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To: Oregon Energy Facility Siting Council

From: Sarah Esterson, Senior Siting Analyst

Date: October 12, 2018

Subject: Agenda Item B (Action Item) - Golden Hills Wind Project - Council Review of Requests for Contested Case on Proposed Order on Request for Amendment 5; and Proposed Order on Request for Amendment 5 for the October 25-26, 2018 EFSC Meeting

Attachments: Attachment 1: Proposed Order on Request for Amendment 5 (red-line version)

Attachment 2: Requests for Contested Case*

*To be provided in Supplemental Staff Report during week of October 15, 2018

Background

The Oregon Energy Facility Siting Council (Council) issued a site certificate for the Golden Hills Wind Project (facility) on June 18, 2009, authorizing construction and operation of a wind energy generation facility with electrical capacity of up to 400 megawatts (MW). The facility has not yet been constructed. The facility site boundary includes approximately 29,500 acres of privately owned land both east and west of Highway 97, between the cities of Wasco and Moro in Sherman County. The Council previously approved amendments to the site certificate in May 2012, January 2015, February 2017 and April 2018.

Golden Hills Wind Farm, LLC (certificate holder) submitted a complete Request for Amendment 5 (amendment request or RFA5) of the Golden Hills Wind Project site certificate on July 6, 2018. The amendment request seeks Council approval for flexibility in its final selection of wind turbine type and meteorological towers, with maximum allowable dimensions not to exceed 650-feet in blade-tip height; 404 feet in wind turbine tower hub height and meteorological tower height; and, not to be below 46 feet in aboveground blade tip clearance. The amendment request also seeks Council approval to change temporary access road and crane path design (increasing road width from 40 to 100 feet for up to 52 miles), and remove a weight limitation, of wind turbine blades and nacelles, from a previously imposed condition.

On July 13, 2018, the Oregon Department of Energy issued the Draft Proposed on Request for Amendment 5, along with a Public Notice of a comment period extending through the close of the record, which occurred at the close of the public hearing on August 23, 2018 during the August 23-24, 2018 Council meeting in Boardman, Oregon. During the comment period, the Department received 9 comments on the record of the public hearing, including oral testimony received at the August 23, 2018 public hearing, from: Oregon Department of State Lands; Oregon State Historic Preservation Office; Oregon Department of Aviation; Oregon Department of Geologic and Mineral Industries; Confederated Tribes of Warm Springs Reservation of Oregon; Confederated Tribes of Umatilla Indian Reservation; Ms. Irene Gilbert, as an individual and on behalf of Friends of the Grande Ronde Valley (FGRV); and, Ms. JoAnn Marlette.

On September 12, 2018, following consideration of the above-referenced comments, the Department issued the Proposed Order on Request for Amendment 5, along with a Public Notice and Notice of an Opportunity to Request a Contested Case Proceeding, noticing those who commented, either orally or in writing, on the record of the public hearing of the opportunity to request a contested case on the proposed order. The deadline for submitting requests for a contested case proceeding on the proposed order is October 12, 2018 at 5:00 p.m. If any requests are received on or before the deadline, a supplemental staff report will be provided to Council during the week of October 15, 2018 that includes requests for contested case, and the Department's analysis of the request(s).

The proposed order was issued in red-line version to demonstrate the changes that occurred between the draft proposed order and proposed order, including substantive changes in response to issues raised in received comments, related to an applicable Council standard and the proposed changes. This memo is intended to assist the Council in its review of the proposed order.

Summary of Proposed Order

Pursuant to OAR 345-027-0071(1), the proposed order addresses each of the Council standards, and comments received on the record of the public hearing, and recommends that the Council find that the facility, with proposed changes, would comply with, or, based on compliance with existing and recommended amended site certificate conditions, would comply with each of the Council standards.

As presented in the proposed order, there were no comments received on the record of the public hearing that resulted in changes in recommended findings or conditions between the draft proposed order to the proposed order for the following standards:

- Organizational Expertise
- Protected Areas
- Scenic Resources
- Historic, Cultural and Archeological Resources
- Recreation
- Waste Minimization
- Noise Control Regulation
- Removal Fill Law
- Water Rights

Based on comments received, the Department incorporated additional reasoning and analysis for the following standards, and in some instances, recommends condition amendments:

- **General Standard of Review (Recommended Amended Condition):** Based on certificate holder's representation in RFA5, recommended substantive condition change to require that wind turbines, with maximum dimensions specified, be equipped with noise reducing technology (i.e. serrated trailing edge blades).
- **Structural (Recommended Amended Condition):** Based on comments from the Oregon Department of Geology and Mineral Industries (DOGAMI), recommended substantive condition changes requiring that the certificate holder, prior to construction, submit a protocol to the Department and DOGAMI to ensure that agency comments are considered prior to completing the site specific geo-technical investigation.
- **Land Use (Recommended Amended Findings and Amended Condition):** Based on comments from Ms. Gilbert/FGRV, recommended existing condition be amended to align with Sherman County Wind Setback Ordinance 39-2007. Based on comments from Ms. Gilbert/FGRV, recommended amended findings for OAR 660-033-0130(37) to more adequately describe sufficiency of existing conditions in minimizing unnecessary soil compaction during facility construction.
- **Retirement and Financial Assurance (Recommended Amended Findings):** Based on comments from Ms. Gilbert/FGRV, recommended amended findings to clarify the tasks and actions considered in the retirement cost estimate.
- **Fish and Wildlife Habitat (Recommended Amended Findings and Condition):** Based on review of the record, recommended administrative change to condition to clarify the map to be referenced when evaluating location of previously approved corridors. Based on comments from Ms. Gilbert/FGRV, recommended

amended findings to clarify the area to be included in the certificate holder's pre-construction habitat survey, and additional mitigation obligation if bird and bat fatality exceeds thresholds of concern during post-construction surveys.

- **Threatened and Endangered Species (Recommended Amended Findings):** Based on comments from Ms. Gilbert/FGRV, recommended amended findings to clarify the area to be included in the certificate holder's pre-construction threatened and endangered species survey.
- **Public Services (Recommended Amended Findings):** Based on comments from Ms. Gilbert/FGRV, recommended amended findings to address concerns related to facility related blasting and vibration to drinking water quality of private water wells.
- **Public Health and Safety for Wind Energy Facilities (Recommended Amended Findings and Condition):** Based on comments from Ms. Gilbert/FGRV, recommended amended findings to address concerns on the sufficiency of previously imposed setback requirements (i.e. wind turbine setback distances to roads and structures), and recommended amended condition, based on certificate holder representation, requiring that the certificate holder conduct blade and tower inspections, based on manufacturer recommended frequency, and provide a causal analysis to the Department in the event of blade failure.

Requests for Contested Case on the Proposed Order

In the event requests for contested case proceeding on the Proposed Order on Request for Amendment 5 of the Golden Hills Wind Project site certificate are received on or before the October 12, 2018 deadline, the Department provides an overview of the Council's scope of review of such requests below.

Council Scope of Review of Request for Contested Case on Amendments

OAR 345-027-0071(9) contains the standard of review for contested case requests for amendments. It states:

To determine that an issue justifies a contested case proceeding, the Council must find that the request raises a significant issue of fact or law that may affect the Council's determination that the facility, with the change proposed by the amendment, meets the applicable laws and standards included in chapter 345 divisions 22, 23 and 24.

Therefore, simply raising a significant issue of law or fact is not sufficient to justify a contested case. That significant issue of law or fact must have some connection to the Council's ability to determine that the facility, which in this case is the Golden Hills Wind Project, as amended, meets an applicable standard.

OAR 345-027-0071(10) gives the Council three options for action on a contested case request:

Option 1: Under OAR 345-027-0071(10)(a), if the Council finds that an issue justifies a contested case under the criteria quoted above, the Council can decide to conduct a contested case proceeding. The contested case proceeding would be limited to the issues that the Council found sufficient to justify the proceeding.

Option 2: Under OAR 345-027-0071(10)(b), if the Council finds that the request identifies one or more properly raised issues that an amendment to the proposed order, including modification to conditions, would settle in a manner satisfactory to the Council, the Council may deny the request as to those issues and direct the Department to amend the proposed order and send a notice of the amended proposed order to the persons described in section (4).

Option 3: Under OAR 345-027-0071(10)(c), if the Council finds that an issue does not justify a contested case under the criteria quoted above, the Council can deny the contested case request. The Council would issue a written order specifying the basis for the decision. The Council would then have the further option to adopt, modify or reject the proposed order on the amendment request.

As noted above, the deadline for submitting requests for a contested case proceeding on the proposed order is October 12, 2018 at 5:00 p.m. If any requests are received on or before the deadline, a supplemental staff report will be provided to Council during the week of October 15, 2018 that includes requests for contested case, and the Department's analysis of the request(s).

Attachment 1: Proposed Order on Request for Amendment 5 (red-line version)

BEFORE THE
ENERGY FACILITY SITING COUNCIL
OF THE STATE OF OREGON

|
In the Matter of Request for Amendment 5 for the
Golden Hills Wind Project Site Certificate

)
) ~~DRAFT~~ PROPOSED ORDER ON
) REQUEST FOR AMENDMENT 5 TO
) THE SITE CERTIFICATE

|
~~July 13, September~~ 2018

TABLE OF CONTENTS

I. INTRODUCTION	1
I.A. NAME AND ADDRESS OF CERTIFICATE HOLDER	2
I.B. DESCRIPTION OF THE APPROVED FACILITY	2
I.C. DESCRIPTION OF APPROVED FACILITY SITE LOCATION	4
I.D. PROCEDURAL HISTORY.....	1
II. AMENDMENT PROCESS	1
II.A. REQUESTED AMENDMENT	1
II.B. AMENDMENT REVIEW PROCESS	6
II.C. COUNCIL REVIEW PROCESS.....	7
II.D. APPLICABLE DIVISION 27 RULE REQUIREMENTS	9
III. REVIEW OF THE REQUESTED AMENDMENT	10
III.A. GENERAL STANDARD OF REVIEW: OAR 345-022-0000	11
III.B. ORGANIZATIONAL EXPERTISE: OAR 345-022-0010.....	14
III.C. STRUCTURAL STANDARD: OAR 345-022-0020	17
III.D. SOIL PROTECTION: OAR 345-022-0022.....	21
III.E. LAND USE: OAR 345-022-0030.....	23
III.F. PROTECTED AREAS: OAR 345-022-0040	32
III.G. RETIREMENT AND FINANCIAL ASSURANCE: OAR 345-022-0050.....	43
III.H. FISH AND WILDLIFE HABITAT: OAR 345-022-0060.....	46
III.I. THREATENED AND ENDANGERED SPECIES: OAR 345-022-0070	53
III.J. SCENIC RESOURCES: OAR 345-022-0080	55
III.K. HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES: OAR 345-022-0090	63
III.L. RECREATION: OAR 345-022-0100.....	66
III.M. PUBLIC SERVICES: OAR 345-022-0110.....	73
III.N. WASTE MINIMIZATION: OAR 345-022-0120.....	81
III.O. DIVISION 23 STANDARDS	82
III.P. DIVISION 24 STANDARDS.....	83
III.P.1. Public Health and Safety Standards for Wind Energy Facilities: OAR 345-024-0010	83
III.P.2. Cumulative Effects Standard for Wind Energy Facilities OAR 345-024-0015.....	90
III.P.3. Siting Standards for Transmission Lines: OAR 345-024-0090.....	94
III.Q. OTHER APPLICABLE REGULATORY REQUIREMENTS UNDER COUNCIL JURISDICTION	95
III.Q.1. Noise Control Regulations: OAR 340-035-0035	96
III.Q.2. Removal-Fill	98
III.Q.3. Water Rights.....	99
IV. PROPOSED CONCLUSIONS AND ORDER.....	100

LIST OF TABLES

Table 1: Sherman County Applicable Substantive Criteria	25
Table 2: Protected Areas within Analysis Area (Oregon) and Distance from Site Boundary	35
Table 3: Summary of Applicable Land Use Plans and Scenic Resources within the Analysis Area	56

LIST OF FIGURES

Figure 1: Facility Location.....	1
Figure 2: Facility Turbine Options (Approved and Proposed).....	3

ATTACHMENTS

- Attachment A: Draft Amended Site Certificate (Red line version)
- Attachment B: Reviewing Agency Comments on preliminary RFA5
- Attachment C: ~~[Reserved for~~Comments on Draft Proposed Order ~~Comments]~~
- Attachment D: Draft Habitat Mitigation and Revegetation Plan
- Attachment E: Raptor Nest Survey Protocol
- Attachment F: Wildlife Monitoring and ~~Adaptive Management~~Mitigation Plan
- Attachment G: Draft Erosion Sediment Control Plan

I. INTRODUCTION

The Oregon Department of Energy (Department or ODOE) issues this ~~draft~~ proposed order, in accordance with Oregon Revised Statute (ORS) 469.405(1) and Oregon Administrative Rule (OAR) 345-027-~~00710065~~, based on its review of Request for Amendment 5 (amendment request or RFA5) to the Golden Hills Wind Project site certificate, as well as comments and recommendations received by specific state agencies, ~~and~~ local and Tribal governments, and members of the public during the draft proposed order comment period and comments received from the Energy Facility Siting Council (Council or EFSC) following its review of the draft proposed order at the August 24, 2018 Council meeting during review of the preliminary amendment request. The certificate holder is Golden Hills Wind Farm, LLC, (Golden Hills or certificate holder) which is wholly owned by Pacific Wind Development, LLC, a subsidiary of Avangrid Renewables, LLC.

The certificate holder requests that ~~the Energy Facility Siting Council (EFSC or Council)~~ approve changes to the site certificate to:

- Amend wind turbine dimension specifications to allow flexibility in final wind turbine selection that would:
 - Increase maximum turbine blade tip height from 158 to 198 meters (518 to 650 feet);
 - Increase maximum turbine hub height from 95 to 123 meters (312 to 404 feet);
 - Reduce minimum aboveground blade tip clearance from 19.8 to 14 meters (65 to 46 feet);
- Amend the meteorological tower dimension specification from 95 to 123 meters (312 to 404 feet);
- Change the design of up to 41 miles of temporary access roads and up to 11 miles of temporary crane paths, increasing road width from 40 to 100 feet;
- Amend Condition PRE-DC-01 (III.A.1) to allow turbines with a higher-taller hub height, taller maximum blade tip height, and shorter minimum blade tip clearance; and, remove a restriction on maximum combined weight of metals.¹

¹ In the 2018 Final Order on Amendment 4, the Council approved and issued an amended site certificate which included reformatting and a new condition numbering system that corresponds the conditions with the specific phase (e.g. construction [CON], operation [OPR], etc) and Council standard. The conditions, if previously imposed, had been numbered based on section number within the Final Order on the ASC. In this order, when referencing existing conditions, the Department provides the current condition number and the original condition in number in parenthesis for reference.

Based upon review of this amendment request, in conjunction with comments and recommendations received by state agencies and local governments, the Department recommends that the Council approve and grant a fifth amended site certificate for the Golden Hills Wind Facility, subject to the existing and recommended amended conditions set forth in this ~~draft~~ proposed order.

I.A. Name and Address of Certificate Holder

Golden Hills Wind Farm, LLC
1125 NW Couch Street, Suite 700
Portland, OR 97209

Parent Company of the Certificate Holder

Pacific Wind Development, LLC
a wholly-owned subsidiary of Avangrid Renewables, LLC
The U.S. division of Iberdrola, S.A.
1125 NW Couch Street, Suite 700
Portland, OR 97209

Certificate Holder Contact

Brian Walsh, Senior Developer
Avangrid Renewables, LLC
1125 NW Couch Street, Suite 700
Portland, OR 97209

I.B. Description of the Approved Facility

The Golden Hills Wind Project (facility) is an approved but not yet constructed wind energy generation facility to be located in Sherman County, with a peak generating capacity of up to 400 megawatts (MW) of electricity and an average electric generating capacity of about 133 MW. The facility would consist of up to 125 wind turbines as well as related or supporting facilities including: meteorological towers, a power collection system, a substation, operations and maintenance facility, two 230-kilovolt (kV) transmission line segments, supervisory control and data acquisition (SCADA) system, access roads, and temporary laydown areas (see Figure 1, [Facility Location](#) below).

The facility, as approved, would include up to six unguyed tubular meteorological tower structures, about 95 meters (312 feet) tall, and set in concrete foundations. The power collection system would include approximately 55 miles of aboveground 34.5 kV collector lines to transport the power from the wind turbines to the substation. The substation would include transformers, switching equipment and a parking area and would be located in a graveled and fenced area about 5 acres in size. A 5,000-square-foot operations and maintenance (O&M)

1 building would be located adjacent to the facility's centrally located substation.² The O&M
2 building would house office and workshop areas, a control room for the SCADA system, and a
3 kitchen, bathroom and shower. A fiber optic communications network would link the wind
4 turbines to a central computer at the O&M ~~facility~~building. The SCADA system would collect
5 operating and performance data from each wind turbine and ~~Golden Hills~~the facility as a whole
6 and provide for remote operation of the wind turbines.

7
8 The 230 kV transmission line would extend approximately 5 miles and would interconnect the
9 substation to the existing Hay Canyon 230 kV transmission line. From there, electricity would be
10 transmitted using the existing Hay Canyon 230 kV line-transmission structures, to the
11 northernmost transmission pole structure near the existing Klondike Substation where an
12 approximately 700 foot segment of 230 kV transmission line would be constructed along with
13 associated structures and equipment necessary to interconnect the facility to Bonneville Power
14 Administration's (BPA's) transmission structure located approximately 300 feet north of the
15 Klondike Substation.

16
17 The facility, as approved, would include approximately 41 miles of new and temporary roads to
18 provide access to the turbine strings and other facility components.³ Access roads would
19 connect to graveled turbine pad areas at the base of each wind turbine. Temporary access
20 roads are approved to be 40 feet wide and permanent access roads would be 20 feet wide and
21 constructed with crushed gravel. In addition, the certificate holder would improve and widen

² The fourth amended site certificate, issued on April 27, 2018, included a description of the O&M facility as follows, "A 5,000-square foot operations and maintenance ("O&M") building would be constructed at one of the other of two locations proposed by GHWF." While not requested by the certificate in RFA5, the Department acknowledges that the Council's approval in 2017 of the third amended site certificate included a change in the related and supporting facilities description that removed one of two previously considered substations, and changed the previously considered locations to one centralized location within the site boundary. The Department further acknowledges that the certificate holder represented in its ASC that the substations and O&M buildings would be co-located, or adjacent. Therefore, to align the description of the O&M buildings with previously approved amendments and align with the facility layout, as represented in RFA5 Figure 1, the Department recommends that Council update the description of the O&M facility location as follows, "A 5,000-square foot operations and maintenance ("O&M") building would be constructed adjacent to the substation ~~at one of the other of two locations proposed by GHWF,~~" as presented in Attachment 1 of this order.

³ The existing site certificate does not describe temporary access roads or crane paths; however, the certificate holder made representations in its ASC and subsequent amendments of disturbance from temporary access roads and crane paths. Therefore, the Department recommends Council consider the previous representations, including 41 miles of temporary access road and 11 miles of temporary crane paths to have been previously considered, and approved, as part of the facility and associated impacts.

1 some existing county and farm roads. The facility, as approved, would include up to seven
2 principal, temporary laydown areas to stage construction and store supplies and equipment
3 during construction. In addition, temporary laydown areas would be required at the base of
4 each wind turbine. The laydown areas would be covered with gravel, and the gravel would be
5 removed and the areas would be restored to their preconstruction conditions following
6 completion of construction.

7 8 **I.C. Description of Approved Facility Site Location**

9 10 *Site Boundary*

11
12 The approved facility site boundary includes approximately 29,500 acres of private land,
13 between the cities of Wasco and Moro in Sherman County, Oregon, as presented in Figure 1,
14 *Facility Location*.⁴ The facility has not yet been constructed.

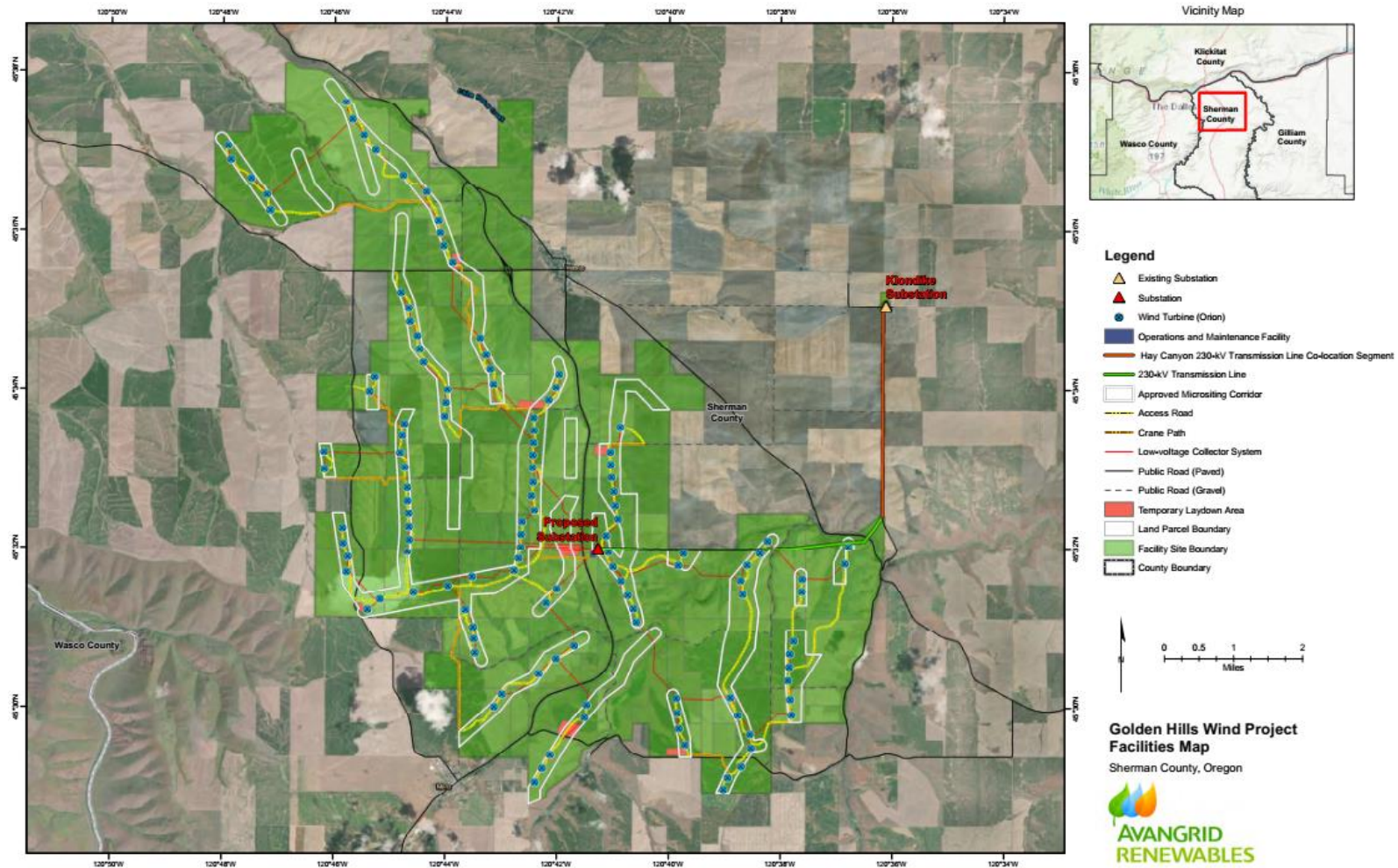
15 16 *Micrositing Corridor*

17
18 For this facility, the site boundary includes previously approved “micrositing corridors” to allow
19 some flexibility in specific component locations and design in response to site-specific
20 conditions and engineering requirements to be determined prior to construction. The Council
21 permits final siting flexibility within a micrositing corridor when the certificate holder
22 demonstrates that requirements of all applicable standards have been satisfied by adequately
23 evaluating the entire corridor and location of facility components anywhere within the corridor.

24
25 The micrositing corridor includes approximately 900-feet in diameter around turbines, and
26 wider in some locations, and 200-feet in width for the 5-mile and 700-foot segments of 230 kV
27 transmission line. The amendment request does not include changes to the previously-
28 approved micrositing corridors.

29
30
⁴ On the record of the draft proposed order, the certificate holder notified the Department that Figure 1 of the draft proposed order did not accurately represent the previously approved Hay Canyon 230 kV transmission line co-location segment and site boundary area around the Klondike Substation. Based on this comment, the Department updates Figure 1 from the draft proposed order to proposed order.

1 **Figure 1: Facility Location**



2

I.D. Procedural History

The Council issued the *Final Order on the Application for Site Certificate* (ASC) for the Golden Hills Wind Project on May 15, 2009 (Final Order on ASC). The site certificate became effective upon execution on June 18, 2009. In December 2011 the certificate holder submitted RFA1 to the site certificate, requesting to extend the construction beginning and completion deadlines by two years. The Council issued the final order and the first amended site certificate in May 2012, approving the amendment request. That amended site certificate extended the beginning construction date to June 18, 2014 and the construction completion date to June 18, 2016.

In June 2014, Golden Hills submitted RFA2 to the site certificate, again requesting an extension of the construction deadlines and also requesting a transfer of certificate holder ownership ~~from BP Wind Energy North America Inc. of the parent company~~ to Orion Renewable Energy Group, LLC ~~from the previous parent company owner~~. Council issued a final order and the second amended site certificate in January 2015.

On December 17, 2015 Golden Hills submitted RFA3, ~~which requested~~requesting an extension ~~to of~~ the construction commencement and completion deadlines, and changes to the facility ~~design layout~~. Specifically, the certificate holder requested to: eliminate one of its two approved substations, remove an 11 mile 500 kilovolt (kV) transmission interconnection line, relocate the remaining substation to a more centrally located area and expand its footprint from 2 ~~acres~~ to 5 acres, modify the grid interconnection 230 kV transmission line, increase meteorological tower height, and expand the width of temporary access roads. These changes were expected to remove approximately 2,800 ~~previously reviewed~~ acres from the site boundary, and ~~to add 122.5 acres~~ within amended site boundary area not previously reviewed by Council. In February 2017, Council issued a final order and the third amended site certificate.

On October 19, 2017 Golden Hills submitted RFA4, ~~which requested~~requesting an extension to the construction commencement deadlines, and a transfer of ownership of the certificate holder from Orion Renewable Energy Group, LLC to Pacific Wind Development, LLC, a subsidiary of Avangrid Renewables. ~~At its April 27, 2018, Council issued a final order and fourth amended site certificate approving the site certificate transfer and construction commencement deadline extension.~~

II. AMENDMENT PROCESS

II.A. Requested Amendment

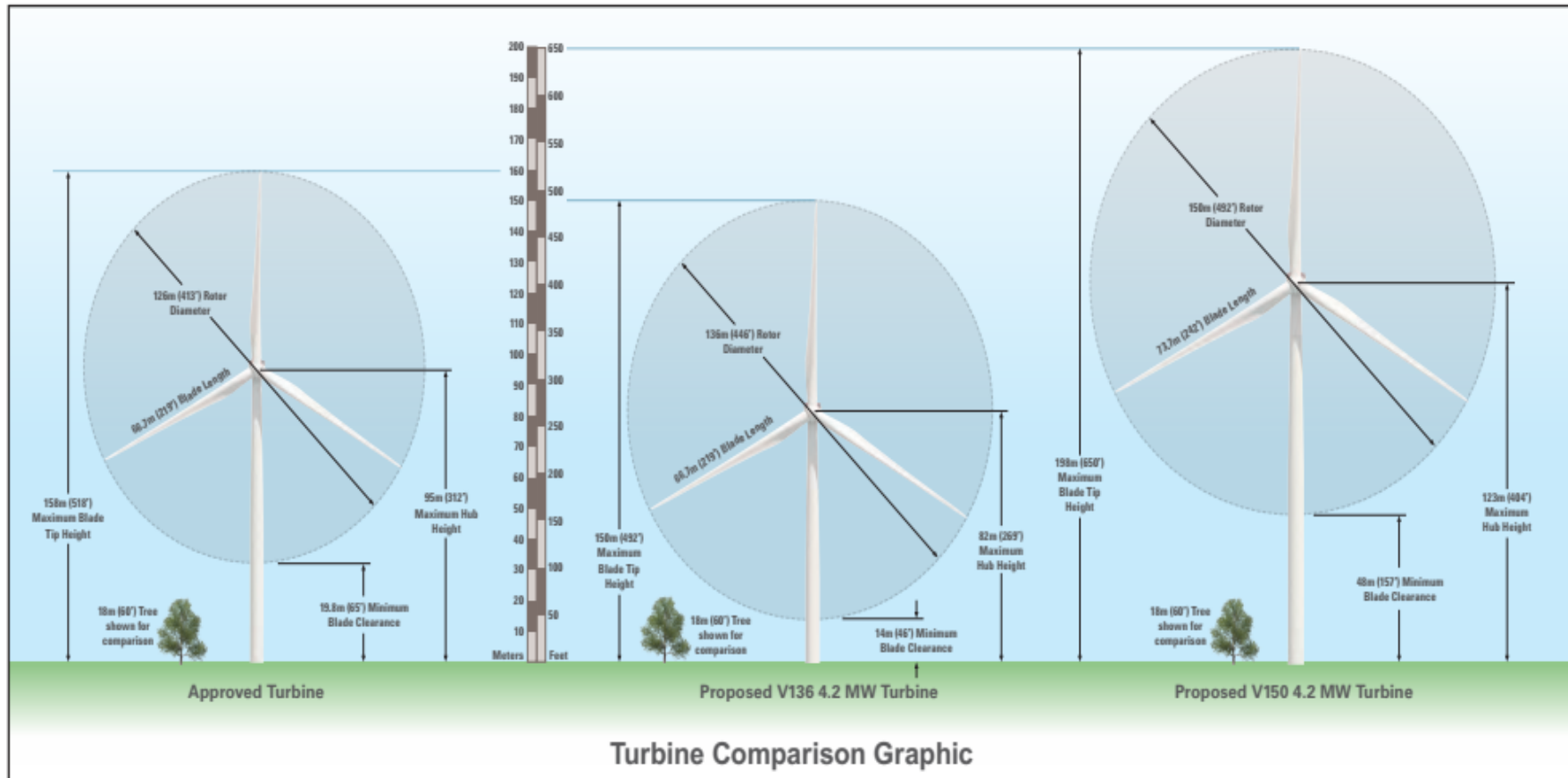
Proposed Larger Turbines

The certificate holder requests Council approval to amend its site certificate to construct and operate a range of wind turbine types with differing dimensions, including the wind turbine

1 dimension ranges previously approved by Council.⁵—In RFA5, the certificate holder presents two
2 different~~ly~~ sized~~d~~ wind turbines that are representative of a range of turbine dimensions
3 requested for Council approval, as presented in Figure 2, *Facility Turbine Options (Approved and*
4 *Proposed)* below. The maximum dimensions within the specification range include a taller
5 maximum blade tip height from 158 to 198 meters (518 to 650 feet); taller hub height from 95
6 to 123 meters (312 to 404 feet); and, lower minimum aboveground blade tip clearance from
7 19.8 to 14 meters (65 to 46 feet). Wind turbine blades would be manufactured with serrated
8 trailing edges (STE), a technology designed for noise reduction.
9

⁵ GHAMD5Doc15 Complete Request for Amendment 5 2018-07-06. ~~In response to the Department's request for information, the~~The certificate holder describes that it ~~conservatively evaluated a worst case scenario modeled "worst case scenario" for~~ potential impacts by assuming it would construct and operate 125 of the larger (4.2 MW) wind turbines, but that there is "no reasonable case" whereby it would construct 125 4.2 MW turbines because the nameplate capacity would violate its interconnection agreement.

1 **Figure 2: Facility Turbine Options (Approved and Proposed)**



2

3

4

Proposed Changes in Facility Design

In RFA5, the certificate holder presents changes in facility design that would result from the construction and operation of the proposed larger turbines.⁶ Changes include taller meteorological towers and changes in design of temporary access roads and crane paths to be used during construction, which are described in more detail below.

Meteorological Towers

The proposed larger turbines, if selected, would necessitate taller meteorological towers, increasing the height from 312 to 404 feet.

Temporary Access Roads and Crane Paths

The proposed larger turbines, if selected, would necessitate increasing the width from 40 to 100 feet of up to 41 miles of temporary access roads and up to 11 miles of temporary crane paths, to allow delivery of larger turbine components.

Proposed Changes in Facility Operation

The proposed change in turbine type, if selected, could require use of larger cranes during repairs associated with operation and maintenance (O&M) activities. The certificate holder explains that if a crane is needed for repairs, the crane would be assembled near the base of the wind turbine or in limited circumstances, would be walked down access roads to work on multiple wind turbines. Any disturbance areas would be restored to its pre-disturbance condition.

Amended Conditions

OAR 345-027-0060(1)(d) requires that the certificate holder provide the specific language of the site certificate, including affected conditions, that the certificate holder proposes to change, add, or delete by an amendment. The certificate holder ~~requested requests~~ to amend Condition PRE-DC-01 (III.A.1) to account for the proposed changes in turbine dimensions and, delete sub(e) to remove a restriction to maximum combined weight of ~~wind turbine metals~~ (tower and nacelle). The Department presents its evaluation of the proposed condition amendment in Section III.A. *General Standard of Review*. Additionally, as presented in Section III, *Review of Requested Amendment*, the Department recommends condition amendments ~~for Council~~

⁶ GHAMD5Doc15 Complete Request for Amendment 5, Table 2, 2018-07-06.

- 1 ~~review~~ determined necessary to maintain compliance with Council standards, for Council
- 2 review.

II.B. Amendment Review Process

Council rules describe the processes for transfers, Type A, Type B, and Type C reviews of a request for amendment at OAR 345-027-0051.⁷ The Type A review is the standard or “default” site certificate amendment process for changes that require an amendment. Type C review ~~process~~ is associated with construction-related changes. The key procedural difference between the Type A and Type B review is that the Type A review includes a public hearing on the draft proposed order and an opportunity for a contested case proceeding. The primary timing differences between Type A and Type B review are in the maximum allowed timelines for the Department’s determination of completeness of the preliminary request for amendment, as well as the issuance of the draft proposed order, and proposed order. It is important to note that Council rules authorize the Department to adjust the timelines for these specific procedural requirements, if necessary.

A certificate holder may submit an amendment determination request to the Department for a written determination of whether a request for amendment justifies review under ~~the~~ Type B review ~~process~~. The certificate holder has the burden of justifying the appropriateness of ~~the~~ Type B review ~~process~~ as described in OAR 345-027-0051(3). The Department may consider, but is not limited to, the factors identified in OAR 345-027-0057(8) when determining whether to process an amendment request under Type B review.

On May 4, 2018, the certificate holder submitted a Type B Review amendment determination request (Type B Review ADR), requesting the Department’s review and determination of whether, based on evaluation of the OAR 345-027-0057(8) factors, the amendment request could be reviewed under ~~the~~ Type B review ~~process~~. On June 1, 2018, the Department determined that Type A review was appropriate ~~based on~~ because the proposed modifications are considered complex; there is an anticipated level of interest from members of the public and reviewing agencies in the proposed modifications; and the likelihood of potential significant adverse impacts from the proposed modifications is uncertain. On June 7, 2018, the certificate holder requested to refer the Department’s June 1, 2018 Type A review determination to Council. At its June 29, 2018 meeting, the Council concurred with the Department’s Type A review determination. Therefore, this draft proposed order presents the procedural history for the Type A review process.

⁷ On October 24, 2017, changes in the rules and procedures for site certificate amendment became effective. The four previous site certificate amendments were processed under the old Council rules regarding amendment processing; those rules were replaced with the changes effective October 2017.

1 The Department received preliminary RFA5 (pRFA5) on May 4, 2018. The Department initiated
2 consultation with select reviewing agencies and posted an announcement on its project
3 website notifying the public that pRFA5 had been received.

4
5 Pursuant to OAR 345-027-0063(2), on May 17, 2018, the Department determined pRFA5 to be
6 incomplete and issued requests for additional information.⁸ The certificate holder provided
7 responses to the information request on June 4, 2018 and July 2, 2018.

8
9 After reviewing the responses to its information request, the Department determined the RFA
10 to be complete on July 6, 2018. Under OAR 345-027-0063(5), an RFA is complete when the
11 Department finds that a certificate holder has submitted information adequate for the Council
12 to make findings or impose conditions for all applicable laws and Council standards. On July 6,
13 2018, the Department posted an announcement on its project website notifying the public that
14 the complete RFA had been received.

15
16 Reviewing Agency Comments on ~~Preliminary~~ Request for Amendment 5

17
18 As presented in Attachment B of the ~~draft~~ proposed order, the Department received comments
19 on pRFA5 from the following reviewing agencies and Special Advisory Group:

- 20
21
 - Oregon Department of Aviation
 - Oregon Department of Environmental Quality
 - Oregon Department of Fish and Wildlife
 - Sherman County Board of Commissioners (Special Advisory Group)⁹

22
23
24
25
26 **II.C. Council Review Process**

27
28 On July 13, 2018, the Department issued the draft proposed order, and a notice of public
29 hearing and comment period on RFA5 and the draft proposed order (notice). The notice was
30 distributed to all persons on the Council's general mailing list, to the special mailing list
31 established for the facility, to an updated list of property owners supplied by the certificate
32 holder, and to a list of reviewing agencies as defined in OAR 345-001-0010(52).

33
34 On August 23, 2018, Council Chair Beyeler conducted a public hearing on the draft proposed
35 order in Boardman, Oregon.¹⁰ The record of the public hearing closed on August 23, 2018 at the

⁸ GHAMD5Doc8 Incomplete Determination Letter and RAIs 2018-05-17.

⁹ The Council appointed Sherman County Board of Commissioners as the Special Advisory Group for the Golden Hills Wind Facility on August 17, 2007, during the ASC phase.

¹⁰ Chair Beyeler and Council members Jenkins, Grail, Gravatt, Gravatt, Billings and Roppe attended the hearing in person.

1 conclusion of the public hearing, as provided in the public notice of the draft proposed order.
2 The Council reviewed the draft proposed order and comments received on the record of the
3 public hearing at its regularly scheduled Council meeting on August 24, 2018.
4

5 The Department received 9 comments on the record of the public hearing, including oral
6 testimony received at the August 23, 2018 public hearing, from: Oregon Department of State
7 Lands; Oregon State Historic Preservation Office; Oregon Department of Aviation; Oregon
8 Department of Geologic and Mineral Industries; Confederated Tribes of Warm Springs
9 Reservation of Oregon; Confederated Tribes of Umatilla Indian Reservation; Ms. Irene Gilbert,
10 as an individual and on behalf of Friends of the Grande Ronde Valley; and, Ms. JoAnn
11 Marlette.¹¹ Attachment C of this proposed order includes an index and copies of the comments
12 submitted on the record. Issues raised that are within the Council's jurisdiction and related to
13 the proposed amendment are addressed under the applicable standards section below.
14

15 ~~The Department is issuing this draft proposed order for public comment on July 13, 2018; the~~
16 ~~comment period extends through the close of the public hearing scheduled to occur on August~~
17 ~~23, 2018 at 5:30 p.m. at Boardman City Hall in Boardman, Oregon. In addition to accepting~~
18 ~~written comments during the comment period, the Council will also accept oral testimony at~~
19 ~~the public hearing.¹² The record of the draft proposed order will close at the conclusion of the~~
20 ~~public hearing on August 23, 2018, as described in the public notice.~~
21

22 ~~Notice of public hearing was issued on July 13, 2018 and distributed to all persons on the~~
23 ~~Council's general mailing list, to the special mailing list established for the facility, and to a list~~
24 ~~of reviewing agencies as defined in OAR 345-001-0010(52).~~
25

26 ~~Following the close of the record of the public hearing and Council's review of the draft~~
27 ~~proposed order, t~~The Department will issue a~~prepared this~~ proposed order, taking into
28 consideration Council comments, ~~any~~and comments received "on the record of the public
29 hearing" (i.e., oral testimony provided at the public hearing and written comments received by
30 the Department after the date of the notice of the public hearing and before the close of the
31 public hearing), including ~~any~~ comments from reviewing agencies, special advisory groups, or
32 Tribal Governments. Concurrent with the issuance of thise proposed order, the Department ~~will~~
33 issued a ~~N~~otice of Opportunity to Request a ~~C~~ontested Cease and a ~~public~~ Notice of the

¹¹ Oregon State Historic Preservation Office submitted two comment letters, on July 19 and July 26, 2018, covering above-ground historic resources and archeological resources.

¹² ~~OAR 345-027-0067(6).~~

1 ~~P~~proposed ~~order~~Order.¹³ Only those persons who ~~commented~~commented in person or in
2 writing on the record of the public hearing may request a contested case proceeding, unless the
3 Department did not follow the follow the requirements of OAR 345-027-0067, or unless the
4 action recommended in the proposed order differs materially from the draft proposed order,
5 including any recommended conditions of approval, in which case the person may raise only
6 new issues within the jurisdiction of the Council that are related to such differences.

7 Additionally, to raise an issue in a contested case proceeding, the issue must be within Council
8 jurisdiction, and the person must have raised the issue on the record of the public hearing with
9 “sufficient specificity to afford the Council, the Department, and the certificate holder an
10 adequate opportunity to respond to the issue.”¹⁴ If the Council finds that a request for
11 contested case identifies one or more properly raised issues that justify a contested case
12 proceeding, the Council shall conduct a contested case proceeding on the proposed order.
13

14 Following a contested case proceeding, if requested and granted; or if no contested case is
15 requested or if requested but not granted, the Council shall adopt, modify or reject the
16 proposed order and will issue a final order approving or denying the site certificate amendment
17 request based upon ~~In making a decision to grant or deny issuance of an amended site~~
18 ~~certificate, the Council shall apply~~ the applicable laws and Council standards required under
19 OAR 345-027-0075(2) and in effect on the dates described in OAR 345-027-0075(3). The
20 Council’s final order is subject to judicial review by the Oregon Supreme Court. Only a party to
21 the contested case proceeding may request judicial review and the issues on appeal are limited
22 to those raised by the parties to the contested case proceeding. A petition for judicial review
23 must be filed with the Supreme Court within 60 days after the date of service of the Council’s
24 final order or within 30 days after the date of a petition for rehearing is denied or deemed
25 denied.¹⁵
26

27 **II.D. Applicable Division 27 Rule Requirements**

28

29 A site certificate amendment is necessary under OAR 345-027-0050(4) because the certificate
30 holder requests to design, construct, and operate the facility in a manner different from the
31 description in the site certificate, and the proposed changes: (1) could result in a significant
32 adverse impact to a resource or interest protected by a Council standard that the Council has
33 not addressed in an earlier order; (2) could impair the certificate holder’s ability to comply with

¹³ See OAR 345-027-0071.

¹⁴ OAR 345-027-0071(7).

¹⁵ ORS 469.403 and OAR 345-027-0071(12).

1 a site certificate condition; or (3) could require new conditions or modification to existing
2 conditions in the site certificate, or could meet more than one of these criteria.¹⁶
3 The Type A amendment review process (consisting of OARs 345-027-0059, -0060, -0063, -0065,
4 -0067, -0071 and -0075) is the default amendment review process and shall apply to the
5 Council's review of a request for amendment proposing a change described in OAR 345-027-
6 0050(2), (3), and (4).¹⁷ The Council is reviewing Golden Hill's amendment request under the
7 Type A review process because the RFA includes the changes described in OAR 345-027-
8 0050(4), as explained in the preceding paragraph.

10 III. REVIEW OF THE REQUESTED AMENDMENT

12 Under ORS 469.310, the Council is charged with ensuring that the "siting, construction and
13 operation of energy facilities shall be accomplished in a manner consistent with protection of
14 the public health and safety." ORS 469.401(2) further provides that the Council must include in
15 the amended site certificate "conditions for the protection of the public health and safety, for
16 the time for completion of construction, and to ensure compliance with the standards, statutes
17 and rules described in ORS 469.501 and ORS 469.503."¹⁸ The Council implements this statutory
18 framework by adopting findings of fact, conclusions of law, and conditions of approval
19 concerning the ~~amended ability of the~~ facility, with proposed changes, 's to maintain
20 compliance with the Council's Standards for Siting Facilities at OAR 345, Divisions 22, 24, and
21 26, and 27.

22 ~~This draft proposed order includes the Department's initial analysis of whether the proposed~~
23 ~~amendments meet each applicable Council Standard (with mitigation and subject to compliance~~
24 ~~with recommended conditions, as applicable), based on the information in the record.~~
25 ~~Following the written and oral comment period on the draft proposed order, the Department~~

¹⁶ GHAMD5Doc25. DPO Public Comment Gilbert. Introductory Comments. 2018-08-23. On the record of the draft proposed order public hearing, Ms. Gilbert argues that RFA5 be processed as a new application for site certificate, not an amendment request, because the facility has changed (making reference to changes in wind turbine size and weight, and road width) since its original approval 10 years ago and that the information relied upon in RFA5, when referencing previous Council orders, no longer applies. The Department did not make changes to findings or conditions from the draft proposed order to proposed order in response to this comment for the following reasons. The originally approved facility, and facility as presented in RFA5, includes a wind energy generation facility within an approximately 29,500 acre site boundary in Sherman County. Council's approval of subsequent site certificate amendments include differing wind turbine sizes, and changes to facility component locations within the previously approved site boundary; but the facility type, major facility components and general site boundary size and location have not changed since Council's initial approval of the site certificate. Further, certificate holders are allowed, under to OAR 345-027-0060(4), to incorporate and rely upon information already on the record of the facility and evidence previously submitted within amendment requests, as appropriate.

¹⁷ OAR 345-027-0051(2).

¹⁸ ORS 469.401(2).

~~will issue its proposed order, which will include the Department's consideration of the comments and any additional evidence received on the record of the draft proposed order.~~

III.A. General Standard of Review: OAR 345-022-0000

(1) To issue a site certificate for a proposed facility or to amend a site certificate, the Council shall determine that the preponderance of evidence on the record supports the following conclusions:

(a) The facility complies with the requirements of the Oregon Energy Facility Siting statutes, ORS 469.300 to ORS 469.570 and 469.590 to 469.619, and the standards adopted by the Council pursuant to ORS 469.501 or the overall public benefits of the facility outweigh the damage to the resources protected by the standards the facility does not meet as described in section (2);

(b) Except as provided in OAR 345-022-0030 for land use compliance and except for those statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the Council, the facility complies with all other Oregon statutes and administrative rules identified in the project order, as amended, as applicable to the issuance of a site certificate for the proposed facility. If the Council finds that applicable Oregon statutes and rules, other than those involving federally delegated programs, would impose conflicting requirements, the Council shall resolve the conflict consistent with the public interest. In resolving the conflict, the Council cannot waive any applicable state statute.

** * **

(4) In making determinations regarding compliance with statutes, rules and ordinances normally administered by other agencies or compliance with requirement of the Council statutes if other agencies have special expertise, the Department of Energy shall consult such other agencies during the notice of intent, site certificate application and site certificate amendment processes. Nothing in these rules is intended to interfere with the state's implementation of programs delegated to it by the federal government.

Findings of Fact

OAR 345-022-0000 provides the Council's General Standard of Review and requires the Council to find that a preponderance of evidence on the record supports the conclusion that the proposed amendments comply with the requirements of EFSC statutes and the siting standards adopted by the Council and that the proposed amendments comply with all other Oregon statutes and administrative rules applicable to the issuance of an amended site certificate ~~for the amended facility.~~

The requirements of OAR 345-022-0000 are discussed in the sections that follow. The Department consulted with other state agencies and Sherman County Board of Commissioners

1 during review of pRFA5 to aid in the evaluation of whether the facility, with proposed changes,
2 would maintain compliance with statutes, rules and ordinances otherwise administered by
3 other agencies. Additionally, in many circumstances the Department relies upon these
4 reviewing agencies' special expertise in evaluating compliance with the requirements of Council
5 standards.

6
7 OAR 345-022-0000(2) and (3) apply to RFAs where a certificate holder has shown that the
8 proposed amendments cannot meet Council standards or has shown that there is no
9 reasonable way to meet the Council standards through mitigation or avoidance of the damage
10 to protected resources; and, for those instances, establish criteria for the Council to evaluate in
11 making a balancing determination. In RFA5, the certificate holder has not represented that the
12 proposed amendments cannot meet an applicable Council standard. Therefore, OAR 345-022-
13 0000(2) and (3) would not apply to this review.

14
15 *Proposed and Recommended General Condition Amendments*

16
17 In RFA5, the certificate holder requests to amend Condition PRE-DC-01 (III.A.1) sub(c) and (d)
18 based on proposed changes in maximum allowable turbine blade tip height, hub height and
19 minimum aboveground blade tip clearance. The certificate holder also requests to amend
20 Condition PRE-DC-01 (III.A.1) to remove sub(e) and its limitation of 336 tons of combined
21 weight of metal per turbine (tower and nacelle). The certificate holder explains that the Council
22 imposed the per turbine metal weight restriction based on anticipated landfill capacity at the
23 time of facility retirement. Based on this assertion, the certificate holder states that because
24 the closest landfill to the facility, Columbia Ridge Recycling and Landfill Center, has 329 million
25 tons of remaining available capacity and is not projected to reach capacity for 143 years, the
26 combined metal weight restriction per turbine is no longer justified. The certificate holder also
27 explains that all facility components could be salvaged, resulting in a significant reduction in
28 materials sent to the landfill.¹⁹

29
30 Based on review of the record for the facility, the Department is unable to substantiate the
31 certificate holder's evaluation of the Council's basis for imposing the condition and concludes
32 that the combined weight restriction (324 tons in Final Order on ASC, then 336 tons in Final
33 Order on RFA3) was based on the certificate holder's representation during the ASC phase of
34 the maximum combined weight of metals in the nacelle and tower, per turbine, and was used
35 in its retirement cost estimate under the Council's Retirement and Financial Assurance
36 standard.²⁰ In the draft proposed order, tThe Department recommendeds that Council amend
37 Condition PRE-DC-01 (III.A.1) as requested by the certificate holder; however, the evaluation of

¹⁹ GHAMD5Doc15 Complete Request for Amendment 5, p. 7, 2018-07-06.

²⁰ GH1APPD082-15 Exhibit W ASC Supplement, 2008-05.

the removal of sub(e) is presented in Section III.G *Retirement and Financial Assurance* of this order. In the proposed order, the Department further amends Condition PRE-DC-01 (III.A.1), consistent with the certificate holder's representation, to require that the proposed larger wind turbines, if selected, are equipped with serrated trailing edge blades, a noise reducing technology. Recommended amended Condition PRE-DC-01 is presented in underline/strikethrough below. Recommended edits to this condition from the draft proposed order to the proposed order are presented in hi-lite, underline/strikeout; recommended edits included in the draft proposed order are presented in underline/strikeout, only:

Amended Condition PRE-DC-01: The certificate holder shall construct a facility substantially as described in the site certificate and may select up to 125 turbines, subject to the following restrictions and compliance with other site certificate conditions. Before beginning construction, the certificate holder shall provide to the Department a description of the turbine types selected for the facility demonstrating compliance with this condition.

- a) The total number of turbines at the facility must not exceed 125 turbines.
- b) The combined peak generating capacity of the facility must not exceed 400 megawatts.
- c) The turbine hub height must not exceed 123 ~~95~~ meters and the maximum blade tip height must not exceed 198 ~~158~~ meters.
- d) The minimum blade tip clearance must be 14 ~~19.8~~ meters above ground.
- e) Wind turbine types with the maximum dimension specifications listed in this condition shall be equipped with serrated trailing edge blades.
- f) ~~The maximum combined weight of metals in the tower (including ladders and platforms) and nacelle must not exceed 336 U.S. tons per turbine.~~

[Final Order on ASC, Condition III.A.1; Final Order on AMD3; Final Order on AMD 5]

OAR 345-025-0020 lists certain conditions that the Council must adopt in every site certificate. Due to rule changes in OAR 345 Division 25 since the Council's 2009 *Final Order on the ASC*, in the draft proposed order the Department recommends eds the Council impose the following mandatory condition in the site certificate to align with current OAR 345 Division 25 requirements:

Condition GEN-MC-18 [OAR 345-025-0006(6)]: If the certificate holder becomes aware of a significant environmental change or impact attributable to the facility, the certificate holder shall, as soon as possible, submit a written report to the Department describing the impact on the facility and any affected site certificate conditions.

[Final Order on AMD5.]

Conclusions of Law

Based on the foregoing findings of fact and conclusions of law, and subject to compliance with the existing and recommended amended conditions, the Department recommends that the

Council find that the facility, with proposed changes, would satisfy the requirements of OAR 345-022-0000.

III.B. Organizational Expertise: OAR 345-022-0010

(1) To issue a site certificate, the Council must find that the applicant has the organizational expertise to construct, operate and retire the proposed facility in compliance with Council standards and conditions of the site certificate. To conclude that the applicant has this expertise, the Council must find that the applicant has demonstrated the ability to design, construct and operate the proposed facility in compliance with site certificate conditions and in a manner that protects public health and safety and has demonstrated the ability to restore the site to a useful, non-hazardous condition. The Council may consider the applicant's experience, the applicant's access to technical expertise and the applicant's past performance in constructing, operating and retiring other facilities, including, but not limited to, the number and severity of regulatory citations issued to the applicant.

(2) The Council may base its findings under section (1) on a rebuttable presumption that an applicant has organizational, managerial and technical expertise, if the applicant has an ISO 9000 or ISO 14000 certified program and proposes to design, construct and operate the facility according to that program.

(3) If the applicant does not itself obtain a state or local government permit or approval for which the Council would ordinarily determine compliance but instead relies on a permit or approval issued to a third party, the Council, to issue a site certificate, must find that the third party has, or has a reasonable likelihood of obtaining, the necessary permit or approval, and that the applicant has, or has a reasonable likelihood of entering into, a contractual or other arrangement with the third party for access to the resource or service secured by that permit or approval.

(4) If the applicant relies on a permit or approval issued to a third party and the third party does not have the necessary permit or approval at the time the Council issues the site certificate, the Council may issue the site certificate subject to the condition that the applicant shall not commence construction or operation as appropriate until the third party has obtained the necessary permit or approval and the applicant has a contract or other arrangement for access to the resource or service secured by that permit or approval.

Findings of Fact

Subsections (1) and (2) of the Council's Organizational Expertise standard require that the applicant (certificate holder) demonstrate its ability to design, construct operate and retire the facility, with proposed changes, in compliance with Council standards and all site certificate conditions, and in a manner that protects public health and safety, as well as its ability to restore the site to a useful, non-hazardous condition. The Council may consider the certificate holder's experience and past performance in constructing, operating and retiring other facilities in determining compliance with the Council's Organizational Expertise standard. Subsections (3) and (4) address third party permits.

Compliance with Council Standards and Site Certificate Conditions

The Council may consider a certificate holder's past performance, including but not limited to the quantity or severity of any regulatory citations in the construction or operation of a facility, type of equipment, or process similar to the facility, in evaluating whether a proposed change may impact the certificate holder's ability to design, construct and operate a facility, with proposed changes, in compliance with Council standards and site certificate conditions.²¹

Golden Hills Wind Farm, LLC, is a project-specific LLC and therefore relies upon the organizational expertise and experience of Avangrid, the parent company of Pacific Wind and Golden Hills Wind Farm, LLC.²² In RFA5, the certificate holder explains that there have been no changes to its organizational expertise that would impact Council's prior findings of compliance. Based on review of the record for the facility, the Department confirms that, to date, no regulatory citations have been issued by the Department for any EFSC-jurisdictional Avangrid-operated facility.

The Council previously imposed Conditions GEN-OE-01 (IV.B.1), PRE-OE-01 (IV.B.2), GEN-OE-02 (IV.B.4), GEN-OE-03 (IV.B.5), GEN-OE-04 (IV.B.6), GEN-OE-05 (IV.B.7) and GEN-OE-06 (IV.B.8), which would continue to apply to the certificate holder (see Attachment A Draft Amended Site Certificate for condition references). Conditions GEN-OE-01 (VI.B.1) and GEN-OE-05 (IV.B.7) require the certificate holder to submit to the Department personnel contact information and report any changes in the corporate structure of its parent company, Avangrid Renewables LLC. Conditions PRE-OE-01 (IV.B.2), GEN-OE-03 (IV.B.5) and GEN-OE-04 (IV.B.6) require the certificate holder to demonstrate that its third-party contractors have adequate qualifications, are required to comply with site certificate terms and conditions, and that they obtain necessary permit approvals. Conditions GEN-OE-02 (IV.B.4) and GEN-OE-06 (IV.B.8) obligate the

²¹ OAR 345-021-0010(1)(d)(D)

²² GH1AMD4Doc27 Final Order on Amendment 4, p.23, 2018-05-15.

1 certificate holder for liability of noncompliance with the site certificate and requires reporting
2 of site certificate violations.

3
4 Based upon compliance with existing site certificate conditions, and the ongoing compliance
5 with site certificates of the certificate holder's parent company for other EFSC-jurisdictional
6 facilities, the Department recommends the Council find that the facility, with proposed
7 changes, would not impact the certificate holder's ability to design, construct, operate and
8 retire the facility in compliance with Council standards and site certificate conditions.

9
10 *Public Health and Safety*

11
12 The proposed change in turbine size could result in health and safety risks from blade failure,
13 structural and reliability concerns, ice throw, risks to public and private providers of air
14 transportation and agricultural services, and risks to public providers of fire service during
15 tower rescue events. The Department's evaluation of these risks is presented in Section III.M,
16 *Public Services* and Section III.P.1, *Public Health and Safety Standards for Wind Facilities* of this
17 order. Based on the reasoning and analysis provided in the sections described, the Department
18 recommends the Council find that the proposed change in turbine size would not impact the
19 certificate holder's ability to design, construct, and operate the facility in a manner that
20 protects public health and safety.

21
22 *Ability to Restore the Site to a Useful, Non-Hazardous Condition*

23
24 As described in Section III.G, *Retirement and Financial Assurance*, the facility, with proposed
25 changes, would not be expected to impact the certificate holder's ability to restore the facility
26 site to a useful, non-hazardous condition.

27
28 *ISO 900 or ISO 14000 Certified Program*

29
30 OAR 345-022-0010(2) is not applicable because the certificate holder has not proposed to
31 design, construct or operate the amended facility according to an ISO 9000 or ISO 14000
32 certified program.

33
34 *Third-Party Permits*

35
36 OAR 345-022-0010(3) addresses the requirements for potential third party contractors. In RFA5,
37 the certificate holder describes that the proposed amendments would not require any
38 additional third-party permits not previously considered. As described above, Conditions PRE-
39 OE-01 (IV.B.2), GEN-OE-03 (IV.B.5) and GEN-OE-04 (IV.B.6) require the certificate holder to
40 demonstrate that its third-party contractors have adequate qualifications, are required to
41 comply with site certificate terms and conditions, and that they obtain necessary permit
42 approvals.

1 **Conclusions of Law**

2
3 Based on the evidence in the record, and subject to compliance with the existing and
4 recommended amended conditions of approval, the Department recommends that the Council
5 find that the certificate holder would continue to satisfy the requirements of the Council's
6 Organizational Expertise standard.²³
7

8 **III.C. Structural Standard: OAR 345-022-0020**

9
10 *(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the*
11 *Council must find that:*

12
13 *(a) The applicant, through appropriate site-specific study, has adequately*
14 *characterized the seismic hazard risk of the site;*

15
16 *(b) The applicant can design, engineer, and construct the facility to avoid dangers to*
17 *human safety and the environment presented by seismic hazards affecting the site,*
18 *as identified in subsection (1)(a);*

19
20 *(c) The applicant, through appropriate site-specific study, has adequately*
21 *characterized the potential geological and soils hazards of the site and its vicinity*
22 *that could, in the absence of a seismic event, adversely affect, or be aggravated by,*
23 *the construction and operation of the proposed facility; and*

24
25 *(d) The applicant can design, engineer and construct the facility to avoid dangers to*
26 *human safety and the environment presented by the hazards identified in subsection*
27 *(c).*

28
29 *(2) The Council may not impose the Structural Standard in section (1) to approve or deny*
30 *an application for an energy facility that would produce power from wind, solar or*
31 *geothermal energy. However, the Council may, to the extent it determines appropriate,*
32 *apply the requirements of section (1) to impose conditions on a site certificate issued for*
33 *such a facility.*

34
35 *(3) The Council may not impose the Structural Standard in section (1) to deny an*
36 *application for a special criteria facility under OAR 345-015-0310. However, the Council*
37 *may, to the extent it determines appropriate, apply the requirements of section (1) to*
38 *impose conditions on a site certificate issued for such a facility.*

²³ See recommended amended site certificate conditions in Section III.M Public Services of this order.

1 **Findings of Fact**

2
3 As provided in section (1) above, the Structural Standard generally requires the Council to
4 evaluate whether the applicant (certificate holder) has adequately characterized the potential
5 seismic, geological and soil hazards of the site, and that the applicant (certificate holder) can
6 design, engineer and construct the facility to avoid dangers to human safety from these
7 hazards.²⁴ Pursuant to OAR 345-022-0020(2), the Council may issue a site certificate for a wind
8 energy facility without making findings regarding compliance with the Structural Standard;
9 however, the Council may apply the requirements of the standard to impose site certificate
10 conditions.

11
12 The analysis area for the Structural Standard is the area within the site boundary. Site
13 boundary, as defined in OAR 345-001-0010(55), is the area within the perimeter of the facility,
14 its related or supporting facilities, all temporary laydown and staging areas, and all microsites
15 corridors proposed by the applicant (certificate holder).

16
17 *Potential Seismic, Geological and Soil Hazards*

18
19 The certificate holder describes that potential geological and soil hazards within the analysis
20 area (site boundary) were previously evaluated and approved by Council. The certificate holder
21 also provides January 2018 communication from the Department of Geology and Mineral
22 Industries (DOGAMI) confirming that the partial 2009 geotechnical report previously provided
23 during the ASC review phase remains adequate for the facility, with the proposed changes.²⁵
24 Because the certificate holder is not requesting a change in site boundary or microsites
25 corridor area as part of the amendment request, and based on DOGAMI consultation, the
26 Department recommends that the Council find that the certificate holder's previous
27 characterization of the potential seismic, geologic and soil hazards of the site remain adequate.

28
29 To aid the Council in its review and understanding of its previous evaluation, the Department
30 presents a summary of the seismic and non-seismic hazards as evaluated in the ASC and 2009
31 *Final Order on the ASC*. Previously identified seismic hazards in the facility vicinity were from
32 three seismic sources: Cascadia Subduction Zone ("CSZ") interplate events, CSZ intraslab events
33 and crustal events (referred to as mechanisms). The CSZ is located near the coastlines of
34 Oregon, Washington and British Columbia.

²⁴ OAR 345-022-0020(3) does not apply to the facility, with proposed changes, because it is not a special criteria facility under OAR 345-015-0310.

²⁵ GHAMD5Doc15 Complete Request for Amendment 5, Attachment 2, 2018-07-06.

1 Nine mapped crustal faults were previously identified within the facility vicinity. One was within
2 1.2 miles of the southwest corner of the site, and one was within 3.7 miles. The others ranged
3 from 6.2 to 52.2 miles from the site.

4
5 As previously evaluated, non-seismic hazards in the facility vicinity include stability failure at
6 native slope angles and deep-seated slope failure. However, the certificate holder represented
7 that most slopes within the site boundary are gentle rolling hills consisting of basalt with a
8 relatively thin veneer of windblown silts, which are generally not susceptible to stability failures
9 at native slope angles and that the likelihood of deep-seated slope failures is very low. Further,
10 the certificate holder and Council previously identified that portions of collector lines and
11 transmission towers would be located within Sherman's County Natural Hazards (NH)
12 Combining Zone, presenting non-seismic risks due to slope stability. However, the Council
13 previously imposed Condition PRE-LU-04 (IV.D.6) requiring the certificate holder to evaluate
14 slope stability during its pre-construction, site-specific geotechnical investigation and minimize
15 risk within areas of marginally stable slope.

16
17 *Design, Engineer and Construct Facility to Avoid Dangers to Human Safety from Seismic and*
18 *Non-Seismic Hazards*

19
20 The proposed amendments would be located within the previously approved site boundary and
21 micrositings corridor areas. The certificate holder refers to compliance with existing site
22 certificate Conditions PRE-SS-01 (V.A.1), PRE-SS-02 (V.A.4), PRE-SS-03 (V.A.5), and GEN-SS-01
23 (V.A.3) and asserts that its ability to design, engineer and construct the facility, with proposed
24 changes, to avoid dangers to human safety would not be affected by the proposed
25 amendments.²⁶

26
27 The Department notes that conditions PRE-SS-01 (V.A.1), PRE-SS-02 (V.A.4), PRE-SS-03 (V.A.5),
28 and GEN-SS-01 (V.A.3) require the certificate holder to receive concurrence from the
29 Department, in consultation with DOGAMI, on its pre-construction site-specific geotechnical
30 investigation; to design the facility to avoid non-seismic hazards, including implementing
31 sufficient setbacks from steep slopes; and, design the facility in accordance with applicable
32 state building code and design procedures. As described above, compliance with Condition PRE-

²⁶ In RFA5, Section 4.3 Structural Standard, the certificate holder addresses potential safety and reliability risks from blade failure and ice throw. However, because there are no changes to the potential seismic, geologic or soil conditions at the site, the Department instead considers those potential impacts under [OAR 345-024-0010](#) and presents its evaluation in Section III.P.1., *Public Health and Safety for Wind Facilities* of this order, rather than in the Structural Standard section.

1 LU-04 (IV.D.6) would further reduce potential risk of siting facility components with areas of
2 marginally stable slope.

3
4 On the record of the draft proposed order public hearing, on behalf of DOGAMI, Ms. Yumei
5 Wang proposed changes to existing site certificate condition PRE-SS-01 (V.A.1) to clarify pre-
6 construction requirements and ensure that the pre-construction geotechnical investigation and
7 facility design is based on current rules and regulations.²⁷ Consistent with DOGAMI's
8 comments, the Department amends Condition PRE-SS-01 (V.A.1) in the proposed order to
9 ensure that the draft site-specific geotechnical investigation report, based on a protocol
10 reviewed by the Department and DOGAMI, uses current guidelines and adequately presents
11 design considerations to avoid seismic and non-seismic risks of the site:

12
13 **Amended Condition PRE-SS-01:** Prior to construction, the certificate holder shall:

14 (a) Submit a protocol to the Department and Oregon Department of Geology &
15 Mineral Industries, for review, with the applicable codes, standards, and
16 guidelines to be used, and proposed geotechnical work to be conducted for
17 the site-specific geotechnical investigation report.

18 ~~(a)(b)~~ Submit a draft site-specific geotechnical investigation report to the
19 Department and Oregon Department of Geology & Mineral Industries
20 ("DOGAMI"), for review. The investigation and report shall conform to the
21 Oregon State Board of Geologist Examiners guidelines titled "Guidelines for
22 Engineering Geologic Reports" and "Guidelines for Site Specific Seismic
23 Hazard Reports for Essential and Hazardous Facilities and Major and Special-
24 Occupancy Structures in Oregon." The site-specific geotechnical investigation
25 shall address Quaternary faults, landslide hazards, and non-seismic hazards
26 native soil and bedrock stability concerns at cuts, fills and culvert crossings,
27 and shall include design and construction recommendations to meet public
28 safety for the anticipated lifespan of the facility. minimize the potential for
29 destabilizing marginally stable slopes and the potential for stream erosion.

²⁷ GHAMD5Doc25. DPO Reviewing Agency Comment DOGAMI. 2018-08-21. On the record of the draft proposed order public hearing, on behalf of DOGAMI, Ms. Wang recommends condition changes for GEN-SS-01, PRE-SS-01, PRE-SS-02, and PRE-SS-03. The Department confirms that DOGAMI's recommended condition amendment language is either consistent with OAR Chapter 345 Division 21 requirements, which the certificate holder satisfied during the ASC phase (i.e. seismic hazards analysis, landslide hazard evaluation, and non-seismic hazard evaluation) and Request for Amendment 4 (i.e. disaster resiliency plan and response to future climatic conditions) process; or, is not appropriate condition language or not necessary to satisfy the standard (e.g. "Any geotechnical work that is planned for the future should be fully described."). The Department did not amend conditions where the recommended amendment language identifies information previously provided on the record, or is not appropriate condition language or not necessary to satisfy the standard. The Department amends Condition PRE-SS-01 based upon review of DOGAMI's comments and interpreted intent of the proposed changes.

(b)(c) The Department shall review and concur with the report, in consultation with DOGAMI, prior to construction.
[Final Order on ASC, Condition V.A.1; Amended in Final Order on AMD4, AMD5]

Based upon compliance with existing site certificate conditions, and because the proposed amendments would not change site boundary or micrositings corridor area previously evaluated, the Department ~~concurs and~~ recommends Council find that the proposed amendments would not affect the certificate holder's characterization of the site or seismic hazards, or its ability to design, engineer, and construct the facility to avoid dangers to human safety presented by seismic, geologic or soils hazards.

Conclusions of Law

Based on the foregoing analysis, and in compliance with OAR 345-022-0020(2), the Department recommends that the Council rely on existing site certificate conditions to address the Structural Standard.

III.D. Soil Protection: OAR 345-022-0022

To issue a site certificate, the Council must find that the design, construction and operation of the facility, taking into account mitigation, are not likely to result in a significant adverse impact to soils including, but not limited to, erosion and chemical factors such as salt deposition from cooling towers, land application of liquid effluent, and chemical spills.

Findings of Fact

The Soil Protection standard requires the Council to find that the design, construction and operation of the facility, with proposed changes, are not likely to result in significant adverse impacts to soil. The analysis area for the Soil Protection standard is the area within the site boundary.

Potential Significant Adverse Impacts to Soil

Potential impacts to soil within the analysis area (site boundary) could occur as a result of the proposed amendment, specifically additional soil erosion impacts from wind or rain during construction of the proposed wider temporary access roads and crane paths, from 40 to 100

1 feet.²⁸ The Department notes that the existing site certificate authorizes construction of up to
2 41 miles of temporary access roads and 11 miles of temporary crane paths. In RFA5, the
3 certificate holder describes that if the proposed larger wind turbines are selected during final
4 facility design, the length of temporary and permanent access road and crane paths would be
5 reduced by 30 to 50 percent.²⁹ The certificate holder did not provide an updated temporary
6 disturbance estimate for soil impacts, but explains that less than 1,522 acres would be
7 temporarily impacted during construction of the facility, with proposed changes, which was the
8 impact evaluated in the Council's 2009 *Final Order on the Application ASC*.

9
10 In RFA5, the certificate holder describes that if selected during final facility design, the
11 proposed larger wind turbines would allow use of fewer wind turbines (as few as 95 wind
12 turbines compared to the maximum allowed 125 wind turbines). However, the certificate
13 holder has not requested to reduce the maximum allowable number of turbines and requests
14 flexibility in its final wind turbine selection including ~~selection of~~ a mix of wind turbine types.
15 Therefore, while not expected based on the certificate holder's description of limitations of its
16 interconnection agreement, the Department evaluates a "worst-case scenario" for soil
17 impacts for the facility, with proposed changes, based on the total length of temporary access
18 roads (41 miles) and crane paths (11 miles) and increased width from 40 to 100 feet. Based on
19 the Department's evaluation, the proposed change in temporary road and crane path width
20 would result in approximately 378 acres of temporary soil impacts; and 1,294 total acres of
21 temporary soil impacts from the facility, with the proposed changes.³⁰
22

²⁸ GHAMD5Doc25. DPO Public Comment Gilbert. 2018-08-23. On the record of the draft proposed order public hearing, Ms. Gilbert argues the Department pre-determined certain sections of Council standards to be inapplicable to RFA5, and references the Council's Soil Protection standard. Ms. Gilbert then expresses concern regarding soil compaction from use of heavier cranes and equipment during wind turbine delivery. The draft proposed order and proposed order present a compliance assessment of Council standards and applicable rules in its entirety. Further, the Department notes that the certificate holder is required to demonstrate that unnecessary soil compaction would be minimized and implement appropriate mitigation for soil compaction impacts under the Council's Land Use standard. The Department incorporates clarifying language from the draft proposed order to proposed order in the Land Use section in response to Ms. Gilbert's introductory comments on soil compaction.

²⁹ GHAMD5Doc15 Complete Request for Amendment 5, Section 4.4, 2018-07-06.

³⁰ The Department notes that while the evaluation of potentially significant adverse impacts to soils is based on the impact and mitigation measure, or condition, not specifically the quantity (acreage) of soil impacts, this impact would be more than the temporary soil impacts of 1,069 acres evaluated in the Council's 2017 *Final Order on Amendment 3*. The Department does not consider the certificate holder's referral to the Council's impact evaluation from the 2009 *Final Order on ASC*, which included a greater acreage impact than the Council's *Final Order on Amendment 3*, to supplant the need for an impact assessment of the changes requested in Request for Amendment 5.

1 In RFA5, the certificate holder asserts that compliance with existing site certificate Conditions
2 GEN-SP-01 (IV.E.1), CON-SP-01 (IV.E.2), PRE-SP-01 (IV.E.4), CON-SP-02 (IV.E.5), OPR-SP-01
3 (IV.E.3), and OPR-SP-02 (IV.E.6) would minimize potentially significant adverse impacts to soils
4 during construction and operation of the facility, with proposed changes. The Department
5 ~~agrees and~~ recommends that the Council find that the existing site certificate conditions are
6 sufficient to minimize the potential for significant adverse impacts to soils from the facility,
7 with proposed changes. Specifically, Condition CON-SP-01 (IV.E.2) requires the certificate
8 holder to manage and salvage temporarily disturbed topsoil by stripping, stockpiling,
9 protecting (with plastic sheeting or mulch) and redistributing soils. Conditions GEN-SP-01
10 (IV.E.1) and OPR- SP-01 (IV.E.3) require the certificate holder to implement erosion and
11 sediment control measures and conduct routine inspections of the erosion control measures
12 during construction and operation, respectively.³¹ The erosion and sediment control
13 measures, as provided in the draft NPDES 1200-C permit application during the ASC review
14 phase, is provided as Attachment G of this order, for reference to measures and monitoring
15 schedule to be implemented during construction that would further reduce and minimize the
16 potential for soil erosion impacts.

17
18 Based upon compliance with existing site certificate conditions, the Department recommends
19 that the Council find that the design, construction and operation of the facility, with proposed
20 changes, would not result in a significant adverse impact to soils.

21 **Conclusions of Law**

22
23
24 Based on the foregoing recommended findings of fact and conclusions of law, and subject to
25 compliance with existing site certificate conditions, the Department recommends that the
26 Council find that the facility, with proposed changes, would continue to comply with the
27 Council's Soil Protection standard.

28 **III.E. Land Use: OAR 345-022-0030**

29
30
31 *(1) To issue a site certificate, the Council must find that the proposed facility complies*
32 *with the statewide planning goals adopted by the Land Conservation and Development*
33 *Commission.*
34

³¹ Conditions CON-SP-02 (IV.E.5) and OPR-SP-02 (IV.E.6) require the certificate holder to manage and eliminate concrete wash wastewater and blade wash wastewater runoff during construction and operation, respectively. Condition PRE-SP-01 (IV.E.4) requires the certificate holder to implement a weed control plan during construction and for the life of facility operation.

1 (2) *The Council shall find that a proposed facility complies with section (1) if:*

2
3 (a) *The applicant elects to obtain local land use approvals under ORS 469.504(1)(a)*
4 *and the Council finds that the facility has received local land use approval under the*
5 *acknowledged comprehensive plan and land use regulations of the affected local*
6 *government; or*

7
8 (b) *The applicant elects to obtain a Council determination under ORS 469.504(1)(b)*
9 *and the Council determines that:*

10
11 (A) *The proposed facility complies with applicable substantive criteria as*
12 *described in section (3) and the facility complies with any Land Conservation and*
13 *Development Commission administrative rules and goals and any land use*
14 *statutes directly applicable to the facility under ORS 197.646(3);*

15
16 (B) *For a proposed facility that does not comply with one or more of the*
17 *applicable substantive criteria as described in section (3), the facility otherwise*
18 *complies with the statewide planning goals or an exception to any applicable*
19 *statewide planning goal is justified under section (4); or*

20
21 (C) *For a proposed facility that the Council decides, under sections (3) or (6), to*
22 *evaluate against the statewide planning goals, the proposed facility complies*
23 *with the applicable statewide planning goals or that an exception to any*
24 *applicable statewide planning goal is justified under section (4).*

25 ***

26
27 **Findings of Fact**

28
29 The Land Use standard requires the Council to find that the facility, with proposed changes,
30 would continue to comply with local applicable land use substantive criteria, as well as the
31 statewide planning goals adopted by the Land Conservation and Development Commission
32 (LCDC).³² The analysis area for land use is the area within and extending 0.5 miles from the site
33 boundary.

34
35 **Local Applicable Substantive Criteria**

36
37 On August 17, 2007, during the review of the ASC, the Council appointed the Sherman County
38 Board of Commissioners as the Special Advisory Group (SAG) for the facility. On behalf of and as

³² The Council must apply the Land Use standard in conformance with the requirements of ORS 469.504.

1 authorized by the SAG, the Sherman County Planning Director identified applicable substantive
 2 criteria to be considered during the ASC phase and through subsequent amendment requests
 3 has identified changes in local code to be considered applicable substantive criteria. In RFA5,
 4 the certificate holder describes that there have been no changes in local code provisions that
 5 would affect Council's previous findings of compliance with the Land Use standard. Table 1,
 6 *Sherman County Applicable Substantive Criteria*, below, summarizes the applicable substantive
 7 criteria that the Council previously evaluated and determined the certificate holder could
 8 satisfy.

Table 1: Sherman County Applicable Substantive Criteria

Sherman County Zoning Ordinance (SCZO)	
<i>Article 3 – Use Zones</i>	
Section 3.1	Exclusive Farm Use, F-1 Zone
Section 3.1(1)	General Purpose
Section 3.1(2)	Uses Permitted
Section 3.1(3)	Conditional Uses Permitted
Section 3.1(4)	Dimensional Standards/Setback Requirements
Section 3.7	Natural Hazards Combining Zone
Section 3.7(1)	Purpose
Section 3.7(3)	Conditional Uses
Section 3.7(4)	Permit for Use or Development in NH Zone
Section 3.7(5)	Application Requirements for a Use in a NH Zone
Section 3.7(6)	Standards for Building Construction in NH Zone
Section 3.7(7)	Standards for an Access Route in NH Zone
<i>Article 4 – Supplementary Provisions</i>	
Section 4.9	Compliance with and Consideration of State and Federal Agency Rules and Regulations
Section 4.13	Additional Conditions to Development Proposals
<i>Article 5 – Conditional Uses</i>	
Section 5.2	General Criteria
Section 5.8	Standards Governing Specific Conditional Uses
Section 5.8(14)	Public Facilities and Services
Section 5.8(20)	Non-farm Uses in an F-1 Zone
Sherman County Ordinances	
Ordinance No. 39-2007 ³³	Setback Ordinance for Wind Power Generation Siting
Transportation System Plan (2015 Update)	
Section 7	Rural Road Design Standards
Sherman County Comprehensive Plan	

³³ Ordinance 35-2007 was amended on July 15, 2009.

Section VIII Planning Process and Citizen Involvement Goal I: Policy I, II
Section XI Physical Characteristics Goal I: Policy I; Goal II; Goal III; Goal IV; Goal V; Goal VI, Policy VII; Goal VII; Goal VIII
Section XII Social Characteristics Goal I, Policy I, IX, X; Goal II, Policy XI, XII
Section XIV Economics Goal I
Section XV Energy Goal I, Policy I
Section XVI Land Use Goal I, Policy IV

The facility, with proposed changes, could impact the certificate holder's ability to satisfy the applicable substantive criteria contained in the requirements of Sherman County Zoning Ordinance (SCZO) Section 5.8(20), Ordinance No. 39-2007 and Section 7 of the Transportation System Plan. Therefore, the Department provides its evaluation of the certificate holder's compliance with these applicable substantive criteria below.

SCZO Section 5.8 Standards Governing Specific Conditional Uses

20 – Non-Farm Uses in an F-1 Zone = Non-farm uses, excluding farm related, farm accessory uses, or uses conducted in conjunction with a farm use as a secondary uses thereof, may be approved upon a finding that each such use:

- 1. Is compatible with farm uses described in ORS 215.203(2);*
- 2. Does not interfere seriously with accepted farming practices on adjacent lands devoted to farm use;*
- 3. Does not materially alter the overall land use pattern of the area;*
- 4. Is situated upon generally unsuitable land for the production of farm crops and livestock, considering the terrain, adverse soil or land conditions, drainage and flooding, vegetation, location and size of the tract, and the availability of necessary support resources for agriculture;*

Potential Facility-related Impacts to Aerial Spraying

SCZO Section 5.8(20) establishes approval standards for all conditional uses within exclusive farm use (EFU) zoned land. In particular, based on the proposed changes in wind turbine dimensions and meteorological towers and a recognized farm practice of aerial spraying on adjacent lands, the certificate holder evaluates its ability to continue satisfying the requirements of SCZO Section 5.8(20)(2).

The proposed larger wind turbines would increase the maximum turbine blade tip height from 518 feet, as previously approved, to 650 feet and increase rotor-swept diameter from 413 feet, as previously approved, to 492 feet. The proposed larger meteorological towers would increase the total tower height from 312 feet, as previously approved, to 404 feet. In RFA5, the certificate holder explains that these proposed changes could reduce the amount of land available for aerial spraying around each wind turbine or could alter aerial spraying flight

1 patterns. However, the certificate holder describes that aerial applicators (crop dusters) fly very
2 close to the ground, in some cases 10 feet above the ground, and as such any vertical obstacle,
3 such as a tree, hill, or building, could affect the flight pattern. In RFA5, it is explained that the
4 increased height of the proposed wind turbines (and meteorological towers) should not
5 significantly affect crop duster's flight patterns because pilots would typically avoid the wind
6 turbines altogether and wind turbines would be located in "linear strings" as opposed to
7 "clusters."³⁴ The certificate holder also refers to comments obtained from local crop dust
8 operators during the ASC review phase, indicating that wind turbines would not impede this
9 accepted farm practice. Moreover, the certificate holder describes lease agreements between
10 the facility and adjacent landowners where landowners could use lease payments to offset
11 potential impacts to accepted farm practices, including use of ground based applicators near
12 wind turbines rather than aerial spraying.

13
14 Based on the certificate holder's representations, the Department recommends that Council
15 find that the proposed larger wind turbines and meteorological towers would not cause a
16 significant change in aerial applicators' flight patterns nor significantly increase the cost of
17 aerial spraying. For these reasons, the Department recommends Council find that the facility,
18 with proposed changes, would continue to satisfy the conditional use standards at SCZO Section
19 5.8(20)(2).

20 21 *Potential Facility-related Impacts to Agricultural Soils*

22
23 The Department notes that, while not specifically addressed in RFA5, the proposed changes in
24 temporary access road and crane path width may result in impacts to accepted farm practices
25 such as temporary soil compaction, weed dispersion from ground disturbance, and temporarily
26 removing agricultural land from production and, therefore, is evaluated. Based on the potential
27 disturbance impact, the Department reviewed the sufficiency of existing conditions CON-SP-01
28 (IV.E.2), GEN-SP-01 (IV.E.1), OPR-SP-01 (IV.E.3) and PRE-SP-01 (IV.E.4) related to topsoil
29 management; erosion and sediment control; and weed control.

30
31 Condition CON-SP-01 (IV.E.2) requires the certificate holder to manage and salvage temporarily
32 disturbed topsoil by stripping, stockpiling, protecting (with plastic sheeting or mulch) and
33 redistributing soils. Conditions GEN-SP-01 (IV.E.1) and OPR-SP-01 (IV.E.3) require the certificate
34 holder to implement erosion and sediment control measures and conduct routine inspections
35 of the erosion control measures during construction and operation, respectively. PRE-SP-01
36 (IV.E.4) requires the certificate holder to, prior to construction, develop a weed control plan as
37 approved by the Department in consultation with the Sherman County Weed Control

³⁴ GHAMD5Doc15 Complete Request for Amendment 5, p. 18, 2018-07-06.

Supervisor. The final approved weed control plan is then required to be implemented during construction and for the life of facility operations.

Based on its review, the Department recommends that Council conclude that based on the temporary nature of the impact and compliance with existing conditions, the proposed increase in temporary access road and crane path width would not cause a significant change in agricultural land use nor significantly increase the cost of farm practices. For these reasons, the Department recommends Council find that the facility, with proposed changes, would continue to satisfy the conditional use standards at SCZO Section 5.8(20)(2).

Ordinance No. 39-2007 Setback Ordinance for Wind Power Generation Siting

Sherman County Ordinance No. 39-2009 establishes setback requirements for wind turbines to non-project property lines, pre-existing wind turbines, public road rights-of-way, and incorporated cities within Sherman County. The ordinance encourages wind facility owners to negotiate setback distances with neighboring non-project property owners to find mutually-agreeable solutions. If a solution cannot be reached, the ordinance setback requirements apply. The Council previously imposed Condition PRE-LU-14 (IV.D.22) requiring the certificate holder to comply with [Section 4 of](#) Ordinance No. 39-2007 setback requirements, unless Council approves a variance or the certificate holder demonstrates that a setback agreement with the affected landowner has been reached.

On the record of the draft proposed order public hearing, Ms. Gilbert requests that Council impose a condition requiring the certificate holder to comply with Sherman County Ordinance No. 39-2007, specifically that wind turbines comply with a setback distance of one mile from incorporated cities, which was previously excluded but that the exclusion is no longer valid.³⁵

Because Sherman County Ordinance No. 39-2007 was identified as applicable substantive criteria during Council's review of Request for Amendment 1, Council previously imposed a condition (Condition PRE-LU-14 [IV.D.22]) requiring compliance with Section 4 of the ordinance. Section 4 establishes wind turbine setback distances from property lines. As noted above, the ordinance also requires wind turbine setback distances from pre-existing wind turbines and the boundary of any incorporated city in Sherman County. These additional setback requirements are included in Section 5 and 6 of the ordinance, which is not currently referenced in the previously imposed site certificate condition. Because the requirements of the ordinance apply to the facility, with proposed changes, as Ms. Gilbert notes, the Department amends Condition

³⁵ [GHAMD5Doc25. DPO Public Comment Gilbert. Comment 1. 2018-08-23.](#)

PRE-LU-14 (IV.D.22) from the draft proposed order to proposed order to mirror all setback requirements identified within the ordinance as follows:

Amended Condition PRE-LU-14: Prior to construction, Certificate Holder shall demonstrate that the final location of turbines within the micrositing corridors approved by the Council will satisfy setback requirements prescribed by Section 4 of the Sherman County Wind Setback Ordinance (Ordinance No. 39-2007) unless the Council has approved a variance to such setback for the turbine or the Certificate Holder has negotiated a setback agreement with the affected adjacent property owner or wind project developer in accordance with Section 3 of the ordinance as follows:-

(a) Setback from property lines in all East-West upwind and downwind directional property line installation shall be no less than 7.5 times the rotor diameter and no less than 1.5 times the rotor diameter for all North-South property line delineations. These requirements shall only apply to project boundaries and will not be required for towers installed internally within the site boundary. (Sherman County Ordinance 39-2007, Section 4)

(b) Setbacks from pre-existing wind turbines shall be 15 times the rotor diameter upwind and downwind for all East-West setback considerations and 3 times the rotor diameter for all North-South setback considerations. (Sherman County Ordinance 39-2007, Section 5)

(c) Setbacks from an operating wind turbine to the boundary lines of any incorporated city in Sherman County shall be a distance of one (1) mile, unless a variance to such distance is obtained through the city council of an affected city, after public hearing. (Sherman County Ordinance 39-2007, Section 6)

[Final Order on Amendment #1, Condition IV.D.22; Amended in Final Order on ~~AMD1~~, AMD4; AMD5]

The Department notes that Ordinance No. 39-2007 setback distances are established based on rotor diameter. As described in this order, the proposed larger wind turbines would increase rotor diameter from 413 feet, as previously approved, to 492 feet and therefore would increase the associated setback requirement. In RFA5, the certificate holder acknowledges the setback requirements and Condition PRE-LU-14 (IV.D.22), and is not requesting a variance. Therefore, based on compliance with the recommended amended condition, the Department recommends the Council find that the facility, with proposed changes, would continue to comply with Ordinance No. 39-2007 setback requirements.

Sherman County Transportation System Plan (Updated 2015)

Sherman County Transportation System Plan, Section 7.0 contains rural road design standards that would apply to new or modified public roads, including new or modified intersections of

public and private roads.³⁶ In RFA5, the certificate holder proposes two road design changes including temporarily enlarging turning radii on some county roads and increasing temporary private access road and crane path width from 40 to 100-feet to accommodate delivery of longer turbine blades. The certificate holder confirms that the proposed larger wind turbines could be delivered on temporary access roads with a 40-foot wide drivable surface; however, depending on the need for cut and fill slopes and associated work area, the actual disturbance of temporary access roads and crane paths ~~could~~ would be as wide as 100 feet.³⁷

Council previously imposed conditions to confirm that facility related roads were constructed in accordance with applicable Sherman County road design standards, including the Transportation System Management Plan, (PRE-LU-01(IV.D.1)); and to ensure any facility-related damage to county roads is repaired (PRE-LU-01 (IV.D.1)); (PRE-LU-12 (IV.D.19)). Based upon compliance with existing site certificate conditions, the Department recommends that Council find that the facility, with proposed changes, would satisfy the applicable rural road design standards within Sherman County's Transportation System Plan.

Directly Applicable State Statutes and Administrative Rules

Conditional use standards at OAR 660-033-0130(37), effective January 2, 2009, apply directly to the facility, with proposed changes. Because the facility, with proposed changes, would not result in a new site boundary or micrositings corridors, the Department recommends Council rely on its previous findings of compliance under OAR 660-033-0130(37)(a), which requires the certificate holder to consider: 1) reasonable alternatives and, 2) long term environmental, economic, social and energy consequences of siting the facility or component on alternative sites. The Department, however, recommends that Council evaluate the proposed changes in temporary access road and crane paths, and the associated additional temporary disturbance under OAR 660-033-0130(37)(b).

OAR 660-033-0130(37)(b) Wind Power Generation Facility Minimum Standards, Additional Criteria

Subsections (b), (c) and (d) of OAR 660-033-0130(37) provide additional criteria for wind power generation facilities located on "arable" or "nonarable" land. OAR 660-033-0130(37)(b) defines "arable land" as "lands that are cultivated or suitable for cultivation, including high-value farmland soils" and provides criteria for locating a facility on arable land. OAR 660-033-0130(37)(c) defines "nonarable land" as land "not suitable for cultivation" and provides that the criteria in subsection (b)(D) apply on nonarable land. Subsection (d) provides that when a

³⁶ GHAMD5Doc4-1 pRFA Reviewing Agency Comment SAG Sherman County 2018-05-31.

³⁷ GHAMD5Doc15 Complete Request for Amendment 5, Section 4.5, 2018-07-06.

proposed wind power generation facility is located on a combination of arable and nonarable lands, then all of the criteria in subsection (b) apply to the entire facility. The facility is approved to be located on a combination of arable and nonarable lands. Accordingly, the criteria in subsection (b) apply to the facility, with proposed changes. These criteria are discussed below.

(A) Impacts on Agricultural Operations

OAR 660-033-0130(37)(b)(A) provides that the facility, with proposed changes, must not “create unnecessary negative impacts on agricultural operations conducted on the subject property.” In RFA5, the certificate holder requests approval to modify the design of its temporary access road and crane paths, increasing width from 40 to 100-feet for up to 52 miles combined. While temporary road and crane paths could temporarily preclude agricultural operations, the Council previously imposed Condition PRE-LU-02 (IV.D.3) requiring the certificate holder to consult with affected landowners in the design and construction of private access roads to minimize the division of existing farm units.

(B) Soil Erosion or Loss

OAR 660-033-0130(37)(b)(B) provides that “the presence of a proposed wind power facility” must not result in unnecessary soil erosion or loss that could limit agricultural productivity. Potential adverse impacts to soils and measures to avoid or control soil erosion and loss are addressed by the Council’s Soil Protection standard, discussed in Section III.D, *Soil Protection* of this order. The recommended findings in that section indicate that based upon compliance with existing conditions, construction and operation of the facility, with proposed changes, would not result in unnecessary soil erosion or loss that would reduce the productivity of soil for crop production.

(C) Soil Compaction

OAR 660-033-0130(37)(b)(C) provides that facility construction or maintenance activities must not result in unnecessary soil compaction that reduces the productivity of soil for crop production. Potential adverse impacts to soils and measures to avoid or control soil compaction are addressed by the certificate holder’s draft Habitat Mitigation and Revegetation Plan (HMRP) (see Attachment D to this order), required to be implemented following construction completion per existing site certificate Condition PRE-FW-01 (IV.M.1). Council’s Soil Protection standard, discussed in Section III.D, *Soil Protection* of this order. The draft HMRP requirements include consultation with the Sherman County Soil and Water Conservation District to identify proper procedures for restoring agricultural quality to its pre-disturbance condition, which would include de-compaction procedures. The Department recommends Council find, based upon compliance with Condition PRE-FW-01 (IV.M.1) ~~recommend findings in that section indicate~~ that construction and operation of the facility, with proposed changes, would not

1 result in unnecessary soil compaction that would reduce the productivity of soil for crop
2 production.³⁸

3
4 (D) Weed Control

5
6 OAR 660-033-0130(37)(b)(D) provides that facility construction or maintenance activities must
7 not result in the “unabated introduction or spread of noxious weeds and other undesirable
8 weeds species.” To ensure compliance with this rule, the Council previously imposed Condition
9 PRE-SP-01 (IV.E.4) which requires the certificate holder to, prior to construction, develop a
10 weed control plan as approved by the Department in consultation with the Sherman County
11 Weed Control Supervisor. The final approved weed control plan is then required to be
12 implemented during construction and for the life of facility operations.

13
14 Based on the above analysis and ~~additional analysis provided in Section III.D Soil Protection of~~
15 ~~this order, compliance with existing and amended site certificate conditions,~~ the Department
16 recommends Council find that the facility, with proposed changes, would continue to satisfy the
17 requirements of OAR 660-033-0130(37)(b).

18
19 **Conclusions of Law**

20
21 Based on the foregoing findings and the evidence in the record, and subject to compliance with
22 existing site certificate conditions, the Department recommends the Council find that the
23 facility, with proposed changes, would continue to comply with the Land Use standard.

24
25 **III.F. Protected Areas: OAR 345-022-0040**

26
27 *(1) Except as provided in sections (2) and (3), the Council shall not issue a site certificate*
28 *for a proposed facility located in the areas listed below. To issue a site certificate for a*
29 *proposed facility located outside the areas listed below, the Council must find that,*
30 *taking into account mitigation, the design, construction and operation of the facility are*
31 *not likely to result in significant adverse impact to the areas listed below. References in*

³⁸ GHAMD5Doc25. DPO Public Comment Gilbert. Introductory Comments. 2018-08-23. On the record of the draft proposed order public hearing, Ms. Gilbert expresses concern regarding soil compaction from use of heavier cranes and equipment during wind turbine delivery. The certificate holder is required to demonstrate that unnecessary soil compaction would be minimized and implement appropriate mitigation for soil compaction impacts under the Council’s Land Use standard pursuant to OAR 660-033-0130(37)(b)(C). The Department amended findings under the Land Use standard of the draft proposed order to proposed order in response to this comment.

1 *this rule to protected areas designated under federal or state statutes or regulations are*
2 *to the designations in effect as of May 11, 2007:*

3
4 *(a) National parks, including but not limited to Crater Lake National Park and Fort*
5 *Clatsop National Memorial;*

6
7 *(b) National monuments, including but not limited to John Day Fossil Bed National*
8 *Monument, Newberry National Volcanic Monument and Oregon Caves National*
9 *Monument;*

10
11 *(c) Wilderness areas established pursuant to The Wilderness Act, 16 U.S.C. 1131 et*
12 *seq. and areas recommended for designation as wilderness areas pursuant to 43*
13 *U.S.C. 1782;*

14
15 *(d) National and state wildlife refuges, including but not limited to Ankeny, Bandon*
16 *Marsh, Baskett Slough, Bear Valley, Cape Meares, Cold Springs, Deer Flat, Hart*
17 *Mountain, Julia Butler Hansen, Klamath Forest, Lewis and Clark, Lower Klamath,*
18 *Malheur, McKay Creek, Oregon Islands, Sheldon, Three Arch Rocks, Umatilla, Upper*
19 *Klamath, and William L. Finley;*

20
21 *(e) National coordination areas, including but not limited to Government Island,*
22 *Ochoco and Summer Lake;*

23
24 *(f) National and state fish hatcheries, including but not limited to Eagle Creek and*
25 *Warm Springs;*

26
27 *(g) National recreation and scenic areas, including but not limited to Oregon Dunes*
28 *National Recreation Area, Hell's Canyon National Recreation Area, and the Oregon*
29 *Cascades Recreation Area, and Columbia River Gorge National Scenic Area;*

30
31 *(h) State parks and waysides as listed by the Oregon Department of Parks and*
32 *Recreation and the Willamette River Greenway;*

33
34 *(i) State natural heritage areas listed in the Oregon Register of Natural Heritage*
35 *Areas pursuant to ORS 273.581;*

36
37 *(j) State estuarine sanctuaries, including but not limited to South Slough Estuarine*
38 *Sanctuary, OAR Chapter 142;*

39
40 *(k) Scenic waterways designated pursuant to ORS 390.826, wild or scenic rivers*
41 *designated pursuant to 16 U.S.C. 1271 et seq., and those waterways and rivers listed*
42 *as potentials for designation;*
43

1 *(l) Experimental areas established by the Rangeland Resources Program, College of*
2 *Agriculture, Oregon State University: the Prineville site, the Burns (Squaw Butte) site,*
3 *the Starkey site and the Union site;*

4
5 *(m) Agricultural experimental stations established by the College of Agriculture,*
6 *Oregon State University, including but not limited to: Coastal Oregon Marine*
7 *Experiment Station, Astoria Mid-Columbia Agriculture Research and Extension*
8 *Center, Hood River Agriculture Research and Extension Center, Hermiston Columbia*
9 *Basin Agriculture Research Center, Pendleton Columbia Basin Agriculture Research*
10 *Center, Moro North Willamette Research and Extension Center, Aurora East Oregon*
11 *Agriculture Research Center, Union Malheur Experiment Station, Ontario Eastern*
12 *Oregon Agriculture Research Center, Burns Eastern Oregon Agriculture Research*
13 *Center, Squaw Butte Central Oregon Experiment Station, Madras Central Oregon*
14 *Experiment Station, Powell Butte Central Oregon Experiment Station, Redmond*
15 *Central Station, Corvallis Coastal Oregon Marine Experiment Station, Newport*
16 *Southern Oregon Experiment Station, Medford Klamath Experiment Station, Klamath*
17 *Falls;*

18
19 *(n) Research forests established by the College of Forestry, Oregon State University,*
20 *including but not limited to McDonald Forest, Paul M. Dunn Forest, the Blodgett*
21 *Tract in Columbia County, the Spaulding Tract in the Mary's Peak area and the*
22 *Marchel Tract;*

23
24 *(o) Bureau of Land Management areas of critical environmental concern,*
25 *outstanding natural areas and research natural areas;*

26
27 *(p) State wildlife areas and management areas identified in OAR chapter 635,*
28 *Division 8.*

29 ***

30 **Findings of Fact**

31
32 The Protected Areas standard requires the Council to find that, taking into account mitigation,
33 the design, construction, and operation of a facility are not likely to result in significant adverse
34 impacts to any protected area as defined by OAR 345-022-0040. Impacts to protected areas are
35 evaluated based on identification of protected areas, pursuant to OAR 345-022-0040, within
36 the analysis area and an evaluation of the following potential impacts during facility
37 construction and operation: excessive noise, increased traffic, water use, wastewater disposal,
38 visual impacts of facility structures or plumes, and visual impacts from air emissions.

39
40 In accordance with OAR 345-001-0010(59)(e) and consistent with the study area boundary, the
41 analysis area for protected areas is the area within and extending 20 miles from the site
42 boundary.

In RFA5, the certificate holder confirms that no new protected areas were identified within the 20-mile analysis area since the Council's 2017 *Final Order on Amendment 4*, which also confirmed that no new protected areas had been identified since the Council's *Final Order on the ASC*. The protected areas within the analysis area, in Oregon, as previously identified in Table IV.F.1 in the *Final Order on ASC*, are presented in Table 2 below:

Table 2: Protected Areas within Analysis Area (Oregon) and Distance from Site Boundary

Protected Area ³⁹	Distance (miles) and Direction
Columbia Basin Agriculture Research Center	0.4 Southwest
Lower Deschutes Wildlife Area	1.8 Southwest
Deschutes Federal Wild and Scenic River	2.3 West
Deschutes State Scenic Waterway (Pelton Dam to Columbia River)	2.4 West
Columbia River Gorge National Scenic Area	2.7 West
Deschutes River State Recreation Area	4.3 West
John Day Federal Wild and Scenic River	5.2 East
John Day State Scenic Waterway (Parrish Creek to Tumwater Falls)	5.3 East
John Day Wildlife Refuge	5.3 East
Heritage Landing (Deschutes)	5.4 West
JS Burres State Recreation Site / BLM Cottonwood Facility	6.8 Southeast

As presented in Table 2, *Protected Areas within Analysis Area and Distance from Site Boundary*, the majority of the listed protected areas are located at least three miles from the facility site boundary. As previously identified in the *Final Order on ASC*, the protected areas closest to the site boundary include the Columbia Basin Agriculture Research Center (0.4 mile), Lower Deschutes Wildlife Area (1.8 mile), and Deschutes Federal Wild and Scenic River (2.3 miles). Potential adverse impacts to protected areas during construction and operation of the facility, with proposed changes, from noise, traffic, water use and wastewater disposal, and visual are discussed below.

³⁹ The *Final Order on the Application*, the Council considered potential facility impacts to Maryhill State Park in Washington. As shown in Table IV.F.1 in that order, Maryhill State Park is approximately 1 mile from the facility, as previously designed, across the Columbia River. The Department concludes that non-Oregon state parks are not identified as protected areas subject to the Council's Protected Areas standard. Under OAR 345-022-0040(h), protected areas include "State parks and waysides as listed by the Oregon Department of Parks and Recreation and the Willamette River Greenway." Being in Washington, Maryhill State Park is not listed by the Oregon Department of Parks and Recreation and therefore would not qualify as a protected area under the Council's standard. However, even if Maryhill State Park were considered to be a protected area, the Council previously found that the Golden Hills facility would not cause a significant adverse impact to the park from noise or other impacts. The park is across the Columbia River and there are a number of other intervening development features including I-84, SR-14, railroad lines, existing transmission lines, and other features.

1
2 RFA5 generally represents that the proposed larger wind turbines would result in fewer impacts
3 than previously evaluated by Council. In RFA5 Section 3.3, *Description of Proposed Changes*, the
4 certificate holder explains that while a change in the maximum number of wind turbines, at 125
5 wind turbines, is not requested, the proposed larger turbines would allow the certificate holder
6 to construct and operate fewer than 125 wind turbines. The certificate holder further describes
7 that it would be infeasible to construct and operate 125 proposed larger wind turbines (at 4.2
8 MW per wind turbine) as it would result in a violation of its interconnection agreement.

9
10 *Potential Noise Impacts*

11
12 The significance of potential noise impacts to identified protected areas is based on the
13 magnitude and likelihood of the impact on the affected human population or natural resource
14 that uses the protected area.⁴⁰ The nearest protected area, the Columbia Basin Agriculture
15 Research Center (Agriculture Research Center), is an agricultural experimental station owned
16 and operated by Oregon State University's College of Agricultural Sciences. As explained in *Final*
17 *Order on Amendment 3*, the Center is used for field research related to the production of wheat
18 and rotational crops. Any potential increase in operational noise from the facility, with
19 proposed changes, would not be expected to result in a significant adverse impact to the
20 agricultural field research conducted at the Center, because the Center's purpose and function
21 does not represent a human population or natural resource that could be affected by facility-
22 related noise levels.

23
24 The next closest protected area to the facility is the Lower Deschutes Wildlife Area (LDWA),
25 located approximately 1.8 miles southwest of the site boundary. The LDWA is managed by the
26 Oregon Department of Fish and Wildlife (ODFW) to improve and/or maintain habitats for native
27 and desired fish and wildlife species. Based on this function and purpose, the LDWA could be
28 affected if adverse noise levels from the facility, with proposed changes, were audible at LDWA.
29 Potential noise impacts at the LDWA from construction and operation of the facility, with
30 proposed changes, are evaluated below.

⁴⁰ The Protected Areas standard requires the Council to find that, taking into account mitigation, the design, construction and operation of a facility are not likely to result in significant adverse impacts to any protected area as defined by OAR 345-022-0040. OAR 345-001-0010(53) defines "significant" as: "having an important consequence, either alone or in combination with other factors, based upon the magnitude and likelihood of the impact on the affected human population or natural resources, or on the importance of the natural resources affected, considering the context of the action or impact, its intensity and the degree to which possible impacts are caused by the proposed action. Nothing in this definition is intended to require a statistical analysis of the magnitude or likelihood of a particular impact."

Construction

The Department notes that construction related noise impacts at protected areas within the analysis area were not specifically addressed in RFA5. However, the proposed larger turbines, larger meteorological towers, and changes in temporary access road width would generate construction-related noise. Therefore, the Department considers it necessary to evaluate whether the facility, with proposed changes, could result in potentially significant adverse noise impacts during construction at protected areas within the analysis area.

The certificate holder previously represented that a “worst-case noise scenario” during construction might include three pieces of equipment operating at full load at a single tower site and would result in 90 A-weighted decibels (dBA) at 50 feet, and would attenuate to approximately 64 dBA at the nearest residence approximately 1,000 feet away.⁴¹ For reference, “normal conversation” registers at 60 dBA and regular automobile traffic 50 feet away registers at approximately 70 dBA. In RFA5, with the exception of the proposed change in temporary road design, the certificate holder did not identify that the modified facility would result in new or differing construction activities, or changes in construction schedules. Moreover, the certificate holder has not requested to amend the previously approved site boundary or micrositings corridor. Therefore, the Department assumes that 64 dBA at 1,000 feet continues to represent a reasonable “worst-case noise scenario” during construction.

As described above, the closest protected area to the facility, with proposed changes, that may be affected by noise impacts is the LDWA located 1.8-miles from the site boundary. At this protected area, construction related noise levels are expected to be less than 50 dBA due to noise attenuation and topographical screening between, such as hills. For reference, sound levels of 50 dBA are representative of the sound level of a “typical office.”⁴² In addition, existing site certificate Condition CON-CJ-01 (VI.A.1.1) would reduce noise impacts during construction by requiring the use of exhaust mufflers on combustion engine-powered equipment and limiting the noisiest operation of heavy construction equipment to daylight hours. For these reasons, the Department recommends that Council find that construction of the facility, with proposed changes, would not be likely to result in significant adverse noise impacts at the LDWA. Because the other protected areas within the analysis area are located at greater distances from the facility site boundary than the LDWA, the Department recommends that Council find that potential construction-related impacts from the proposed amendments at these protected areas would also not likely be potentially significant or adverse.

⁴¹ GH1APPD01-28 ASC Exhibit X, p. 8, 2007-07.

⁴² GH1APPD01-28 ASC Exhibit X, Table X-2, 2007-07.

Operation

The facility, with proposed changes, would generate noise during facility operation; however, RFA5 states that the proposed larger wind turbines would generate a maximum noise level of 104.9 A-weighted decibels (dBA) per turbine, compared to the maximum noise level of the previously approved wind turbines at 106 dBA.⁴³ Based on noise modeling conducted during the ASC review phase, the Council found that facility-related operational noise would be inaudible at all protected areas other than the Agricultural Research Center, which as described above, based on its purpose and function would not be expected to be adversely impacted by noise.⁴⁴ Therefore, because the proposed larger wind turbines would generate similar or slightly lower per turbine noise levels than the previously evaluated wind turbines, and if selected would allow the certificate holder to site fewer wind turbines than currently allowed in the site certificate; and, because the certificate holder has not requested to amend the site boundary or micrositing corridor, the Department recommends Council find that operation of the facility, with proposed changes, would not be likely to result in significant adverse noise impacts to any protected areas within the analysis area.

Potential Traffic Impacts

Construction

The facility, with proposed changes, would generate construction-related traffic. In RFA5, the certificate holder describes that, if selected during final facility design, the proposed larger wind turbines would allow for the construction of fewer overall turbines resulting in an approximately 30 percent decrease in truck traffic compared to the truck traffic impacts evaluated in the Council's *Final Order on the ASC*. Because the certificate holder has not requested to amend its site boundary or micrositing corridors, and has not identified any new routes to be used during construction, the Department refers the Council to construction routes identified in ASC Exhibit U ~~of the ASC~~ and the construction-related traffic impacts evaluated in the *Final Order on the ASC*.

During the ASC review phase, the certificate holder identified roads that ~~will~~would be used during construction as U.S. Highway 97, Oregon Highway 206, and Sherman County-managed roads. In the *Final Order on the ASC*, the Council found that construction-related traffic, mostly short-term traffic delays, on U.S. Highway 97 and local roads could affect access to protected areas associated with the John Day River and Columbia Basin Agriculture Research Center.⁴⁵

⁴³ GHAMD5Doc15 Complete Request for Amendment 5 Section 3.3, Table 2, p. 9, 2018-07-06.

⁴⁴ GH1AMD3Doc118 Final Order on Amendment 3, p. 64, 2017-02-28.

⁴⁵ GH1APPD0208 Final Order on ASC, p.84, 2009-05-15.

1 However, given that these are not the primary access points, there are passing lanes on Hwy 97
2 and there are low traffic volumes, the Council found that local facility-related road use during
3 construction ~~and operation facility~~ would not result in a significant adverse impact to any
4 protected area.

5
6 The facility, with proposed changes, is expected to experience reduced traffic impacts
7 compared to the evaluation in the Council's *Final Order on the ASC*, where construction-related
8 traffic impacts were not expected to be significant or adverse.; Therefore, the Department
9 recommends that Council find that construction-related traffic impacts from the facility, with
10 proposed changes, would not be likely to result in significant adverse impacts to protected
11 areas within the analysis area.

12 13 Operation

14
15 The facility, with proposed changes, would generate operational-related traffic. However, the
16 proposed modifications in RFA5 would not result in changes to previously evaluated
17 operational traffic impacts of 10 to 15 vehicle trips per day, determined not likely to have a
18 significant adverse impact to protected area access roads.⁴⁶ Additionally, the proposed changes
19 to the facility in RFA5 would not result in changes to the expected number of permanent
20 employees. Therefore, the Department recommends Council find that traffic impacts resulting
21 from the operation of the facility, with proposed changes, would not be likely to result in
22 significant adverse impacts to protected areas within the analysis area.

23 24 Potential Water Use and Wastewater Impacts

25 26 Construction and Operation

27
28 Construction and operation of the facility, with proposed ~~amendments~~changes, would result in
29 water use and wastewater generation. However, as explained in RFA5, construction and
30 operation of the facility, with proposed ~~amendments~~changes, would not require more water,
31 nor increase the amount of wastewater generated than previously evaluated in the ASC.⁴⁷
32 Based on review of the record for the facility, approximately 25,000,000 gallons of water would
33 be used for dust control and concrete mixing during construction; and fewer than 5,000 gallons
34 of water per day would be used for O&M activities.⁴⁸ The Council previously found that the
35 anticipated construction and operational water use would not be likely to result in significant
36 adverse impacts to protected areas within the analysis area. Because the proposed larger wind

⁴⁶ GHAMD5Doc15 Complete Request for Amendment 5 Section 4.13, pp. 45-46, 2018-07-06.

⁴⁷ GHAMD5Doc15 Complete Request for Amendment 5 Section 4.13, 2018-07-06.

⁴⁸ GH1APPD01-19 ASC Exhibit O, p.1, 2007-07.

turbine type, if selected, would allow the certificate holder to construct and operate fewer than 125 wind turbines, and thereby less water use, the Department recommends that Council find that construction and operational water use from the facility, with proposed changes, would continue not to be likely to result in significant adverse impacts to protected areas within the analysis area.

Based on review of the record for the facility, construction-related wastewater includes concrete washwater, vehicle washwater, and stormwater runoff. Operational-related wastewater includes blade washwater, stormwater runoff, and sanitary effluent. In the ASC, the certificate described that wastewater would not be discharged into wetlands or adjacent resources, sanitary effluent would be treated by a septic system, and stormwater would infiltrate on site.⁴⁹ The Council previously imposed construction and operational conditions to minimize potential wastewater impacts, CON-WM-01 (V.D.3) Construction Sanitary Waste Handling and OPR-WM-01 (V.D.4) Operational Septic System Discharge Limitations, and found that the anticipated construction and operational wastewater generation would not be likely to result in significant adverse impacts to protected areas within the analysis area. Because the proposed larger wind turbine type, if selected, would allow the certificate holder to construct and operate fewer than 125 wind turbines, and thereby less wastewater generation, the Department recommends that Council find that construction and operational wastewater generation from the facility, with proposed changes would continue not to be likely to result in significant adverse impacts to protected areas within the analysis area.

Potential Visual Impacts of Facility Structures

The facility, with proposed changes, would result in visual impacts. To support its evaluation of potential visual impacts of the proposed amendments at protected areas, the certificate holder completed a revised “zone of visual influence” (ZVI) analysis. As described in RFA5, the ZVI analysis addresses potential wind turbine visibility based on topography and does not take into account screening from vegetation or structures. The revised ZVI analysis conservatively assumed 650-foot wind turbines at 125 locations to evaluate whether the taller wind turbines could be visible at different protected areas, or if the change would result in significant visual impacts at areas previously considered (see RFA5, Figure 3). The certificate holder’s revised ZVI analysis represents new areas near the Lower Deschutes Wildlife Area, John Day River, and the Columbia River Gorge National Scenic Area where the proposed taller wind turbines would be visible; however, the certificate holder argues that the new areas are small areas adjacent to

⁴⁹ GH1APPD0c1-16 ASC, p. 3, Exhibit L, 2007-07.

areas from which wind turbine visibility was previously identified, and therefore would not result in significant adverse visual impacts to protected areas.⁵⁰ The Department presents an assessment of the certificate holder's visual impact evaluation at these protected areas below. Consistent with the certificate holder's representation, all of the John Day protected areas are discussed together as "John Day River," and all of the Deschutes River protected areas are discussed together as "Deschutes River", because these areas overlap significantly (see Table 2, *Protected Areas within Analysis Area (Oregon) and Distance from Site Boundary* above).^{51, 52}

Deschutes River

The Deschutes River is a scenic waterway identified as a protected area under OAR 345-022-0040(1)(k) and located as close as 2.3 miles southwest of the site boundary.⁵³ Based on the revised ZVI analysis, the proposed larger wind turbines would not be visible from the areas of most use including the water, shoreline, or the lower canyon areas of the river. However, new areas of wind turbine visibility were identified along isolated canyon rims due to the taller maximum blade tip height of the proposed larger wind turbines. In many locations, Gordon Ridge, which follows the east side of the Lower Deschutes River Canyon to the west of the facility site boundary, would block views of wind turbines. Based on the distance from the

⁵⁰ GHAMD5Doc15 Complete Request for Amendment 5, Section 4.6, 2018-07-06.

⁵¹ GHAMD5Doc25. DPO Public Comment Gilbert. Comment 5. 2018-08-23. On the record of the draft proposed order public hearing, Ms. Gilbert makes several claims in reference to the Council's Protected Areas standard, as follows: 1) Visual impacts from proposed larger wind turbines, including visibility of structures and blinking lights, at the Columbia River Gorge National Scenic Area (CRGNSA) have not been adequately evaluated; reliance on viewscape of existing development is not justified; and, a cumulative impact analysis is necessary; 2) Minimal negative visual impacts should not be considered insignificant; and, 3) U.S. Forest Service and The Gorge Commission, as the designated management groups for the Gorge, should be Special Advisory Groups for the facility.

First, because Ms. Gilbert does not comment on the revised ZVI analysis provided in RFA5 and described in the draft proposed order, and because a cumulative analysis is not required under the standard, this claim is not considered further. Second, the Protected Areas standard does not prohibit all visual impacts to protected areas, therefore Ms. Gilbert's second claim is not considered further. Third, U.S. Forest Service and The Gorge Commission do not meet the statutory definition of a SAG, which pursuant to ORS 469.480 include the governing bodies of any local government within whose jurisdiction that facility is to be located. Therefore, Ms. Gilbert's third claim is not considered further.

⁵² GHAMD5Doc25. DPO Public Comment Marlette. 2018-08-23. On the record of the draft proposed order public hearing, Ms. Marlette expresses general concern of visual impacts of the facility with proposed changes to Deschutes River and Columbia River Gorge Scenic Area. It is not clear whether the comment raised issues with the visual impact assessment provided in RFA5 and evaluated in the draft proposed order. Therefore, the Department did not amend findings in the draft proposed order to the proposed order in response to this comment

⁵³ The Lower Deschutes Wildlife Area is the closest Deschutes River protected area to the site boundary located 1.8 miles southwest; however, this protected area is managed by ODFW to improve and/or maintain habitats for native and desired fish and wildlife species. Based on this function and purpose, visual impacts would not be considered an impact to this protected area, nor be considered significant or adverse.

Deschutes River to the facility site boundary, wind turbine visibility limited to river canyon rims, and topographical screening, the Department recommends Council find that the visual impacts of the facility, with proposed changes, would not be likely to result in a significant adverse impact to these protected areas.

John Day River

The John Day River is a scenic waterway identified as a protected area under OAR 345-022-0040(1)(k) and located as close as 5.2 miles east of the site boundary. Based on the revised ZVI analysis, the proposed larger wind turbines would not be visible from the areas of most use including the water, shoreline, or the lower canyon areas of the river. However, new areas of wind turbine visibility were identified along canyon rims and some canyon walls due to the taller maximum blade tip height of the proposed larger wind turbines. The certificate holder describes that views of wind turbines from the canyon rim were previously evaluated and determined not be a significant impact due to a number of intervening development features including other existing wind projects and transmission lines. The certificate holder also describes that visual impacts from the proposed larger wind turbines would be less because, if selected during final design, fewer overall turbines would be sited ~~if selected during final design~~. Based on this analysis, the Department recommends Council find that the visual impacts of the facility, with proposed changes, would not result in a significant adverse impact to ~~this~~ these protected areas.

Columbia River Gorge National Scenic Area

The CRGNSA is a national recreation and scenic area identified as a protected area under OAR 345-022-0040(1)(g) and located approximately 2.7 miles west of the site boundary. Based on the revised ZVI analysis, the proposed larger wind turbines would be visible from hillsides above and below State Route (SR)-14 (within the State of Washington), but these steep areas are not easily accessible to the general public. The proposed larger wind turbines would also be seen somewhat higher on the hillsides above SR-14 than the previously approved wind turbines, and on steep hillsides located below SR-14 and above the Columbia River. The same existing, intervening development features between SR-14 and the proposed larger wind turbines including multiple transmission lines (composed of steel lattice towers and distribution lines), radio towers, rail lines, Interstate 84, Highway 30, and rural development, would decrease the visual impact on views from SR-14. Based on this analysis, the Department recommends Council find that the visual impacts of the facility, with proposed changes, ~~would not result in a~~ significant adverse impact to this protected area.

Visual Impacts from Air Emissions

The facility, with proposed changes, would not result in air emissions or visual impacts from air emissions.

1 **Conclusions of Law**

2
3 Based on the foregoing recommended findings, the Department recommends that Council
4 ~~conclude-find~~ that the design, construction and operation of the facility, with proposed
5 changes, would not be likely to result in significant adverse impacts to any protected areas, in
6 compliance with the Council's Protected Area standard.

7
8 **III.G. Retirement and Financial Assurance: OAR 345-022-0050**

9
10 *To issue a site certificate, the Council must find that:*

11
12 *(1) The site, taking into account mitigation, can be restored adequately to a useful, non-*
13 *hazardous condition following permanent cessation of construction or operation of the*
14 *facility.*

15
16 *(2) The applicant has a reasonable likelihood of obtaining a bond or letter of credit in a*
17 *form and amount satisfactory to the Council to restore the site to a useful, non-*
18 *hazardous condition.*

19
20 **Findings of Fact**

21
22 The Retirement and Financial Assurance standard requires a finding that the facility site can be
23 restored to a useful, non-hazardous condition at the end of the facility's useful life, should
24 either the certificate holder stop construction or should the facility cease to operate. In
25 addition, it requires a demonstration that the certificate holder can obtain a bond or letter of
26 credit in a form and amount satisfactory to the Council to restore the site to a useful, non-
27 hazardous condition.

28
29 *Restoration of the Site Following Cessation of Construction or Operation*

30
31 OAR 345-022-0050(1) requires the Council to find that the ~~proposed facility~~ site of a facility can
32 be restored to a useful non-hazardous condition at the end of the ~~proposed~~ facility's useful life.

33
34 Based on review of the record for the facility, restoring the site to a useful, nonhazardous
35 condition upon cessation of construction or operations (or upon retirement) would involve
36 removal of all turbine components, meteorological towers, aboveground electrical
37 components, transformers and other substation equipment; removing foundations to a
38 minimum depth of three feet below grade; and grading and replanting the affected area. In
39 RFA5, the certificate holder asserts that the facility, with proposed changes, would not result in
40 changes to the tasks and actions previously identified as necessary to restore the site to a
41 useful, non-hazardous condition. Further, Council previously imposed conditions obligating the
42 certificate holder to prevent the development of conditions (Condition IV.C.1 through IV.C.10)
43 on the site that would preclude restoration.

1 Based upon compliance with existing conditions, the Department recommends Council find that
2 the site of the facility, with proposed changes, could be adequately restored to a useful, non-
3 hazardous condition following permanent cessation of construction or operation.

4
5 *Estimated Cost of Site Restoration*
6

7 OAR 345-022-0050(2) requires the Council to find that the certificate holder continues to have a
8 reasonable likelihood of obtaining a bond or letter of credit in a form and *amount* necessary to
9 restore the site of the facility, with proposed changes, to a useful non-hazardous condition
10 [Emphasis added].
11

12 In RFA5, the certificate holder requests flexibility in its final selection of wind turbine type,
13 including the ability to construct and operate the proposed larger wind turbines and the
14 previously approved maximum number of wind turbines (125). As noted throughout this order,
15 the certificate holder indicates that if the proposed larger wind turbines are selected during
16 final design, that as few as 95 wind turbines would be sited.
17

18 In RFA5, Section 4.7 Retirement and Financial Assurance, the certificate holder provides an
19 updated retirement cost estimate summary of approximately \$11 million, or \$13 million with
20 contingencies, if the proposed larger turbines are selected during final design.⁵⁴ However, it is
21 clarified that a reduction in the previously approved retirement cost estimate of \$14.4 million is
22 not requested. The updated retirement cost estimate summary presents total cost based on
23 facility component, but did not present the subtotals and individual line items contributing to
24 the summary values.
25

26 Council previously imposed Condition PRE-RT-01 (IV.C.4) requiring that the certificate holder,
27 prior to construction, provide a bond or letter of credit based on a final retirement cost
28 estimate. The final retirement cost estimate shall be based on final facility design and the unit
29 and general costs illustrated in Table IV.C.1 of the Final Order on the ASC. Table IV.C.1 is based
30 upon ASC Exhibit W, which utilized the Department's previously recommended

⁵⁴ GHAMD5Doc25. DPO Public Comment Gilbert. Comment 8. 2018-08-23. On the record of the draft proposed order public hearing, Ms. Gilbert argues that the certificate holder's retirement cost estimate does not include the cost of removal, preparation, transporting and disposal of wind turbine blades and concrete. Based on this assumption, Ms. Gilbert suggests that the retirement cost estimate does not represent an amount sufficient to decommission the facility and would not satisfy the Council's Retirement and Financial Assurance Standard (OAR 345-022-0050). Based on the Department's review of the record, and confirmation that the tasks and actions identified by Ms. Gilbert are included in the retirement cost estimate, findings under the Retirement and Financial Assurance standard from the draft proposed order to proposed order were amended to address this comment.

Decommissioning Cost Estimate Tool. Turbine blade and concrete removal, preparation, transporting and disposal are accounted for in the tool and in the previously approved and adjusted retirement cost estimates.⁵⁵

In RFA5, tThe certificate holder ~~however~~ requests to remove the limitation of 336 tons of combined weight of metal per turbine established in Condition PRE-DC-01 (III.A.1) sub(e). Based on the Department's review of the record for the facility, the combined weight of metal, per turbine, is used in the retirement cost estimate. Based on the maximum number of turbines allowed for the facility, the cost for removal of turbines, per ton of steel, equates to \$3.4 million of the previously approved \$14.4 million total retirement cost estimate.

The Department notes that if the combined weight of metal per turbine exceeds 336 tons and a maximum of 125 turbines is constructed and operated, as allowed, the retirement cost estimate would no longer be sufficient to restore the site to a useful, nonhazardous condition. However, the certificate holder represents that the proposed larger turbines would allow the certificate holder to construct and operate fewer than 125 wind turbines. The certificate holder further describes that it would be infeasible to construct and operate 125 proposed larger wind turbines (at 4.2 MW per wind turbine) as it would result in a violation of its interconnection agreement.⁵⁶ While the retirement cost estimate presented in RFA5 does not provide a unit cost breakdown, or the combined metal weight of the proposed larger wind turbines, because the retirement cost estimate for the proposed larger wind turbines is less than the \$14.4 million retirement estimate and bonding requirement previously approved by Council through Condition PRE-RT-01 (IV.C.4), the Department recommends that the Council continue to find that the previously approved \$14.4 million retirement cost estimate ~~continues to be~~ a reasonable estimate of an amount satisfactory to restore the facility site to a useful, non-hazardous condition.

Ability of the Applicant (Certificate Holder) to Obtain a Bond or Letter of Credit

OAR 345-022-0050(2) requires the Council to find that the applicant (certificate holder) has a reasonable likelihood of obtaining a bond or letter of credit in a *form* and amount necessary to restore the proposed facility site to a useful non-hazardous condition [Emphasis added]. A bond or letter of credit provides a site restoration remedy to protect the state of Oregon and its citizens if the certificate holder fails to perform its obligation to restore the site. The bond or letter of credit must remain in force until the certificate holder has fully restored the site. OAR

⁵⁵ GH1APPD0c1-27 ASC Exhibit W 2007-07. GH1AMD3Doc1 RFA3 Supplement, Attachment 6. 2016-03-18

⁵⁶ GHAMD5Doc15 Complete Request for Amendment 5, P. 7, 2018-07-06.

345-025-0010(8) establishes a mandatory condition, Condition PRE-RT-01 (IV.C.4), which ensures compliance with this requirement.

Based on review of the record for the facility, the Department refers Council to a December 19, 2017 financial assurance letter from Liberty Mutual Insurance Company, which is an entity included on the Council's pre-approved financial institution list. The financial assurance letter states that the certificate holder "is qualified for issuance of a single bond in the amount of \$75,000,000 with aggregate capacity of \$75,000,000."⁵⁷ The Council previously found this financial assurance letter to provide ~~be~~ adequate evidence that the certificate holder had a reasonable likelihood of obtaining a bond or letter of credit in a form determined by Council to be satisfactory. ~~when it approved the site certificate transfer to the current parent company of the certificate holder, Avangrid Renewables, as part of Amendment 4.~~ Because the certificate holder has not requested to reduce or change the previously approved bond amount, and based upon the recent nature (i.e. 2017) of the financial assurance letter, the Department recommends that Council find that the 2017 financial assurance letter remains adequate and that the facility, with proposed changes, would not impact the reasonable likelihood of certificate holder's ability to obtain a bond or letter of credit in a form and amount satisfactory to the Council to restore the site to a useful, non-hazardous condition.

Conclusions of Law

Based on the foregoing findings of fact, and subject to compliance with the existing conditions, the Department recommends that the Council find that the facility, with proposed changes, would continue to comply with the Council's Retirement and Financial Assurance standard.

III.H. Fish and Wildlife Habitat: OAR 345-022-0060

To issue a site certificate, the Council must find that the design, construction and operation of the facility, taking into account mitigation, are consistent with:

*(1) The general fish and wildlife habitat mitigation goals and standards of OAR 635-415-0025(1) through (6) in effect as of February 24, 2017****

Findings of Fact

The EFSC Fish and Wildlife Habitat standard requires the Council to find that the design, construction and operation of a facility is consistent with the Oregon Department of Fish and

⁵⁷ GH1AMD4Doc2-1 RFA4 Supplement, p.115, 2017-12-30.

Wildlife's (ODFW) habitat mitigation policy, goals, and standards, as set forth in OAR 635-415-0025. The ODFW Habitat Mitigation Policy, and EFSC Fish and Wildlife Habitat standard, creates requirements to mitigate impacts to fish and wildlife habitat, based on the quantity and quality of the habitat as well as the nature, extent, and duration of the potential impacts to the habitat. The policy also establishes a habitat classification system based on value the habitat would provide to a species or group of species. There are six habitat categories; Category 1 being the most valuable and Category 6 the least valuable

The analysis area for habitat characterization is 750 feet from 900 foot wide corridors surrounding wind turbines and roads, as well as 750 feet from new roads, substations, staging areas, meteorological towers, and overhead transmission lines.⁵⁸

Habitat Types and Categories in the Analysis Area

Habitat within the analysis area includes Categories 2, 3, 4 and 6, with Category 6 (agricultural land, the lowest quality habitat) representing 93 percent of total habitat. The identified Categories 2, 3 and 4 habitat and habitat subtypes within the analysis area include Category 2: Conservation Reserve Enhancement Program and Shrub-steppe, Category 3: Conservation Reserve Program and Grassland, and Category 4: Grassland.

In RFA5, the certificate holder relies upon ODFW's 2015 habitat category confirmation and review of recent aerial imagery to confirm that there have been no significant changes in habitat types since the 2006 habitat mapping conducted during the ASC review process. In its *Final Order on Amendment 4* (April 27, 2018), Council found that the habitat categorization and assessment conducted as part of RFA3 remains accurate, based on confirmation from ODFW.⁵⁹ The habitat categorization presented in this order is the same as that confirmed by ODFW and Council in April 2018. Finally, existing site certificate condition PRE-FW-02 (IV.M.1) requires that the certificate holder conduct a field-based habitat survey to confirm the habitat categories in areas that will be affected by the facility, with proposed changes, based on final facility design. The survey would also include locations of sensitive resources such as active raptor nests.

Potential Impacts to Habitat

The facility, with proposed changes, would cause temporary, temporal and permanent habitat impacts. In RFA5 the certificate holder explains that while a change in the maximum number of

⁵⁸ GH1APPD0208 Final Order on ASC, p.114. 2009-05-15.

⁵⁹ GH1AMD4Doc27 Final Order on Amendment 4, Section III.A.8, p. 42, 2018-04-27.

wind turbines, at 125 wind turbines, is not requested, the proposed larger wind turbines may allow the certificate holder to construct and operate fewer than 125 wind turbines, thereby reducing permanent habitat impacts.⁶⁰

Because the certificate holder requests flexibility in its final facility design, including selection of a mix-combination of wind turbine types and approval to site the maximum number (125) of previously approved wind turbines, the Department recommends that Council evaluate temporary, temporal and permanent habitat impacts assuming that the maximum approved 125 wind turbines would be constructed.

Construction Impacts

The Department assumes that construction impacts include 125 of the proposed larger wind turbines and an increase in disturbance impacts based on an increase in temporary access road and crane path width from 40 to 100-feet for up to 52 miles. Based on the Department's evaluation, the proposed change in temporary road and crane path width would result in approximately 378 acres of new temporary impacts; and 1,294 acres total of temporary impacts from the facility, with proposed changes. If additional temporary or temporal impacts to Category 2, 3 and 4 result from the facility, with proposed changes, the certificate holder would be required to mitigate impacts in accordance with its draft Habitat Mitigation and Revegetation Plan (HMRP) (see Attachment D to this DPO), as required per existing site certificate Condition PRE-FW-01 (IV.M.1) and GEN-FW-01 (IV.M.2).^{61 62}

⁶⁰ GHAMD5Doc15 Complete Request for Amendment 5, Section 4.8.1. 2018-07-06.

⁶¹ As required in the draft HMRP, to address the temporal loss of temporarily impacted Category 2 Shrub-steppe habitat quality and to satisfy ODFW's Category 2 habitat mitigation goal of "no net loss of either habitat quantity or quality and to provide a net benefit of habitat quantity or quality," the certificate holder agrees to enhance or create an additional 0.5 acres of Category 2 Shrub-steppe (representing 0.5:1 acre ratio) within a designated mitigation area. This is in addition to revegetation of the temporarily impacted area to pre-impact habitat quality and function. Temporary impacts to the remaining Category 2, 3 and 4 habitat subtypes including CREP, CRP and Grassland would be mitigated through required revegetation efforts, as described further in the draft HMRP~~this plan~~. In the event that temporary impacts to CREP, CRP and Native Grassland habitat subtypes within Category 3 and 4 habitat are not restored within a short timeframe (i.e. 2-3 years) following completion of construction, the Department in consultation with ODFW may require compensatory mitigation.

⁶² On the record of the draft proposed order public hearing, CTUIR requested that the certificate holder be required to manage noxious weeds. Council previously imposed Condition PRE-SP-01 (IV.E.F) requiring that, for the facility, the certificate holder monitor and control noxious weeds within the site boundary. The Department considers that the comment is addressed by the existing site certificate. In addition, CTUIR requested that certificate holder evaluate cumulative habitat impacts from the facility in combination with other wind facilities

As presented in Table 1 of the draft HMRP, the certificate holder previously estimated the maximum impact from temporal habitat loss of Category 2 (Shrub-steppe) to be 0.9 acres from the facility, as approved; and 2.9 acres of Category 2 (CREP and Shrub-steppe), 57.0 acres of Category 3 (CRP and Grassland), and 6.5 acres of Category 4 (Grassland) from temporary habitat loss.⁶³ The maximum impact of the facility, as approved, from temporary loss within Category 6 habitat is estimated at 1,002.2 acres.

Operational Impacts

In RFA5, the certificate holder confirms that the proposed larger wind turbines, if selected during final design, would not require differing O&M activities, including crane pad sites, crane walking and crane operation, than evaluated previously for the facility, as approved. Therefore, the Department assumes that the previous evaluation of permanent habitat impacts represents a worst-case scenario. As presented in Table 2 of the draft HMRP, the certificate holder previously estimated the maximum impact from permanent loss of habitat in Categories 3 (CRP and Grassland) and 4 (Grassland) to be 5.6 acres from the facility, as approved. The maximum impact of the facility, as approved, from permanent loss within Category 6 habitat is estimated at 127 acres.⁶⁴

The Department recommends Council administratively amend ~~changes to~~ Condition PRE-FW-04 (IV.M.9) to accurately reference the document (i.e. final Habitat Mitigation and Revegetation Plan versus Table 1 of Final Order on Amendment 3) to include final acreage impacts determined during final facility design. Based on the administrative conversion of the draft proposed order to the proposed order, the Department identified additional clarifying edits to Amended Condition PRE-FW-04 (IV.M.9) recommended for Council consideration. The clarifying edits would update an unclear reference to a figure representing approved micrositings corridors which final facility design maps must align (i.e. Figure 1 of the Amended Site Certificate instead of Figures P-1 through P-10 of the Application for site Certificate and August 2008 supplement).⁶⁵ Recommended edits to this condition from the draft proposed order to the proposed order are presented in hi-lite, underline/strikeout; recommended edits included in the draft proposed order are presented in underline/strikeout, only.

within the Columbia Basin, which is not required under a Council standard. CTUIR also posed general questions that are not further addressed as its relation to a Council standard was either not clear or determined not relevant.

⁶³ Temporal loss refers to loss of habitat function and values from the time an impact occurs to the time when the restored habitat provides a pre-impact level of habitat function.

⁶⁴ Impacts to Category 6 habitat do not require compensatory mitigation, per ODFW Policy and the EFSC Fish and Wildlife standard, and would be restored following construction per agreements with the landowner.

⁶⁵ Based on review of the record for the facility, the Department affirms that the micrositings corridors presented in Figure 1 of the Amended Site certificate are the same as those presented in Figure C-2 of the August 2008 ASC Supplement.

Amended Condition PRE-FW-04: Prior to construction, the certificate holder shall submit to the Department final facility design maps confirming that turbines and other facility components will be located within the 900-foot corridors shown on Figures P-1 through P-10 of the Application for a Site Certificate and August 2008 supplement Figure 1 of the Amended Site Certificate. The certificate holder shall not construct any facility components within areas of Category 1 or Category 2 habitat and shall avoid temporary disturbance of Category 1 or Category 2 habitat, except for those acreages allowed in the final Habitat Mitigation and Revegetation Plan (HMRP) Table 1 in the Final Order for RFA No. 3. The certificate holder may rely upon the maps and data submitted per Condition IV.M.1 to satisfy this condition.

[Final Order on ASC, Condition IV.M.9; Amended in Final Order on AMD3, AMD4, AMD5]

Potential Impacts to State Sensitive Species

In RFA5, the certificate holder identifies suitable habitat within the analysis area for 10 state sensitive species including one fish (Steelhead summer), one reptile (Northern sagebrush lizard), and eight bird species (Brewer's sparrow, Burrowing owl, Common nighthawk, Ferruginous hawk, Grasshopper sparrow, Loggerhead shrike, Long-billed curlew, Sagebrush sparrow).⁶⁶ Based on the Department's review, all of the species identified with suitable habitat within the analysis area represent state sensitive species previously considered by Council for this facility. As noted, existing site certificate condition PRE-FWDC-02 (IV.M.1.III.C.1) requires that, prior to construction, the certificate holder conduct a field-based habitat survey to confirm the habitat categories in areas that will be affected by the facility, based on final facility design, and that survey will also include locations of sensitive resources such as active raptor nests. If active nests are found, existing condition CON-FW-01 (IV.M.10) and PRE-FW-02 (IV.M.4) require a protective 0.25 mile buffer zone be established during construction for the nesting and breeding season.

⁶⁶ GHAMD5Doc15 Complete Request for Amendment 5, p.22. 2018-07-06.

The area to be included in these pre-construction surveys, as referenced by the condition, includes all areas temporarily and permanently affected by construction and operation of facility components. {Emphasis added}. The existing condition requires the certificate holder to obtain approval of the habitat survey protocol prior to completing the survey, but references a protocol provided in the ASC Exhibit P which previously established survey area buffers extending 750-feet from 500-feet (or 1,250-ft) of wind turbines and existing roads, and buffers extending 750-feet from new roads. The assessment of appropriate survey buffers, and evaluation of potential changes to the previously established buffers, will be evaluated prior to construction and confirmed by the Department and ODFW. ⁶⁷

Impacts from construction and operation of the facility, with proposed changes, would include a small loss of potentially suitable habitat and turbine collision fatality risk for avian species. Potential habitat impacts from the facility, with proposed changes, are described above. The changes proposed in RFA5, specifically the proposed larger wind turbines, may pose additional avian collision risk due to the larger rotor-swept area from the longer turbine blades and taller hub height. The certificate holder also identifies that the proposed taller maximum blade tip height may cause the rotor-swept area to overlap with flight heights of migrating birds that were previously above shorter turbine models, also leading to increased collision risk. Moreover, the proposed lower aboveground minimum blade tip clearance may lead to greater collision risk of low-flying avian species that would have passed below the blade clearance of previous wind turbine models. However, RFA5 cites various scientific studies that have shown conflicting results, and concludes that there is no consensus and remaining uncertainty whether larger wind turbines increase mortality risk to avian species. The certificate holder also notes that if fewer turbines are used at the facility, as is possible if the proposed larger wind turbines are selected during final design, it is possible that the risk of collision is may be reduced accordingly.⁶⁸

⁶⁷ GHAMD5Doc25. DPO Public Comment Gilbert. Comment 6. 2018-08-23. On the record of the draft proposed order public hearing, Ms. Gilbert makes several claims in reference to the Council's Fish and Wildlife Habitat standard, as follows: 1) Limiting pre-construction survey areas to the footprint of laydown areas, new substation, mitigation areas, and existing roads is inadequate; 2) Survey areas do not appear to include connecting corridors between turbine strings and transmission line alignment; and, 3) Survey area should include required setbacks for protection of wildlife. It is not clear whether Ms. Gilbert expressly has concerns regarding the adequacy of the existing condition; however, the Department provides clarifying edits under the Fish and Wildlife Habitat section from the draft proposed order to proposed order in response to this comment.

⁶⁸ In a comment received on the pRFA5, ODFW expressed that there have been studies in the US that show wildlife collision risk is "primarily influenced by turbine and blade-tip height," and that bird collisions in particular have been shown to increase with turbine height. ODFW also explained that new, larger turbines, presumably the type associated with the amendment request, have not been implemented in the Pacific Northwest and as such, there

1 While current scientific studies regarding increased collision risk to birds and bats from larger
2 wind turbines may be uncertain, the Council previously imposed Condition OPR-FW-05 (IV.M.11)
3 requiring the certificate holder to implement a Wildlife Monitoring and Mitigation Plan
4 (WMMP). The WMMP, currently in draft form and included as Attachment F to this order,
5 requires the certificate holder to conduct ~~a post-construction bird and bat fatality monitoring~~
6 ~~study and an avian use and behavior study, both of which will provide important data that can~~
7 ~~be used in adaptive management.~~ short-term and long-term surveys to evaluate wildlife
8 impacts. Specifically, the WMMP requires that the certificate holder conduct raptor nest
9 surveys on 5-year intervals for the life of the facility. The WMMP also requires that the
10 certificate holder conduct a short-term post-construction bird and bat fatality monitoring study
11 and an avian use and behavior study, both of which will provide important data that can be
12 used in adaptive management.⁶⁹

13
14 Based on ODFW comments on pRFA5, the Department recommends amendments to the draft
15 WMMP post-construction bird and bat fatality monitoring study to specify that the sample size
16 of wind turbines include an equal proportion of each wind turbine type, if a mix of wind turbines
17 is selected during final design, and that it include meteorological towers. Including a
18 representative sample of all wind turbine models used at the facility will provide data regarding
19 each wind turbine model's impact on avian and bat species that can be used in adaptive
20 management at the facility and future management recommendations in accordance with the
21 WMMP.⁷⁰ Results of these post-construction studies would be compared against the WMMP's
22 thresholds of concern that, if exceeded, would require the certificate holder to implement
23 additional mitigation if determined appropriate. The Department recommends Council amend
24 the draft WMMP to clarify that if any mitigation is required for a threshold of exceedance, that
25 the mitigation must be approved through amendment of the WMMP by Council. ~~The draft~~

are no assessments of the relative risks of increased collision with birds and bats in the region that could inform management recommendations. GHAMD5Doc3-1, pRFA Reviewing Agency Comment ODFW Thompson 2018-06-12

⁶⁹ GHAMD5Doc25, DPO Public Comment Gilbert, Comment 7, 2018-08-23. On the record of the draft proposed order public hearing, Ms. Gilbert requests that, based on the increase in rotor diameter and swept area of the proposed larger wind turbines, the certificate holder be required to monitor bird and bat impacts for the life of the facility. Ms. Gilbert references OAR 469.507, which the Department presumes is a reference to ORS 469.507. ORS 469.507 requires the establishment of programs for monitoring the environmental and ecological effects of the construction and operation of an energy facility. The statute, however, does not identify or require specific monitoring programs, nor establish a specific duration for which monitoring programs be implemented. Condition OPR-FW-05 (IV.M.11) aligns with the statutory intent of ORS 469.507. The Department amends findings under the Council's Fish and Wildlife Habitat standard to address this comment, but does not impose a requirement for long-term bird and bat fatality monitoring as scientific evidence has not been presented warranting such mitigation for the potential issue. As described in this section, the potential issue of wildlife impacts from wind turbine collision will be evaluated based on actual data obtained during operational surveys and mitigated based upon Council determination of appropriate mitigation benefiting the impacted species.

⁷⁰ GHAMD5Doc13, pRFA Reviewing Agency Comment ODFW Thompson, 2018-07-02.

~~amended WMMP is included as Attachment F to this DPO. Additional mitigation could include other wildlife studies or other mitigation as deemed appropriate, through Council review, as sufficiently benefiting the affected species.~~

Based on the above analysis, and subject to compliance with existing and recommended amended site certificate conditions, the Department recommends that the Council find that the design, construction, and operation of the facility, with proposed changes, taking into account mitigation, would be consistent with the fish and wildlife habitat mitigation goals and standards of OAR 345-415-0025.

Conclusions of Law

Based on the foregoing findings of fact and conclusions, and subject to compliance with existing and recommended amended site certificate conditions, the Department recommends the Council find that the facility, with proposed changes, would comply with the Council's Fish and Wildlife Habitat standard.

III.I. Threatened and Endangered Species: OAR 345-022-0070

To issue a site certificate, the Council, after consultation with appropriate state agencies, must find that:

(1) For plant species that the Oregon Department of Agriculture has listed as threatened or endangered under ORS 564.105(2), the design, construction and operation of the proposed facility, taking into account mitigation:

(a) Are consistent with the protection and conservation program, if any, that the Oregon Department of Agriculture has adopted under ORS 564.105(3); or

(b) If the Oregon Department of Agriculture has not adopted a protection and conservation program, are not likely to cause a significant reduction in the likelihood of survival or recovery of the species; and

(2) For wildlife species that the Oregon Fish and Wildlife Commission has listed as threatened or endangered under ORS 496.172(2), the design, construction and operation of the proposed facility, taking into account mitigation, are not likely to cause a significant reduction in the likelihood of survival or recovery of the species.

Findings of Fact

The Threatened and Endangered Species standard requires the Council to find that the design, construction, and operation of the facility, with proposed changes, are not likely to cause a significant reduction in the likelihood of survival or recovery of a fish, wildlife, or plant species

1 listed as threatened or endangered by ODFW or Oregon Department of Agriculture (ODA). For
2 threatened and endangered plant species, the Council must also find that the facility, with
3 proposed changes, is consistent with an adopted protection and conservation program from
4 ODA. Threatened and endangered species are those listed under ORS 564.105(2) for plant
5 species and ORS 496.172(2) for fish and wildlife species. For the purposes of this standard,
6 threatened and endangered species are those identified as such by either the ODA or the
7 Oregon Fish and Wildlife Commission.⁷¹

8
9 The analysis area for threatened or endangered plant and wildlife species is the area within and
10 extending five miles from the site boundary.

11 12 *Potential Impacts to Identified Threatened and Endangered Species*

13
14 In order to identify endangered and threatened species that might occur within the analysis
15 area, the certificate holder, in 2016, conducted aerial raptor nest surveys within 10 miles of the
16 micrositing corridors and for this amendment request conducted desktop surveys using ORBIC
17 data (December 21, 2017), the U.S. Fish and Wildlife Service Information for Planning and
18 Consultation (IPaC) species list (USFWS 2017), the National Marine Fisheries Service list of
19 anadromous fish species within the Interior Columbia Recovery Domain (NMFS 2016), the ODA
20 listed plant species for Sherman County (ODA 2017), and the ODFW list of threatened,
21 endangered, and candidate fish and wildlife species in Oregon (ODFW 2017). Additionally, the
22 certificate holder conducted rare plant surveys in 2007, and in 2016 specific to site boundary
23 changes. In RFA5, the certificate holder confirms that no listed plant species were observed and
24 habitat would not support listed plants.

25
26 Based on its desktop review and field surveys, the certificate holder identified five state-listed
27 species with the potential to occur within the analysis area including the North American
28 wolverine, Washington ground squirrel, Snake River chinook salmon, northern wormwood, and
29 Laurence's milkvetch. This list of species, with the exception of species no longer listed, was
30 previously evaluated by Council for the facility. The proposed facility changes to allow for a
31 larger wind turbine model is-are not anticipated to significantly impact any of the state-listed
32 species.

33
34 The Department recommends Council conclude that because the site boundary and micrositing
35 corridor are not being amended, because the site boundary is predominantly Category 6
36 habitat and would not provide suitable habitat for the five state-listed species, the facility with

⁷¹ Although the Council's Threatened and Endangered Species standard does not address federally-listed threatened or endangered species, a certificate holder must comply with all applicable federal laws, including laws protecting those species, independent of the site certificate.

proposed changes would not be likely to cause a significant reduction in the likelihood or survival of any species listed as threatened or endangered.

Council previously imposed conditions to minimize potential impact to threatened and endangered species, which would continue to apply to the facility, with ~~the~~ proposed ~~facility~~ changes. Conditions PRE-TE-01 (IV.L.1), PRE-TE-02 (IV.L.2), and PRE-TE-03 (IV.L.3) require a pre-construction database review for documentation of nesting bald eagles and peregrine falcon; preparation of sensitive wildlife area maps during construction activities; and a pre-construction field survey for threatened and endangered species.

Condition PRE-TE-03 (IV.L.3) requires that, prior to construction, the certificate holder a conduct field-based survey, according to protocols reviewed and approved by the Department in consultation with ODFW, to confirm presence of threatened or endangered species. The area to be included in the pre-construction survey, as referenced by the condition, includes *all areas temporarily and permanently affected by construction and operation of facility components.* {Emphasis added}. The existing condition requires the certificate holder to obtain approval of the species survey protocol prior to completing the survey.⁷²

Conclusions of Law

Based on the foregoing findings of fact and conclusions, and subject to compliance with the existing site certificate conditions, the Department recommends that the Council find that the facility, with proposed changes, would continue to comply with the Council's Threatened and Endangered Species standard.

III.J. Scenic Resources: OAR 345-022-0080

(1) Except for facilities described in section (2), to issue a site certificate, the Council must find that the design, construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to scenic resources and values identified as significant or important in local land use plans,

⁷² GHAMD5Doc25. DPO Public Comment Gilbert. Comment 6. 2018-08-23. On the record of the draft proposed order public hearing, Ms. Gilbert makes several claims in reference to the Council's Threatened and Endangered Species standard, as follows: 1) Limiting pre-construction survey areas to the footprint of laydown areas, new substation, mitigation areas, and existing roads is inadequate; 2) Survey areas do not appear to include connecting corridors between turbine strings and transmission line alignment; and, 3) Survey area should include required setbacks for protection of wildlife. It is not clear whether Ms. Gilbert expressly has concerns regarding the adequacy of the existing condition; however, the Department provides clarifying edits under the Threatened and Endangered Species section from the draft proposed order to proposed order in response to this comment.

tribal land management plans and federal land management plans for any lands located within the analysis area described in the project order.

Findings of Fact

The Scenic Resources standard requires the Council to find that the facility would not cause a significant adverse impact to identified scenic resources and values. To be considered under the standard, scenic resources and values must be identified as significant or important in local land use plans, tribal land management plans, and/or federal land management plans.

The analysis area for scenic resources includes the area within and extending 10 miles from the site boundary.⁷³ There are no lands administered by tribal governments within the analysis area.

Applicable Land Use Plans

The Department presents the applicable land use plans with significant or important scenic resources in Table 3, *Summary of Applicable Land Use Plans and Scenic Resources within the Analysis Area* below.⁷⁴ In RFA5, the certificate holder did not specifically identify applicable land use plans with significant or important scenic resources and values. Therefore, the Department relies upon the record for the facility, and confirms that the certificate holder reviewed the plans presented in Table 3, *Summary of Applicable Land Use Plans and Scenic Resources within the Analysis Area* in December 2017 and at that time confirmed that no new important scenic resources or values had been identified within an applicable land use plan.

Table 3: Summary of Applicable Land Use Plans and Scenic Resources within the Analysis Area

Applicable Land Use Plans for Analysis Area	Important or Significant Resource Identified within Analysis Area
Sherman County Comprehensive Land Use Plan (Amended 2007)	No
Management Plan for the Columbia River Gorge National Scenic Area (Revised May 2004)	Yes
John Day Proposed Management Plan, Two Rivers and John Day Resource Management Plan Amendments and Final Environmental Impact Statement (June 2001)	Yes
National Historic Trail and Mormon Pioneer National Historic Trail	Yes

⁷³ GH1APPD0208 Final Order on ASC, p. 86, 2009-05-15.

⁷⁴ GH1AMD4Doc2-1 RFA4 Supplement, 2017-12-30.

Table 3: Summary of Applicable Land Use Plans and Scenic Resources within the Analysis Area

Applicable Land Use Plans for Analysis Area	Important or Significant Resource Identified within Analysis Area
(August 1999)	
Lewis and Clark National Historic Trail Comprehensive Plan for and Management and Us (January 1998)	Yes
Lower Deschutes River Management Plan and Final Environmental Impact Statement (January 1993)	Yes
Proposed Two Rivers Resource Management Plan Final Environmental Impact Statement (September 1985)	No
Spokane Resource Management Plan Record of Decision (May 1987)	No
Journey Through Time Management Plan (April 1996)	Yes
Comprehensive Plan for Wasco County [Oregon] (June 2010)	No
Gilliam County [Oregon] Comprehensive Land Use Plan (May 2017)	No

Significant or important scenic resources previously identified in applicable land use plans within the analysis area include: ⁷⁵

- Lands within the Columbia River Gorge National Scenic Area (CRSNSA)
- State Route 14 within CRGNSA
- Lower Deschutes River and corridor
- John Day River and corridor
- Journey Through Time Scenic Byway
- Oregon National Historic Trail (high-potential sites)
- Sherman County landscape

Visual Impacts

Under the Scenic Resources standard, pursuant to OAR 345-021-0010(r)(C), potential visual impacts at identified resources from loss of vegetation or alteration of landscape and from facility structures or plumes during facility-related construction and operations are evaluated.

RFA5 seeks approval to construct and operate a differing wind turbine type with a taller maximum blade tip height from 158 to 198 meters (518 to 650 feet) and taller meteorological

⁷⁵ GH1APPD0208 Final Order on ASC, Table IV.G.1, 2009-05-19.

1 towers from 95 to 123 meters (312 to 404 feet). The certificate holder explains that the
2 proposed larger wind turbines would allow the certificate holder to construct and operate
3 fewer than 125 wind turbines, as previously approved; however, the certificate holder has not
4 requested to reduce the previously approved maximum number of wind turbines (125) or
5 meteorological towers (6). The Department's analysis of the certificate holder's visual impact
6 evaluation of proposed taller structures at scenic resources is presented below.

7 8 *Loss of Vegetation* 9

10 Construction of the facility, with proposed changes, would result in temporary vegetation loss.
11 Temporary vegetation loss would be restored through the certificate holder's implementation
12 of a final Habitat Mitigation and Revegetation Plan, to be reviewed and approved by the
13 Department prior to construction, in accordance with Condition PRE-FW-01 (IV.M.1). Operation
14 of the facility, with proposed changes, would result in permanent vegetation loss from the
15 footprint of facility components. Based on compliance with Condition PRE-FW-01 (IV.M.1) and
16 the distance of at least 5 miles from the facility site boundary to the nearest scenic resource,
17 the Department recommends Council find that visual impacts from temporary and permanent
18 vegetation loss would not be likely to result in a significant adverse impact at the significant or
19 important scenic resources identified within the analysis area.

20 21 *Facility Structures* 22

23 The proposed larger wind turbines and meteorological towers would result in visual impacts. To
24 support its evaluation of potential visual impacts of the proposed larger wind turbines at
25 significant or important scenic resources, the certificate holder completed a revised "zone of
26 visual influence" (ZVI) analysis. As described in RFA5, the ZVI analysis addresses potential wind
27 turbine visibility based on topography and does not take into account screening from
28 vegetation or structures. The revised ZVI analysis conservatively assumed 650-foot wind
29 turbines at 125 locations to evaluate whether the taller wind turbines could be visible at
30 different scenic resources, or if the change would result in significant visual impacts at areas
31 previously considered (see RFA5, Figure 3).

32
33 Based on the revised ZVI analysis, the certificate holder confirms that no new scenic areas
34 would be impacted and that the proposed larger wind turbines would be visible from the same
35 scenic resources previously considered by Council.⁷⁶ However, more wind turbines may be
36 visible and visibility may be slightly extended in specific locations along the Lower Deschutes
37 River and corridor, John Day River and corridor, "high-potential" sites along the Oregon

⁷⁶ GHAMD5Doc15 Complete Request for Amendment 5, p. 35, 2018-07-06.

1 National Historic Trail, and lands and SR-14 within the CRGNSA. An evaluation of potential
2 visibility impacts at these scenic resources is provided below.

3 4 Columbia River Gorge National Scenic Area 5

6 The CRGNSA is managed for its “unparalleled combination of scenery, geology, plants, wildlife
7 and multicultural history.”⁷⁷ The certificate holder presents that the closest wind turbines
8 would be approximately 5 miles from the CRGNSA, and 7.5 miles from SR-14 within the
9 CRGNSA, across the Columbia River in Washington. Based on the revised ZVI analysis, the
10 proposed larger wind turbines would be visible from hillsides above and below SR-14 (within
11 the State of Washington), but these steep areas are not easily accessible to the general public.
12 The proposed larger wind turbines would also be seen somewhat higher on the hillsides above
13 SR-14 than the previously approved turbines, and on steep hillsides located below SR-14 and
14 above the Columbia River. The same existing, intervening development features between SR-14
15 and the proposed larger wind turbines including multiple transmission lines (composed of steel
16 lattice towers and distribution lines), radio towers, rail lines, Interstate 84, Highway 30, and
17 rural development, would decrease the visual impact on views from SR-14. Because the visual
18 character, including existing development features, of the area has not changed, and due to the
19 distance of the facility to the CRGNSA, the Department recommends that Council find that the
20 facility, with proposed changes, would not be likely to result in a significant adverse impact at
21 the scenic resources and values identified as significant or important in the CRGNSA
22 management plans.

23 24 Oregon National Historic Trail⁷⁸ 25

26 The Oregon National Historic Trail (NHT) is a broad meandering route along favorable ridges,
27 valleys, and stream crossings. While the certificate holder describes that the proposed larger
28 wind turbines would be visible from Oregon NHT trail routes, consistent with previous Council
29 orders, visual impacts are specifically evaluated from three “high potential sites” along with
30 NHT: the McDonald Ferry John Day River Crossing, Biggs Junction, and the Deschutes River
31 Crossing. These sites were previously identified based on criteria established in the National
32 Trails System Act including historic significance, the presence of visible historic remnants, scenic
33 quality, and relative freedom from intrusion (NPS, 1999), and are all located at least 5 miles

⁷⁷ GH1APPD0c1-22 ASC Exhibit R, Section R.3, 2007-07.

⁷⁸ In RFA5 Section 4.10 *Scenic Resources*, the certificate holder does not address potential visual impacts at the two Oregon National Historic Trail high potential sites previously identified; rather, potential visual impacts to these high-potential sites are addressed in RFA5 Section 4.11 *Historic, Cultural and Archeological Resources*. The Department therefore relies upon the impact assessment for the Oregon National Historic Trail high-potential sites as provided in RFA5 Section 4.11 *Historic, Cultural and Archeological Resources* to inform the evaluation under the Scenic Resources standard.

1 from the nearest micrositing corridor. Based on the revised ZVI analysis, the certificate holder
2 asserts that the proposed larger wind turbines would not be visible from the three high-
3 potential sites due to topography. Due to the distance of the facility, with proposed changes,
4 from the resources, and the certificate holder's assertion that topographical screening blocks
5 the visibility of the proposed larger wind turbines at these "high potential sites," the
6 Department recommends Council find that the facility, with proposed changes, would not
7 result in a significant adverse impact to these scenic resources.

8 9 Lower Deschutes River and Corridor

10
11 The Lower Deschutes River and corridor is a designated Federal Wild and Scenic River and
12 Oregon State Scenic Waterway. The Lower Deschutes Canyon "contains a diversity of
13 landforms, vegetation, and color."⁷⁹ The certificate holder presents that the closest wind
14 turbines would be approximately 5.5 miles from the Lower Deschutes River and corridor. The
15 certificate holder's revised ZVI analysis determined that the proposed taller wind turbines
16 would continue to be visible from portions of the corridor, as previously evaluated, but that
17 there would be new areas of wind turbine visibility within the scenic resource boundary (see
18 RFA5 Figure 4 Scenic and Aesthetic Values). While the incremental increase in maximum blade
19 tip height would result in increased turbine visibility at areas within the corridor, the certificate
20 holder characterizes the increase as slight compared to its previous visual impact assessments
21 on the record.

22
23 Based on the revised ZVI analysis, the proposed larger wind turbines would not be visible from
24 the areas of most use including the water, shoreline, or the lower canyon areas of the river.
25 However, new areas of wind turbine visibility were identified along isolated canyon rims due to
26 the taller maximum blade tip height of the proposed larger turbines. In many locations, Gordon
27 Ridge, which follows the east side of the Lower Deschutes River Canyon to the west of the
28 facility site boundary, would block views of wind turbines. BLM's management and visual
29 resource plan includes objectives to protect the river from visual impacts.⁸⁰ Because visibility of
30 the proposed larger turbines would be limited to isolated areas with limited public access, and
31 would not be visible from the Deschutes River, shoreline, or interior canyon walls, the
32 Department recommends the Council find the facility, with proposed changes, is not likely to
33 result in a significant adverse impact to the scenic resources and values identified as significant
34 and important in the management plans for the Deschutes River Canyon.

⁷⁹ GH1APPD0c1-22 ASC Exhibit R, Section R.3, 2007-07.

⁸⁰ GH1APPD0c208 Final Order on ASC, pp.-87-90, 2009-05-19.

1 Journey Through Time Scenic Byway

2
3 The Journey Through Time Scenic Byway (US-97) (scenic byway) is a 286-mile route through
4 north central Oregon that provides a scenic byway of Oregon's rural heritage and history. The
5 scenic byway traverses through the site boundary. However, the certificate holder represents
6 that the closest wind turbine would be 0.3 miles from the scenic byway.

7
8 The certificate holder's revised ZVI analysis determined that the proposed taller wind turbines
9 would continue to be visible from the scenic byway, as previously evaluated, but that there
10 would be new areas of wind turbine visibility within the scenic resource boundary (see RFA5
11 Figure 4 Scenic and Aesthetic Values). The Department recommends Council rely on its previous
12 reasoning to evaluate the significance of potential visual impacts at the scenic byway from the
13 proposed larger wind turbines and meteorological towers.

14
15 As discussed in Council's *Final Order on the ~~Application~~ASC*, the management plan for the scenic
16 byway as well as the cities of Moro and Wasco do not identify any significant or important
17 scenic values for the byway, and there were no scenic overlooks or waysides along the byway in
18 the analysis area.⁸¹ Furthermore, in the *Final Order on the ~~Application~~ASC*, the Council found
19 that the byway management plan emphasizes management goals and values including creating
20 jobs, maintaining rural lifestyles, protecting important values such as historical attractions and
21 artifacts, and building identity for the region. Additionally, there are other development
22 features visible along the route. Based on Council's previous reasoning, the Department
23 recommends that Council find that the facility, with proposed changes, is not likely to result in a
24 significant adverse impact to the scenic resources and values identified as significant and
25 important in the management plans for the scenic byway.

26
27 John Day River Canyon

28
29 The John Day River Canyon (the area rim-to-rim) is part of more than 500 river miles and is
30 identified as an "area of high visual quality." The facility, with proposed changes, would be
31 located approximately 9 miles from the closest section of the John Day River, and would be
32 separated from the river by a number of existing wind projects and transmission lines. The
33 certificate holder's revised ZVI analysis determined that the proposed taller wind turbines
34 would be potentially visible in very remote portions of upper rims of the John Day River

⁸¹ GH1APPD0208 Final Order on ASC, Section IV.G. 2009-05-19.

1 Canyon, but that no wind turbines would be seen from the river, its shoreline, or lower canyon
2 areas.

3
4 BLM's management and visual resource plan includes objectives to protect the river from visual
5 impacts.⁸² Because visibility of the proposed larger wind turbines would be limited to isolated
6 areas with limited public access, and would not be visible from the John Day River Canyon
7 shoreline, or interior canyon walls, the Department recommends the Council find the facility,
8 with proposed changes, would not be likely to result in a significant adverse impact to the
9 scenic resources and values identified as significant and important in the management plans for
10 the John Day River Canyon.

11 Sherman County

12
13
14 Sherman County has identified trees, rock outcroppings, the John Day and Deschutes River
15 canyons, and the rural nature of the Sherman County landscape as important local scenic
16 resources. The facility, with proposed changes, would be located approximately 5 miles from
17 the closest scenic resource within Sherman County. The facility, with proposed changes, would
18 not require new or amended site boundary or micro-siting area; therefore, impacts to trees or
19 rock outcroppings would not be expected. As described above, the facility, with proposed
20 changes, would also not be expected to significantly impact the visual resources within
21 Sherman County including the John Day and Deschutes River canyons.

22
23 The Department recommends Council rely on additional reasoning included in *Final Order on*
24 *Amendment 3*. This reasoning included reference to the facility's limited permanent impact to
25 wheat fields, farms, and other rural character elements and findings that the proposed taller
26 wind turbines would be similar in appearance and character to wind turbines featured in
27 Sherman County tourism brochures such as Windmills & Wheatfields: Scenic Cycling Tour
28 Through Sherman County and Windmills and Wheatfields: Oregon Wind Farm Driving Tour that
29 celebrate the rural character of Sherman County along with the County's unique position as
30 "Oregon's #1 wind farm region."⁸³ Finally, the Council previously found in the *Final Order on the*
31 *Application-ASC* that the facility satisfied the Council's Land Use standard which includes the
32 applicable substantive criteria from the Sherman County Comprehensive Plan and Sherman
33 County Zoning Ordinance, and in Section ~~IV.A.5III.E Land Use~~ above of this order, the
34 Department recommends that the Council find that the facility, with proposed changes,
35 continues to meet the Land Use standard. Based on ~~these findings~~ this analysis, the
36 Department recommends Council find~~s~~ that the facility, with proposed changes, is not likely to

⁸² GH1APPD0208 Final Order on ASC, pp.-87-88, 2009-05-19.

⁸³ GH1AMD3Doc118 Final Order on Amendment 3, p. 90, 2017-02-28.

result in a significant adverse impact to the scenic resources and values identified as significant or important in the Sherman County Comprehensive Plan.

Conclusion of Law

Based on the foregoing findings of fact and conclusions of law, the Department recommends the Council find that the facility, with proposed changes, would continue to comply with the Council's Scenic Resources standard.

III.K. Historic, Cultural, and Archaeological Resources: OAR 345-022-0090

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impacts to:

(a) Historic, cultural or archaeological resources that have been listed on, or would likely be listed on the National Register of Historic Places;

(b) For a facility on private land, archaeological objects, as defined in ORS 358.905(1)(a), or archaeological sites, as defined in ORS 358.905(1)(c); and

(c) For a facility on public land, archaeological sites, as defined in ORS 358.905(1)(c).

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

Findings of Fact

Subsection (1) of the Historic, Cultural and Archaeological Resources standard, OAR 345-022-0090, requires the Council to find that the facility is not likely to result in significant adverse impacts to identified historic, cultural, or archaeological resources. Pursuant to OAR 345-022-0090(2), the Council may issue a site certificate for a facility that would produce power from wind energy without making findings regarding the Historic, Cultural and Archeological standard; however, the Council may impose site certificate conditions based upon the requirements of the standard.

The analysis area is the area within the site boundary. There are three aboveground historic resources protected by the Council's Historic, Cultural, and Archaeological Resources standard within the analysis area that could be affected by the facility, with proposed changes; the Oregon National Historic Trail, Barlow Road Cutoff Trail, and DeMoss Springs Memorial Park.

1 These three resources have been identified and assessed by Council in the *Final Order on the*
2 *ASC* and all subsequent amendments. No new resources protected by the Council's standard
3 have been identified in RFA5.⁸⁴

4
5 The Oregon National Historic Trail (NHT) is a meandering route along ridges, valleys, and stream
6 crossing. The Barlow Cutoff is a trail that allowed individuals travelling along the Oregon Trail to
7 reduce their journey by up to a week.

8
9 ~~The~~ DeMoss Springs Memorial Park is a Sherman County Park, located with the facility site
10 boundary, and is a historical property based on its listing on the National Register of History
11 Places. The park includes approximately 2.5 acres along Barnum Creek and east of Highway 97.
12 The park marks the location of the home of the DeMoss Lyric Bards, a family of traveling
13 musicians who toured between 1872 and 1933. The park contains a lawn, large trees, a
14 bandstand, pump house, basalt retaining wall, bridge remnants, two shelters, a picnic area, and
15 interpretive signs. Most residential and commercial structures associated with the park and
16 historic community of DeMoss Springs have been demolished.^{85, 86}

17 18 Potential Impacts

19 20 Oregon NHT and Barlow Road Cutoff Trail

⁸⁴ GHAMD5Doc19. DPO Tribal Government Comment CTWS 2018-07-20. GHAMD5Doc25. DPO Public Comment Gilbert. Comment 9. 2018-08-23. On the record of the draft proposed order public hearing, the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS) express concern regarding the proposed increase in temporary access road and crane path width and its potential impacts to historic properties that may be located within the Area of Potential Effects (APE) for the facility. The CTWS's comments did not identify specific historic properties that could be impacted by the proposed changes; rather, the CTWS stated that if there are any changes to the APE, then additional identification, evaluation, and protection of historic properties or cultural resources may be necessary and references review of RFA5 under Section 106 of the National Historic Preservation Act (NHPA). Ms. Gilbert expresses concern that the comment received from CTWS suggests that government to government consultation is needed and has not been completed. The Section 106 NHPA does not apply to EFSC review of proposed and amended energy facilities, and if required by a federal government agency, the certificate holder must comply with such requirements independent of and outside the EFSC review process. EFSC considers potential historic, cultural and archaeological impacts of facilities pursuant to state law and Council rules. Previous historic, cultural and archaeological resource surveys for the ASC and subsequent amendments did not identify Tribal resources within the site boundary, and the proposed changes in temporary access road and crane path width would not result in changes to the previously approved site boundary, which is equivalent to the APE. Therefore, the Department did not amend findings or recommend new or amended conditions from the draft proposed order to proposed order in response to these comments.

⁸⁵ GH1APPD0c1-23 ASC Exhibit S, p. 2, 2007-07.

⁸⁶ GH1APPD0c1-24 ASC Exhibit T, p. 5, 2007-07.

In RFA5, the certificate holder indicates that the proposed larger wind turbines would be visible along routes of both the Oregon NHT and the Barlow Cutoff. However, the Council previously reviewed impacts of turbine visibility to these locations. In the *Final Order on the ASC*, the Council found that private land limits opportunities to view or visit these sites, and that no intact segments or physical evidence of the trails have been identified within the analysis area.⁸⁷ The Council adopted Condition CON-HC-04 (V.B.10), which requires the certificate holder to consult with the Oregon Historic Trails Advisory Council on the appropriate content of an interpretive sign and must place a sign in a publicly accessible location, which describes the historical background of the facility site and surrounding areas. This condition would continue to apply to the facility, with proposed changes. On the record of the draft proposed order public hearing, Oregon State Historic Preservation Office agreed that, based upon the certificate holder's analysis, visual impacts of the proposed larger wind turbines would not result in significant adverse impacts to the identified segments of the Oregon NHT and Barlow Road Cutoff Trail.⁸⁸

~~Because the Council previously reviewed~~ Based on comments received from SHPO on the record of the draft proposed order public hearing confirming that visual impacts of the facility, with proposed changes, to the Oregon NHT and the Barlow Road Cutoff Trail would not be significant or adverse, because no portions of these trails are currently available to the public, and because there are no intact segments of the trail or physical evidence of either trail in the analysis area, the Department recommends that the Council rely on existing conditions to address the standard.

DeMoss Springs Memorial Park

In RFA5, the certificate holder provides photographic simulations, including a discussion of its methodology, to represent visibility and appearance of the proposed larger wind turbines from DeMoss Springs Memorial Park. As presented in the photographic simulations, there would be very limited or no visibility of the proposed larger wind turbines from DeMoss Springs Memorial Park. The topography and the trees effectively block or screen outward views from most locations within the park. There are some clearings within the park, particularly near the parking area and the restroom facility, where visibility is more open. The certificate holder explains that at certain times of year, proposed wind turbines would be visible at some areas within the park but would be limited to the upper portions of a small number of wind turbines

⁸⁷ GH1APPD0208 Final Order on ASC, p. 133, 2009-05-19.

⁸⁸ GHAMD5Doc20 DPO Reviewing Agency Comment SHPO, 2018-07-26.

1 and would only be possible with the trees in leaf-off condition. However, visibility of the
2 proposed larger wind turbines from some limited areas of the park would not be expected to
3 impact the ongoing preservation of the critical aspects of the park and the surrounding area
4 including the preservation of water, the advancement of commercial activities, the preservation
5 of an alcohol temperance society, and the advancement of social and educational values
6 important to the DeMoss family.⁸⁹

7
8 ~~Additionally, in~~ a comment letter submitted on behalf of the Sherman County Special
9 Advisory Group by the Sherman County Planning Director, Georgia Macnab, ~~on behalf of the~~
10 ~~Sherman County Special Advisory Group~~, stated that “the county has no concerns with visibility
11 of turbines from the DeMoss Springs Memorial Park..”⁹⁰ On the record of the public hearing,
12 Oregon State Historic Preservation Office agreed that, based upon the certificate holder’s
13 analysis, the visual impacts of the proposed larger wind turbines would not result in significant
14 adverse impacts to the NRHP-listed DeMoss Springs Memorial Park.⁹¹

15 16 **Conclusions of Law**

17
18 Based on the foregoing analysis, and in compliance with OAR 345-022-~~0110~~0090(2), the
19 Department recommends that the Council rely on existing site certificate conditions to address
20 the Historic, Cultural and Archaeological Resources standard.

21 22 **III.L. Recreation: OAR 345-022-0100**

23
24 *(1) Except for facilities described in section (2), to issue a site certificate, the Council must*
25 *find that the design, construction and operation of a facility, taking into account*
26 *mitigation, are not likely to result in a significant adverse impact to important*
27 *recreational opportunities in the analysis area as described in the project order. The*
28 *Council shall consider the following factors in judging the importance of a recreational*
29 *opportunity:*
30

⁸⁹ GHAMD5Doc16 NRHP Continuation Form 2007-03-12.

⁹⁰ GHAMD5Doc4-1 pRFA Reviewing Agency Comment SAG Sherman County, 2018-05-31.

⁹¹ GHAMD5Doc20. DPO Reviewing Agency Comment SHPO, 2018-07-26.

- (a) Any special designation or management of the location;*
- (b) The degree of demand;*
- (c) Outstanding or unusual qualities;*
- (d) Availability or rareness;*
- (e) Irreplaceability or irretrievability of the opportunity.*

Findings of Fact

The Recreation standard requires the Council to find that the design, construction, and operation of a facility would not likely result in significant adverse impacts to “important” recreational opportunities. Therefore, the Council’s Recreation standard applies only to those recreation areas that the Council finds to be “important,” utilizing the factors listed in the subparagraphs of section (1) of the standard. The importance of recreational opportunities is assessed based on five factors outlined in the standard: special designation or management, degree of demand, outstanding or unusual qualities, availability or rareness, and irreplaceability or irretrievability of the recreational opportunity. The certificate holder evaluates impacts to important recreational opportunities based on the potential of construction or operation of the facility, with proposed changes, to result in any of the following: direct or indirect loss of a recreational opportunity, excessive noise, increased traffic, and visual impacts of facility structures or plumes.

Recreational Opportunities within the Analysis Area

In RFA5, the certificate holder confirms that no new, important recreational opportunities were identified within the 5-mile analysis area since the Council’s 2017 *Final Order on Amendment 4*, which also confirmed that no new important recreational opportunities had been identified within the analysis area since the Council’s *Final Order on the ASC*. The important recreational opportunities within the 5-mile analysis area include:

- Columbia River Gorge National Scenic Area
- Deschutes River Corridor
- Columbia River Corridor
- Journey Through Time Scenic Byway

- Oregon National Historic Trail and Barlow Road Cutoff Trail⁹²
- Lewis and Clark National Historic Trail
- Maryhill Museum of Art
- Maryhill's Stonehenge
- DeMoss Springs Memorial Park

Evaluation of Potential Impacts to Important Recreation Opportunities

Under the Council's Recreation standard, the Council must find that, taking into account mitigation, the facility, with proposed changes, is not likely to result in a significant adverse impact to those identified important recreational opportunities. The Department presents its evaluation of the certificate holder's impact assessment below.

Potential Direct or Indirect Loss of Recreational Opportunity

The Department notes that potential direct or indirect loss of important recreational opportunities within the analysis area was not specifically addressed in RFA5. However, based on the bounds of the previously approved micrositings corridors, the facility, with proposed changes, would not physically disturb, or result in ground disturbance, to the important recreational opportunities within the analysis area including the closest, DeMoss Springs Memorial Park located within the site boundary but 1,000-feet from the micrositings corridor. The facility, with proposed changes, would also not require any temporary or permanent closure or removal of the important recreation opportunities to public use. Therefore, the Department recommends the Council find that the facility, with proposed changes, would not be expected to result in indirect impact, or indirect loss, to important recreational opportunities within the analysis area.

⁹² Mapped trail alignments of the Oregon National Historic Trail and Barlow Road Cutoff Trail, both previously-determined by Council to be important recreational opportunities, are within the site boundary with overlapping areas within the approved micrositings corridor, and would be closer to the facility than DeMoss Springs Memorial Park. Based on review of the record, the evaluation of potential impacts (direct or indirect loss, noise, visual, traffic) from the facility to these important recreational opportunities relied upon potential impacts to intact segments, which the certificate holder affirmed would not occur as a result of facility construction or operation because no intact trail segments have been identified within the site boundary. Because the facility, with proposed changes, would not result in site boundary changes, the Department recommends the Council find that the facility, with proposed changes, would not result in impacts not evaluated in a previous Council order.

Potential Noise Impacts

Construction

The Department notes that construction related noise impacts at important recreational opportunities within the analysis area ~~was~~were not specifically addressed in RFA5. However, the proposed larger wind turbines, larger meteorological towers, and changes in temporary access road width would generate construction-related noise. Therefore, the Department considers it necessary to evaluate whether the facility, with proposed changes, could result in potentially significant adverse noise impacts during construction at important recreational opportunities within the analysis area.

The certificate holder previously represented that a worst-case noise scenario during construction might include three pieces of equipment operating at full load at a single tower site and would result in 90 dBA at 50 feet, and would attenuate to approximately 64 dBA at the nearest residence approximately 1,000 feet away.⁹³ In RFA5, with the exception of the proposed change in temporary road design, the certificate holder did not identify that the facility, with proposed changes, would result in new or differing construction activities, or changes in construction schedule. Moreover, the certificate holder is not requesting to amend the previously approved site boundary or microsite corridor. Therefore, the Department assumes that 64 A-weighted decibels (dBA) at 1,000 feet continues to represent a reasonable worst-case noise scenario during construction.

As described above, the closest important recreational opportunity to the facility, with proposed changes, is the DeMoss Springs Memorial Park located within the site boundary and approximately 1,000-feet from the microsite corridor where wind turbines could be located. At this important recreational opportunity, construction related noise levels are expected to be 64 dBA or less. Sound levels ranging between 60 and 70 dBA are representative of the sound level of a “normal conversation” and “auto traffic at 50 feet.”⁹⁴ Existing site certificate Condition CON-CJ-01 (VI.A.1.1) would reduce noise impacts during construction by requiring the use of exhaust mufflers on combustion engine-powered equipment and limiting the noisiest operation of heavy construction equipment to daylight hours.

Based on the low level modeled noise level and compliance with existing site certificate conditions, and because construction related noise would be temporary and short-term in duration, the Department recommends that Council find that construction of the facility, with proposed changes, would not be likely to result in significant adverse noise impacts at the

⁹³ GH1APPD01-28 ASC Exhibit X, p. 8, 2007-07.

⁹⁴ GH1APPD01-28 ASC Exhibit X, Table X-2, 2007-07.

DeMoss Springs Memorial Park. Because the other important recreational opportunities within the analysis area are located at greater distances from the facility site boundary than the DeMoss Springs Memorial Park, the Department recommends that Council conclude that potential construction-related impacts from the facility, with proposed changes, at these important recreational opportunities would also not likely be potentially significant or adverse.

Operation

The facility, with proposed changes, would generate noise during facility operation; however, RFA5 states that the proposed larger wind turbines would generate a maximum noise level of 104.9 dBA per turbine, compared to the maximum noise level of the previously approved wind turbines at 106 dBA.⁹⁵ Based on noise modeling conducted during the ASC phase, the Council previously found that facility-related operational noise would be inaudible at all important recreational opportunities other than DeMoss Springs Memorial Park where operational sound levels of 48 dBA would be audible.⁹⁶ Sound levels of 50 dBA are representative of the sound level of a “typical office.”⁹⁷ The Council previously concluded that audible noise levels of 48 dBA would not interfere with the park’s recreational opportunities of the park. Therefore, based on the Council’s previous findings and because the proposed larger wind turbines would generate similar or slightly lower per wind turbine noise levels than the previously evaluated wind turbines, and if selected would allow the certificate holder to site fewer wind turbines than currently allowed in the site certificate, the Department recommends Council find that operation of the facility, with proposed changes, would not be likely to result in significant adverse noise impacts to any important recreational opportunities within the analysis area.

Potential Traffic Impacts

Construction

The facility, with proposed changes, would generate construction-related traffic. In RFA5 Section 4.12 *Recreation*, the certificate holder asserts that the facility, with proposed changes, would not result in changes to construction or operational traffic from traffic-related impacts considered by Council in previous orders for the facility. Although, the Department notes that the certificate holder describes in its RFA5 Section 4.6 *Protected Areas* that if selected during final facility design, the proposed larger wind turbines would allow construction of fewer overall turbines resulting in an approximately 30 percent decrease in truck traffic compared to the truck traffic impacts evaluated in the Council’s *Final Order on the ASC*.⁹⁸ Because the

⁹⁵ GHAMD5Doc15. Request for Amendment 5, Table-2, 2018-07-06

⁹⁶ GH1APPD0208 Final Order on ASC, p. 94, 2009-05-15.

⁹⁷ GH1APPD021-28 ASC Exhibit X, Table X-2, 2007-07.

⁹⁸ GHAMD5Doc15 Complete Request for Amendment 5, p.22, 2018-07-06.

certificate holder has not requested to amend its site boundary or micrositings corridors, and has not identified any new routes to be used during construction, the Department refers the Council to construction routes identified in the ASC and the construction-related traffic impacts evaluated in the *Final Order on the ASC*.

During the ASC phase, the certificate holder identified roads to be used during construction as U.S. Highway 97, Oregon Highway 206, and Sherman County roads. In the *Final Order on the ASC*, the Council found that construction-related traffic on U.S. Highway 97 and Sherman County roads could impact the Journey Through Time Scenic Byway; however, the Council found that the use of passing lanes would alleviate potential impacts.

Because construction of the facility, with proposed changes, is expected to reduce traffic impacts compared to the evaluation in the Council's *Final Order on the ASC*, where construction-related traffic impacts at important recreational opportunities were not expected to be significant or adverse, the Department recommends that Council find that construction-related traffic impacts would not be likely to result in a significant adverse traffic impact to important recreational opportunities within the analysis area.

Operation

The facility, with proposed changes, would generate operational-related traffic. However, RFA5 would not result in changes to previously evaluated operational traffic impacts of 10 to 15 vehicle trips per day and determined not likely to have a significant adverse impact to protected area access roads.⁹⁹ Because RFA5 would not result in changes to the expected number of permanent employees, the Department recommends Council find that operational-traffic impacts would not be likely to result in a significant adverse impact to important recreational opportunities within the analysis area.

Potential Visual Impacts

The facility, with proposed changes, would result in visual impacts. To support its evaluation of potential visual impacts at important recreational opportunities, the certificate holder completed a revised "zone of visual influence" (ZVI) analysis. As described in RFA5, the ZVI analysis addresses potential wind turbine visibility based on topography and does not take into account screening from vegetation or structures. The revised ZVI analysis conservatively assumed 650-foot wind turbines at 125 locations to evaluate whether the taller wind turbines could be visible at different important recreational opportunities, or if the change would result in significant visual impacts at areas previously considered (see RFA5, Figures 3 and 4).

⁹⁹ GHAMD5Doc15 Request for Amendment 5, Section 4.13, pp. 45-46, 2018-07-06.

1 The certificate holder's revised ZVI analysis represents new areas near the Columbia River
2 Gorge National Scenic Area (CRGNSA), Journey Through Time Scenic Byway, and DeMoss
3 Springs Memorial Park where the proposed taller wind turbines would be visible; however, the
4 certificate holder argues that the new areas are small areas adjacent to areas from which wind
5 turbine visibility was previously identified, and therefore would not result in significant adverse
6 visual impacts to important recreational opportunities.

7
8 The Department presents an assessment of the certificate holder's visual impact evaluation at
9 the DeMoss Springs Memorial Park below. The Department's assessment of the certificate
10 holder's visual impact evaluation for CRGNSA and Journey Through Time Scenic Byway is
11 presented in Section III.F *Protected Areas* and Section III.J *Scenic Resources* of this order,
12 respectively, and is incorporated by reference for this section.

13
14 *DeMoss Springs Memorial Park*

15
16 DeMoss Springs Memorial Park is a National Registry of Historic Places (NRHP)-listed Sherman
17 County park previously determined by Council to be an important recreational opportunity. The
18 park is located within the site boundary and approximately 1,000-feet from a previously
19 approved micrositing corridor.¹⁰⁰ The key features of the park include a lawn, trees, bandstand,
20 pump house, basalt retaining wall, bridge remnants, two shelters, and a picnic area. As
21 explained in RFA5, the park is approximately 2 acres in size and is confined in the narrow,
22 relatively shallow valley formed by Barnum Creek. US Highway 97 is situated immediately to the
23 west of the park. The eastern valley wall is adjacent to the east side of the park, and the
24 western valley wall is just beyond US 97. The park property includes numerous mature trees
25 and other vegetation, particularly along the west edge near the highway and to the north of the
26 bandstand and other structures.

27
28 In RFA5, the certificate holder provides photographic simulations, including a discussion of its
29 methodology, to represent visibility and appearance of the proposed larger wind turbines from
30 DeMoss Springs Memorial Park. As presented in the photographic simulations, there would be
31 very limited or no visibility of the proposed larger wind turbines from DeMoss Springs Memorial
32 Park. The topography and the trees effectively block or screen outward views from most
33 locations within the park. There are some clearings within the park, particularly near the
34 parking area and the restroom facility, where visibility is more open. The certificate holder
35 explains that at certain times of year, proposed wind turbines would be visible at some areas
36 within the park but would be limited to the upper portions of a small number of wind turbines

¹⁰⁰ The Lower Deschutes Wildlife Area is the closest Deschutes River protected area to the site boundary located 1.8 miles southwest; however, this protected area is managed by ODFW to improve and/or maintain habitats for native and desired fish and wildlife species. Based on this function and purpose, visual impacts would not be considered an impact to this protected area, nor be considered significant or adverse.

1 and would only be possible with the trees in leaf-off condition. However, as described,
2 occasional partial visibility of some wind turbines would not be expected to detract from the
3 recreational opportunities at the park, which generally include picnics and community
4 gatherings. A comment letter submitted during review of pRFA5 by the Sherman County
5 Planning Director, Georgia Macnab, on behalf of the Sherman County Special Advisory Group,
6 stated that “the county has no concerns with visibility of turbines from the DeMoss Springs
7 Memorial Park. Currently there are large trees that surround the perimeters of the park and the
8 DeMoss Grain Elevators also site adjacent to the south of the park.”¹⁰¹

9
10 Based on the above-described analysis, the Department recommends Council find that the
11 visual impacts of the facility, with proposed changes, would not result in a significant adverse
12 impact to this important recreational opportunity. Further, based on the visual impact analysis
13 presented in Section III.F Protected Areas, Section III.K Historic, Cultural and Archeological
14 Resources, and Section III.J Scenic Resources of this order, the Department also recommends
15 Council find that the visual impacts of the facility, with proposed changes, would not result in
16 significant adverse impacts to the CRGNSA, Journey Through Time Scenic Byway, OHT and
17 Barlow Road Cutoff Trail.

18 19 **Conclusions of Law**

20
21 Based on the foregoing recommended findings of fact and conclusions, the Department
22 recommends that the Council find that the facility, with proposed changes, would continue to
23 comply with the Council’s Recreation standard.

24 25 **III.M. Public Services: OAR 345-022-0110**

26
27 *(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the*
28 *Council must find that the construction and operation of the facility, taking into account*
29 *mitigation, are not likely to result in significant adverse impact to the ability of public*
30 *and private providers within the analysis area described in the project order to provide:*
31 *sewers and sewage treatment, water, storm water drainage, solid waste management,*
32 *housing, traffic safety, police and fire protection, health care and schools.*

33
34 *(2) The Council may issue a site certificate for a facility that would produce power from*
35 *wind, solar or geothermal energy without making the findings described in section (1).*
36 *However, the Council may apply the requirements of section (1) to impose conditions on*
37 *a site certificate issued for such a facility.*

38 ***

¹⁰¹ GHAMD5Doc4-1 pRFA Reviewing Agency Comment SAG Sherman County, 2018-05-31.

Findings of Fact

The Council's Public Services standard requires the Council to find that the facility, with proposed changes, is not likely to result in significant adverse impacts on the ability of public and private service providers to supply sewer and sewage treatment, water, stormwater drainage, solid waste management, housing, traffic safety, police and fire protection, health care, and schools. Pursuant to OAR 345-022-0110(2), the Council may issue a site certificate for a facility that would produce power from wind energy without making findings regarding the Public Services standard; however, the Council may impose site certificate conditions based upon the requirements of the standard.

The analysis area for potential impacts to public services from construction and operation of the facility, with proposed changes, is defined as the area within and extending 10-miles from the site boundary.

Sewers and Sewage Treatment, Water, and Stormwater Drainage

~~Construction and operation of the facility, with proposed changes, would not affect the ability of public and private providers of water, sewer or sewage treatment, or stormwater drainage to deliver services.~~ As described in RFA5, the facility, with proposed changes, would not change construction or operational water use or source, sewer or sewage treatment needs, or stormwater drainage from what was previously found by Council.¹⁰² As described in the *Final Order on Amendment 4*, Council found that facility water use would not impact private or public water service providers because water would be secured from an off-site source during construction and supplied from an on-site well during operations.¹⁰³

~~On the record of the draft proposed order public hearing, Ms. Gilbert expresses a concern of potential water quality impacts from construction and operational vibration from wind turbines. Ms. Gilbert provides reference to an excerpt, dated July 16, 2012, obtained from Kirby Mountain, an online blogspot. The excerpt, cited from the Wind Energy Siting Handbook, American Wind Energy Association, describes potential water quality impacts from aquifer collapse and compaction from construction-related blasting and contamination from blasting material type, such as perchlorate.¹⁰⁴ In RFA5, the certificate holder has not proposed any~~

¹⁰² GHAMD5Doc15 Complete Request for Amendment 5 Section 4.13, pp. 45-46, 2018-07-06.

¹⁰³ GH1AMD4Doc25 Final Order on Amendment 4, Section III.A.13, 2018-04-27.

¹⁰⁴ GHAMD5Doc25. DPO Public Comment Gilbert. Comment 2. 2018-08-23. ~~On the record of the draft proposed order public hearing, Ms. Gilbert provided attachments in support of Comment 2, titled "Turbines have Negative~~

1 change to the previously-approved construction techniques, including potential blasting.
2 Council previously imposed conditions under the Structural Standard, specifically Condition
3 PRE-SS-02 (V.A.4) requiring the certificate holder to design, engineer and construct the facility
4 to avoid dangers to human safety presented by non-seismic hazards (e.g. landslides, erosion,
5 flooding and settlement). If the certificate holder utilizes blasting as a construction technique,
6 compliance with Condition PRE-SS-02 (V.A.4) and PRE-SS-01 (V.A.1), as described in Section
7 III.C. *Structural Standard* of this order, would minimize the likelihood of potential groundwater
8 impacts by minimizing potential subsurface risks such as aquifer collapse.¹⁰⁵
9

10 Council previously found that facility sewage treatment needs would not impact private or
11 public sewage treatment providers because portable toilets would be used during construction
12 and an onsite septic system would be installed for operational use. Council previously found
13 that facility stormwater drainage needs would not impact private or public stormwater
14 drainage systems because the facility would not be connected to a public stormwater drainage
15 system. Based on the Council's previous reasoning and because the facility, with proposed
16 changes, would not result in changes to water use or source, sewer or sewage treatment needs,
17 or stormwater drainage, the Department recommends the Council ~~found~~find that the facility,
18 with proposed changes, would not likely result in a significant adverse impact on the ability of

Impact on our Drinking Water," published by GLBR SOS on March 27, 2018, and "Wind turbines impact on
groundwater to be discussed - Public Meeting planned August 10, 2016." These sources are editorial and related to
a wind project in Ontario, Canada; the Department considers that the editorial nature of these sources do not
represent factual information nor factual information relevant to RFA5.

¹⁰⁵ GHAMD5Doc25. DPO Public Comment Gilbert. Comment 2. 2018-08-23. On the record of the draft proposed
order public hearing, Ms. Gilbert expresses a concern, based on information obtained from three online media
sources, of potential water quality impacts to adjacent non-participating landowner wells from construction and
operational vibration from wind turbines. Based on the potential impacts referenced in the three online media
sources, and in order to find compliance with ORS 469.501(g) and (k) and the Public Services standard, Ms. Gilbert
requests that Council require the certificate holder to conduct a pre-construction inventory of adjacent non-
participating landowner wells, and then to conduct water quality testing and monitoring of identified wells during
both construction and operation to assure adjacent non-participating landowners wells are not impacted by wind
turbine construction and operation and contain safe drinking water.

While the Council has not adopted a specific health and safety standard for water quality, the Department agrees
that under the Council's Public Services standard (OAR 345-022-0110(1)), adopted under ORS 469.501(k), potential
water quantity and quality impacts to public and private providers of water service are evaluated. Ms. Gilbert
requests that the certificate holder be required to test and monitor adjacent non-participating landowner wells to
identify water quality impacts associated with construction and operation of the facility. Because the Public
Services standard applies to potentially significant adverse impacts to public and private providers of water service,
and not private water wells, the Department considers the request for testing and monitoring of non-participant
landowner wells not applicable nor required under the Public Services or any Council standard.

1 public and private providers of water, sewer or sewage treatment, or stormwater drainage to
2 deliver services.

3
4 Solid Waste Management
5

6 Construction and operation of the facility, with proposed changes, would not increase or
7 change the type and amount of solid waste generated during construction or operation
8 previously found by Council.¹⁰⁶ The Council previously imposed Conditions PRE-WM-01 (V.D.1),
9 Construction Waste Management Plan and PRO-WM-01 (V.D.2), Operational Waste
10 Management Plan and found that based on the estimated amount of solid waste generated and
11 compliance with the referenced condition, that the facility would not be likely to result in a
12 significant adverse impact on the ability of public and private providers of solid waste
13 management to deliver services. Conditions PRE-WM-01 (V.D.1), Construction Waste
14 Management Plan and PRO-WM-01 (V.D.2), Operational Waste Management Plan require the
15 certificate holder to develop and implement plans for waste minimization, recycling, and
16 proper management and disposal of non-recyclable hazardous and non-hazardous materials.
17 Based on the Council's previous reasoning and because the facility, with proposed changes,
18 would not result in changes to solid waste generation during construction or operation, the
19 Department recommends the Council found that the facility, with proposed changes, would not
20 likely result in a significant adverse impact on the ability of public and private providers of solid
21 waste management to deliver services.

22
23 Housing, Police Services, Health Care and Schools
24

25 ~~Construction and operation of the facility, with proposed changes, would result in temporary~~
26 ~~and permanent workers that could affect the ability of public and private providers of housing,~~
27 ~~police services, health care, and schools to deliver services.~~ As described in RFA5, ~~however,~~ the
28 facility, with proposed changes, would not change the previously estimated temporary or
29 permanent number of workers as found in Council's *Final Order on Amendment 4*.¹⁰⁷ RFA4
30 assumed there would be 170 average and 300 peak number of workers during construction,
31 and 10 to 15 permanent workers during operations. As described in the *Final Order on*
32 *Amendment 4*, Council found that there was sufficient supply of hotel rooms and other housing
33 options for construction workers, that temporary construction workers from out of the area
34 tend not to move their families and as such, would not be likely to affect local schools, and that
35 police and health care providers could manage a short-term increase that could occur during

¹⁰⁶ GHAMD5Doc15 Complete Request for Amendment 5, Section 4.13, pp. 45-46, 2018-07-06.

¹⁰⁷ GHAMD5Doc15 Complete Request for Amendment 5, Section 4.13, pp. 45-46, 2018-07-06.

1 facility construction and could handle any permanent increase in demand for services that
2 could result from the small increase in number of permanent new jobs created by the facility.¹⁰⁸
3 Based on the Council's previous reasoning and because the facility, with proposed changes,
4 would not increase the expected number of temporary or permanent workers, the Department
5 recommends the Council found that the facility, with proposed changes, would not likely result
6 in a significant adverse impact on the ability of public and private providers of housing, police
7 services, health care, and schools to deliver services.

8 9 Traffic Safety

10
11 Construction of the facility, with proposed changes, may require temporarily enlarging turning
12 radii on County roads to accommodate the delivery of longer wind turbine blades, which could
13 affect the ability of public and private providers of traffic safety to deliver services.¹⁰⁹ If selected
14 during final facility design, the proposed larger wind turbines would allow construction of fewer
15 overall turbines resulting in an approximately 30 percent decrease in truck traffic compared to
16 the truck traffic impacts evaluated in the Council's *Final Order on the ASC*.¹¹⁰ The Council
17 previously imposed Condition PRE-PS-02 (V.C.10) requiring the certificate holder to implement
18 a construction traffic management plan that would address and minimize potential adverse
19 impacts that could arise from construction-related traffic flow to public providers of traffic
20 safety.

21
22 The Council previously imposed conditions related to road design, construction, and restoration
23 of any damage. Condition PRE-LU-01 (IV.D.1) requires the certificate holder to demonstrate
24 that new or substantially modified public roads meet or exceed road standards in accordance
25 with the County's transportation plan, and that private road connections to public roads also
26 meet County road requirements. Condition PRE-LU-13 (IV.D.20) requires the certificate holder
27 to secure any local permits necessary for work in county rights of way or road approaches onto
28 county roads. Condition PRE-LU-12 (IV.D.19) requires the certificate holder, in consultation with
29 the County road department, to conduct a pre-construction survey of public road conditions of
30 transportation routes to the facility, fund an escrow account with an estimated cost of possible
31 road damage attributed to facility construction vehicle use, and conduct a post-construction
32 inspection of County roads used and impacted. These conditions would continue to apply to the
33 facility, with proposed changes, and would address and minimize potential adverse impacts
34 that could arise to public providers of traffic safety from facility-related road damage during
35 construction.¹¹¹

¹⁰⁸ GH1A~~MDDD~~4Doc25 Final Order on Amendment 4, Section III.A.13, 2018-04-27.

¹⁰⁹ GHAMD5Doc15 Complete Request for Amendment 5, Section 4.5, p. 19, 2018-07-06.

¹¹⁰ GHAMD5Doc15 Complete Request for Amendment 5, p.22, 2018-07-06.

¹¹¹ Issues that could result with air traffic safety are discussed in Section III.P.1 *Public Health and Safety Standards for Wind Energy Facilities* (OAR 345-024-0010).

1
2 In the draft proposed order, the The Department recommends eds Council amend Condition PRE-
3 LU-12 (IV.D.19) to clarify the certificate holder's obligation to repair Sherman County road
4 damages from facility construction, as follows:-

5
6 **Amended Condition PRE-LU-12:** The certificate holder shall:

- 7 (a) Prior to beginning construction, provide evidence to the Department that both a
8 pre-construction road condition inspection and consultation with the Sherman
9 County Road Department has occurred. Through the consultation, the certificate
10 holder shall, at a minimum, obtain confirmation of the following or provide the
11 following documentation to the Sherman County Road Department:
12 (1) Final facility design maps identifying the route or routes for the transport of wind
13 turbine construction material (including water, aggregate, concrete, machinery
14 and tower pieces) and facility access for construction personnel; and,
15 concurrence on the pre-construction conditions of any routes using or crossing
16 Sherman county roads.
17 (2) A written summary of possible anticipated road damage to the designated route
18 or routes, and an estimate of the cost of repair to the designated route or
19 routes;
20 (3) Communication protocol for reporting to the Sherman County Road Department
21 unusual damage or wear identified during facility construction and determined
22 to be a result of facility construction vehicle use.
23 (4) Establish and maintain an escrow account for so long as construction is ongoing,
24 funded in an amount equal to the estimated cost to repair the designated route
25 or routes consistent with the estimate provided in ~~(b)(2)~~; and
26 (5) Conduct an inspection of the roads along the designated route or routes after
27 construction with a representative of the Sherman County Road Department and
28 an independent third party with the required expertise to inspect and evaluate
29 paved and graveled roads. In the event a dispute arises, the third party shall be
30 the final arbiter. The cost of the hiring of the third party shall be borne by the
31 certificate holder.
32 (b) Following completion of construction and prior to operation, conduct the inspection
33 of the roads along the designated route or routes with a representative of the
34 Sherman County Road Department and an independent third party, as specified in
35 sub(a)(5) of this condition.
36 (c) After completing the inspection required per sub(b), the certificate holder shall
37 coordinate with the Sherman County Road Master and shall provide adequate
38 funding to allow the county to restore any necessary damages to Sherman County
39 roads resulting from facility construction as agreed upon by the Sherman County
40 Road Department. The escrow account established in (a)(4) shall not be closed until
41 Sherman County Road Department has agreed with the restoration to Sherman
42 County roads, or otherwise that the certificate holder has not caused damage to
43 Sherman County roads.

[Final Order on ASC, Condition IV.D.19; Amended in Final Order on AMD4, AMD5]

The Department recommends Council find that compliance with existing and recommended amended conditions would address and minimize potential adverse impacts from construction and operation of the facility, with proposed changes, to public providers of traffic safety.¹¹²

Fire Protection

In RFA5, the certificate holder explains that the facility, with proposed changes, would not alter the facility's impact on the ability of public and private service providers to provide fire protection services. Construction and operation of the facility, with proposed changes, would result in increased risk from the increase in turbine hub height that could affect the ability of public and private fire protection providers to deliver services. As noted in Section ~~I-E.II.A~~ Requested Amendment of this order, the proposed amendments, specifically the increase in hub height (312 to 404 feet), might affect the ability of fire protection services to provide high angle rescue services during emergency O&M events. However, based on review of the record, the certificate holder previously identified that local fire districts are unable to provide high-angle rescue services, and therefore the certificate holder maintains responsibility for response to such high-angle rescue emergency events.

The Council previously imposed Conditions PRE-PS-01 (V.C.3) and OPR-PS-02 (V.C.~~810~~), which require the certificate holder to develop and implement a fire safety and response plan during construction and operation, and to ensure that on-site employees receive annual fire prevention and response training, including tower rescue training. Because of the increased hub height and associated risk, and because local providers of fire protection services are unable to provide high-angle rescue services during an emergency event, in the draft proposed order, the Department recommended~~eds~~ the Council amend Conditions PRE-PS-01 (V.C.3) and OPR-PS-02 (V.C.~~810~~) to allow the Department the ability to verify implementation and compliance as follows:

Amended Condition OPR-PS-02 (V.C.8): During operation of the facility, the certificate holder shall ensure that all on-site employees receive annual fire prevention and response training, including tower rescue training, from qualified instructors or members of local fire districts and that all employees are instructed to keep vehicles on roads and off dry grassland, except when off-road operation is required for emergency purposes. The certificate holder shall submit a copy of its training materials with the annual compliance report submitted to the Department pursuant to OAR 345-026-0080(2).

¹¹² Issues that could result with air traffic safety are discussed in *Section III.P.1 Public Health and Safety Standards for Wind Energy Facilities*: OAR 345-024-0010.

[Final Order on ASC, Condition V.C.10; Amended in Final Order on AMD4, AMD5]

Amended Condition PRE-PS-01 (V.C.3) Before beginning construction of the facility, the certificate holder shall develop ~~and implement~~ a fire safety and response plans for both construction and operation phases in consultation with the Oregon State Fire Marshal, the Sherman County Emergency Services, North Sherman Fire and Rescue, Moro Rural Fire Protection District and other first response agencies the facility will rely upon for fire protection services. A copy of the Construction Fire Safety and Response plan must be provided to the Department at least 30 days before beginning construction. A copy of the Operational Fire Safety and Response Plan must be provided to the Department at least 30 days before beginning operation. The Operational Plan must be updated at least annually by the agencies identified in (a) below and a copy provided to the agencies identified in (a), (b), and (c) and to the Department within 30 days of the update. The fire safety and response plans shall address, at a minimum, the following:

- Identification of agencies that participated in developing the plans;
- Identification of agencies that are designated as first response agencies or are included in any mutual aid agreements with the facility;
- A list of any other mutual aid agreements or fire protection associations in the vicinity of the facility;
- Complete contact information for each agency listed in (a), (b), and (c) above, including at least two facility contacts available on a 24-hour basis;
- Communication protocols for both routine and emergency events and the incident command system to be used in the event a fire response by multiple agencies is needed at the facility;
- Access and fire response at the facility site during construction and operations. Fire response plans during construction shall address regular and frequent communication amongst the agencies regarding the number and location of construction sites within the site boundary, access roads that are completed and those still under construction, location of water receptacles, and a temporary signage system until permanent addresses and signs are in place;
- The minimum designated time period of the fire season (i.e., May 1 through October 15) and the criteria to modify the designated fire season to respond to changing conditions;
- The number, size, and location of onsite water receptacles to be staged around the facility site for firefighting purposes during the fire season; and
- Training needs (both for facility personnel and for first responders) including at a minimum fall protection and rescue employee training requirements.
- Copies of mutual aid, fire protection association, or other agreements entered into concerning fire protection at the facility site.

[Final Order on ASC, Condition V.C.3; Amended in Final Order on AMD2, AMD5]

The Department recommends Council find that compliance with existing and recommended amended conditions would address and minimize potential adverse impacts from construction and operation of the facility, with proposed changes, to public providers of fire protection services.¹¹³

Conclusions of Law

Based on the foregoing analysis, and in compliance with OAR 345-022-0110(2), the Department recommends that the Council rely on existing and recommended amended site certificate conditions to address the Public Services standard.

III.N. Waste Minimization: OAR 345-022-0120

(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that, to the extent reasonably practicable:

(a) The applicant's solid waste and wastewater plans are likely to minimize generation of solid waste and wastewater in the construction and operation of the facility, and when solid waste or wastewater is generated, to result in recycling and reuse of such wastes;

(b) The applicant's plans to manage the accumulation, storage, disposal and transportation of waste generated by the construction and operation of the facility are likely to result in minimal adverse impact on surrounding and adjacent areas.

(2) The Council may issue a site certificate for a facility that would produce power from wind, solar or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility.

Findings of Fact

As provided in section (1) above, the Waste Minimization standard requires the Council to find that the applicant (certificate holder) will minimize the generation of solid waste and wastewater, and that the waste generated will be managed to result in minimal adverse impacts on surrounding and adjacent areas. Pursuant to OAR 345-022-0120(2), the Council may

¹¹³ Issues that could result with air traffic safety are discussed in Section III.P.1 *Public Health and Safety Standards for Wind Energy Facilities* (OAR 345-024-0010).

1 issue a site certificate for a facility that would produce power from wind energy without making
2 findings regarding the Waste Minimization standard; however, the Council may impose site
3 certificate conditions based upon the requirements of the standard.

4
5 The facility, with proposed changes, would generate solid waste and wastewater during
6 construction and operation. In RFA5, the certificate holder asserts that the proposed changes
7 would not increase the quantities of solid waste and wastewater, nor change the certificate
8 holder's plans for managing solid waste and wastewater.¹¹⁴ The certificate holder describes that
9 if selected during final design, the proposed larger wind turbines would allow the certificate
10 holder to construct and operate fewer than 125 wind turbines, thereby reducing solid waste
11 and wastewater produced during facility construction and operation.

12
13 To address the standard, the Council previously imposed Condition PRE-WM-01 (V.D.1) and
14 PRO-WM-01 (V.D.2), which require the certificate holder to develop and implement solid waste
15 management plan during construction and operation, respectively. Condition OPR-WM-01
16 (V.D.4) requires the certificate holder to discharge sanitary wastewater generated at the O&M
17 facilities-building to licensed on-site septic systems in compliance with State permit
18 requirements. The certificate holder asserts that the proposed amendments would not require
19 modifications of the procedures and practices to be used to handle solid waste and
20 wastewater, nor impact its ability to comply with site certificate conditions. The Department
21 recommends Council find that compliance with existing conditions would minimize and manage
22 solid waste and wastewater, resulting in minimal adverse impacts on surrounding and adjacent
23 areas from construction and operation of the facility, with proposed changes.¹¹⁵

24 25 **Conclusions of Law**

26
27 Based on the foregoing analysis, and in compliance with OAR 345-022-0120(2), the Department
28 recommends that the Council rely upon the existing site certificate to address the Council's
29 Waste Minimization standard.

30 31 **III.O. Division 23 Standards**

32
33 The Division 23 standards apply only to "nongenerating facilities" as defined in ORS
34 469.503(2)(e)(K), except nongenerating facilities that are related or supporting facilities. The
35 facility, with proposed changes, would not be a nongenerating facility as defined in statute and
36 therefore Division 23 is inapplicable to the facility, with proposed changes.·

¹¹⁴ GHAMD5Doc15 Complete Request for Amendment 5, Section 4.14, p. 46, 2018-07-06.

¹¹⁵ Issues that could result with air traffic safety are discussed in *Section III.P.1 Public Health and Safety Standards for Wind Energy Facilities*: OAR 345-024-0010.

1 **III.P. Division 24 Standards**

2
3 The Council's Division 24 standards include specific standards for the siting of energy facilities,
4 including wind projects, underground gas storage reservoirs, transmission lines, and facilities
5 that emit carbon dioxide.

6
7 **III.P.1. Public Health and Safety Standards for Wind Energy Facilities: OAR 345-024-0010**

8
9 *To issue a site certificate for a proposed wind energy facility, the Council must find that the*
10 *applicant:*

11
12 *(1) Can design, construct and operate the facility to exclude members of the public from*
13 *close proximity to the turbine blades and electrical equipment.*

14
15 *(2) Can design, construct and operate the facility to preclude structural failure of the tower*
16 *or blades that could endanger the public safety and to have adequate safety devices and*
17 *testing procedures designed to warn of impending failure and to minimize the consequences*
18 *of such failure.*

19
20 **Findings of Fact**

21
22 *Potential Public Health and Safety Impacts from Proximity to Turbine Blades*

23
24 The proposed larger wind turbines would increase the maximum blade tip height from 518 to
25 650 feet and could result in potential public health and safety impacts from proximity to turbine
26 blades. In RFA-5, the certificate holder describes that the proposed larger wind turbines could
27 impact public health and safety by affecting low flying aircraft used within the area for crop
28 dusting, as well as air safety concerns to the Wasco State Airport. Additionally, the certificate
29 holder explains that a U.S. Navy Military Training Route crosses a portion of the site boundary.
30 ~~The certificate holder's evaluation of the Council's Structural Standard describes risks of blade~~
31 ~~failure and from turbine blade ice shedding, which the Department also considers potential~~
32 ~~public health and safety impacts and as such, is discussed in this section, not in the Structural~~
33 ~~Standard section of this DPO.~~

34
35 ~~RFA5 includes a letter from the U.S. Department of Navy which states that the military training~~
36 ~~route (MTR) IR 343 that passes over the facility has a floor for the military planes at 5,000 feet~~
37 ~~mean sea level. The approximate elevation at the town of Moro, near the site boundary, is 1,800~~
38 ~~feet. If the 650 foot turbines are selected, the total elevation would be approximately 2,450 feet,~~
39 ~~well below the 5,000 foot floor of the MTR.~~

40
41
42 ~~The certificate holder explains that operation of the proposed 650-foot turbine could result in~~
43 ~~public health and safety impacts to low flying aerial applicators (duster aircraft). The certificate~~

holder refers to comments obtained from local crop dust operators during the ASC phase, indicating that wind turbines would not impede this accepted farm practice. Based on consultation with the Oregon Department of Aviation, the Department understands that potential impacts to low flying duster aircraft would ~~also~~ include both airspace and vertical obstructions near private airstrips used by duster aircraft during take-off and landing. ~~due to lightning, human error and stresses that exceed the design parameters of the blade or its connection to the hub, or manufacturing defects.~~ In RFA5, the certificate holder states that duster aircraft fly very close to the ground, in some cases 10 feet above the ground, and as such any vertical obstacle, such as a tree, hill, or building, could affect the flight pattern. The increased height of the wind turbines as part of RFA5 should not significantly increase risk affect to duster aircraft from airspace and vertical obstructions flight patterns compared to the previously-approved facility, because pilots would typically avoid the wind turbines altogether. Finally, the certificate holder states that there are hundreds of existing wind turbines in Sherman County, including existing wind turbines near the ~~Golden Hills~~ facility and the Wasco State Airport, and as such, pilots are experienced in avoiding wind turbines.¹¹⁶

On the record of the draft proposed order, the Oregon Department of Aviation confirms that the proposed larger wind turbines would be required to comply with FAA lighting requirements pursuant to FAA-AC 70/7461-IL-Obstruction Marking and Lighting. Adequate turbine lighting is intended to enhance turbine visibility for aircraft operators and reduce collision risk. Additionally, through the FAA 7460-1 review of the proposed larger wind turbines, issuance of public notice would be required allowing for the navigation community to respond and express any concerns related to air navigation impacts.

In RFA5, the certificate holder identifies that the closest wind turbine micro-siting corridor to Wasco State Airport is about 1.5 miles to the south, and about 2 miles to the west. The runway is oriented east-west, so that departing aircraft must fly over the city of Wasco before reaching the facility. If, during FAA's review of the certificate holder's Notice of Construction or Alteration (7460) Forms for each wind turbine location, as required per Condition PRE-PH-03 (IV.I.7), FAA or ODA determine wind turbines to be a hazard, siting of wind turbines within micro-siting corridors could be affected. The certificate holder acknowledges that, based upon FAA and ODA's review and determination of final wind turbine locations, there may be locations within an EFSC-approved micro-siting corridor where wind turbine siting is restricted.

¹¹⁶ GHAMD5Doc15 Complete Request for Amendment 5, Section 4.15, pp. 46-48, 2018-07-06.

1 ~~The certificate holder submitted a letter from the Department of Aviation, from 2016, which~~
2 ~~was reviewed by the Council as part of its determination in RFA #3. In a comment to the~~
3 ~~Department on the pRFA, the Department of Aviation reiterated the validity of the contents of~~
4 ~~the letter stating that, "Since there have been no major modifications, ODA would like to re-~~
5 ~~submit the letter dated May 31, 2016."~~¹¹⁷ ~~In addition, the ODA requests that the certificate~~
6 ~~holder evaluate potential impacts to airports within 3 miles of the facility. The Department of~~
7 ~~Aviation's comment letter stated that, by rule, any object over 500 feet in height from the~~
8 ~~ground is considered to be an "obstruction." The letter indicates that the ODA recommended~~
9 ~~an "airspace study and analysis of the overall project."~~¹¹⁸ ~~The certificate holder, in RFA #3,~~
10 ~~proposed the construction of turbines up to 518 feet in height, which was approved by Council.~~
11 ~~In RFA5, the certificate holder included the same letter from the Department of Aviation noting~~
12 ~~that this study would take into consideration any potential impacts in and around the Wasco~~
13 ~~State Airport as well as aircraft flying in proximity to the study area.~~¹¹⁹
14 The certificate holder affirmed sed in RFA5 that they will be in compliance with Condition PRE-PH-
15 03 (IV.I.7), which requires -submittal to the FAA Department of Aviation and FAA form Notice of
16 Proposed Construction or Alteration (7460-1) forms identifying final facility component
17 locations and requesting a Determination of No Hazard, as required under FAA regulations for
18 final wind turbine siting. In RFA5, the certificate holder acknowledges that final wind turbine
19 locations require approval from the FAA, and if any final wind turbine locations proposals are
20 not allowed by the FAA, they will would relocate these wind turbines elsewhere within the
21 micrositing corridor.¹²⁰

¹¹⁷ ~~GHAMD5Doc5-1 Reviewing Agency Comment Dept of Aviation Caines 2018-05-30.~~

¹¹⁸ ~~GHAMD5Doc22 DPO Reviewing Agency Comment ODA 2018-08-20. On the record of the draft proposed order public hearing, Oregon Department of Aviation made three comments and requests that existing site certificate Condition PRE-PH-03 (IV.I.7) be amended. First, ODA recommends completion of an airspace study and analysis of the overall project. Second, ODA comments that the proposed larger wind turbines, in excess of 500 feet, would automatically be classified as "obstructions." Third, ODA indicates that the proposed larger wind turbines would be required to comply with marking and lighting requirements pursuant to FAA AC 70/7461-1L. The comments provided are consistent with comments previously provided. Further, the Department considers the recommended condition changes, as presented in Attachment C of this order, useful in understanding the 7460-1 process, which is outside EFSC jurisdiction, but not appropriate for inclusion within a condition. The Department did not amend conditions from the draft proposed order to proposed order in response to this comment.~~

¹¹⁹ ~~GHAMD5Doc15 Complete Request for Amendment 5, Attachment 4, 2018-07-06.~~

¹²⁰ ~~GHAMD5Doc25. DPO Public Comment Gilbert. Comment 3. 2018-08-23. On the record of the draft proposed order public hearing, Ms. Gilbert expresses a concern regarding risk of the proposed larger wind turbines to private and commercial aircraft operators, and Wasco State Airport, and requests that the certificate holder be required to obtain documentation prior to construction that the facility, with proposed changes, will not increase risk to airplanes flying in daytime or nighttime within the area. The Department amends findings from the draft proposed order to the proposed order, incorporating information provided in the draft proposed order comments received~~

RFA5 also includes a letter from the U.S. Department of Navy which states that the military training route (MTR) IR-343 that passes over the site boundary area has a floor for the military planes at 5,000 feet mean sea level. The approximate elevation at the town of Moro, near the site boundary, is 1,800 feet. If the 650 foot turbines are selected, the total elevation would be approximately 2,450 feet, well below the 5,000 foot floor of the MTR. The letter, provided in RFA5 Attachment 5, states that the proposed 650-foot wind turbines would not directly obstruct military flight activities in MTR IR-343.

Finally, the proposed amendment would reduce the blade tip clearance from approximately 65 feet to approximately 46 feet above the ground. RFA5 represents that the tallest farm equipment normally used during dryland wheat farming operations is a combine, which may be up to 18 feet high, well below the 46 feet tip clearance.¹²¹

Potential impacts from structural failure of the tower or blades and safety devices and testing procedures to warn of impending failure

The facility, with proposed changes, could result in public health and safety risks from potential blade failure from stresses that exceed the design parameters of the blade or its connection to the hub, manufacturing defects, lightning damage, and human error. Lightning damage and human error are described in the amendment request as unrelated to blade length, a point with which the Department agrees, and therefore are not further evaluated under this standard. The certificate holder asserts that blade failure risk from fatigue, stress and manufacturing defects would be extremely low, as further analyzed below.

The certificate holder describes that risk from ice shedding or ice throw depends on several variables, including the number of icing events per year, wind speed, wind turbine size, and the number of passersby who could potentially be struck by ice. The proposed increase in maximum blade-tip height, from 518 to 650 feet, could result in potential ice throw risks extending greater distances than the previously approved wind turbines.

In RFA5, the certificate holder explains that the probability of catastrophic blade failure from the proposed larger wind turbines would be remote because wind turbine blades, regardless of size, are designed to meet International Electrotechnical Commission (IEC) 61400 safety and structural standards, which specify minimum design requirements for wind turbines, and outline full-scale structural (i.e. extreme loading and fatigue) testing protocols of blades before new types of blades become commercially available. As described in the amendment request,

from Oregon Department of Aviation and additional information presented in RFA5, under the Public Health and Safety Standard for Wind Energy Facilities to address this comment.

¹²¹ GHAMD5Doc15 Complete Request for Amendment 5, Section 4.15, pp. 46-48, 2018-07-06.

Golden Hills Wind Project

~~Draft~~ Proposed Order on Request for Amendment 5
July 13, September 12, 2018

1 the risk of blade failure from manufacturing defects would not change as a result of the
2 proposed larger turbines because blades, regardless of size, are designed and tested to
3 withstand the same stresses (caused by wind pressure and operation of the wind turbine) that
4 the previously approved blades were designed to withstand. The certificate holder also explains
5 that O&M activities would include blade inspection to identify and address potential blade
6 defects, and minimize the potential for blade failure.

7
8 The site certificate includes a number of existing conditions that ~~were imposed~~ will continue to
9 ~~apply to the facility, with proposed changes,~~ to address sub(2) of the standard and which ~~will~~
10 would continue to ensure that the certificate holder reduces the risk of potential impacts from
11 structural failure of the wind turbine tower or blades. As described above, Condition PRO-PH-01
12 (IV.I.4) requires the certificate holder to develop and implement an operational safety-
13 monitoring program that includes regular inspections and maintenance; ~~and,~~ Condition PRE-
14 PH-01 (IV.I.2) requires installation of self-monitoring devices installed on each wind turbine that
15 would alert operators of dangerous conditions and would also automatically shut down wind
16 turbines in the event of abnormal levels of vibration. Condition CON-PH-01 (IV.I.1) requires that
17 turbine manufacturer's recommendations for handling instruction and procedures are followed
18 during construction.¹²² Finally, Condition GEN-PH-01 (IV.I.8) requires that the facility be
19 constructed in compliance with setback requirements from public roads, residences, and the
20 boundary of the facility lease area.

21
22 To support review of the certificate holder's operational safety monitoring program and blade
23 inspection and maintenance activities, in the proposed order, the Department amends
24 Condition PRO-PH-01 (IV.I.4) to include a reporting requirement for wind turbine tower and
25 blade inspection and repair and maintenance activities, and causal factors in the event of tower
26 or blade failure during operations. If the evaluation of causal factors identifies that tower or
27 blade failure was preventable by the certificate holder, the Department maintains authority to
28 issue citation of corrective actions or violation of the site certificate.

¹²² Council updated condition CON-PH-01 as part of its final decision on Amendment 4; however, the updated condition language was not included in the fourth amended site certificate. The Department recommends Council adopt the administrative change as part of this amendment request. The condition, as approved by Council in the Final Order on Amendment 4 states, "During construction, the certificate holder shall follow manufacturer's recommended handling instructions and procedures to prevent damage to turbine or turbine tower components that could lead to failure. In the compliance plan required per OAR 345-026-0048, the certificate holder shall describe the process or protocol to be implemented to ensure manufacturer's handling instructions and procedures are followed during equipment delivery." [Final Order on ASC, Condition IV.I.1; Amended in Final Order on AMD4]

Amended Condition PRO-PH-01: Prior to operation, the certificate holder shall:

- (a) Submit to the Department materials or other documentation demonstrating the facility's operational safety-monitoring program and cause analysis program, for review and approval. The program shall, at a minimum, include requirements for regular turbine blade and turbine tower component inspections and maintenance, based on wind turbine manufacturer recommended frequency.
 - (b) The certificate holder shall document inspection and maintenance activities including but not limited to date, turbine number, inspection type (regular or other), turbine tower and blade condition, maintenance requirements (i.e. equipment used, component repair or replacement description, impacted area location and size), and wind turbine operating status. This information shall be submitted to the Department pursuant to OAR 345-026-0080 in the facility's annual compliance report.
 - (c) In the event of blade or tower failure, the certificate holder shall report the incident to the Department within 72 hours, in accordance with OAR 345-026-0170(1), and shall, within 90-days of blade or tower failure event, submit a cause analysis to the Department for its compliance evaluation.
- [Final Order on ASC, Condition IV.I.4; Final Order on AMD4; AMD5]

On the record of the draft proposed order public hearing, Ms. Gilbert asserts that the setbacks from roads and structures are not adequate to provide for the health and safety of the public as required by OAR 345-024-0010. She recommends that Council impose a setback of 1,000 feet from the proposed larger wind turbines to roads and structures. She argues that the current setbacks from roads and structures are not adequate to protect public health and safety from potential risk of ice throw or detached objects from the proposed larger wind turbines.¹²³ To support the argument, she refers to a scientific paper titled "Analysis of throw distances of detached objects from horizontal-axis wind turbines" authored by Sarthatlak, Hamid; and Sorensen, Jens. This scientific paper was published in Fluid Mechanics, Department of Wind Energy; Technical University of Denmark, Lygby, Denmark and also Wind Energy, 2016.¹²⁴

As described above, OAR 345-024-0010(2) requires the Council to find that the certificate holder can design, construct and operate the facility to preclude structural failure of the tower or blades that could endanger public safety. In other words, the Council must evaluate if the

¹²³ GHAMD5Doc25 DPO Public Comment Gilbert. Comment 4.2018-08-23. The Department amends findings from the draft proposed order to proposed order under the Public Health and Safety Standards for Wind Energy Facilities to further address this comment.

¹²⁴ GHAMD5Doc24 DPO Public Comment Marlette 2018-08-23. On the record of the draft proposed order public hearing, Ms. Marlette expresses concern regarding sufficiency of setbacks from private property and publicly used roads from potential ice and object throw from the proposed larger wind turbines. She refers to the scientific paper titled "Analysis of throw distances of detached objects from horizontal-axis wind turbines" authored by Sarthatlak, Hamid; and Sorensen, Jens to support her comments.

1 certificate holder has demonstrated that it has the ability to preclude a structural failure in the
2 first place through design, construction and operation of the turbines. OAR 345-024-0010(2)
3 does not establish a minimum setback requirement nor require that a certificate holder
4 demonstrate an *elimination* of all public health and safety risk [Emphasis added]. Instead, it
5 requires that the certificate holder design, construct and operate the facility to avoid structural
6 failure, to have adequate mechanisms in place to warn of an impending failure, and to minimize
7 the consequences of such failure.

8
9 Ms. Gilbert's request for a 1,000-foot setback from the proposed larger wind turbines to roads
10 and structures is based on the referenced study, but appears to be arbitrary as it is a value
11 between those resulting from outputs of modeled throw distances from wind turbines with
12 significant variability ranging of 2 and 20 MW and normal operating blade-tip speeds of 70
13 meters/second. The Department reviewed the study and affirms that it is from a reputable
14 online database of peer-reviewed, scientific articles; however, Council previously imposed
15 Condition GEN-PH-01 (IV.I.8) establishing minimum setback distances from public road rights-
16 of-way (minimum right-of-way width of 60-feet) and from the nearest boundary of the
17 certificate holder's lease area, which based on total wind turbine blade-tip height equates to a
18 distance of 715 feet; and, establishes a setback distance of 1,320 feet from the nearest
19 residence. The 1,320 foot setback distance from wind turbines to residences, as required per
20 Condition GEN-PH-01(b) (IV.I.8), provides a greater setback distance than is requested by Ms.
21 Gilbert.

22
23 While the existing setback to roads is less than that requested by Ms. Gilbert, the Department
24 considers that the existing and recommended amended conditions are sufficient to minimize
25 the risk of structural tower and blade failure and does not consider the study to represent a
26 new impact specific to the facility, with proposed changes, that warrants differing setbacks
27 pursuant to the requirement of OAR 345-024-0010.

28
29 ~~The facility, with proposed changes, would maintain compliance with this setback distance~~
30 ~~requirement that would apply to the facility with proposed changes, which would further~~
31 ~~reduce the risk to public health and safety from ice shedding.~~

32
33 ~~The Department finds-recommends that Council find that the imposition of compliance with~~
34 ~~these the existing and recommended amended~~ conditions would continue to satisfy the
35 requirements of the standard and ensure that the facility, with proposed changes, is designed,
36 constructed, and operated to preclude structural failure of the tower or blades that could
37 endanger public safety, and that the facility, with proposed changes, would have adequate
38 safety devices and testing procedures to warn of impending failure and minimize consequences
39 of such failure, should it occur.

40
41 Based upon the analysis presented here, and in compliance with existing and recommended
42 amended site certificate conditions, the Department recommends that the Council find that the
43 certificate holder can design, construct, and operate the facility, with proposed changes, in

1 compliance with OAR 345-024-0010, the Public Health and Safety Standards for Wind Energy
2 Facilities.

3 4 **Conclusions of Law**

5
6 Based on the foregoing analysis, and subject to compliance with ~~the existing~~ site certificate
7 conditions, the Department recommends the Council find that the facility, with ~~the~~ proposed
8 changes, would continues to comply with the Council's Public Health and Safety Standards for
9 Wind Energy Facilities.

10 11 III.P.2. Cumulative Effects Standard for Wind Energy Facilities OAR 345-024-0015

12
13 To issue a site certificate for a proposed wind energy facility, the Council must find that the
14 applicant can design and construct the facility to reduce cumulative adverse environmental
15 effects in the vicinity by practicable measures including, but not limited to, the following:

- 16
17 (1) Using existing roads to provide access to the facility site, or if new roads are needed,
18 minimizing the amount of land used for new roads and locating them to reduce adverse
19 environmental impacts.
20 (2) Using underground transmission lines and combining transmission routes.
21 (3) Connecting the facility to existing substations, or if new substations are needed,
22 minimizing the number of new substations.
23 (4) Designing the facility to reduce the risk of injury to raptors or other vulnerable wildlife in
24 areas near turbines or electrical equipment.
25 (5) Designing the components of the facility to minimize adverse visual features.
26 (6) Using the minimum lighting necessary for safety and security purposes and using
27 techniques to prevent casting glare from the site, except as otherwise required by the
28 Federal Aviation Administration or the Oregon Department of Aviation.

29 30 **Findings of Fact**

31
32 This standard requires the use of practicable measures to reduce the "cumulative adverse
33 environmental effects" compared to possible wind energy facility effects in the absence of
34 those measures. The standard is limited to environmental effects that are capable of being
35 reduced and does not require the Council to find that a wind energy facility would have no
36 cumulative environmental impacts.

37 38 Access Roads

39
40 OAR 345-024-0015(1) encourages the use of existing roads for facility site access, minimizing
41 the amount of land used for new roads, and locating new roads in such a manner that reduces
42 adverse environmental impacts.
43

1 RFA5 does not propose new roads or changes to the previously approved site boundary or
2 micrositing corridor. The certificate holder affirms that facility construction and operation
3 would utilize existing roads, where possible. Therefore, the Department recommends Council
4 find that RFA5 would not result in a significant adverse impact under OAR 345-024-0015(1) that
5 was not addressed in a previous Council order and incorporate its previous reasoning and
6 analysis presented in the *Final Order on the ASC*. Based on the evidence in the record, the
7 Department recommends the Council continue to find that the certificate holder demonstrates
8 that it would use existing roads where practicable to provide access to the site of the facility,
9 with proposed changes, and where previously approved new roads would be needed they
10 would be located to reduce adverse environmental impacts and constructed in a manner that
11 minimizes the amount of land used.

12 *Transmission Lines and Substations*

14
15 OAR 345-024-0015(2) and (3) encourage wind facilities to utilize underground transmission
16 lines, combine transmission routes and minimize the number of new substations.

17
18 RFA5 does not propose new transmission lines or substations, or changes to the previously
19 approved site boundary or micrositing corridor. Therefore, the Department recommends
20 Council find that RFA5 would not result in a significant adverse impact under OAR 345-024-
21 0015(2) and (3) that was not addressed in a previous Council order and incorporate reasoning
22 and analysis presented in its previous final orders for the facility.

23
24 The facility, as approved, includes two 230 kV transmission line segments, extending 8-miles
25 and 700-feet; up to 55 miles of 34.5 kV collector lines; and, 1 substation. For the 8-mile 230 kV
26 transmission line segment, 3-miles would be co-located with the existing 230 kV Hay Canyon
27 transmission line. The 34.5 kV collector lines would be located primarily underground with
28 aboveground segments occurring only in specific locations to avoid impacts or accommodate
29 unforeseen geotechnical conditions. The substation is necessary to collect power generated
30 from the wind turbines and provide an interconnection point to transmit electricity via the
31 facility 230 kV transmission line to BPA's grid-interconnection point at Klondike Substation.
32 Based on the design of the facility, as approved, the Department recommends Council continue
33 to find, based on its previous reasoning, that the certificate holder demonstrates it can reduce
34 cumulative adverse environmental effects in the vicinity by co-locating a segment of 230 kV
35 transmission with an existing transmission line, minimizing aboveground collector lines, and
36 relying on one substation for facility operation.

37 *Wildlife Protection*

38
39
40 OAR 345-024-0015(4) encourages facility design that reduces the risk of injury to raptors or
41 other vulnerable wildlife in areas near wind turbines or electrical equipment.

1 In RFA5, the certificate holder states that the proposed change in turbine dimensions could
2 have a beneficial cumulative effect because as few as 95 wind turbines would be sited if the
3 proposed larger wind turbines are selected during final design. Because the certificate holder
4 has not requested to reduce the maximum allowable number of wind turbines at the facility,
5 and requests flexibility in its final facility design selection of wind turbines, the Department
6 evaluates the sufficiency of existing site certificate conditions in addressing OAR 345-024-
7 0015(4) based on a worst-case or maximum layout scenario (i.e. 125 of the proposed, 4.2 MW
8 wind turbines).

9
10 The proposed larger wind turbines would increase the maximum turbine blade tip height from
11 518 feet, as previously approved, to 650 feet and increase rotor-swept diameter from 413 feet,
12 as previously approved, to 492 feet. The proposed changes in wind turbine type could result in
13 increased bird and bat fatality risk from wind turbine collision. As discussed in Section III.H, *Fish*
14 and *Wildlife Habitat*, the Council previously imposed Condition OPR-FW-05 (IV.M.7) requiring
15 the certificate holder to implement a Wildlife Monitoring and Mitigation Plan (WMMP). The
16 WMMP, currently in draft form and included as Attachment F to this order, requires the
17 certificate holder to conduct a post-construction bird and bat fatality monitoring study and an
18 avian use and behavior study, both of which will provide important data that can be used in
19 adaptive management.

20
21 In addition, Council previously imposed Condition GEN-FW-04 (IV.M.8) requiring that the
22 certificate holder design the facility to minimize raptor injury by adhering to the 2012 Avian
23 Powerline Interaction Committee suggested practices for raptor protection on powerlines and
24 installing anti-perching devices on transmission pole tops and cross arms where poles are
25 within the site or are located within one-quarter mile of any wind turbine. Additionally, as
26 described in Section III.I *Threatened and Endangered Species*, there are no avian species listed
27 as threatened or endangered by ODFW that are anticipated to occur in the facility analysis area.
28 As described in Section III.H *Fish and Wildlife Habitat*, 93% of the site boundary is Category 6
29 habitat, the lowest quality habitat.

30
31 Based on compliance with other existing site certificate conditions, the certificate holder would
32 implement the following measures to further reduce and avoid wildlife impacts:

- 33
34
 - 35 • Pre- and post-construction raptor nest monitoring, seasonal timing restrictions and
 - 36 avoidance requirements (Condition PRE-FW-02 [IV.M.4]); Condition PRE-FW-05
 - 37 [IV.M.11]); Condition PRE-FW-05 [IV.M.11]; PRE-TE-01 [IV.L.1]; Condition CON-FW-01
 - 38 [IV.M.10]))
 - 39 • Pre-construction grassland bird monitoring and avoidance requirements (Condition PRE-
 - 40 FW-03 [IV.M.5]);
 - 41 • Habitat mitigation, revegetation and monitoring (Condition PRE-FW-01 [IV.M.1])
 - 42 • Weed control and monitoring (Condition PRE-SP-01 [IV.E.4])

1 Subject to compliance with existing site certificate conditions, the Department recommends the
2 Council find the certificate holder continues to demonstrate that it can reduce cumulative
3 adverse environmental effects in the vicinity by designing the facility, with proposed changes,
4 to reduce the risk of injury to raptors or other vulnerable wildlife in areas near wind turbines or
5 electrical equipment.

6
7 Visual Features

8
9 OAR 345-024-0015(5) encourages the certificate holder to design a facility to minimize adverse
10 visual features.

11
12 Based on compliance with existing site certificate conditions, the certificate holder would
13 implement the following measures to reduce potential visual impacts from the facility:

- 14
15 • The O&M building would be designed and constructed to be generally consistent with
16 the character of agricultural buildings used by farmers or ranchers in the area, and the
17 buildings finished in a neutral color to blend with the surrounding landscape (Condition
18 GEN-SR-01 [IV.G.2])
- 19 • Substation structures would be finished in neutral colors to blend with the surrounding
20 landscape (Condition PRE-SR-01 [IV.G.1])
- 21 • Lighting would be kept to a minimum necessary, and designed to prevent offsite glare
22 (Condition ORP-SR-01 [IV.G.3])
- 23 • No advertising or commercial signage would be displayed on any part of the proposed
24 facility (Condition PRE-SR-01 [IV.G.1])
- 25 • Temporary impact areas would be restored and revegetated as soon as practicable
26 following completion of construction (Condition GEN-M-06 [VII.1.1])

27
28 Based on the evidence in the record and subject to compliance with existing site certificate
29 conditions, the Department recommends the Council find the certificate holder continues to
30 demonstrate that it can reduce cumulative adverse environmental effects in the vicinity by
31 designing the components of the facility, with proposed changes, to minimize adverse visual
32 features.

33
34 Lighting

35
36 OAR 345-024-0015(6) requires the use of techniques to prevent casting glare from the site and
37 the use of minimum lighting necessary for safety and security purposes, except as otherwise
38 required by the Federal Aviation Administration (FAA) and the Oregon Department of Aviation.

39
40 RFA5 does not propose changes to previously evaluated exterior lighting of the facility
41 substation and O&M building. Therefore, the Department recommends Council find that RFA5
42 would not result in a significant adverse impact under OAR 345-024-0015(4) that was not

1 addressed in a previous Council order and incorporate reasoning and analysis presented in its
2 previous final orders for the facility.

3
4 Condition OPR-SR-01 [IV.G.3] requires wind turbines to be equipped with the minimum turbine
5 tower lighting required by FAA; O&M building and substation lighting to be shielded and
6 directed downward to reduce glare; and minimum lighting necessary used during repairs and
7 emergencies. Subject to compliance with existing site certificate conditions, the Department
8 recommends the Council find the certificate holder continues to demonstrate that it can reduce
9 cumulative adverse environmental effects in the vicinity by designing the components of the
10 facility, with proposed changes, to minimize the adverse impacts of lighting.

11 12 **Conclusions of Law**

13
14 Based on the foregoing recommended findings of fact and conclusions, and subject to
15 compliance with existing site certificate conditions, the Department recommends that the
16 Council find that the facility, with proposed changes, would continue to comply with the
17 Council's Cumulative Effects Standards for Wind Energy Facilities.

18 19 III.P.3. Siting Standards for Transmission Lines: OAR 345-024-0090

20
21 *To issue a site certificate for a facility that includes any transmission line under Council*
22 *jurisdiction, the Council must find that the applicant:*

- 23
24 (1) *Can design, construct and operate the proposed transmission line so that*
25 *alternating current electric fields do not exceed 9 kV per meter at one meter*
26 *above the ground surface in areas accessible to the public;*
27 (2) *Can design, construct and operate the proposed transmission line so that*
28 *induced currents resulting from the transmission line and related or*
29 *supporting facilities will be as low as reasonably achievable*
30
31

32 **Findings of Fact**

33 This standard addresses safety hazards associated with electric fields around transmission lines.
34 Section (1) of OAR 345-024-0090 sets a limit for electric fields from transmission lines of not
35 more than 9 kV per meter at one meter above the ground surface in areas that are accessible to
36 the public. Section (2) requires implementation of measures to reduce the risk of induced
37 current. RFA5 does not propose changes to the previously approved 230 kV transmission line
38 segments or its location, and therefore does not apply to the proposed changes included in the
39 amendment request. However, for the record, the Department recommends Council find that
40 RFA5 would not result in a significant adverse impact under OAR 345-024-0090(1) and (2) that

1 was not addressed in a previous Council order and incorporate reasoning and analysis
2 presented in its previous final orders for the facility.

3
4 The Council addressed the Siting Standards for Transmission Lines in section IV.K of the *Final*
5 *Order on the ASC* and found the facility to be in compliance with the standard. In the *Final*
6 *Order on the ASC*, the Council found that the certificate holder could construct and operate the
7 transmission lines so that alternating current electric fields do not exceed 9 kV per meter at one
8 meter above the ground surface in areas accessible to the public. The Council further found
9 that the certificate holder could design, construct and operate the transmission lines so that
10 induced currents resulting from the transmission lines would be as low as reasonably
11 achievable.¹²⁵

12
13 Subsection (2) of the standard requires the Council to find that a certificate holder can design,
14 construct, and operate transmission lines so that induced currents will be as low as reasonably
15 achievable. The Council previously found that the facility would comply with this standard, as
16 the certificate holder would provide appropriate grounding of fences and metal-roofed
17 buildings in order to reduce the risk of induced current. The Council previously imposed
18 Condition GEN-MC-12 [VII.17] requiring that the certificate holder design, construct and
19 operate the transmission line in accordance with the 2012 Edition National Electric Safety Code
20 standards, reducing risk of induced current.

21 22 **Conclusion of Law**

23 For the reasons discussed above, and subject to compliance with the existing site certificate
24 conditions, the Department recommends that the Council find that the facility, with proposed
25 changes, would not result in a significant adverse impact under OAR 345-024-0090 that was not
26 addressed in a previous Council order and would continue to comply with the Council's Siting
27 Standards for Transmission Lines.

28 29 **III.Q. Other Applicable Regulatory Requirements Under Council Jurisdiction**

30
31 Under ORS 469.503(3) and under the Council's General Standard of Review (OAR 345-022-
32 0000), the Council must determine whether the proposed facility complies with "all other
33 Oregon statutes and administrative rules...as applicable to the issuance of a site certificate for
34 the proposed facility." This section addresses the applicable Oregon statutes and administrative
35 rules that are not otherwise addressed in Council standards, including noise control regulations,

¹²⁵ GH1APPD0208 Final Order on Application, Section IV.K. 2009-05-15

regulations for removal or fill of material affecting waters of the state, and regulations for appropriating ground water.

III.Q.1. Noise Control Regulations: OAR 340-035-0035

(1) Standards and Regulations:

(b) New Noise Sources:

(B) New Sources Located on Previously Unused Site:

(i) No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit the operation of that noise source if the noise levels generated or indirectly caused by that noise source increase the ambient statistical noise levels, L10 or L50, by more than 10 dBA in any one hour, or exceed the levels specified in Table 8, as measured at an appropriate measurement point, as specified in subsection (3)(b) of this rule, except as specified in subparagraph (1)(b)(B)(iii).

(ii) The ambient statistical noise level of a new industrial or commercial noise source on a previously unused industrial or commercial site shall include all noises generated or indirectly caused by or attributable to that source including all of its related activities. Sources exempted from the requirements of section (1) of this rule, which are identified in subsections (5)(b) - (f), (j), and (k) of this rule, shall not be excluded from this ambient measurement.

Findings of Fact

The Department of Environmental Quality (DEQ) noise control regulations^s at OAR 340-035-0035 have been adopted by Council as the compliance requirements for EFSC-jurisdiction energy facilities. The Council addressed the Noise Control Regulations in section VI.A.1 of the *Final Order on the ~~Application~~ASC*. In the ASC, the certificate holder conducted a noise analysis assuming that the facility would construct 267 1.5 MW turbines that produce a maximum A-weighted sound output of 106 dBA per turbine.¹²⁶ To ensure that the facility would comply with noise regulations, the Council adopted Conditions VI.A.1.1 - VI.A.1.4 (renumbered in the Final Order on Amendment 4 as: CON-CJ-01, PRE-CJ-01, OPR-CJ-01, PRO-CJ-01) in its *Final Order on the ASC*. These conditions, in pertinent part, require the certificate holder to provide information to the Department relating to its final wind turbine selection and design layout

¹²⁶ GH1APPD0c1-28 ASC Exhibit X, p. 9, 2007-07.

1 prior to beginning construction, and must demonstrate compliance with the DEQ noise
2 regulations or otherwise obtain a noise easement from a property owner, and establish a noise-
3 compliant response system.

4
5 ~~Relating to RFA5, as noted in the certificate holder's Table 2,~~As presented in RFA5 Table 2, the
6 ~~new proposed~~ facility, with proposed changes, would contain a maximum of 125 wind turbines
7 and each wind turbine is expected to generate 104.9 dBA.¹²⁷ The certificate holder submitted,
8 under confidential cover, information related to wind turbine specifications from a
9 representative manufacturer, Vestas. With this information, the Department was able to verify
10 that the anticipated maximum wind turbine sound level is consistent with what is represented
11 in RFA5, 104.9 dBA for the standard Vestas turbine with serrated trailing edges, a noise
12 reducing technology. If the certificate holder selects the larger turbine size, in addition to each
13 turbine generating less noise, there may also be fewer turbines. As noted above, the proposed
14 larger wind turbines would allow use of as few as 95 wind turbines compared to the maximum
15 allowed 125 wind turbines.

16
17 ~~The request for amendment 5~~RFA5 would not change the wind turbine micrositing corridors,
18 and although the amendment request would allow a different model of turbine to be selected,
19 the certificate holder would still be required to demonstrate that it maintains compliance with
20 the DEQ noise control regulations as per the above described site certificate conditions.

21
22 Based on the analysis presented here, because the maximum noise level, per wind turbine, of
23 the proposed larger wind turbines would be reduced from the previously approved wind
24 turbines, because the previously approved site boundary and micrositing corridor remains
25 unchanged and because existing site certificate conditions address compliance with DEQ
26 regulations, the Department recommends the Council find that the facility, with the proposed
27 changes, would remain in compliance with the DEQ noise regulations.

28 29 **Conclusions of Law**

30
31 Based on the foregoing findings, the Department recommends that the Council find that the
32 facility, with proposed changes, would comply with the Noise Control Regulations in OAR 340-
33 035-0035(1)(b)(B).
34
35

¹²⁷ GHAMD5Doc15 Complete Request for Amendment 5 Section 3.3, Table 2, p. 9, 2018-07-06.

III.Q.2. Removal-Fill

The Oregon Removal-Fill Law (ORS 196.795 through 196.990) and Department of State Lands (DSL) regulations (OAR 141-085-0500 through 141-085-0785) require a removal-fill permit if 50 cubic yards or more of material is removed, filled, or altered within any “waters of the state.”¹²⁸ The Council, in consultation with DSL, must determine whether a removal-fill permit is needed and if so, whether a removal-fill permit should be issued. The analysis area for wetlands and other waters of the state is the area within the site boundary.

Findings of Fact

In RFA5, the certificate holder describes that construction and operation of the facility, with proposed changes, would avoid impacts to wetlands and waters of the State through boring or re-rerouting facilities. The certificate holder confirms that a Removal/Fill Permit would not be required for the facility, with proposed changes. The Council addressed the removal-fill law in Section VI.A.2 of the Final Order on the Application and found that the facility does not require a removal-fill permit. The Council previously imposed Removal Fill Condition 1 (Condition PRE-CJ-02 (Removal Fill Condition 1)) in its Final Order of Amendment 3, which requires that the certificate holder to conduct an updated wetland delineation survey prior to construction. The survey must review all areas subject to temporary or permanent impacts, and must submit the delineation survey report to both the Department as well as the Department of State Lands (DSL), and obtain DSL concurrence.¹²⁹ If the survey determines that a removal-fill permit is required to construct and operate the facility, then the certificate holder must file a site certificate amendment at that time to request the removal-fill permit.¹³⁰

¹²⁸ ORS 196.800(15) defines “Waters of this state.” The term includes wetlands and certain other waterbodies.

¹²⁹ GHAMD5Doc25. DPO Public Comment Gilbert. Comment 6. 2018-08-23. On the record of the draft proposed order public hearing, Ms. Gilbert makes several claims in reference to potential wetland impacts, as follows: 1) Limiting pre-construction survey areas to the footprint of laydown areas, new substation, mitigation areas, and existing roads is inadequate; 2) Survey areas do not appear to include connecting corridors between turbine strings and transmission line alignment; and, 3) Survey area should include temporarily and permanently impacted wetlands. Because the survey area was described in the draft proposed order, the Department did not amend findings or recommend new or amended conditions in response to this comment.

¹³⁰ In a comment on the record of the public hearing, Oregon Department of State Lands (ODSL) identified that a wetland delineation would be required if the areas impacted by the change in temporary access road and crane path width were not included in previous wetland delineations for which ODSL concurrence had been obtained. The comments also describe that a removal fill permit would be required if wetlands or waters of the State would be impacted by the change. As described in this section, existing Condition PRE-CJ-02 (Removal Fill Condition 1) requires a pre-construction wetland delineation, DSL concurrence, and confirmation that no removal fill permit is required, or if required, that a site certificate amendment request be submitted for a removal fill permit.

~~Because RFA 5 does not request any change to the facility layout or site boundary, and based on the imposition of the above described condition~~Based on compliance with existing Condition PRE-CJ-02 (Removal Fill Condition 1), the Department recommends the Council find that the facility, with proposed changes, ~~maintains compliance with~~continues to satisfy the requirements of the removal-fill law and the certificate holder is not currently required to obtain a removal-fill permit.

Conclusions of Law

Based on the foregoing findings of fact and conclusions, the Department recommends that the Council find that a removal-fill permit is not needed for the facility, with proposed changes.

III.Q.3. Water Rights

Under ORS Chapters 537 and 540 and OAR Chapter 690, OWRD administers water rights for appropriation and use of the water resources of the state. Under OAR 345-022-0000(1), the Council must determine whether the ~~proposed~~ facility would comply with these statutes and administrative rules

Findings of Fact

OAR 690 establishes the procedures and standards which shall be applied by the OWRD in the evaluation of applications for a permit to appropriate surface water or ground water, to construct a reservoir and store water, to use reserved water, or to use water stored in a reservoir. The ~~c~~Certificate holder does not request a groundwater permit, a surface water permit, or a water rights transfer during the construction or operation of the ~~proposed~~ facility, with proposed changes.

The Council previously found in the *Final Order on the ASC* that the ~~proposed~~ facility would comply with the Ground Water Act of 1955 and Water Resources Department administrative rules. The certificate holder does not request any changes to the facility layout, design, or site boundary nor does the certificate holder request a water permit. As such, the facility, with proposed changes, maintains compliance with the Ground Water Act of 1955 or Water Resources Department rules.

Conclusions of Law

Based on the foregoing findings of fact, the Department recommends that the Council conclude that the facility, with proposed changes, does not require a groundwater permit, surface water permit, or water right transfer.

IV. PROPOSED CONCLUSIONS AND ORDER

Based on the recommended findings and conclusions included in this order, the Department recommends that Council make the following findings:

1. The facility, with proposed changes, included in Request for Amendment 5 of the Golden Hills Wind Project site certificate complies with the requirements of the Oregon Energy Facility Siting Statutes, ORS 469.300 to 469.520.
2. The facility, with proposed changes, ~~included as presented~~ in Request for Amendment 5 of the Golden Hills Wind Project site certificate complies with the standards adopted by the Council pursuant to ORS 469.501.
3. The facility, with proposed changes, included in Request for Amendment 5 of the Golden Hills Wind Project site certificate complies with all other Oregon statutes and administrative rules included in and governed by the original site certificate and as applicable to the amendment of the identified in the project order as applicable to the issuance of a site certificate for the proposed facility site certificate.

Accordingly, the Department recommends that the Council find that the facility, with proposed changes, included in Request for Amendment 5 of the Golden Hills Wind Project site certificate complies with the General Standard of Review (OAR 345-022-0000). The Department recommends that the Council find, based on a preponderance of the evidence on the record, that the site certificate may be amended as requested.

1 **Proposed Order**

2
3 The Department recommends that the Council approve Amendment 5 of the Golden Hills Wind
4 Project site certificate, and issue an amended site certificate subject to the terms and
5 conditions set forth above.

6
7 Issued this ~~13th~~12th day of ~~July~~September, 2018

The OREGON DEPARTMENT OF ENERGY

By: _____



Todd Cornett, Assistant Director
Oregon Department of Energy, Energy Facility Siting Division

Notice of the Right to Appeal

[Text to be added to Final Order]

Attachment A: Draft Amended Site Certificate (Red-line version)

ENERGY FACILITY SITING COUNCIL
OF THE
STATE OF OREGON

**Fifth~~Fourth~~ Amended Site
Certificate for the
Golden Hills Wind Project**

ISSUANCE DATES

Site Certificate	May 15, 2009
First Amended Site Certificate	May 11, 2012
Second Amended Site Certificate	January 30, 2015
Third Amended Site Certificate	February 24, 2017
Fourth Amended Site Certificate	April 27, 2018
<u>Fifth Amended Site Certificate</u>	<u>TBD</u>

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Table of Contents

1.0	Introduction and Site Certification	1
2.0	Facility Location and Site Boundary	3
3.0	Facility Description	4
3.1	Energy Facility.....	4
3.2	Related or Supporting Facilities.....	4
4.0	Site Certificate Conditions.....	6
4.1	Condition Format	6
4.2	General Conditions (GEN): Design, Construction and Operations.....	8
4.3	Pre-Construction (PRE) Conditions	15
4.4	Construction (CON) Conditions.....	27
4.5	Pre-Operational (PRO) Conditions.....	30
4.6	Operational (OPR) Conditions.....	31
4.7	Retirement Conditions (RET).....	33
5.0	Successors and Assigns.....	35
6.0	Severability and Construction.....	35
7.0	Execution	35

GOLDEN HILLS WIND PROJECT SITE CERTIFICATE

Attachments

Attachment A Facility Site Boundary Map

Acronyms and Abbreviations

ASC	Application for Site Certificate
Council	Oregon Energy Facility Siting
Department	Oregon Department of Energy
DOGAMI	Oregon Department of Geology and Mineral Industries
DSL	Department of State Lands
HMRP	Habitat Mitigation and Revegetation Plan
NH zone	Natural Hazards Combining Zone
O&M	Operations and Maintenance
OAR	Oregon Administrative Rule
ODFW	Oregon Department of Fish and Wildlife
ODEQ	Oregon Department of Environmental Quality
ORS	Oregon Revised Statute
SHPO	State Historic Preservation Office

1.0 Introduction and Site Certification

This site certificate is a binding agreement between the State of Oregon (State), acting through the Energy Facility Siting Council (Council), and Golden Hills Wind Farm LLC (certificate holder), which is a wholly-owned subsidiary of Pacific Wind Development, LLC (Pacific Wind or parent company). As authorized under Oregon Revised Statute (ORS) Chapter 469, the Council issues this site certificate authorizing the certificate holder to construct, operate and retire the Golden Hills Wind Project (facility) at the below described site within Sherman county, subject to the conditions set forth herein.

Both the State and certificate holder must abide by local ordinances, state law and the rules of the Council in effect on the date this site certificate is executed. However, upon a clear showing of a significant threat to public health, safety, or the environment that requires application of later-adopted laws or rules, the Council may require compliance with such later-adopted laws or rules (ORS 469.401(2)).

The findings of fact, reasoning, and conclusions of law underlying the terms and conditions of this site certificate are set forth in the Council's Final Order in the Matter of the Application for a Site Certificate for the Golden Hills Wind Project (the "Final Order on the Application" or "Final Order") issued on May 15, 2009, the Council's Final Order in the Matter of the Request for Amendment #1 of the Site Certificate for the Golden Hills Wind Project ("Final Order on Amendment #1") issued May 11, 2012;~~;~~ the Council's Final Order in the Matter of the Request for Amendment #2 of the Site Certificate for the Golden Hills Wind Project ("Final Order on Amendment #2"), issued January 30, 2015;~~;~~ the Council's Final Order in the Matter of the Request for Amendment #3 of the Site Certificate for the Golden Hills Wind Project ("Final Order on Amendment #3"), issued February 24, 2017;~~;~~ ~~and~~ the Council's Final Order in the Matter of the Request for Amendment #4 of the Site Certificate for the Golden Hills Wind Project ("Final Order on Amendment #4"), issued April 27, 2018; and the Council's Final Order in the Matter of the Request for Amendment #5 of the Site Certificate for the Golden Hills Wind Project ("Final Order on Amendment #5), issued TBD -and incorporated herein by this reference. In interpreting the amended site certificate, any ambiguity shall be clarified by reference to the following, in order of priority: (1) this amended site certificate; (2) the Final Order on Amendment #4; (3) the Final Order on Amendment #3; (4) the Final Order on Amendment #2; (5) the Final Order on Amendment #1; (6) the Final Order on the Application; and (7) the record of the proceedings that led to all the Final Orders. This site certificate binds the State and all counties, cities and political subdivisions in Oregon as to the approval of the site and the construction, operation, and retirement of the facility as to matters that are addressed in and governed by this site certificate (ORS 469.401(3)). This site certificate does not address, and is not binding with respect to, matters that are not included in and governed by this site certificate, and such matters include, but are not limited to: employee health and safety; building code compliance; wage and hour or other labor regulations; local government fees and charges; other design or operational issues that do not relate to siting the facility (ORS 469.401(4)); and permits issued under statutes and rules for which the decision on compliance has been delegated by the federal government to a state agency other than the Council (ORS 469.503(3)).

Each affected state agency, county, city, and political subdivision in Oregon with authority to issue a permit, license, or other approval addressed in or governed by this site certificate, shall upon submission of the proper application and payment of the proper fees, but without hearings or other proceedings, issue such permit, license or other approval subject only to conditions set forth in this

site certificate. In addition, each state agency or local government agency that issues a permit, license or other approval for this facility shall continue to exercise enforcement authority over such permit, license or other approval (ORS 469.401(3)). For those permits, licenses, or other approvals addressed in and governed by this site certificate, the certificate holder shall comply with applicable state and federal laws adopted in the future to the extent that such compliance is required under the respective state agency statutes and rules (ORS 469.401(2)).

The certificate holder must construct, operate and retire the facility in accordance with all applicable rules as provided for in Oregon Administrative Rule (OAR) Chapter 345, Division 26. After issuance of this site certificate, the Council shall have continuing authority over the site and may inspect, or direct the Oregon Department of Energy (Department) to inspect, or request another state agency or local government to inspect, the site at any time in order to ensure that the facility is being operated consistently with the terms and conditions of this site certificate (ORS 469.430).

The obligation of the certificate holder to report information to the Department or the Council under the conditions listed in this site certificate is subject to the provisions of ORS 192.502 *et seq.* and ORS 469.560. To the extent permitted by law, the Department and the Council will not publicly disclose information that may be exempt from public disclosure if the certificate holder has clearly labeled such information and stated the basis for the exemption at the time of submitting the information to the Department or the Council. If the Council or the Department receives a request for the disclosure of the information, the Council or the Department, as appropriate, will make a reasonable attempt to notify the certificate holder and will refer the matter to the Attorney General for a determination of whether the exemption is applicable, pursuant to ORS 192.450.

The Council recognizes that many specific tasks related to the design, construction, operation and retirement of the facility will be undertaken by the certificate holder's agents or contractors. Nevertheless, the certificate holder is responsible for ensuring compliance with all provisions of the site certificate.

The duration of this site certificate shall be the life of the facility, subject to termination pursuant to OAR 345-027-0013 or the rules in effect on the date that termination is sought, or revocation under ORS 469.440 and OAR 345-029-0100 or the statutes and rules in effect on the date that revocation is ordered. The Council shall not change the conditions of this site certificate except as provided for in OAR Chapter 345, Division 27.

The definitions in ORS 469.300 and OAR 345-001-0010 apply to the terms used in this site certificate, except where otherwise stated, or where the context clearly indicates otherwise.

2.0 Facility Location and Site Boundary

The energy facility and its related and supporting facilities will be located within Sherman County. The site boundary, as defined in OAR 345-001-0010, encompasses approximately 29,500 acres and be located near Wasco in Sherman County, Oregon. More particularly, the site would occupy portions of Sections 1-17, Township 1 South, Range 17 East, Sections 6-7, Township 1 South, Range 18 East, Sections 29-31, Township 1 North, Range 18 East, Sections 5-9, 14-23, and 25-36, Township 1 North, Range 17 East, Sections 1-3, 12-14, 23-26, and 35-36, Township 1 North, Range 16 East, Sections 29-32, Township 2 North, Range 17 East, Sections 25-27 and 34-36, Township 2 North, Range 16 East. Attachment A of this site certificate contains a map of the site boundary.

3.0 Facility Description

3.1 Energy Facility

ORS 469.300(11)(a)(J) defines the “energy facility” in this case as an electric power generating plant with an average electric generating capacity of 35 megawatts or more if the power is produced from ~~---~~ wind energy at a single energy facility.” The proposed “electric power generating plant” would consist of up to 125 wind turbine locations, each consisting of a turbine tower and foundation, turbine pad area, nacelle, rotor and blade assembly, and step-up transformer. Wind turbines would be placed in micro-siting survey corridors as shown in the Application for a Site Certificate. A map of the site boundary, including micro-siting corridors, is included as Attachment A to this amended site certificate. Golden Hills would have a peak electric generating capacity of up to 400 MW and an average electric generating capacity of about 133 MW.

Golden Hills has not yet selected the wind turbine model or models that would be installed in the facility. Golden Hills requested a site certificate that would allow the installation of up to 125 turbines with turbine towers measuring up to 12395 meters (312-404 feet) at the rotor hub, the diameter of the rotor-swept area measuring up to 126-150 meters (413-492 feet), and the total maximum turbine height measuring up to 158-198 meters (650-518 feet). Wind turbine dimensions represent maximum allowable dimensions, but do not restrict the certificate holder from utilizing a mix of wind turbine types within the allowable dimensions.

A wind turbine features a nacelle mounted on a tubular steel tower. The nacelle houses the generator and gearbox and supports the rotor and blades at the hub. The turbine tower supports and provides access to the nacelle. Each turbine unit sits on a concrete pad that accommodates the turbine pedestal, a step-up transformer and a turnout area for service vehicles. The purpose of the step-up transformer is to increase the output voltage of the wind turbine to the voltage of the power collection system. Underlying the pad would be a deep concrete turbine foundation with a surface area dependent upon the type and size of wind turbine selected.

3.2 Related or Supporting Facilities

Golden Hills proposes to construct the following related or supporting facilities:

- Power collection system
- Substation
- 230 kV transmission line
- Meteorological towers
- Supervisory Control and Data Acquisition (“SCADA”) System
- O&M facility
- Access roads
- Temporary laydown areas

Power Collection System. About 55 miles of power collection system, operating at 34.5 kV, would transport the power from the wind turbines to the substation. Some portion of the power collection system may be installed above ground to avoid impacts or to accommodate unforeseen geotechnical conditions.

Substation. The facility would include one substation, located near the center of the Golden Hills site. The substation would occupy a graveled and fenced area about 5 acres in size to facilitate transformers, switching equipment and a parking area.

230-kV Transmission Line. An approximately 5-mile, 230 kV transmission line would interconnect the substation to the existing Hay Canyon 230 kV transmission line. From there, electricity would be transmitted using the existing Hay Canyon 230 kV line to the northernmost transmission pole structure near the existing Klondike Substation where up to approximately 700 feet of new 230 kV transmission line would be constructed along with associated structures and equipment necessary to interconnect the facility to Bonneville Power Administration's (BPA's) transmission structure located approximately 300 feet north of the Klondike Substation.

Meteorological Towers. GHWF proposes to install up to six permanent meteorological towers ("met towers"). The met towers would be unguyed tubular structures about 95 meters (312 feet) tall and set in concrete foundations.

SCADA System. A fiber optic communications network would link the wind turbines to a central computer at the O&M facility. The SCADA system would collect operating and performance data from each wind turbine and Golden Hills as a whole and provide for remote operation of the wind turbines.

O&M Facility. A 5,000-square-foot operations and maintenance ("O&M") building would be constructed ~~adjacent to the substation at one or the other of two locations proposed by GHWF.~~ The O&M building would house office and workshop areas, a control room for the SCADA system, and a kitchen, bathroom and shower. The 5-acre O&M facility site would include parking for vehicles. Domestic water use would not exceed 5,000 gallons per day, and domestic water would be obtained from an on-site well. Domestic wastewater would be drained into an on-site septic system.

Access Roads. Approximately 41 miles of new roads would be constructed to provide access to the turbine strings and other facility components. Access roads would connect to graveled turbine pad areas at the base of each wind turbine. The permanent access roads would be 20 feet wide and constructed with crushed gravel. In addition, GHWF would improve and widen some existing county and farm roads. Approximately 41 miles of temporary access roads and 11 miles of temporary crane paths would be constructed. The temporary access roads and crane paths would be up to 100 feet wide to account for the delivery of larger turbine components. The actual width of temporary roads and crane paths would depend on need for cut and fill slopes and associated work area. ~~In addition, GHWF would improve and widen some existing county and farm roads.~~

Temporary Laydown Areas. Up to seven principal, temporary laydown areas would be used to stage construction and store supplies and equipment during construction. In addition, temporary laydown areas would be required at the base of each wind turbine. The laydown areas would be covered with gravel, and the gravel would be removed and the areas would be restored to their preconstruction conditions following completion of construction.

4.0 Site Certificate Conditions

4.1 Condition Format

The conditions in Sections 4.2 through 4.7 of this Site Certificate are organized and coded to indicate the phase of implementation, the standard the condition is required to satisfy, and an identification number (1, 2, 3, etc.)¹. The table below presents a “key” for phase of implementation:

Key	Type of Conditions/Phase of Implementation
GEN	General Conditions: Design, Construction and Operation
PRE	Pre-Construction Conditions
CON	Construction Conditions
PRO	Pre-Operational Conditions
OPR	Operational Conditions
RET	Retirement Conditions

The standards are presented using an acronym; for example, the General Standard of Review is represented in the condition numbering as “GS”; the Soil Protection standard is represented in the condition numbering as “SP” and so forth.

For example, the coding of Condition GEN-GS-01 represents that the condition is a general condition (GEN) to be implemented during design, construction and operation of the facility, is required to satisfy the Council’s General Standard of Review, and is condition number 1.

The Council administratively amends the following conditions due to OAR Division 27 regulatory changes, as approved by Council on October 19, 2017: Condition VII.1 through VII.5, VII.7 through VII.18, and VII.20 through VII.21.

Conditions from the site certificate that have either been incorporated into other amended conditions or deleted due to duplication with other conditions have been removed.² No substantive changes were made to the requirements of each of the removed conditions, and still apply to the certificate holder.

Condition IV.C.8, relating to the value of salvage in decommissioning calculations, was removed because Council no longer recognizes salvage value as an offset to the total site restoration and decommissioning cost.

¹ The identification number is not representative of an order that conditions must be implemented; it is intended only to represent a numerical value for identifying the condition.

² The removed conditions that were either incorporated into other amended conditions or deleted due to duplication with other conditions are; IV.B.3, IV.C.9, IV.D.16, IV.D.17, IV.D.21, V.B.3, V.C.12, V.C.13, V.C.14, VII.6, and VII.19.

[NOTE: Recommended condition amendments included in the draft proposed order are presented in underline/strikeout only; new or differing recommended condition amendments from the draft proposed order to the proposed order are presented in both hi-lite and underline/strikeout.]

4.2 General Conditions (GEN): Design, Construction and Operations

Condition Number	Pre-Construction (PRE) Conditions
DESCRIPTION CONDITIONS (DC)	
GEN-DC-01	<p>The certificate holder shall begin construction of the facility by June 18, 2020. Under OAR 345-015-0085(9), an amended site certificate is effective upon execution by the Council Chair and the certificate holder. The Council may grant an extension of the deadline to begin construction in accordance with OAR 345-027-0030 or any successor rule in effect at the time the request for extension is submitted.</p> <p>On or before June 18, 2020, the certificate holder shall provide written notification to the Department that it has met the construction commencement deadline. Construction is defined in OAR 345-001-0010.</p> <p>[Final Order on ASC, Condition III.D.1; Amended in Final Order on AMD2, AMD3, AMD4]</p>
GEN-DC-02	<p>The certificate holder shall complete construction of the facility by June 18, 2021. Construction is complete when (1) the facility is substantially complete as defined by the certificate holder's construction contract documents; (2) acceptance testing has been satisfactorily completed; and (3) the energy facility is ready to begin continuous operation consistent with the site certificate. The certificate holder shall promptly notify the Department of the date of completion of construction. The Council may grant an extension of the deadline for completing construction in accordance with OAR 345-027-0030 or any successor rule in effect at the time the request for extension is submitted.</p> <p>[Final Order on ASC, Condition III.D.2; Amended in Final Order on AMD2, AMD3]</p>
STANDARD: ORGANIZATIONAL EXPERTISE (OE) [OAR 345-022-0010]	
GEN-OE-01	<p>During construction, operation and facility retirement, the certificate holder shall report to the Department within 7 days, any change in the corporate structure of Avangrid Renewables LLC (a subsidiary of Avangrid, Inc., and the parent company of Pacific Wind Development, LLC). The certificate holder shall report promptly to the Department any change in its access to the resources, expertise and personnel of Avangrid Renewables LLC. The certificate holder shall include in the report, an evaluation of whether the change in corporate structure represents a change in ownership of the certificate holder and whether a site certificate transfer is warranted.</p> <p>[Final Order on ASC, Condition IV.B.1; Amended in Final Order on AMD2, AMD4]</p>
GEN-OE-02	<p>Any matter of noncompliance under the site certificate shall be the responsibility of the certificate holder. Any notice of violation issued under the site certificate shall be issued to the certificate holder. Any civil penalties assessed under the site certificate shall be levied on the certificate holder.</p> <p>[Final Order on ASC, Condition IV.B.4]</p>
GEN-OE-03	<p>The certificate holder shall contractually require the engineering and procurement contractor and all independent contractors and subcontractors involved in the construction and operation of the facility to comply with all applicable laws and regulations and with the terms and conditions of the site certificate. Such contractual provision shall not operate to relieve the certificate holder of responsibility under the site certificate.</p> <p>[Final Order on ASC, Condition IV.B.5]</p>
GEN-OE-04	<p>During construction, operation and retirement, the certificate holder shall obtain, or shall ensure that its contractors obtain, necessary federal, State and local permits or approvals. The certificate holder shall work with local and State fire officials to ensure compliance with all fire code regulations regarding public buildings.</p> <p>[Final Order on ASC, Condition IV.B.6; Amended in Final Order on AMD4]</p>
GEN-OE-05	<p>The certificate holder shall:</p> <ul style="list-style-type: none"> (a) Prior to construction, notify the Department of the identity, telephone number, e-mail address and qualifications of the on-site construction manager or assistant construction manager. The construction

	<p>manager or assistant construction manager must be capable of managing a wind facility construction project, including permit and regulatory compliance requirements.</p> <p>(b) Prior to operation, notify the Department of the identity, telephone number, e-mail address and qualifications of the facility operations manager. The facility operations manager must be capable of managing permit and regulatory compliance requirements and manage operation of a wind facility.</p> <p>(c) Prior to facility retirement, notify the Department of the identity, telephone number, and e-mail address and qualifications of the personnel or entity responsible for facility decommissioning and restoration activities. The personnel or entity responsible for facility decommissioning and restoration activities must be capable of managing permit and regulatory compliance requirements and be qualified to decommission a wind facility.</p> <p>The certificate holder shall notify the Department within three business days upon any change in personnel or contact information provided to satisfy Condition IV.B.7 (a) through (c).</p> <p>[Final Order on ASC, Condition IV.B.7; Amended in Final Order on AMD4]</p>
GEN-OE-06	<p>Within three business days after discovery of conditions or circumstances that may violate the terms or conditions of the site certificate, the certificate holder shall report, in accordance with OAR 345-029-0010(1), the conditions or circumstances to the Department. Within 30-days of discovery, the certificate holder shall submit to the Department a written report pursuant to OAR 345-029-0010(3).</p> <p>[Final Order on ASC, Condition IV.B.8; Amended in Final Order on AMD4]</p>
STANDARD: STRUCTURAL STANDARD (SS) [OAR 345-022-0020]	
GEN-SS-01	<p>The certificate holder shall design and construct the facility in accordance with requirements set forth by the State's Building Code Division and any other applicable codes and design procedures.</p> <p>Prior to operation, the certificate holder shall provide confirmation to the Department that facility design and construction satisfies the requirements set forth by the State's Building Code Division and any other applicable codes and design procedures.</p> <p>[Final Order on ASC, Condition V.A.3; Amended in Final Order on AMD4]</p>
STANDARD: SOIL PROTECTION (SP) [OAR 345-022-0022]	
GEN-SP-01	<p>The certificate holder shall conduct all construction work in compliance with an Erosion and Sediment Control Plan (the "ESCP") satisfactory to the Oregon DEQ and as required under the National Pollutant Discharge Elimination System Storm Water Discharge General Permit #1200-C. The certificate holder shall include in the ESCP any procedures necessary to meet local erosion and sediment control requirements or storm water management requirements.</p> <p>[Final Order on ASC, Condition IV.E.1]</p>
STANDARD: LAND USE (LU) [OAR 345-022-0030]	
GEN -LU-01	<p>The certificate holder shall ensure that no equipment or machinery is parked or stored on any county road except while in use.</p> <p>[Final Order on ASC, Condition IV.D.2]</p>
GEN -LU-02	<p>Aboveground transmission line structures shall not occupy areas that show gross indicators of landslide activity or marginal stability. Prior to construction of aboveground transmission line structures, the certificate holder shall provide confirmation to the Department that the locations of the aboveground transmission line structures do not occupy areas that show gross indicators of landslide activity or marginal stability. The certificate holder may rely upon the analysis included in the pre-construction geotechnical investigation, as required per Condition V.A.1, to satisfy this condition.</p> <p>[Final Order on ASC, Condition IV.D.5; Amended in Final Order on AMD4]</p>
STANDARD: RETIREMENT AND FINANCIAL ASSURANCE (RT) [OAR 345-022-0050]	

GEN -RT-01	<p>The certificate holder shall prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent that prevention of such site conditions is within the control of the certificate holder.</p> <p>[Final Order on ASC, Condition IV.C.3]</p>
STANDARD: FISH AND WILDLIFE HABITAT (FW) [OAR 345-022-0060]	
GEN -FW-01	<p>The certificate holder shall restore areas outside the permanent footprint that are disturbed, according to the methods and monitoring procedures described in the HMRP included in the Final Order on Amendment 4 as Attachment BC and as amended from time to time. Mitigation and restoration requirements in the plan shall apply to all laydown areas and other areas of temporary disturbance, including those associated with construction of transmission lines.</p> <p>[Final Order on ASC, Condition IV.M.2; Amended in Final Order on AMD4]</p>
GEN -FW-02	<p>Permanent met towers shall not have guy wires.</p> <p>[Final Order on ASC, Condition IV.M.3]</p>
GEN -FW-03	<p>Trees in Category 3 upland tree habitat shall not be physically harmed or removed.</p> <p>[Final Order on ASC, Condition IV.M.6]</p>
GEN -FW-04	<p>The certificate holder shall design and construct all aboveground transmission line support structures following the practices suggested by the Avian Powerline Interaction Committee (APLIC 2006; APLIC 2012) and shall install anti-perching devices on transmission pole tops and cross arms where the poles are within the site or are located within one-quarter mile of any wind turbine.</p> <p>[Final Order on ASC, Condition IV.M.8; Amended in Final Order on AMD4]</p>
STANDARD: SCENIC RESOURCES (SR) [OAR 345-022-0080]	
GEN -SR-01	<p>The certificate holder shall design and construct the O&M facility to be generally consistent with the character of similar buildings used by commercial farmers or ranchers in the area and shall paint the building in a neutral color to blend with the surrounding landscape.</p> <p>[Final Order on ASC, Condition IV.G.2]</p>
STANDARD: HISTORIC, CULTURAL, AND ARCHEOLOGICAL RESOURCES (HC) [OAR 345-022-0090]	
GEN -HC-01	<p>Prior to and during construction, the certificate holder shall ensure that construction personnel receive training from a cultural resources specialist on how to identify sensitive historic, cultural, and archaeological resources present onsite and on measures to avoid accidental damage to identified resource sites. Records of such training must be maintained onsite during construction, and made available to the Department upon request.</p> <p>[Final Order on ASC, Condition V.B.5; Amended in Final Order on AMD4]</p>
GEN -HC-02	<p>Prior to and during construction, “no access” buffers shall be identified on construction plans and temporarily demarcated in the field if work is planned within 200 feet of known cultural resources that require buffers. The facility Environmental Inspector shall monitor flagged “no access” buffers around archeological sites during construction to prevent accidental damage to cultural resources. These flags or markers shall not be moved or removed during construction activities, and construction personnel shall be advised of these restrictions.</p> <p>[Final Order on ASC, Condition V.B.7; Amended in Final Order on AMD4]</p>
STANDARD: PUBLIC SERVICES (PS) [OAR 345-022-0100]	
GEN -PS-01	<p>During construction and operation of the facility, the certificate holder shall install on-site security and shall require on-site security personnel to establish a line of communication with the Sherman County Sheriff’s Office to regularly report on the status of on-site security operations.</p> <p>[Final Order on ASC, Condition V.C.2]</p>
GEN -PS-02	<p>During construction and operation of the facility, the certificate holder shall ensure that the O&M facility and all</p>

	<p>service vehicles are equipped with shovels and portable fire extinguishers of a 4A50BC or equivalent rating.</p> <p>[Final Order on ASC, Condition V.C.5]</p>
STANDARD: PUBLIC HEALTH AND SAFETY STANDARDS FOR WIND ENERGY FACILITIES (PH) [OAR 345-024-0010]	
GEN -PH-01	<p>The certificate holder shall construct all facility components in compliance with the following setback requirements</p> <ol style="list-style-type: none"> The certificate holder shall maintain a minimum distance of 110 percent of maximum blade tip height, measured from the centerline of the turbine tower to the nearest edge of any public road right-of-way. The certificate holder shall assume a minimum right-of-way width of 60 feet. The certificate holder shall maintain a minimum distance of 1,320 feet, measured from the centerline of the turbine tower to the center of the nearest residence existing at the time of tower construction. The certificate holder shall maintain a minimum distance of 110 percent of maximum blade tip height, measured from the centerline of the turbine tower to the nearest boundary of the certificate holder's lease area. <p>Prior to construction of turbine towers, the certificate holder shall submit to the Department final facility design and layout maps, with supporting distance tables (i.e. distance of facility component to nearest setback location – residence, right of way, etc), demonstrating compliance with the aforementioned setback requirements.</p> <p>[Final Order on ASC, Condition IV.I.8; Amended in Final Order on AMD4]</p>
REQUIREMENTS UNDER COUNCIL JURISDICTION (CJ)	
GEN -CJ-01	<p>Prior to construction, the certificate holder shall take reasonable steps to reduce or manage human exposure to electric and magnetic fields, including, but not limited to:</p> <ol style="list-style-type: none"> Submittal of final facility design maps to the Department demonstrating that all aboveground transmission lines would be located at least 200 feet from any residence or other occupied structure, measured from the centerline of the transmission line; Fencing all areas near the facility substations to ensure that substation equipment is not accessible to the public; Submittal of evidence to the Department that a map of underground and overhead transmission lines on private property and an advisory of possible health risks has been provided to all landowners within 200-feet of the transmission line; and Designing and maintaining all transmission lines so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public. <p>[Final Order on ASC, Condition VI.A.4.1; Amended in Final Order on AMD4]</p>
MANDATORY CONDITIONS (MC)	
GEN -MC-01	<p>OAR 345-025-0006 (1): The Council shall not change the conditions of the site certificate except as provided for in OAR Chapter 345, Division 27.</p> <p>[Final Order on ASC, Condition VII.1; Amended in Final Order on AMD4]</p>
GEN -MC-02	<p>OAR 345-025-0006 (3): The certificate holder shall design, construct, operate, and retire the facility:</p> <ol style="list-style-type: none"> Substantially as described in the site certificate; In compliance with the requirements of ORS Chapter 469, applicable Council rules, and applicable state and local laws, rules and ordinances in effect at the time the site certificate is issued; and In compliance with all applicable permit requirements of other state agencies. <p>[Final Order on ASC, Condition VII.3; Amended in Final Order on AMD4]</p>
GEN -MC-03	<p>OAR 345-025-0006 (4): The certificate holder shall begin and complete construction of the facility by the dates specified in the site certificate. [See Conditions (III.D.1) and (111.D.2).]</p> <p>[Final Order on ASC, Condition VII.4; Amended in Final Order on AMD4]</p>

GEN -MC-04	<p>OAR 345-025-0006 (7): The certificate holder shall prevent the development of any conditions on the site that would preclude restoration of the site to a useful, non-hazardous condition to the extent that prevention of such site conditions is within the control of the certificate holder.</p> <p>[Final Order on ASC, Condition VII.7; Amended in Final Order on AMD4]</p>
GEN -MC-05	<p>OAR 345-025-0006 (10): The Council shall include as conditions in the site certificate all representations in the site certificate application and supporting record the Council deems to be binding commitments made by the applicant.</p> <p>[Final Order on ASC, Condition VII.10; Amended in Final Order on AMD4]</p>
GEN -MC-06	<p>OAR 345-025-0006(11): Upon completion of construction, the certificate holder shall restore vegetation to the extent practicable and shall landscape all areas disturbed by construction in a manner compatible with the surroundings and proposed use. Upon completion of construction, the certificate holder shall remove all temporary structures not required for facility operation and dispose of all timber, brush, refuse and flammable or combustible material resulting from clearing of land and construction of the facility.</p> <p>[Final Order on ASC, Condition VII.11; Amended in Final Order on AMD4]</p>
GEN -MC-07	<p>OAR 345-025-0006 (12): The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety and the environment presented by seismic hazards affecting the site that are expected to result from all maximum probable seismic events. As used in this rule “seismic hazard” includes ground shaking, ground failure, landslide, liquefaction triggering and consequences (including flow failure, settlement buoyancy, and lateral spreading), cyclic softening of clays and silts, fault rupture, directivity effects and soil-structure interaction.</p> <p>[Final Order on ASC, Condition VII.12; Amended in Final Order on AMD4]</p>
GEN -MC-08	<p>OAR 345-025-0006 (13): The certificate holder shall notify the Department, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if site investigations or trenching reveal that conditions in the foundation rocks differ significantly from those described in the application for a site certificate. After the Department receives the notice, the Council may require the certificate holder to consult with the Department of Geology and Mineral Industries and the Building Codes Division and to propose mitigation actions.</p> <p>[Final Order on ASC, Condition VII.13; Amended in Final Order on AMD4]</p>
GEN -MC-09	<p>OAR 345-025-0006 (14): The certificate holder shall notify the Department, the State Building Codes Division and the Department of Geology and Mineral Industries promptly if shear zones, artesian aquifers, deformations or clastic dikes are found at or in the vicinity of the site.</p> <p>[Final Order on ASC, Condition VII.14; Amended in Final Order on AMD4]</p>
GEN -MC-10	<p>OAR 345-025-0006 (15): Before any transfer of ownership of the facility or ownership of the site certificate holder, the certificate holder shall inform the Department of the proposed new owners. The requirements of OAR 345-027-0100 apply to any transfer of ownership that requires a transfer of the site certificate.</p> <p>[Final Order on ASC, Condition VII.15; Amended in Final Order on AMD4]</p>
GEN -MC-11	<p>OAR 345-025-0006 (16): If the Council finds that the certificate holder has permanently ceased construction or operation of the facility without retiring the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110, the Council shall notify the certificate holder and request that the certificate holder submit a proposed final retirement plan to the Office within a reasonable time not to exceed 90 days. If the certificate holder does not submit a proposed final retirement plan by the specified date, the Council may direct the Department to prepare a proposed a final retirement plan for the Council’s approval. Upon the Council’s approval of the final retirement plan, the Council may draw on the bond or letter of credit described in OAR 345-027-0020(8) to restore the site to a useful, non-hazardous condition according to the final retirement plan, in addition to any penalties the Council may impose under OAR Chapter 345, Division 29. If the amount of the bond or letter of credit is insufficient to pay the actual cost of retirement, the certificate holder shall pay any additional cost necessary to restore the site to a useful, non-hazardous condition. After completion of site</p>

	<p>restoration, the Council shall issue an order to terminate the site certificate if the Council finds that the facility has been retired according to the approved final retirement plan.</p> <p>[Final Order on ASC, Condition VII.16; Amended in Final Order on AMD4]</p>
GEN -MC-12	<p>OAR 345-025-0006 (4):</p> <ul style="list-style-type: none"> a) The certificate holder shall design, construct and operate the transmission line in accordance with the requirements of the 2012 Edition of the National Electrical Safety Code approved on June 3, 2011, by the American National Standards Institute; and b) The certificate holder shall develop and implement a program that provides reasonable assurance that all fences, gates, cattle guards, trailers, or other objects or structures of a permanent nature that could become inadvertently charged with electricity are grounded or bonded throughout the life of the line. <p>[Final Order on Amendment No. 3]</p> <p>[Final Order on ASC, Condition VII.17 [OAR 345-027-0023(4)]; Amended in Final Order on AMD4]</p>
GEN -MC-13	<p>OAR 345-025-0006 (5) -The certificate holder is authorized to construct a 230-kV transmission line anywhere within the approved corridor, subject to the conditions of the site certificate. The approved corridor includes a 5-mile segment and 700-foot segment extending the length of the 230-kV transmission line route and is 200 feet in width.</p> <p>[Final Order on ASC, Condition VII.18; Amended in Final Order on AMD4]</p>
GEN -MC-14	<p>OAR 345-026-0048: Following receipt of the site certificate or an amended site certificate, the certificate holder shall implement a plan that verifies compliance with all site certificate terms and conditions and applicable statutes and rules. As a part of the compliance plan, to verify compliance with the requirement to begin construction by the date specified in the site certificate, the certificate holder shall report promptly to the Department of Energy when construction begins. Construction is defined in OAR 345-001-0010. In reporting the beginning of construction, the certificate holder shall describe all work on the site performed before beginning construction, including work performed before the Council issued the site certificate, and shall state the cost of that work. For the purpose of this exhibit, “work on the site” means any work within a site or corridor, other than surveying, exploration or other activities to define or characterize the site or corridor. The certificate holder shall document the compliance plan and maintain it for inspection by the Department or the Council.</p> <p>[Final Order on ASC, Condition VII.20]</p>
GEN -MC-15	<p>OAR 345-026-0080: The certificate holder shall report according to the following requirements:</p> <p>(a) General reporting obligation for energy facilities under construction or operating:</p> <ul style="list-style-type: none"> (i) Within six months after beginning construction, and every six months thereafter during construction of the energy facility and related or supporting facilities, the certificate holder shall submit a semiannual construction progress report to the Department of Energy. In each construction progress report, the certificate holder shall describe any significant changes to major milestones for construction. The certificate holder shall include such information related to construction as specified in the site certificate. When the reporting date coincides, the certificate holder may include the construction progress report within the annual report described in OAR 345-026-0080. (ii) By April 30 of each year after beginning construction, the certificate holder shall submit an annual report to the Department addressing the subjects listed in OAR 345-026-0080. The Council Secretary and the certificate holder may, by mutual agreement, change the reporting date. (iii) To the extent that information required by OAR 345-026-0080 is contained in reports the certificate holder submits to other state, federal or local agencies, the certificate holder may submit excerpts from such other reports to satisfy this rule. The Council reserves the right to request full copies of such excerpted reports. <p>(b) In the annual report, the certificate holder shall include the following information for the calendar year preceding the date of the report:</p> <ul style="list-style-type: none"> (i) Facility Status: An overview of site conditions, the status of facilities under construction, and a summary of the operating experience of facilities that are in operation. In this section of the annual report, the certificate holder shall describe any unusual events, such as earthquakes, extraordinary windstorms, major accidents or the

	<p>like that occurred during the year and that had a significant adverse impact on the facility.</p> <p>(ii) Reliability and Efficiency of Power Production: For electric power plants, the plant availability and capacity factors for the reporting year. The certificate holder shall describe any equipment failures or plant breakdowns that had a significant impact on those factors and shall describe any actions taken to prevent the recurrence of such problems.</p> <p>(iii) Status of Surety Information: Documentation demonstrating that bonds or letters of credit as described in the site certificate are in full force and effect and will remain in full force and effect for the term of the next reporting period.</p> <p>(iv) Monitoring Report: A list and description of all significant monitoring and mitigation activities performed during the previous year in accordance with site certificate terms and conditions, a summary of the results of those activities, and a discussion of any significant changes to any monitoring or mitigation program, including the reason for any such changes.</p> <p>(v) Compliance Report: A description of all instances of noncompliance with a site certificate condition. For ease of review, the certificate holder shall, in this section of the report, use numbered subparagraphs corresponding to the applicable sections of the site certificate.</p> <p>(vi) Facility Modification Report: A summary of changes to the facility that the certificate holder has determined do not require a site certificate amendment in accordance with OAR 345-027-0050.</p> <p>[Final Order on ASC, Condition VII.21; Amended in Final Order on AMD4]</p>
GEN -MC-16	<p>OAR 345-026-0105: The certificate holder and the Department of Energy shall exchange copies of all correspondence or summaries of correspondence related to compliance with statutes, rules and local ordinances on which the Council determined compliance, except for material withheld from public disclosure under state or federal law or under Council rules. The certificate holder may submit abstracts of reports in place of full reports; however, the certificate holder shall provide full copies of abstracted reports and any summarized correspondence at the request of the Department.</p> <p>[Final Order on ASC, Condition VII.22]</p>
GEN -MC-17	<p>OAR 345-026-0170(1): The certificate holder shall notify the Department of Energy within 72 hours of any occurrence involving the facility if:</p> <ul style="list-style-type: none"> a) There is an attempt by anyone to interfere with its safe operation; b) A natural event such as an earthquake, flood, tsunami or tornado, or a human-caused event such as a fire or explosion affects or threatens to affect the public health and safety or the environment; or c) There is any fatal injury at the facility. <p>[Final Order on ASC, Condition VII.23]</p>
<u>GEN-MC-18</u>	<p><u>OAR 345-025-0006(6): If the certificate holder becomes aware of a significant environmental change or impact attributable to the facility, the certificate holder shall, as soon as possible, submit a written report to the Department describing the impact on the facility and any affected site certificate conditions.</u></p> <p><u>[Final Order on AMD5]</u></p>

4.3 Pre-Construction (PRE) Conditions

Condition Number	Pre-Construction (PRE) Conditions
DESCRIPTION CONDITIONS (DC)	
PRE-DC-01	<p>The certificate holder shall construct a facility substantially as described in the site certificate and may select up to 125 turbines, subject to the following restrictions and compliance with other site certificate conditions. Before beginning construction, the certificate holder shall provide to the Department a description of the turbine types selected for the facility demonstrating compliance with this condition.</p> <ul style="list-style-type: none"> (a) The total number of turbines at the facility must not exceed 125 turbines. (b) The combined peak generating capacity of the facility must not exceed 400 megawatts. (c) The turbine hub height must not exceed 12395 meters and the maximum blade tip height must not exceed 198458 meters. (d) The minimum blade tip clearance must be 1419.8 meters above ground. (e) Wind turbine types with the maximum dimension specifications listed in this condition shall be equipped with serrated trailing edge blades. (e) The maximum combined weight of metals in the tower (including ladders and platforms) and nacelle must not exceed 336 U.S. tons per turbine. <p>[Final Order on ASC, Condition III.A.1; AMD5]</p>
PRE-DC-02	<p>At least 45-days prior to construction, but not more than two years before beginning construction, and after considering all microsite factors, the certificate holder shall:</p> <ul style="list-style-type: none"> (a) Conduct a field-based habitat survey to confirm the habitat categories of areas that will be affected by facility components, as well as the locations of any sensitive resources such as active raptor and other bird nests. The survey protocols and habitat classification categories shall be confirmed with the Department and ODFW. (b) At least 45-days prior to construction, unless otherwise agreed to by the Department, submit to the Department a habitat assessment report that includes: <ul style="list-style-type: none"> • Habitat impact table, based upon final facility design and updated habitat survey, including permanent and temporary impacts by facility component and habitat category/type/subtype. • Maps showing: habitat categories and subtypes of all areas within the site boundary, final location of temporary and permanent facility components, and locations of any sensitive resources within areas that will be affected by facility components. If any sensitive resources are identified, they will need to be flagged as exclusion zones in accordance with Condition IV.M.10. If necessary, sensitive resource information shall be submitted to the Department in hard copy only and provided under request for information to be treated as confidential. <p>The field survey and information in the habitat assessment report will be used to finalize the HRMP for Department and ODFW approval (Condition PRE-TL). The certificate holder shall not construct any facility components within areas of Category 1 habitat and shall avoid temporary disturbance of Category 1 habitat.</p> <p>[Final Order on ASC, Condition III.C.1; Amended in Final Order on AMD4]</p>
PRE-DC-03	<p>Before beginning construction, the certificate holder shall notify the Department in advance of any work on the site that does not meet the definition of "construction" in ORS 469.300(6), excluding surveying, exploration or other activities to define or characterize the site, and shall provide to the Department a description of the work and evidence that its value is less than \$250,000.</p> <p>[Final Order on ASC, Condition III.D.3]</p>

STANDARD: ORGANIZATIONAL EXPERTISE (OE) [OAR 345-022-0010]

PRE-OE-01

Before beginning construction, the certificate holder shall notify the Department of the identity and qualifications of the major design, engineering and construction contractor(s) for the facility. The certificate holder shall select contractors that have substantial experience in the design, engineering and construction of similar facilities. Within three business days, the certificate holder shall report to the Department any change of major contractors.

[Final Order on ASC, Condition IV.B.2; Amended in Final Order on AMD4]

STANDARD: STRUCTURAL STANDARD (SS) [OAR 345-022-0020]

PRE-SS-01

Prior to construction, the certificate holder shall:

- (a) Submit a protocol to the Department and Oregon Department of Geology & Mineral Industries, for review, with the applicable codes, standards, and guidelines to be used, and proposed geotechnical work to be conducted for the site-specific geotechnical investigation report.
- (b) Submit a draft site-specific geotechnical investigation report to the Department and Oregon Department of Geology & Mineral Industries ("DOGAMI"), for review. The investigation and report shall conform to the Oregon State Board of Geologist Examiners guidelines titled "Guidelines for Engineering Geologic Reports." and "Guidelines for Site-Specific Seismic Hazard Reports for Essential and Hazardous Facilities and Major and Special Occupancy Structures in Oregon." The site-specific geotechnical investigation shall address Quaternary faults, landslide hazards, and non-seismic hazards native soil and bedrock stability concerns at cuts, fills and culvert crossings, and shall include design and construction recommendations to meet public safety for the anticipated lifespan of the facility minimize the potential for destabilizing marginally stable slopes and the potential for stream erosion.
- (c) The Department shall review and concur with the report, in consultation with DOGAMI, prior to construction.

[Final Order on ASC, Condition V.A.1; Amended in Final Order on AMD4; AMD5]

PRE-SS-02

The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety presented by non-seismic hazards. As used in this condition, "non-seismic hazards" include settlement, landslides, flooding and erosion.

[Final Order on ASC, Condition V.A.4]

PRE-SS-03

The certificate holder shall ensure that wind turbine corridors and major structures are constructed with sufficient setbacks from all steeper slopes to minimize the potential for creating unstable or marginally stable conditions.

[Final Order on ASC, Condition V.A.5]

STANDARD: SOIL PROTECTION (SP) [OAR 345-022-0022]

PRE-SP-01

Prior to construction, the certificate holder shall develop a plan to control the introduction and spread of noxious weeds during facility construction and operation. The plan shall be developed in consultation with the Department, the Sherman County Weed Control manager, and ODFW. The plan shall be approved by the Department prior to construction. The plan shall focus on weed species listed on the Sherman County noxious weed list, but shall also include preventative measures, based on consultation with the Sherman County Weed Control Manager, to combat noxious weeds of concern in the area.

[Final Order on ASC, Condition IV.E.4; Amended in Final Order on AMD3, AMD4]

STANDARD: LAND USE (LU) [OAR 345-022-0030]

PRE-LU-01

Prior to construction, the certificate holder shall provide to the Department, Sherman County Planning Department, and Sherman County Transportation Department, as applicable, road design plans demonstrating that:

- (a) New or substantially modified public roads meet or exceed road standards for the road classifications in the County's Transportation System Plan and Zoning Ordinance.

	<p>(b) Private access connection and driveway design of the O&M facility and substation comply with applicable requirements established in Sherman County Zoning Ordinance Section 4.14.4.</p> <p>[Final Order on ASC, Condition IV.D.1; Amended in Final Order on AMD4]</p>
PRE-LU-02	<p>The site certificate holder shall, in consultation with affected landowners, design and construct private access roads to minimize the division of existing farm units.</p> <p>[Final Order on ASC, Condition IV.D.3]</p>
PRE-LU-03	<p>The certificate holder shall not locate any aboveground facility structure (including wind turbines, O&M building, substation and met towers, but not including aboveground power collection and transmission lines and poles and junction boxes) within 50 feet from any external property line or within 50 feet from the right of way of any arterial or major collector road. Prior to construction of any aboveground facility structure, the certificate holder shall submit to the Department maps and distance tables (i.e. distance from nearest facility component to setback location), based on final facility design, demonstrating that the aboveground facility structures are not located within 50 feet from any external property line or within 50 feet from the right of way of any arterial or major collector road.</p> <p>[Final Order on ASC, Condition IV.D.4; Amended in Final Order on AMD4]</p>
PRE-LU-04	<p>Collector lines in the Natural Hazards Combining Zone ("NH zone") shall be placed under ground except in instances where it is more practical to install aboveground power collection lines and provided that the aboveground power collection lines will be designed to minimize slope stability and other NH zone hazards. The site-specific geotechnical investigation required prior to construction shall address native soil and bedrock stability concerns at cuts, fills and culvert crossings, and shall include design and construction recommendations to minimize the potential for destabilizing marginally stable slopes and the potential for stream erosion.</p> <p>[Final Order on ASC, Condition IV.D.6]</p>
PRE-LU-05	<p>Prior to construction, the certificate holder shall submit to the Department evidence that the Sherman County Planning Department has received and concurred with the SCZO Article 3.7.5(e) Development Proposal, required for uses within a NH zone.</p> <p>[Final Order on ASC, Condition IV.D.7; Amended in Final Order on AMD4]</p>
PRE-LU-06	<p>Construction staging areas shall be limited to areas outside the Natural Hazards Combining Zone. Prior to construction of staging areas, the certificate holder shall provide construction related maps demonstrating that the staging areas are located outside the Natural Hazards Combining Zone ("NH Zone").</p> <p>[Final Order on ASC, Condition IV.D.8; Amended in Final Order on AMD4]</p>
PRE-LU-07	<p>The certificate holder shall stabilize all roads or streets in the Natural Hazards Combining by planking, gravel or pavement as deemed necessary, and shall build roadways without installation of excessive fill, diversion of water or excessive cuts unless the site investigation determines that such conditions will not be detrimental to the area or create unwarranted maintenance problems or additional hazards.</p> <p>[Final Order on ASC, Condition IV.D.9; Amended in Final Order on AMD4]</p>
PRE-LU-08	<p>Prior to construction, the certificate holder shall submit to the Department final facility design maps presenting the location of temporary construction laydown and staging areas, including those associated with construction of transmission lines or placement of conductors on third-party transmission lines. The facility shall be designed to minimize disturbance with farming practices and, wherever feasible, as determined in consultation with affected landowners, shall place turbines and transmission interconnection lines along the margins of cultivated areas to reduce the potential for conflict with farm operations. The certificate holder shall place aboveground transmission and collector lines and poles and junction boxes along property lines and public road rights-of-way to the extent practicable.</p> <p>[Final Order on ASC, Condition IV.D.10; Amended in Final Order on AMD4]</p>
PRE-LU-09	<p>Prior to construction, the certificate holder shall submit to the Department evidence that a Farm Management Easement covering the properties on which the certificate holder locates wind power generation facility components has been recorded in the real property records of Sherman County and the Sherman County</p>

	<p>Planning Director.</p> <p>[Final Order on ASC, Condition IV.D.13; Amended in Final Order on AMD4]</p>
PRE-LU-10	<p>The certificate holder shall remove from Special Farm Assessment the portions of parcels on which facilities are located and shall pay all property taxes due and payable after the Special Farm Assessment is removed from such properties.</p> <p>[Final Order on ASC, Condition IV.D.14]</p>
PRE-LU-11	<p>Prior to start of construction, the certificate holder shall, in consultation with Sherman County, assign a 9-1-1 5-digit rural address to every tower road that intersects a State or county road. The county will provide and install the signage for these addresses.</p> <p>[Final Order on ASC, Condition IV.D.18]</p>
PRE-LU-12	<p>The certificate holder shall:</p> <p>(a) Prior to beginning construction, provide evidence to the Department that both a pre-construction road condition inspection and consultation with the Sherman County Road Department has occurred. Through the consultation, the certificate holder shall, at a minimum, obtain confirmation of the following or provide the following documentation to the Sherman County Road Department:</p> <ol style="list-style-type: none"> (1) Final facility design maps identifying the route or routes for the transport of wind turbine construction material (including water, aggregate, concrete, machinery and tower pieces) and facility access for construction personnel; and, concurrence on the pre-construction conditions of any routes using or crossing <u>Sherman</u> county roads. (2) A written summary of possible anticipated road damage to the designated route or routes, and an estimate of the cost of repair to the designated route or routes; (3) Communication protocol for reporting to the Sherman County Road Department unusual damage or wear identified during facility construction and determined to be a result of facility construction vehicle use. (4) Establish and maintain an escrow account for so long as construction is ongoing, funded in an amount equal to the estimated cost to repair the designated route or routes consistent with the estimate provided in (b)(2); and (5) Conduct an inspection of the roads along the designated route or routes after construction with a representative of the Sherman County Road Department and an independent third party with the required expertise to inspect and evaluate paved and graveled roads. In the event a dispute arises, the third party shall be the final arbiter. The cost of the hiring of the third party shall be borne by the certificate holder. <p>(b) Following completion of construction and prior to operation, conduct the inspection of the roads along the designated route or routes with a representative of the Sherman County Road Department and an independent third party, as specified in sub(a)(5) of this condition.</p> <p>(c) <u>After completing the inspection required per sub(b), the certificate holder shall coordinate with the Sherman County Road Master and shall provide adequate funding to allow the county to restore any necessary damages to Sherman County roads resulting from facility construction as agreed upon by the Sherman County Road Department. The escrow account established in (a)(4) shall not be closed until Sherman County Road Department has agreed with the restoration to Sherman County roads, or otherwise that the certificate holder has not caused damage to Sherman County roads.</u></p> <p>[Final Order on ASC, Condition IV.D.19; Amended in Final Order on AMD4, <u>AMD5</u>]</p>
PRE-LU-13	<p>Before beginning construction of facility access roads, the certificate holder shall confer with the Sherman County Road Master regarding any utility permits needed for county road right-of-ways and obtain permits for construction of all approach roads onto county roads.</p> <p>[Final Order on ASC, Condition IV.D.20; Amended in Final Order on AMD4]</p>
PRE-LU-14	<p>Prior to construction, Certificate Holder shall demonstrate that the final location of turbines within the micrositing corridors approved by the Council will satisfy setback requirements prescribed by <u>Section 4 of</u> the Sherman County Wind Setback Ordinance (Ordinance No. 39-2007) unless the Council has approved a variance</p>

to such setback for the turbine or the Certificate Holder has negotiated a setback agreement with the affected adjacent property owner or wind project developer in accordance with Section 3 of the ordinance as follows:

- (a) Setback from property lines in all East-West upwind and downwind directional property line installation shall be no less than 7.5 times the rotor diameter and no less than 1.5 times the rotor diameter for all North-South property line delineations. These requirements shall only apply to project boundaries and will not be required for towers installed internally within the site boundary. (Sherman County Ordinance 39-2007, Section 4)
- (b) Setbacks from pre-existing wind turbines shall be 15 times the rotor diameter upwind and downwind for all East-West setback considerations and 3 times the rotor diameter for all North-South setback considerations. (Sherman County Ordinance 39-2007, Section 5)
- (c) Setbacks from an operating wind turbine to the boundary lines of any incorporated city in Sherman County shall be a distance of one (1) mile, unless a variance to such distance is obtained through the city council of an affected city, after public hearing. (Sherman County Ordinance 39-2007, Section 6)

. ~~{Amendment #1}~~

[Final Order on Amendment #1, Condition IV.D.22; Amended in Final Order on AMD1, AMD4, AMD5]

STANDARD: RETIREMENT AND FINANCIAL ASSURANCE (RT) [OAR 345-022-0050]

PRE-RT-01

Before beginning construction, the certificate holder shall submit to the State through the Council a bond or letter of credit in the amount described herein naming the State, acting by and through the Council, as beneficiary or payee. If the certificate holder elects to build the facility in a single phase, the initial bond or letter of credit amount is \$14,425,000 (in 2008 dollars), adjusted to the date of issuance as described in (b), or the amount determined as described in (a). If the certificate holder elects to build the facility in more than one phase, the amount of the initial bond or letter of credit for each phase of construction shall be the amount determined as described in (a). The certificate holder shall adjust the amount of each bond or letter of credit on an annual basis thereafter as described in (b).

- (a) The certificate holder may adjust the amount of each bond or letter of credit based on the final design configuration of the facility by applying the unit costs and general costs illustrated in Table IV.C.1 of the Final Order on the Application to the final design and calculating the financial assurance amount as described in that order, adjusted to the date of issuance as described in (b) and subject to approval by the Department.
- (b) The certificate holder shall adjust the amount of each bond or letter of credit, using the following calculation and subject to approval by the Department:
 - (i) Adjust the subtotal component of the bond or letter of credit amount (expressed in 2008 dollars) to present value, using the U.S. Gross Domestic Product Implicit Price Deflator, Chain-Weight, as published in the Oregon Department of Administrative Services' "Oregon Economic and Revenue Forecast" or by any successor agency (the "Index") and using the annual average index value for 2008 dollars and the quarterly index value for the date of issuance of the new bond or letter of credit. If at any time the Index is no longer published, the Council shall select a comparable calculation to adjust 2008 dollars to present value.
 - (ii) Calculate the adjusted performance bond amount as 1 percent of the new subtotal (i).
 - (iii) Add the subtotal (i) to the adjusted performance bond amount (ii) for the adjusted gross cost.
 - (iv) Calculate the adjusted administration and project management costs as 10 percent of the adjusted gross cost (iii).
 - (v) Calculate the adjusted future developments contingency as 10 percent of the adjusted gross cost (iii).
 - (vi) Add the adjusted gross cost (iii) to the sum of adjusted administration and project management costs (iv) and the adjusted future developments contingency (v) and round the resulting total to the nearest \$1,000 to determine the adjusted financial assurance amount.
- (c) The certificate holder shall use a form of bond or letter of credit approved by the Council.
- (d) The certificate holder shall use an issuer of the bond or letter of credit approved by the Council.

	<p>(e) The certificate holder shall describe the status of the bond or letter of credit in the annual report submitted to the Council under Condition (VII.21.a.ii).</p> <p>(f) The bond or letter of credit shall not be subject to revocation or reduction before retirement of the facility site.</p> <p>[Final Order on ASC, Condition IV.C.4; Amended in Final Order on Amendment 3]</p>
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STANDARD: FISH AND WILDLIFE HABITAT (FW) [OAR 345-022-0060]

PRE-FW-01	<p>Prior to construction, the certificate holder shall finalize and implement the Habitat Mitigation and Revegetation Plan (HMRP), included as Attachment C to the Final Order on Amendment, as approved by the Department in consultation with ODFW and as amended from time to time. Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments, and the Council retains the authority to approve, reject, or modify any amendments of the HMRP agreed to by the Department. [Final Order on Amendment 4]</p> <p>The finalized HMRP shall incorporate the maps, habitat classifications, and anticipated temporary and permanent habitat impact assessment completed as per site certificate Condition III.C.1. Prior to start of construction, the certificate holder shall acquire the legal right to create, enhance, maintain and protect a habitat mitigation area so long as the site certificate is in effect by means of outright purchase, conservation easement or similar conveyance and shall provide a copy of the documentation to the Department. The nominal lease term shall be at least 30 years, with an option to extend if the facility continues operations past year 30. The mitigation area shall be as shown in figures 1, 2 and 3 of Attachment B to the Final Order. Any different mitigation area shall require prior approval of the Department in consultation with ODFW.</p> <p>If, prior to the achievement of success criteria for revegetation and restoration of temporarily impacted areas as provided in the final HMRP, any area temporarily disturbed during facility construction is converted for some other use such that the Department, in consultation with ODFW, determines the success criteria cannot be achieved, or the Department otherwise determines, in consultation with ODFW, that the success criteria cannot be achieved, the Department shall amend the HMRP using the process described above to require additional mitigation consistent with the habitat classifications and mitigation requirements for other areas permanently impacted by the facility.</p> <p>[Final Order on ASC, Condition IV.M.1; Amended in Final Order on AMD3, AMD4]</p>
PRE-FW-02	<p>The certificate holder shall survey the status of known raptor nests within 0.5 miles before ground-disturbing activities begin. If an active nest is found, and ground-disturbing activities are scheduled to begin before the end of the sensitive nesting and breeding season (mid-April to mid-August), the certificate holder will not engage in ground-disturbing activities within a 0.25-mile buffer around the nest until the nest fledges young or the nest fails, unless ODFW approves an alternative plan. If ground-disturbing construction activities continue into the sensitive nesting and breeding season for the following year, the certificate holder will not engage in ground-disturbing activities within the 0.25-mile buffer if the nest site is found to be active until the nest fledges young or the nest fails, unless ODFW approves an alternate plan.</p> <p>[Final Order on ASC, Condition IV.M.4]</p>
PRE-FW-03	<p>Prior to construction, the certificate holder will survey the status of known loggerhead shrikes nests and visit sites where non-nesting loggerhead shrikes were observed in order to determine old and new nest sites. The certificate holder shall avoid all construction activities within a 492-foot (150-meter) buffer from active loggerhead shrikes nests.</p> <p>[Final Order on ASC, Condition IV.M.5; Amended in Final Order on AMD4]</p>
PRE-FW-04	<p>Prior to construction, the certificate holder shall submit to the Department final facility design maps confirming that turbines and other facility components will be located within the 900-foot corridors shown on <u>Figures P-1 through P-10 of the Application for a Site Certificate and August 2008 supplement Figure 1 of the Amended Site Certificate</u>. The certificate holder shall not construct any facility components within areas of Category 1 or Category 2 habitat and shall avoid temporary disturbance of Category 1 or Category 2 habitat, except for those acreages allowed in <u>the final Habitat Mitigation and Revegetation Plan (HMRP) Table 1 in the Final Order for RFA</u></p>

	<p>No. 3. The certificate holder may rely upon the maps and data submitted per Condition IV.M.1 to satisfy this condition.</p> <p>[Final Order on ASC, Condition IV.M.9; Amended in Final Order on AMD3, AMD4, <u>AMD5</u>]</p>
PRE-FW-05	<p>Prior to construction, the certificate holder shall:</p> <ol style="list-style-type: none"> Conduct one (1) year of raptor nest surveys. The raptor nest surveys shall be conducted following the instructions set forth in the Raptor Nest Survey Protocol for Golden Hills Wind Project included as Attachment D to the Fourth Amended Site Certificate. At least 45-days prior to construction, the certificate holder shall provide a written report on the raptor nest surveys to the Department and ODFW. If the surveys identify the presence of raptor nests within the survey area, the certificate holder shall implement appropriate measures, consistent with the Wildlife Monitoring and Mitigation Plan, and as approved by the Department in consultation with ODFW, to assure that design, construction, and operation of the facility are consistent with the Fish and Wildlife Habitat standard. <p>[Final Order on ASC, Condition IV.M.11; Amended in Final Order on AMD3, AMD4]</p>
STANDARD: THREATENED AND ENDANGERED SPECIES (TE) [OAR 345-022-0070]	
PRE-TE-01	<p>The certificate holder shall report the results of the database review and consultation to the Department and to ODFW and, if there have been new documentations of nesting bald eagles or peregrine falcons within 2 miles of the facility, the certificate holder shall implement appropriate measures to protect the species from adverse impact, as approved by the Department and ODFW.</p> <p>[Final Order on ASC, Condition IV.L.1]</p>
PRE-TE-02	<p>The certificate holder shall implement measures to mitigate impacts to sensitive wildlife habitat during construction including, but not limited to, the following:</p> <ol style="list-style-type: none"> Preparing maps to show sensitive areas, such as nesting or denning areas for sensitive wildlife species, that are off limits to construction personnel; Ensuring that a qualified person instructs construction personnel to be aware of wildlife in the area and to take precautions to avoid injuring or destroying wildlife or significant wildlife habitat; and Avoiding unnecessary road construction, temporary disturbance and vehicle use. <p>[Final Order on ASC, Condition IV.L.2]</p>
PRE-TE-03	<p>Prior to the beginning of construction but no more than two years prior to the beginning of construction of the facility, the certificate holder shall:</p> <ol style="list-style-type: none"> Submit protocol for field surveys for threatened and endangered species to the Department for review and approval, in consultation with ODFW. The survey protocol shall be based on the protocol included on ASC Exhibit P, Attachment P-1, and shall be updated based on consultation with ODFW. Perform new field surveys for threatened and endangered species following the survey protocol as approved per sub(a). The certificate holder shall report the results of the field surveys to the Department and ODFW. If the surveys identify the presence of threatened or endangered species within the site boundary, the certificate holder shall implement appropriate measures to avoid a significant reduction in the likelihood of survival or recovery of the species, as approved by the Department in consultation with ODFW. <p>[Final Order on Amendment 2, Condition IV.L.3; Amended in Final Order on AMD3, AMD4]</p>
STANDARD: SCENIC RESOURCES (SR) [OAR 345-022-0080]	
PRE-SR-01	<p>To reduce the visual impact of the facility, the certificate holder shall:</p> <ol style="list-style-type: none"> Mount nacelles on smooth steel structures painted uniformly in a neutral color to blend with the surrounding landscape; Paint substation structures in a neutral color to blend with the surrounding landscape;

	<ul style="list-style-type: none"> c. Not allow any advertising to be used on any part of the facility; d. Use only those signs required for facility safety or required by law, except that the certificate holder may erect a sign to identify the facility; and e. Maintain any signs allowed under this condition in good repair. <p>[Final Order on ASC, Condition IV.G.1]</p>
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STANDARD: HISTORIC, CULTURAL, AND ARCHEOLOGICAL RESOURCES (HC) [OAR 345-022-0090]

PRE-HC-01	<p>The certificate holder shall design the facility to avoid impacts to sites 35SH217, 35SH220, GH site 6 (above ground resource), 35SH219 and GH Isolate 6.</p> <p>[Final Order on ASC, Condition V.B.1]</p>
PRE-HC-02	<p>At least 45 days prior to construction, the certificate holder shall prepare a Cultural Resource Management Plan (the "CRMP") and shall submit the CRMP to the Department and State Historic Preservation Office (the "SHPO") for review. The Department must approve the CRMP, in consultation with SHPO, prior to construction.</p> <p>The CRMP shall at a minimum include:</p> <ul style="list-style-type: none"> (a) Specific protocols and procedures for protecting known cultural resources including imposing a 30-meter buffer zone and designating as a "no-work zones", around sites 35SH215, 35SH216, 35SH221, and to the sites identified in Condition V.B.1: 35SH217, 35SH220, GH site 6 (above ground resource), 35SH219 and GH Isolate 6. Both the buffer and no work zones apply to cultural resources, including any additional archeological sites and possible human remains accidentally discovered during construction. The CRMP shall identify how protocols will follow State laws and rules at ORS 358.905-961, ORS 390.235, OAR 736-051-0090 and ORS 97.740-760 as in effect on the date of this site certificate,, The certificate holder shall submit the CRMP to the State Historic Preservation Office (the "SHPO") for concurrence and shall provide to the Department documentation confirming SHPO concurrence prior to start of construction. (b) Protocols and procedures for responding to accidental discovery of cultural resources during operations and ongoing maintenance activities. <p>[Final Order on ASC, Condition V.B.2; Amended in Final Order on AMD4]</p>
PRE-HC-03	<p>Before beginning construction of any phase of the facility, the certificate holder shall provide to the Department a map showing the final design locations of all components of that phase of the facility and areas that would be temporarily disturbed during construction, and also showing the areas surveyed by Tetra Tech in preparing the Archeological Inventory for Golden Hills Wind Energy Development included in the Application for a Site Certificate as Attachment S-1. If there are any additional areas where ground-disturbing activities will occur that were not part of the original facility area, the certificate holder shall notify the Department and SHPO to determine whether additional surveys or avoidance measures are necessary.</p> <p>[Final Order on ASC, Condition V.B.4; Amended in Final Order on AMD4]</p>

STANDARD: PUBLIC SERVICES (PS) [OAR 345-022-0100]

PRE-PS-01	<p>Before beginning construction <u>of the facility</u>, the certificate holder shall develop and implement a fire safety and response plan for both construction and operation phases in consultation with the Oregon State Fire Marshal, the Sherman County Emergency Services, North Sherman Fire and Rescue, Moro Rural Fire Protection District and other first-response agencies the facility will rely upon for fire protection services. A copy of the <u>Construction Fire Safety and Response</u> plan must be provided to the Department at least 30 days before beginning construction. <u>A copy of the Operational Fire Safety and Response Plan must be provided to the Department at least 30 days before beginning operation.</u> The <u>Operational</u> plan must be updated at least annually by the agencies identified in (a) below and a copy provided to the agencies identified in (a), (b), and (c) and to the Department within 30 days of the update. The fire safety and response plan shall address, at a minimum, the following:</p> <ul style="list-style-type: none"> (a) Identification of agencies that participated in developing the plan;
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	<ul style="list-style-type: none"> (b) Identification of agencies that are designated as first response agencies or are included in any mutual aid agreements with the facility; (c) A list of any other mutual aid agreements or fire protection associations in the vicinity of the facility; (d) Complete contact information for each agency listed in (a), (b), and (c) above, including at least two facility contacts available on a 24-hour basis; (e) Communication protocols for both routine and emergency events and the incident command system to be used in the event a fire response by multiple agencies is needed at the facility; (f) Access and fire response at the facility site during construction and operations. Fire response plans during construction shall address regular and frequent communication amongst the agencies regarding the number and location of construction sites within the site boundary, access roads that are completed and those still under construction, location of water receptacles, and a temporary signage system until permanent addresses and signs are in place; (g) The minimum designated time period of the fire season (i.e., May 1 through October 15) and the criteria to modify the designated fire season to respond to changing conditions; (h) The number, size, and location of onsite water receptacles to be staged around the facility site for firefighting purposes during the fire season; and (i) Training needs (both for facility personnel and for first responders) <u>including at a minimum fall protection and rescue employee training requirements.</u> (j) Copies of mutual aid, fire protection association, or other agreements entered into concerning fire protection at the facility site. <p>[Final Order on ASC, Condition V.C.3; Amended in Final Order on AMD2, <u>AMD5</u>]</p>
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PRE-PS-02	<p>Before beginning construction of the facility, the certificate holder shall develop, in consultation with Sherman County Road Department, a construction-phase traffic management plan.. The certificate holder shall submit to the Department a copy of the final construction-phase traffic management plan.</p> <p>[Final Order on ASC, Condition V.C.10; Amended in Final Order on AMD4]</p>
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STANDARD: WASTE MINIMIZATION (WM) [OAR 345-022-0120]

PRE-WM-01	<p>Prior to construction, the certificate holder shall submit to the Department a Construction Waste Management Plan that includes, but is not limited to, the following measures:</p> <ul style="list-style-type: none"> (a) Recycling steel and other metal scrap; (b) Recycling wood waste; (c) Recycling packaging wastes, such as paper and cardboard; (d) Collecting non-recyclable waste for transport to a landfill; and (e) Segregating all hazardous wastes, such as used oil, oily rags and oil-absorbent materials, lubricant and cleaning solution containers, mercury-containing lights, and lead-acid and nickel-cadmium batteries, for disposal by a licensed firm specializing in the proper recycling or disposal of hazardous wastes. <p>The requirements of the plan shall be implemented and adhered to during construction activities.</p> <p>[Final Order on ASC, Condition V.D.1; Amended in Final Order on AMD4]</p>
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STANDARD: PUBLIC HEALTH AND SAFETY STANDARDS FOR WIND ENERGY FACILITIES (PH) [OAR 345-024-0010]

PRE-PH-01	<p>The certificate holder shall:</p> <ul style="list-style-type: none"> a) During facility construction, install self-monitoring devices on each turbine, connected to a fault annunciation panel or SCADA system at the O&M facility to alert operators to potentially dangerous conditions. The certificate holder shall equip each turbine with vibration-sensing equipment that will shut down the turbine in the event of abnormal levels of vibration. b) During facility operation, maintain the self-monitoring devices and vibration-sensing equipment on each turbine, connected to the fault annunciation panel or SCADA system at the O&M facility. <p>[Final Order on ASC, Condition IV.I.2; Amended in Final Order on AMD4]</p>
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PRE-PH-02	<p>Prior to construction, the certificate holder shall provide evidence to the Department demonstrating that the facility substations will be enclosed with appropriate fencing and locked gates.</p> <p>[Final Order on ASC, Condition IV.I.6; Amended in Final Order on AMD4]</p>
PRE-PH-03	<p>Before beginning construction, the certificate holder shall submit to the FAA and the Oregon Department of Aviation ("ODA") a Notice of Proposed Construction or Alteration identifying the proposed final locations of the turbines and related or supporting facilities and shall provide a copy of this notice to the Department. The certificate holder shall notify the Department of the FAA's and ODA's responses as soon as they have been received.</p> <p>[Final Order on ASC, Condition IV.I.7]</p>

STANDARD: SITING STANDARDS FOR TRANSMISSION LINES (ST) [OAR 345-024-0090]

PRE-ST-01	<p>The certificate holder shall install the underground segments of the 34.5-kV collector system at a minimum depth of three feet.</p> <p>[Final Order on ASC, Condition IV.K.1]</p>
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REQUIREMENTS UNDER COUNCIL JURISDICTION (CJ)

PRE-CJ-01	<p>The certificate holder shall submit, for Department approval prior to construction, a complete new noise analysis for the facility based on the final design layout and generate a new table listing each noise-sensitive property, as defined in OAR 340-035-0015(38), and the predicted maximum hourly L50 noise level at each noise-sensitive property. In addition, the certificate holder shall provide the predicted sound levels contributed by each turbine at each noise-sensitive property that does not provide a waiver of the ambient noise rule. The certificate holder shall perform the analysis using the CADNA/A by DataKustik GmbH of Munich, Germany, and shall base the analysis on the final facility design including final choice of turbine and location of all facility components. The analysis shall demonstrate to the satisfaction of the Department that each of the following requirements have been met:</p> <p>(a) For any noise-sensitive property, the certificate holder shall identify the final design locations of all turbines to be built and perform a noise analysis demonstrating, in accordance with OAR 340-035-0035(1)(b)(B)(iii)(IV), that the total hourly L50 noise level generated by the facility would not exceed 50 dBA at the appropriate measurement point. The certificate holder shall assume the following input parameters:</p> <ul style="list-style-type: none"> • The maximum sound power level warranted by the manufacturer or confirmed by other means acceptable to the Department; • The exact locations of the proposed turbines; • Attenuation of sound due to absorption to be calculated using a methodology satisfactory to the Department; • The use of 50° F temperature and 70 percent relative humidity in the analysis; • A 2dB safety margin shall be added to turbine sound power levels; • No credit for shielding of any residence by terrain; and • All receptors treated as simultaneously downwind of all turbines. <p>(b) If the hourly L50 noise levels caused by the facility at any noise-sensitive property would increase the ambient noise level at any noise-sensitive property over the full set of wind conditions ranging from cut in to full load by more than 10 dBA, the certificate holder shall obtain a legally effective easement or real covenant from that property owner pursuant to which the owner of the property authorizes the certificate holder's operation of the facility to increase ambient statistical noise levels L50 and L50 by more than 10 dBA at the appropriate measurement point. A legally effective easement or real covenant shall (i) include a legal description of the burdened property (the noise-sensitive property); (ii) be recorded in the real property records of the county; (iii) expressly benefit the certificate holder; (iv) expressly run with the land and bind all future owners, lessees or holders of any interest in the</p>
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	<p>burdened property; and (v) not be subject to revocation without the certificate holder's written approval.</p> <p>(c) If, for any noise-sensitive property where the hourly L50 noise levels caused by the facility would increase by more than 10 dBA above the ambient level over the full range of wind conditions measured for that property and where the certificate holder has not obtained a legally effective easement or real covenant as described in (b), the certificate holder shall identify measures to reduce noise at that property either by eliminating or moving turbines, and shall perform the noise analysis again to demonstrate, in accordance with OAR 340-035-0035(1)(b)(B)(iii)(IV), that the total noise generated by the facility would meet the ambient noise degradation test at the appropriate measurement point at that noise-sensitive property. The certificate holder shall obtain Department concurrence of the new analysis prior to start of construction.</p> <p>[Final Order on ASC, Condition VI.A.1.2]</p>
PRE-CJ-02	<p>Prior to construction, the certificate holder shall:</p> <ol style="list-style-type: none"> 1) Conduct an updated wetlands and waters delineation survey of all areas to be temporarily or permanently impacted by the facility based on final layout and design. 2) Submit the delineation survey report to the department and Oregon Department of State Lands and receive concurrence of the report from DSL. 3) Confirm from the results of the delineation survey and DSL concurrence that the facility will not need a removal-fill permit. 4) If a removal-fill permit is necessary, file a site certificate amendment request to review and process the permit request. <p>(Final Order on Amendment No. 3, Removal-Fill Condition 1)</p>
PRE-CJ-03	<p>Prior to construction, the certificate holder shall prepare detailed design drawings and specifications for 230 kV, and 34.5 kV transmission lines, in consultation with the Utility Safety and Reliability Section of the Oregon Public Utility Commission to ensure that the designs and specifications are consistent with applicable codes and standards.</p> <p>[Final Order on ASC, Condition VI.A.4.2; Amended in Final Order on AMD4]</p>
PRE-CJ-04	<p>Prior to start of construction, the certificate holder shall submit to ODOE a procedure for coordinating, with all affected local electric service utilities and transmission service providers, crane movements under electric transmission lines during construction and maintenance of the facility. The procedure shall address subjects including, but not limited to, minimum advance notification prior to any crane movement under an electric transmission or distribution line, protocols for determining adequate line clearance and specific crane path locations. With the procedure, the certificate holder shall provide evidence of concurrence by each affected electric service utility or transmission service provider. The certificate holder shall ensure that all employees, construction contractors and subcontractors adhere to this procedure throughout construction and maintenance of the facility.</p> <p>[Final Order on ASC, Condition VI.A.4.3]</p>
MANDATORY CONDITIONS (MC)	
PRE-MC-01	<p>OAR 345-025-0006 (5): Except as necessary for the initial survey or as otherwise allowed for wind energy facilities, transmission lines or pipelines under this section, the certificate holder shall not begin construction, as defined in OAR 345-001-0010, or create a clearing on any part of the site until the certificate holder has construction rights on all parts of the site. For the purpose of this rule, "construction rights" means the legal right to engage in construction activities. For wind energy facilities, transmission lines or pipelines, if the certificate holder does not have construction rights on all parts of the site, the certificate holder may nevertheless begin construction, as defined in OAR 345-001-0010, or create a clearing on a part of the site if the certificate holder has construction rights on that part of the site and:</p>

	<p>a) The certificate holder would construct and operate part of the facility on that part of the site even if a change in the planned route of the transmission line or pipeline occurs during the certificate holder's negotiations to acquire construction rights on another part of the site; or</p> <p>b) The certificate holder would construct and operate part of a wind energy facility on that part of the site even if other parts of the facility were modified by amendment of the site certificate or were not built.</p> <p>[Final Order on ASC, Condition VII.5; Amended in Final Order on AMD4]</p>
PRE-MC-02	<p>OAR 345-025-0006 (8): Before beginning construction of the facility, the certificate holder shall submit to the State of Oregon, through the Council, a bond or letter of credit in a form and amount satisfactory to the Council to restore the site to a useful, non-hazardous condition. The certificate holder shall maintain a bond or letter of credit in effect at all times until the facility has been retired. The Council may specify different amounts for the bond or letter of credit during construction and during operation of the facility. [See Condition IV.C.4.]</p> <p>[Final Order on ASC, Condition VII.8; Amended in Final Order on AMD4]</p>

4.4 Construction (CON) Conditions

Condition Number	Pre-Construction (PRE) Conditions															
STANDARD: ORGANIZATIONAL EXPERTISE (OE) [OAR 345-022-0010]																
STANDARD: SOIL PROTECTION (SP) [OAR 345-022-0022]																
CON-SP-01	<p>During construction, the certificate holder shall salvage approximately three feet of topsoil and stockpile this topsoil in windrows, wherever temporary impacts will occur in cultivated areas. The certificate holder shall protect the windrows with plastic sheeting or mulch. Upon removal of the temporary features, the certificate holder shall cultivate the subsoil to a depth of at least 12 inches (except where bedrock prohibits achieving this depth) and then redistribute the salvaged topsoil to match adjacent grades.</p> <p>[Final Order on ASC, Condition IV.E.2; Amended in Final Order on AMD4]</p>															
CON-SP-02	<p>During construction, the certificate holder shall ensure that the wash down of concrete trucks occurs only at a contractor-owned batch plant or at tower foundation locations. If such wash down occurs at tower foundation locations, then the certificate holder shall ensure that wash down wastewater does not run off the construction site into otherwise undisturbed areas and that the wastewater is disposed of on backfill piles and buried underground with the backfill over the tower foundation.</p> <p>[Final Order on ASC, Condition IV.E.5]</p>															
STANDARD: LAND USE (LU) [OAR 345-022-0030]																
CON-LU-01	<p>During construction, the certificate holder shall provide access across construction trenches to fields within the facility site and otherwise provide adequate and timely access to properties during critical periods in the farming cycle, such as harvest, as necessary and as determined feasible by the certificate holder and landowner.</p> <p>[Final Order on ASC, Condition IV.D.12; Amended in Final Order on AMD4]</p>															
STANDARD: FISH AND WILDLIFE HABITAT (FW) [OAR 345-022-0060]																
CON-FW-01	<p>During construction, the certificate holder shall protect the area within a 1300-foot buffer around any active nests of the following species during the sensitive period, as provided in this condition:</p>															
	<table><tr><td>Species</td><td>Sensitive Period</td><td>Early Release Date</td></tr><tr><td>Swainson’s hawk</td><td>April 1 to August 15</td><td>May 31</td></tr><tr><td>Golden eagle</td><td>February 1 to August 31</td><td>May 31</td></tr><tr><td>Ferruginous hawk</td><td>March 15 to August 15</td><td>May 31</td></tr><tr><td>Burrowing owl</td><td>April 1 to August 15</td><td>July 15</td></tr></table>	Species	Sensitive Period	Early Release Date	Swainson’s hawk	April 1 to August 15	May 31	Golden eagle	February 1 to August 31	May 31	Ferruginous hawk	March 15 to August 15	May 31	Burrowing owl	April 1 to August 15	July 15
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	Burrowing owl	April 1 to August 15	July 15													
<p>The 1300-foot buffer may be reduced, with Department approval, if there is an adequate physical barrier between the nest site and the construction impacts such that a 1300-foot buffer proves to be excessive.</p>																
<p>During the year in which construction of any phase occurs, the certificate holder shall use a protocol approved by ODFW to determine whether there are any active nests of these species within a half-mile of any areas that would be disturbed during construction. If a nest is occupied by any of these species after the beginning of the sensitive period, the certificate holder shall not engage in high-impact construction activities (activities that involve blasting, grading or other major ground disturbance) or allow high levels of construction traffic within 1300 feet of the nest site, or such lesser distance as may be approved by the Department in the event there is an adequate physical barrier between the nest site and the construction impacts.</p>																
<p>In addition, the certificate holder shall flag the boundaries of the 1300-foot buffer area, or such lesser distance as may be approved by the Department in the event there is an adequate physical barrier between the nest site and the construction impacts, and shall instruct construction personnel to avoid any unnecessary activity within the buffer area. The certificate holder shall direct a qualified independent third-party biological monitor, as</p>																

	<p>approved by the Department, to observe the active nest sites during the sensitive period for signs of disturbance and to notify the Department of any noncompliance with this condition. If the monitor observes nest site abandonment or other adverse impact to nesting activity, the certificate holder shall implement appropriate mitigation, in consultation with ODFW and subject to the approval of the Department, unless the adverse impact is clearly shown to have a cause other than construction activity. The certificate holder may begin or resume high-impact construction activities before the ending day of the sensitive period if any known nest site is not occupied by the early release date. If a nest site is occupied, then the certificate holder may begin or resume high-impact construction before the ending day of the sensitive period with the approval of ODFW, but after the young are fledged. The certificate holder shall use a protocol approved by ODFW to determine when the young are fledged (meaning the young are independent of the core nest site).</p> <p>[Final Order on ASC, Condition IV.M.10]</p>
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STANDARD: HISTORIC, CULTURAL, AND ARCHEOLOGICAL RESOURCES (HC) [OAR 345-022-0090]

CON-HC-01	<p>During construction, if any cultural resources are discovered, all work at that location shall cease immediately and the certificate holder shall notify the Department and SHPO to determine whether it is necessary to have an archeologist travel to the worksite and assess the discovery or monitor construction activities.</p> <p>[Final Order on ASC, Condition V.B.6; Amended in Final Order on AMD4]</p>
CON-HC-02	<p>During construction, the certificate holder shall ensure that construction personnel cease all ground-disturbing activities in the immediate area if any archaeological or cultural resources are found during construction of the facility until a qualified archaeologist can evaluate the significance of the find. No construction personnel will be allowed in the discovery area except for facility management in consultation with the SHPO. The certificate holder shall notify the Department and the SHPO of the find. If the SHPO determines that the resource is significant, the certificate holder shall make recommendations to the Council for mitigation, including avoidance or data recovery, in consultation with the Department, the SHPO, the appropriate Oregon tribes and other appropriate parties. The certificate holder shall not restart work in the affected area until the certificate holder has demonstrated to the Department that it has complied with State archaeological protection and archaeological permit laws in coordination with the SHPO.</p> <p>[Final Order on ASC, Condition V.B.8; Amended in Final Order on AMD4]</p>
CON-HC-03	<p>During construction, the certificate holder shall ensure that construction personnel are instructed on the location of the mapped alignment of the Oregon Trail, per Condition V.B.5. If any intact physical evidence of the trail is discovered that was not previously identified, the certificate holder shall avoid any disturbance to the intact segments by redesign, reengineering or restricting the area of construction activity. The certificate holder shall promptly notify the Department and the SHPO of the discovery. The certificate holder shall consult with the Department and with the SHPO to determine appropriate mitigation measures.</p> <p>[Final Order on ASC, Condition V.B.9; Amended in Final Order on AMD4]</p>
CON-HC-04	<p>Upon completion of construction, the certificate holder shall consult with the Oregon Historic Trails Advisory Council regarding the appropriate content of an interpretive sign. After such consultation, the certificate holder shall place in a publicly accessible location a sign giving notice of the historic background of the facility site and surrounding areas.</p> <p>[Final Order on ASC, Condition V.B.10]</p>

STANDARD: PUBLIC SERVICES (PS) [OAR 345-022-0100]

CON-PS-01	<p>During construction of the facility, the certificate holder shall ensure that construction vehicles and equipment are operated on graveled areas to the extent possible and that open flames, such as cutting torches, are kept away from grassy areas.</p> <p>[Final Order on ASC, Condition V.C.4]</p>
CON-PS-02	<p>During construction of the facility, the certificate holder shall maintain a water truck on site to respond to potential fire incidents.</p> <p>[Final Order on ASC, Condition V.C.6]</p>

CON-PS-03	<p>The certificate holder shall construct turbines on concrete pads with a minimum of 10 feet of nonflammable and non-erosive ground cover on all sides. The certificate holder shall cover turbine pad areas with nonflammable, non-erosive material immediately following exposure during construction and shall maintain the pad area covering during operation of the facility.</p> <p>[Final Order on ASC, Condition V.C.7]</p>
CON-PS-04	<p>During construction of the facility, the certificate holder shall implement measures to reduce traffic impacts, including:</p> <ul style="list-style-type: none"> (a) Providing notice to all affected local jurisdictions in advance of deliveries; (b) Providing notice to adjacent landowners and residents of Biggs Junction in advance of deliveries; and (c) Requiring flaggers to be at appropriate locations at appropriate times during construction to direct traffic and reduce accident risks. <p>[Final Order on ASC, Condition V.C.11]</p>
STANDARD: WASTE MINIMIZATION (WM) [OAR 345-022-0120]	
CON-WM-01	<p>During construction, the certificate holder shall provide portable toilets for on-site sewage handling and shall ensure that they are pumped and cleaned regularly by a licensed contractor.</p> <p>[Final Order on ASC, Condition V.D.3]</p>
STANDARD: PUBLIC HEALTH AND SAFETY STANDARDS FOR WIND ENERGY FACILITIES (PH) [OAR 345-024-0010]	
CON-PH-01	<p><u>During construction, the certificate holder shall follow manufacturer's recommended handling instructions and procedures to prevent damage to turbine or turbine tower components that could lead to failure. In the compliance plan required per OAR 345-026-0048, the certificate holder shall describe the process or protocol to be implemented to ensure manufacturer's handling instructions and procedures are followed during equipment delivery.</u></p> <p>[Final Order on ASC, Condition IV.I.1; <u>Final Order on AMD4</u>]</p>
CON-PH-02	<p>The certificate holder shall construct turbine towers with no exterior ladders or access to the turbine blades and shall install locked tower access doors. The certificate holder shall keep tower access doors locked at all times except when authorized personnel are present.</p> <p>[Final Order on ASC, Condition IV.I.3]</p>
REQUIREMENTS UNDER COUNCIL JURISDICTION (CJ)	
CON-CJ-01	<p>During construction, to reduce noise impacts at nearby residential areas, the certificate holder shall:</p> <ul style="list-style-type: none"> (a) Confine the noisiest operation of heavy construction equipment to the daylight hours; (b) Require contractors to install and maintain exhaust mufflers on all combustion engine-powered equipment; and (c) Establish a complaint response system at the construction manager's office to address noise complaints. <p>[Final Order on ASC, Condition VI.A.1.1; Amended in Final Order on AMD4]</p>
MANDATORY CONDITIONS (MC)	
CON-MC-01	<p>OAR 345-025-0006 (4): The certificate holder shall begin and complete construction of the facility by the dates specified in the site certificate. [See Conditions (III.D.1) and (111.D.2).]</p> <p>[Final Order on ASC, Condition VII.4; Amended in Final Order on AMD4]</p>

4.5 Pre-Operational (PRO) Conditions

Condition Number	Pre-Construction (PRE) Conditions
STANDARD: PUBLIC SERVICES (PS) [OAR 345-022-0100]	
PRO -PS-01	<p>Before beginning operation of the facility, the certificate holder shall provide to North Sherman Fire Protection District and Moro Rural Fire Protection District a site plan indicating the identification number assigned to each turbine and the location of all facility structures. During operation of the facility, the certificate holder shall ensure that appropriate district personnel have an up-to-date list of the names and telephone numbers of facility personnel available to respond on a 24-hour basis in case of an emergency on the facility site.</p> <p>[Final Order on ASC, Condition V.C.9; Amended in Final Order on AMD4]</p>
STANDARD: WASTE MINIMIZATION (WM) [OAR 345-022-0120]	
PRO -WM-01	<p>Prior to operation, the certificate holder shall submit to the Department an Operational Waste Management Plan that includes, but is not limited to, the following measures:</p> <ul style="list-style-type: none"> (a) Training employees to minimize and recycle solid waste; (b) Recycling paper products, metals, glass and plastics; (c) Recycling used oil and hydraulic fluid; (d) Collecting non-recyclable waste for transport to a landfill; and (e) Segregating all hazardous wastes, such as used oil, oily rags and oil-absorbent materials, oil and cleaning solution containers, mercury-containing lights, and lead-acid and nickel-cadmium batteries, for disposal by a licensed firm specializing in the proper recycling or disposal of hazardous wastes. <p>The requirements of the plan shall be implemented and adhered to during operational activities.</p> <p>[Final Order on ASC, Condition V.D.2; Amended in Final Order on AMD4]</p>
STANDARD: PUBLIC HEALTH AND SAFETY STANDARDS FOR WIND ENERGY FACILITIES (PH) [OAR 345-024-0010]	
PRO-PH-01	<p>Prior to operation, the certificate holder shall:</p> <ul style="list-style-type: none"> (a) Submit to the Department materials or other documentation demonstrating the facility's operational safety-monitoring program <u>and cause analysis program, for review and approval</u>. The program shall, at a minimum, include requirements for regular turbine <u>blades</u> and turbine tower component inspections and maintenance, <u>based on wind turbine manufacturer recommended frequency</u>. (b) <u>The certificate holder shall document inspection and maintenance activities including but not limited to date, turbine number, inspection type (regular or other), turbine tower and blade condition, maintenance requirements (i.e. equipment used, component repair or replacement description, impacted area location and size), and wind turbine operating status. This information shall be submitted to the Department pursuant to OAR 345-026-0080 in the facility's annual compliance report.</u> (c) <u>In the event of blade or tower failure, the certificate holder shall report the incident to the Department within 72 hours, in accordance with OAR 345-026-0170(1), and shall, within 90-days of blade or tower failure event, submit a cause analysis to the Department for its compliance evaluation.</u> <p>[Final Order on ASC, Condition IV.I.4; Amended in Final Order on AMD4, <u>AMD5</u>]</p>
PRO-PH-02	<p>Prior to operation, the certificate shall submit to the Department evidence demonstrating that, for turbine types having pad-mounted step-up transformers, transformers are installed at the base of each tower in locked cabinets designed to protect the public from electrical hazards and to avoid creation of artificial habitat for raptor prey.</p> <p>[Final Order on ASC, Condition IV.I.5; Amended in Final Order on AMD4]</p>
REQUIREMENTS UNDER COUNCIL JURISDICTION (CJ)	

PRO-CJ-01	<p>Prior to start of commercial operation, the certificate holder shall submit a plan for complaint-based operational noise monitoring to the Department. Commercial operation shall not commence until the Department has concurred in writing with the complaint-based noise monitoring protocol. The plan shall provide for testing at houses whose owners or occupants submit a complaint to the Council or the Department. The plan shall include a schedule for completion of required testing and a date certain by which written results shall be provided to the Council. If the owner of the property that filed the complaint refuses to grant access for the purpose of performing the noise test described in this condition after reasonable attempts are made by the certificate holder to receive permission for access, then the Department shall not require further corrective action.</p> <p>[Final Order on ASC, Condition VI.A.1.4]</p>
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4.6 Operational (OPR) Conditions

Condition Number	Pre-Construction (PRE) Conditions
STANDARD: SOIL PROTECTION (SP) [OAR 345-022-0022]	
OPR -SP-01	<p>During facility operation, the certificate holder shall routinely inspect and maintain all roads, pads and trenched areas and, as necessary, maintain or repair erosion control measures. The certificate holder shall restore areas that are temporarily disturbed during facility maintenance or repair activities to predisturbance condition or better.</p> <p>[Final Order on ASC, Condition IV.E.3]</p>
OPR -SP-02	<p>During facility operation, if blade-washing becomes necessary, the certificate holder shall ensure that there is no runoff of wash water from the site or discharges to surface waters, storm sewers or dry wells. The certificate holder shall not use acids, bases or metal brighteners with the wash water. The certificate holder may use biodegradable, phosphate-free cleaners sparingly.</p> <p>[Final Order on ASC, Condition IV.E.6]</p>
STANDARD: LAND USE (LU) [OAR 345-022-0030]	
OPR -LU-01	<p>During operation of the facility, the certificate holder, in cooperation with landowners, shall avoid impact on cultivated land to the extent reasonably possible when performing facility repair and maintenance activities.</p> <p>[Final Order on ASC, Condition IV.D.11]</p>
OPR -LU-02	<p>Within 90 days after beginning operation, the certificate holder shall provide to the Department and to the Sherman County Planning Director the actual latitude and longitude location or Stateplane NAD 83(91) coordinates of each turbine tower, connecting lines and transmission lines. In addition, the certificate holder shall provide to the Department and to the Sherman County Planning Director, a summary of as-built changes in the facility compared to the original plan, if any.</p> <p>[Final Order on ASC, Condition IV.D.15]</p>
STANDARD: RETIREMENT AND FINANCIAL ASSURANCE (RT) [OAR 345-022-0050]	
OPR -RT-01	<p>The certificate holder shall:</p> <ul style="list-style-type: none"> (a) Notify the Department of any spill or release of hazardous material during construction, operation or retirement of the facility-within one working day after the discovery. The certificate holder shall follow applicable Oregon Department of Environmental Quality ("DEQ") response requirements regulations pursuant to OAR Chapter 340 Division 142. (b) Within 45-days of the discovery, the certificate holder shall submit to the Department copies of the Oregon Emergency Response System Spill/Release Report, as submitted to DEQ. <p>[Final Order on ASC, Condition IV.C.6; Amended in Final Order on AMD4]</p>
OPR -RT-02	<p>If the certificate holder has not remedied a spill consistent with applicable ODEQ standards within six months after the date of the spill, the certificate holder shall submit to the Council for its approval an independently</p>

	<p>prepared estimate of the additional cost of remediation or correction within such six-month period.</p> <p>(a) Upon approval of an estimate by the Council, the certificate holder shall increase the amount of its bond or letter of credit by the amount of the estimate.</p> <p>(b) In no event, however, shall the certificate holder be relieved of its obligation to exercise all due diligence in remedying a spill of hazardous substances.</p> <p>[Final Order on ASC, Condition IV.C.7, Final Order on AMD4]</p>
STANDARD: FISH AND WILDLIFE HABITAT (FW) [OAR 345-022-0060]	
OPR -FW-01	<p>During facility operation, the certificate holder shall conduct wildlife monitoring as described in the Wildlife Monitoring and Mitigation Plan that is included as Attachment E to the Final Order on Amendment 4 and as amended from time to time.</p> <p>[Final Order on ASC, Condition IV.M.7; Amended in Final Order on AMD4]</p>
STANDARD: SCENIC RESOURCES (SR) [OAR 345-022-0080]	
OPR -SR-01	<p>During operation of the facility, the certificate holder shall not use exterior nighttime lighting except:</p> <ol style="list-style-type: none"> The minimum turbine tower lighting required or recommended by the Federal Aviation Administration (the "FAA"); Security lighting at the O&M facility and substations, provided that such lighting is shielded or directed downward to reduce glare; Minimum lighting necessary for repairs or emergencies; and As otherwise required by federal, State or local law. <p>[Final Order on ASC, Condition IV.G.3]</p>
STANDARD: PUBLIC SERVICES (PS) [OAR 345-022-0100]	
OPR -PS-01	<p>During operation of the facility, the certificate holder shall obtain water for on-site use from one well located at the O&M facility, subject to compliance with applicable permit requirements. During operation of the facility, the certificate holder shall not use more than 5,000 gallons of water per day from the on-site well.</p> <p>[Final Order on ASC, Condition V.C.1]</p>
OPR -PS-02	<p>During operation of the facility, the certificate holder shall ensure that all on-site employees receive annual fire prevention and response training, including tower rescue training, from qualified instructors or members of local fire districts and shall ensure that all employees are instructed to keep vehicles on roads and off dry grassland, except when off-road operation is required for emergency purposes.</p> <p>[Final Order on ASC, Condition V.C.8]</p>
STANDARD: WASTE MINIMIZATION (WM) [OAR 345-022-0120]	
OPR -WM-01	<p>During operation, the certificate holder shall discharge sanitary wastewater generated at the O&M facility to a licensed on-site septic system in compliance with county permit requirements. The certificate holder shall design the septic system with a discharge capacity of less than 5,000 gallons per day. The certificate holder shall provide copies of all necessary septic system permits to the Department.</p> <p>[Final Order on ASC, Condition V.D.4; Amended in Final Order on AMD4]</p>
REQUIREMENTS UNDER COUNCIL JURISDICTION (CJ)	
OPR-CJ-01	<p>During operation, the certificate holder shall maintain a complaint response system to address noise complaints. The certificate holder shall promptly notify the Department of any complaints received regarding facility noise and of any actions taken by the certificate holder to address those complaints. Prior to start of commercial operation, the certificate holder shall notify, in writing, the owners of potentially affected noise-sensitive properties identified in Exhibit X of the completed Application for a Site Certificate. The notice shall inform the property owners of the procedure and contact information for filing a complaint regarding the noise level from the facility once it is operating. The certificate holder shall document the issuance of this notice and provide that</p>

	documentation to the Department. [Final Order on ASC, Condition VI.A.1.3]
MANDATORY CONDITIONS (MC)	
OPR-MC-01	OAR 345-025-0006 (2): The certificate holder shall submit a legal description of the site to the Department of Energy within 90 days after beginning operation of the facility. The legal description required by this rule means a description of metes and bounds or a description of the site by reference to a map and geographic data that clearly and specifically identifies the outer boundaries that contain all parts of the facility. [Final Order on ASC, Condition VII.2; Amended in Final Order on AMD4]

4.7 Retirement Conditions (RET)

Condition Number	Pre-Construction (PRE) Conditions
STANDARD: RETIREMENT AND FINANCIAL ASSURANCE (RT) [OAR 345-022-0050]	
RET -RT-01	The certificate holder shall retire the facility if the certificate holder permanently ceases construction or operation of the facility. The certificate holder shall retire the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110, and prepared pursuant to Condition (IV.C.2). [Final Order on ASC, Condition IV.C.1]
RET -RT-02	Two years before closure of the energy facility, the certificate holder shall submit to the Department a proposed final retirement plan for the facility and site, pursuant to OAR 345-027-0110, including: <ul style="list-style-type: none"> (a) A plan for retirement that provides for completion of retirement within two years after permanent cessation of operation of the energy facility and that protects the public health and safety and the environment; (b) A description of actions the certificate holder proposes to take to restore the site to a useful, non-hazardous condition suitable for agricultural use; and (c) A detailed cost estimate, a comparison of that estimate with the dollar amount secured by a bond or letter of credit and any amount contained in a retirement fund, and a plan for assuring the availability of adequate funds for completion of retirement. [Final Order on ASC, Condition IV.C.2]
RET -RT-03	If the certificate holder elects to use a bond to meet the requirements of Condition (IV.C.4), the certificate holder shall ensure that the surety is obligated to comply with the requirements of applicable statutes, Council rules and this site certificate when the surety exercises any legal or contractual right it may have to assume construction, operation or retirement of the energy facility. The certificate holder shall also ensure that the surety is obligated to notify the Council that it is exercising such rights and to obtain any Council approvals required by applicable statutes, Council rules and this site certificate before the surety commences any activity to complete construction, operate or retire the energy facility. [Final Order on ASC, Condition IV.C.5]
RET -RT-04	The certificate holder shall pay the actual cost to restore the site to a useful, non-hazardous condition at the time of retirement, notwithstanding the Council's approval in the site certificate of an estimated amount required to restore the site. [Final Order on ASC, Condition IV.C.9]
RET -RT-05	If the Council finds that the certificate holder has permanently ceased construction or operation of the facility without retiring the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110 and prepared pursuant to Condition (IV.C.2), the Council shall notify the certificate holder and

	<p>request that the certificate holder submit a proposed final retirement plan to the Department within a reasonable time not to exceed 90 days.</p> <ul style="list-style-type: none"> (a) If the certificate holder does not submit a proposed final retirement plan by the specified date or if the Council rejects the retirement plan that the certificate holder submits, the Council may direct the Department to prepare a proposed a final retirement plan for the Council's approval. (b) Upon the Council's approval of the final retirement plan prepared pursuant to (a), the Council may draw on the bond or letter of credit described in Condition (IV.C.4) and shall use the funds to restore the site to a useful, non-hazardous condition according to the final retirement plan, in addition to any penalties the Council may impose under OAR Chapter 345, Division 29. (c) If the amount of the bond or letter of credit is insufficient to pay the actual cost of retirement, the certificate holder shall pay any additional cost necessary to restore the site to a useful, non-hazardous condition. (d) After completion of site restoration, the Council shall issue an order to terminate the site certificate if the Council finds that the facility has been retired according to the approved final retirement plan. <p>[Final Order on ASC, Condition IV.C.10]</p>
COUNCIL'S MANDATORY CONDITIONS (MC)	
RET -MC-01	<p>OAR 345-025-0006 (9): The certificate holder shall retire the facility if the certificate holder permanently ceases construction or operation of the facility. The certificate holder shall retire the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110. The certificate holder shall pay the actual cost to restore the site to a useful, non-hazardous condition at the time of retirement, notwithstanding the Council's approval in the site certificate of an estimated amount required to restore the site.</p> <p>[Final Order on ASC, Condition VII.9; Amended in Final Order on AMD4]</p>
RET -MC-02	<p>OAR 345-025-0006 (16): If the Council finds that the certificate holder has permanently ceased construction or operation of the facility without retiring the facility according to a final retirement plan approved by the Council, as described in OAR 345-027-0110, the Council shall notify the certificate holder and request that the certificate holder submit a proposed final retirement plan to the Office within a reasonable time not to exceed 90 days. If the certificate holder does not submit a proposed final retirement plan by the specified date, the Council may direct the Department to prepare a proposed a final retirement plan for the Council's approval. Upon the Council's approval of the final retirement plan, the Council may draw on the bond or letter of credit described in OAR 345-027-0020(8) to restore the site to a useful, non-hazardous condition according to the final retirement plan, in addition to any penalties the Council may impose under OAR Chapter 345, Division 29. If the amount of the bond or letter of credit is insufficient to pay the actual cost of retirement, the certificate holder shall pay any additional cost necessary to restore the site to a useful, non-hazardous condition. After completion of site restoration, the Council shall issue an order to terminate the site certificate if the Council finds that the facility has been retired according to the approved final retirement plan.</p> <p>[Final Order on ASC, Condition VII.16; Amended in Final Order on AMD4]</p>

5.0 Successors and Assigns

To transfer this site certificate or any portion thereof or to assign or dispose of it in any other manner, directly or indirectly, the certificate holder shall comply with OAR 345-027-0100.

6.0 Severability and Construction

If any provision of this agreement and certificate is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and conditions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the agreement and certificate did not contain the particular provision held to be invalid.

7.0 Execution

This amended site certificate may be executed in counterparts and will become effective upon signature by the Chair of the Energy Facility Siting Council and the authorized representative of the certificate holder.

IN WITNESS THEREOF, this site certificate has been executed by the State of Oregon, acting by and through the Energy Facility Siting Council, and by Golden Hills Wind Farm, LLC.

ENERGY FACILITY SITING COUNCIL

By: _____

Barry Beyeler, Chair

Oregon Energy Facility Siting Council

Date: _____

Golden Hills Wind Farm, LLC

By: _____

_____ [Print Name]

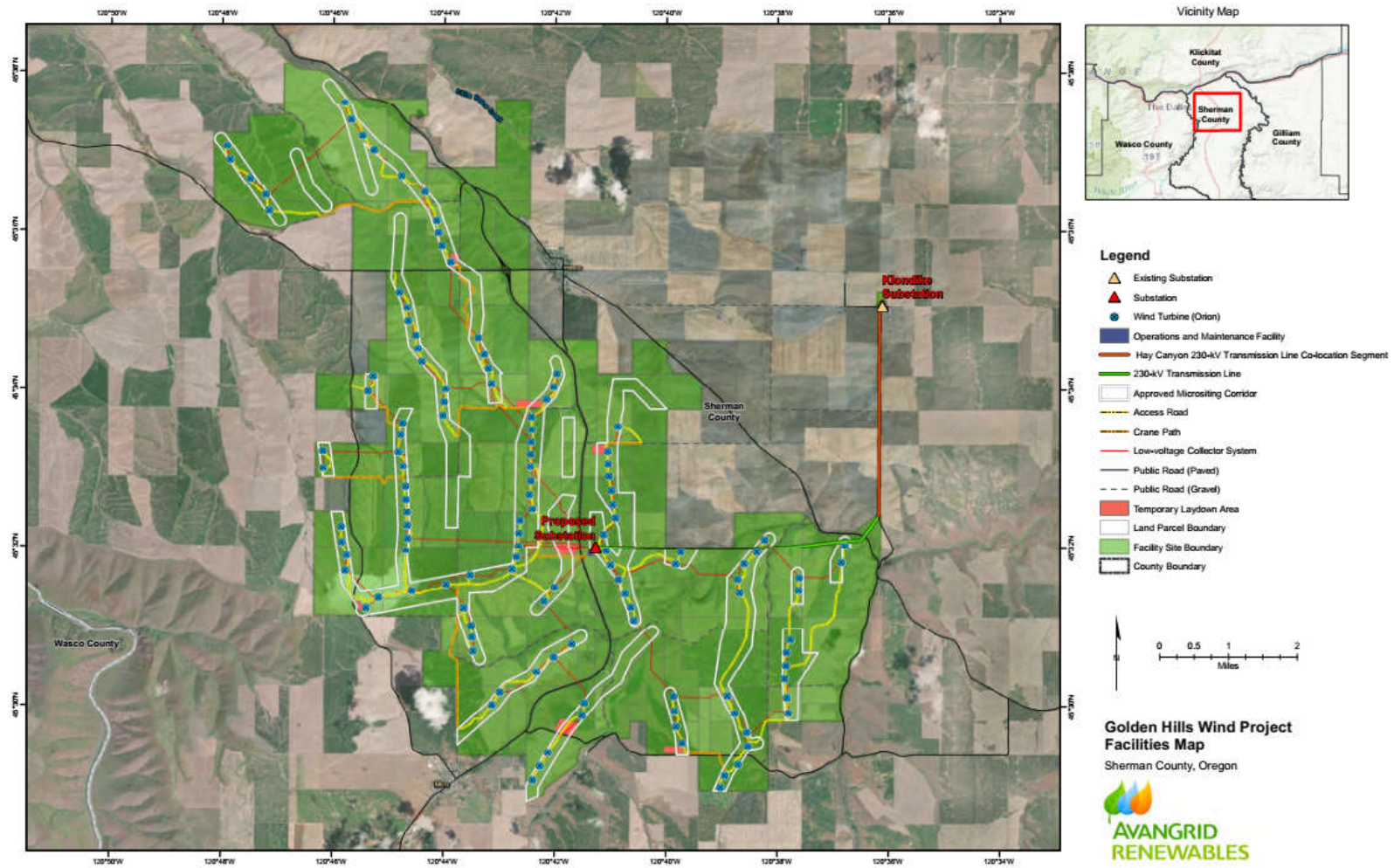
Golden Hills Wind Farm, LLC

Date: _____

Attachment A

Facility Site Boundary Map

Golden Hills Site Boundary and Turbine Micrositing Corridors



Golden Hills Wind Project

Fourth-Fifth Amended Site Certificate – April, DATE 2018

Attachment B: Reviewing Agency Comments on preliminary RFA5

ESTERSON Sarah * ODOE

From: CAINES Jeff <Jeff.CAINES@aviation.state.or.us>
Sent: Wednesday, May 30, 2018 9:10 AM
To: ESTERSON Sarah * ODOE
Subject: Golden Hills Wind Project - ODA Comments

Sarah:

Thank you for allowing ODA to comment on the Golden Hills Wind Project. It appears that the project has not changed significantly since ODA first reviewed the project. Since there have been no major modifications, ODA would like to re-submit the letter dated May 31, 2016 signed by Mitch Swecker, Director. In addition ODA would request and recommend that an evaluation take place on the potential impact on registered private airports within 3 miles of the development boundary.

Please feel free to have the applicant contact ODA for further assistance on this project and the potential it may have on air navigation safety in Oregon.

Thank you again and please feel free to contact me if you or the applicant have any further questions.

Jeff

JEFF CAINES, AICP
OREGON DEPARTMENT OF AVIATION
AVIATION PLANNER / SCIP COORDINATOR



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ESTERSON Sarah * ODOE

From: HESSE Todd <Todd.HESSE@state.or.us>
Sent: Monday, May 14, 2018 3:46 PM
To: ESTERSON Sarah * ODOE
Subject: Golden Hills Wind Project needs to start 1200c process anew

Sarah,

I haven't been able to find any record of the Golden Hills Wind Project obtaining 1200c permit coverage from DEQ. This is based on searches in our water quality database. As a check, I searched for some other wind projects (Montague, Wheatridge, Stateline) and found all of those and many others in the WQ database.

If Golden Hills has been the project name the entire life of the project, the database search indicates it never had 1200c coverage. I also searched the archived stormwater files to see if there was an application in there, but didn't find anything. So it seems that there never was permit coverage and there may not have been an application and associated erosion and sediment control plan submitted for this project. I'll check in tomorrow with our WQ permit coordinator to see if she has any info on Golden Hills applying for 1200c permit coverage.

Even if an ESCP was submitted back in 2007, I'd request and updated ESCP with a 1200c permit application. It's my best guess that the process for 1200c permit coverage should start from scratch with a new 1200c application and current ESCP. Once that is reviewed and ESCP revisions / edits are complete (round 1 only to get the ESCP near final) then DEQ sends the conditional approval letter to DOE.

Please let me know if you have any comments or questions on the suggested approach.

Thanks,

Todd Hesse, P.E.
CWSRF Engineer
DEQ - Eastern Region
475 NE Bellevue Dr Suite 110
Bend, OR 97701
541-633-2026

GAO Yuan * ODOE

From: Jeremy Thompson <Jeremy.L.Thompson@state.or.us>
Sent: Tuesday, June 12, 2018 9:52 AM
To: ESTERSON Sarah * ODOE; REIF Sarah J; THOMPSON Jeremy L; REIF Sarah J
Cc: WOODS Maxwell * ODOE
Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request
Attachments: GoldenHills_amendment#5_ODFWcomments.pdf

Sarah,

Please find ODFW's comments regarding Amendment 5 for Golden Hills wind facility.

Let me know if you have any questions.

Jeremy Thompson

District Wildlife Biologist
Mid-Columbia District, ODFW
3701 W. 13th. St.
The Dalles, OR 97058
541-296-4628 office
541-980-8524 cell
541-298-4993 fax

From: ESTERSON Sarah * ODOE [mailto:Sarah.Esterson@oregon.gov]
Sent: Monday, June 11, 2018 9:54 AM
To: REIF Sarah J <Sarah.J.Reif@state.or.us>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>; REIF Sarah J <Sarah.J.Reif@state.or.us>
Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>
Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Jeremy and Sarah,

We would like to follow up regarding ODFW's review/comment on the Golden Hills Wind Project Request for Amendment 5. We would like to request receipt of comments by June 15, 2018 – please let us know if that is not feasible.

Per our conference call on June 4, we discussed that ODFW would comment on any potential concerns, or lack thereof, related to increase in wind turbine rotor diameter to bird/bat fatality, suitability of threshold of concern in evaluating potential impacts, and whether any changes were necessary within the WMMP related to the proposed change in turbine specifications.

Thanks,
Sarah

Sarah T. Esterson

Energy Facility Siting Analyst
Oregon Department of Energy
550 Capitol St NE, 1st Floor
Salem, OR 97301
P:(503) 373-7945
C: (503) 385-6128

Oregon.gov/energy



From: ESTERSON Sarah * ODOE

Sent: Monday, May 14, 2018 1:39 PM

To: 'Sarah J Reif' <Sarah.J.Reif@state.or.us>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>; REIF Sarah J <Sarah.J.Reif@state.or.us>

Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>

Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Thanks for the responses – I will schedule a call between ODOE and Jeremy for June 4.

Sarah T. Esterson

Energy Facility Siting Analyst
Oregon Department of Energy
550 Capitol St NE, 1st Floor
Salem, OR 97301
P:(503) 373-7945
C: (503) 385-6128

Oregon.gov/energy



From: Sarah J Reif [<mailto:Sarah.J.Reif@state.or.us>]

Sent: Monday, May 14, 2018 1:28 PM

To: THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>; REIF Sarah J <Sarah.J.Reif@state.or.us>; ESTERSON Sarah * ODOE <Sarah.Esterson@oregon.gov>

Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>

Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

4th and 5th might be tough for me, I think we have a field trip for Obsidian solar, down in Lake County. However, I do not need to be present for this call; I can provide Jeremy with input and guidance prior to this date.

Sarah Reif
Office: 503-947-6082
Cell: 503-991-3587

From: Jeremy Thompson [<mailto:Jeremy.L.Thompson@state.or.us>]
Sent: Monday, May 14, 2018 1:14 PM
To: Sarah J Reif <Sarah.J.Reif@state.or.us>; ESTERSON Sarah * ODOE <Sarah.Esterson@oregon.gov>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>
Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>
Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

That date does not work for me, I am in the field that week. I could do the 4th or 5th. The next two weeks are pretty packed.

Jeremy

From: Sarah J Reif [<mailto:Sarah.J.Reif@state.or.us>]
Sent: Monday, May 14, 2018 1:12 PM
To: ESTERSON Sarah * ODOE <Sarah.Esterson@oregon.gov>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>
Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>
Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Hi Sarah,

May 30th at 2pm works for me.

Sarah Reif
Office: 503-947-6082
Cell: 503-991-3587

From: ESTERSON Sarah * ODOE [<mailto:Sarah.Esterson@oregon.gov>]
Sent: Monday, May 14, 2018 12:30 PM
To: REIF Sarah J <Sarah.J.Reif@state.or.us>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>
Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>
Subject: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Sarah and Jeremy,

The Oregon Department of Energy received preliminary Request for Amendment 5 (pAMD5) for the Golden Hills Wind Project Site Certificate (link provided below). The Golden Hills Wind Project is an approved but not yet constructed wind energy facility, to be located in Sherman County, with up to 125 wind turbines and a maximum capacity of 400 megawatts. The approved facility site boundary includes 29,500 acres. The certificate holder must commence construction activities by June 18, 2020.

The pAMD5 requests Council approval for the following primary components: differing turbine model option (increase turbine hub height from 311 to 404 feet, increase blade tip height from 521 to 650 feet, and reduce minimum blade tip clearance from 65 to 46 feet); increase temporary access road width (40 to 100 feet); and increase height of meteorological towers (311 to 404 feet).

<http://www.oregon.gov/energy/facilities-safety/facilities/Pages/GHW.aspx>

We would like to request ODFW review and comment on the amendment request by **June 1, 2018**. In particular, we have the following questions:

- Does ODFW concur with the evaluation of avian and bat collision risk (see Section 4.8.3 of the amendment request) and its conclusion that there is not currently enough data to link increased collision risk with increased rotor swept diameter?
- Does ODFW continue to consider the thresholds of concern, as imposed in the WMMP (see attached), to be the appropriate metric for evaluating significance of impacts from wind turbine operation to sensitive bird/bat species?
- Does ODFW consider the fatality monitoring program sufficient to monitor/mitigate for potential bird/bat species during operation of the proposed differing turbine model option (i.e. post construction monitoring currently includes 1 yr post-construction, and second year at year 5 of operation unless thresholds of concern are exceeded)

We would like to propose a phone call to discuss questions/comments – please let me know if **Wed, May 30 at 2pm** works for your schedule.

Thanks,
Sarah

Sarah T. Esterson
Energy Facility Siting Analyst
Oregon Department of Energy
550 Capitol St NE, 1st Floor
Salem, OR 97301
P:(503) 373-7945
C: (503) 385-6128

Oregon.gov/energy





Department of Fish and Wildlife

Mid-Columbia Field Office
3701 West 13th Street
The Dalles, OR 97058
(541) 296-4628
FAX (541) 298-4993

June 8, 2018

Sarah Esterson
Oregon Department of Energy
550 Capitol Street NE
Salem, OR 97301

RE: Oregon Department of Fish and Wildlife review of Golden Hills request for Amendment #5

Dear Ms. Esterson:

The Oregon Department of Energy (ODOE) has requested review from the Oregon Department of Fish and Wildlife (Department) on the May 4th, 2018 Amendment to Site Certificate proposal for the proposed Golden Hills Wind Project. This Letter contains: (1) Department contact information for the project; and (2) the Department's review comments and recommendations on the proposed amendment.

A. Contacts

I will remain the primary Department contact person for the Energy Facility Siting Council (EFSC) permitting process. My contact information is: Jeremy Thompson, 3701 W 13th St. The Dalles, OR 97058. My phone number is (541) 296-4628. Please also copy the Department's Energy Program Coordinator: Sarah Reif, 4034 Fairview Industrial Drive SE, Salem, OR 97302; Office phone number (503) 947-6082.

B. Comments on the Application

General Comments

Please find below a listing of the most applicable statutes, administrative rules and policies administered by the Department that would pertain to the siting of this proposed facility. The Department will review and make recommendations for the proposed project based on the following applicable statutes and rules.

Oregon Revised Statutes (ORS)

- ORS 496.012 Wildlife Policy
- ORS 506.036 Protection and Propagation of Fish
- ORS 496.171 through 496.192 Threatened and Endangered Wildlife and Fish Species. A listing of State and Federal threatened, endangered and candidate species

can be found on the Department's website at:

http://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp

- ORS 498.301 through 498.346 Screening and By-pass devices for Water Diversions or Obstructions
- ORS 506.109 Food Fish Management Policy
- ORS 509-140 Placing Explosives in Water
- ORS 509.580 through 509.910 Fish Passage; Fishways; Screening Devices. A listing of requirements under the Department's Fish Passage Program can be found on the Department's website at <http://www.dfw.state.or.us/fish/passage/>

Oregon Administrative Rules (OAR)

- OAR Chapter 635, Division 100 provides authority for adoption of the State sensitive species list and the Wildlife Diversity Plan, and contains the State list of threatened and endangered wildlife and fish species. A current list of State sensitive species can be found on the Department's website at:
http://www.dfw.state.or.us/wildlife/diversity/species/docs/SSL_by_category.pdf
- OAR Chapter 635, Division 415 Fish and Wildlife Habitat Mitigation Policy can be found on the Department's website at:
http://www.dfw.state.or.us/lands/mitigation_policy.asp describes six habitat categories and establishes mitigation goals and standards for each wildlife habitat ranging from Habitat Category 1 (irreplaceable, essential, limited) to Habitat Category 6 (non-habitat)
- The Mitigation Policy goal for Habitat Category 1 is avoidance of impacts through development alternatives ultimately resulting in a Department recommendation of no authorization of the proposed development action if impacts cannot be avoided. Habitat Categories 2-4 are essential or important for fish and wildlife, but not irreplaceable habitats. Habitat Category 5 is not essential or important habitat for fish and wildlife, but has a high restoration potential. The application for a site certificate should identify the appropriate habitat categorization for all affected areas of the proposed project on mapping; provide basis for each habitat category selection; and provide an appropriate mitigation plan; all subject to ODOE and the Department's review and comment. ODOE has adopted this rule into OAR 345-022-0060 as an energy facility siting standard for Applicants to meet in order to obtain a site certificate.
- The Department also provides technical review and recommendations on compliance with Oregon EFSC rules, particularly OAR 345-02100010(1) (p) and (q) and 345-22-040, 060 and 070.

- The Department also recommends project consistency with the Oregon Columbia Plateau Ecoregion Wind Energy Siting and Permitting Guidelines that were established in conjunction with multiple state, federal and industry partners. The intent of these guidelines is to create a balance between the development of renewable energy and environmental protection.

Department Recommendations

In amendment #5 the applicant proposes an increase in turbine height and rotor swept area permitted for use in the project, an increase in the total height of meteorological towers used on the project, and an increase in the width of temporary roads.

Wind-wildlife studies elsewhere in the United States show that collision risk is primarily influenced by turbine and blade-tip height. Bird collisions have been shown to increase with turbine height because the blades reach higher into the flight zone of migratory birds. That said, the technology for larger turbines is so recent that assessments of the relative increase in risk for birds and bats in the Pacific Northwest are not yet available to inform management recommendations. The previously-approved site certificate for Golden Hills included a post-construction fatality monitoring effort with an associated adaptive management plan, and the Department believes this effort is particularly important to carry forward in Amendment #5. The Department recommends this fatality monitoring protocol includes an adequate number of turbines in the sample size to statistically detect any potential increase in mortality rates for all species within portions of the project that utilize the larger turbine design.

The Department that meteorological towers be included in the fatality monitoring effort to better assess the risk of increasing their height on bird and bat collisions within the project area.

The Department requests that the proposed increase in temporary impacts be specifically addressed pre-construction in the habitat assessment that is required per condition III.C.1 in RFA#4 and be provided as part of the final calculation of mitigation recommendations.

The Department appreciates the opportunity to comment on this application and looks forward to working with ODOE and the Applicant.

Respectfully,



Jeremy Thompson
Mid-Columbia District Wildlife Biologist

Cc: Jon Germond, Salem
Sarah Reif, Salem
Michael Harrington, Bend

Kalysta Adkins, The Dalles
Simon Wray, Bend
Applicant

DRAFT

ESTERSON Sarah * ODOE

From: Jeremy Thompson <Jeremy.L.Thompson@state.or.us>
Sent: Monday, July 2, 2018 11:14 AM
To: ESTERSON Sarah * ODOE; THOMPSON Jeremy L; REIF Sarah J
Cc: ADKINS Kalysta I; WOODS Maxwell * ODOE
Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Sarah,

As per our conversation, my concern that led to this comment is that in the past we have seen developers use a mix of different turbines within a development and there is not necessarily a requirement to sample an equal proportion of each design within current mortality protocol.

I would refine my comment to ask that the applicant sample an equal proportion of each turbine design within the 50 turbines that will be monitored based on the requirements of the WMMP.

Jeremy Thompson

District Wildlife Biologist
Mid-Columbia District, ODFW
3701 W. 13th. St.
The Dalles, OR 97058
541-296-4628 office
541-980-8524 cell
541-298-4993 fax

From: ESTERSON Sarah * ODOE [mailto:Sarah.Esterson@oregon.gov]
Sent: Friday, June 15, 2018 9:46 AM
To: THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>; REIF Sarah J <Sarah.J.Reif@state.or.us>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>; REIF Sarah J <Sarah.J.Reif@state.or.us>
Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>
Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Jeremy and Sarah,

Thank you for providing comments on the Golden Hills Wind Project preliminary Request for Amendment 5.

In your comment letter, it states, "The Department recommends this fatality monitoring protocol includes an adequate number of turbines in the sample size to statistically detect any potential increase in mortality rates for all species within portions of the project that utilize the larger turbine design."

The current WMMP states, "The sample size for fatality monitoring is the number of turbines searched per monitoring year. The certificate holder shall conduct fatality monitoring during the each monitoring year in search plots at 1/3 of the turbines. If fewer than 150 turbines are built, GHWF shall monitor a minimum of 50 turbines."

The facility is authorized to construct and operate up to 125 turbines, so the sample size would be a minimum of 50 turbines. This seems to be the typical sample size for these studies in other WMMPs – could ODFW provide recommendations or comments on the adequacy of the sample size included in the GHWP WMMP based on the proposed changes in turbine dimensions?

Thanks in advance,
Sarah

Sarah T. Esterson

Energy Facility Siting Analyst
Oregon Department of Energy
550 Capitol St NE, 1st Floor
Salem, OR 97301
P:(503) 373-7945
C: (503) 385-6128

Oregon.gov/energy



From: Jeremy Thompson [<mailto:Jeremy.L.Thompson@state.or.us>]
Sent: Tuesday, June 12, 2018 9:52 AM
To: ESTERSON Sarah * ODOE <Sarah.Esterson@oregon.gov>; REIF Sarah J <Sarah.J.Reif@state.or.us>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>; REIF Sarah J <Sarah.J.Reif@state.or.us>
Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>
Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Sarah,

Please find ODFW's comments regarding Amendment 5 for Golden Hills wind facility.

Let me know if you have any questions.

Jeremy Thompson

District Wildlife Biologist
Mid-Columbia District, ODFW
3701 W. 13th. St.
The Dalles, OR 97058
541-296-4628 office
541-980-8524 cell
541-298-4993 fax

From: ESTERSON Sarah * ODOE [<mailto:Sarah.Esterson@oregon.gov>]
Sent: Monday, June 11, 2018 9:54 AM

To: REIF Sarah J <Sarah.J.Reif@state.or.us>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>; REIF Sarah J <Sarah.J.Reif@state.or.us>

Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>

Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Jeremy and Sarah,

We would like to follow up regarding ODFW's review/comment on the Golden Hills Wind Project Request for Amendment 5. We would like to request receipt of comments by June 15, 2018 – please let us know if that is not feasible.

Per our conference call on June 4, we discussed that ODFW would comment on any potential concerns, or lack thereof, related to increase in wind turbine rotor diameter to bird/bat fatality, suitability of threshold of concern in evaluating potential impacts, and whether any changes were necessary within the WMMP related to the proposed change in turbine specifications.

Thanks,
Sarah

Sarah T. Esterson

Energy Facility Siting Analyst
Oregon Department of Energy
550 Capitol St NE, 1st Floor
Salem, OR 97301
P:(503) 373-7945
C: (503) 385-6128

Oregon.gov/energy



From: ESTERSON Sarah * ODOE

Sent: Monday, May 14, 2018 1:39 PM

To: 'Sarah J Reif' <Sarah.J.Reif@state.or.us>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>; REIF Sarah J <Sarah.J.Reif@state.or.us>

Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>

Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Thanks for the responses – I will schedule a call between ODOE and Jeremy for June 4.

Sarah T. Esterson

Energy Facility Siting Analyst
Oregon Department of Energy
550 Capitol St NE, 1st Floor
Salem, OR 97301
P:(503) 373-7945
C: (503) 385-6128



From: Sarah J Reif [<mailto:Sarah.J.Reif@state.or.us>]
Sent: Monday, May 14, 2018 1:28 PM
To: THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>; REIF Sarah J <Sarah.J.Reif@state.or.us>; ESTERSON Sarah * ODOE <Sarah.Esterson@oregon.gov>
Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>
Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

4th and 5th might be tough for me, I think we have a field trip for Obsidian solar, down in Lake County. However, I do not need to be present for this call; I can provide Jeremy with input and guidance prior to this date.

Sarah Reif
Office: 503-947-6082
Cell: 503-991-3587

From: Jeremy Thompson [<mailto:Jeremy.L.Thompson@state.or.us>]
Sent: Monday, May 14, 2018 1:14 PM
To: Sarah J Reif <Sarah.J.Reif@state.or.us>; ESTERSON Sarah * ODOE <Sarah.Esterson@oregon.gov>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>
Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>
Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

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Jeremy

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Sent: Monday, May 14, 2018 1:12 PM
To: ESTERSON Sarah * ODOE <Sarah.Esterson@oregon.gov>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>
Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>
Subject: RE: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Hi Sarah,

May 30th at 2pm works for me.

Sarah Reif
Office: 503-947-6082

From: ESTERSON Sarah * ODOE [<mailto:Sarah.Esterson@oregon.gov>]

Sent: Monday, May 14, 2018 12:30 PM

To: REIF Sarah J <Sarah.J.Reif@state.or.us>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>

Cc: WOODS Maxwell * ODOE <Maxwell.Woods@oregon.gov>

Subject: Golden Hills Wind Project - Preliminary Request for Amendment 5 of Site Certificate - ODFW Review Request

Sarah and Jeremy,

The Oregon Department of Energy received preliminary Request for Amendment 5 (pAMD5) for the Golden Hills Wind Project Site Certificate (link provided below). The Golden Hills Wind Project is an approved but not yet constructed wind energy facility, to be located in Sherman County, with up to 125 wind turbines and a maximum capacity of 400 megawatts. The approved facility site boundary includes 29,500 acres. The certificate holder must commence construction activities by June 18, 2020.

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We would like to propose a phone call to discuss questions/comments – please let me know if **Wed, May 30 at 2pm** works for your schedule.

Thanks,
Sarah

Sarah T. Esterson

Energy Facility Siting Analyst
Oregon Department of Energy
550 Capitol St NE, 1st Floor
Salem, OR 97301
P:(503) 373-7945
C: (503) 385-6128

Oregon.gov/energy



May 31, 2018

TO: Sarah T. Esterson

Energy Facility Siting Analyst
Oregon Department of Energy
550 Capitol Street N.E., 1st Floor
Salem, OR 97301

FROM: Georgia L. Macnab

Sherman County Planning Director
PO Box 381
Moro, Or 97039

RE: Golden Hills Wind Project- Amendment #5

Thank you for the opportunity to comment on the **Request for Amendment #5 for the Golden Hills Wind Project**. These comments are provided on behalf of the Special Advisory Group for Sherman County by Georgia Macnab, Sherman County Planning Director.

General Comments

Sherman County has no objections to the amendment itself regarding the transfer of ownership and the request of an extension to the construction start deadline.

In response to your concerns regarding public roadway intersection modifications due to larger equipment being delivered to the sites. I would request that you coordinate with the county road master for any questions you have regarding larger turning radii to the county roads with oversize loads. The road department also has a road approach application that is required for new roads accessing county roads. I have also added the information about the Sherman County Transportation Plan for new road rural design standards below.

The county has no concerns with visibility of the turbines from the DeMoss Springs Memorial Park. Currently there are large trees that surround the perimeters of the park and the DeMoss Grain Elevators also sit adjacent to the south of the park.

Specific Comments

Ordinance #39-2007

Sherman County requests that this ordinance still be applied to the current amendment request.

Sherman County Transportation System Plan (TSP)-update 2015

The Sherman County TSP was updated and finalized in October 2015. Rural Design standards for new roads are included in Section 7 starting on page 72 in the TSP. The document is not available electronically. However there is a DVD of the document available.

Conditions of Approval

We would also request that all previous conditions of approval in the original site certificate and previous amendments remain in the proposed amendment. This would include the condition regarding the minimum setback distance from turbines to public roadways of 110 % of maximum blade tip height. Please contact me at 541-565-3601 if you have any questions or need more information.

Attachment C: ~~[Reserved for Draft Proposed Order Comments]~~Comments on Draft Proposed Order

Comment Index:
Comments Received on Draft Proposed Order on
Request for Amendment 5 of the Golden Hills Wind Project Site Certificate

Commenter Name	Agency or Public	Date Received
Pouley, John	Agency: Oregon State Historic Preservation Office	7/19/18
Hartman, Heidi	Agency: Oregon Department of State Lands	7/19/18
Nauer, Christian	Tribal Government: Confederated Tribes of Warm Springs Reservation of Oregon	7/20/18
Johnson, Ian	Agency: Oregon State Historic Preservation Office	7/26/18
Ferman, Teara Farrow	Tribal Government: Confederated Tribes of Umatilla Indian Reservation	8/17/18
Caines, Jeff	Agency: Oregon Department of Aviation	8/21/18
Wang, Yumei	Agency: Oregon Department of Geology and Mineral Industries	8/21/18
Marlette, JoAnn	Public	8/23/18
Gilbert, Irene	Public/Friends of Grande Ronde Valley	8/23/18

ESTERSON Sarah * ODOE

From: POULEY John * OPRD
Sent: Thursday, July 19, 2018 11:15 AM
To: ESTERSON Sarah * ODOE
Subject: SHPO Case Nbr SHPO Case No.: 14-1150, Golden Hills Wind Project
Attachments: SHPO Response Letter Case Nbr SHPO Case No._ 14-1150.pdf

Please find the SHPO's response to your request for comment on cultural resources at the above-identified project. This attachment serves as your file copy. If you have any questions, please feel free to contact me.

John Pouley
Assistant State Archaeologist
Oregon SHPO
503-986-0675



Oregon
Kate Brown, Governor

Parks and Recreation Department

State Historic Preservation Office

725 Summer St NE Ste C

Salem, OR 97301-1266

Phone (503) 986-0690

Fax (503) 986-0793

www.oregonheritage.org



July 19, 2018

Ms. Sarah Esterson
OR Dept of Energy
550 Capitol St NE, 1st Flr
Salem, OR 97301

RE: SHPO Case No. 14-1150
Golden Hills Wind Project
Install of wind turbines
Multiple Legals, Sherman County

Dear Ms. Esterson:

Our office recently received your memorandum for the project referenced above, and concur the project will likely have no adverse effects to any other known archaeological sites. Additional archaeological research is not anticipated for this project. This letter refers to archaeological resources only. Comments pursuant to a review for above-ground historic resources will be sent separately.

Sincerely,

John Pouley, M.A., RPA
Assistant State Archaeologist
(503) 986-0675
john.pouley@oregon.gov



ESTERSON Sarah * ODOE

From: HARTMAN Heidi <heidi.m.hartman@state.or.us>
Sent: Thursday, July 19, 2018 4:04 PM
To: ESTERSON Sarah * ODOE
Cc: STEVENSON Christine
Subject: RE: Golden Hills Wind Project: Notice of Complete Request for Amendment 5 of the Site Certificate, Draft Proposed Order and Public Hearing - August 23, 2018 Comment Deadline

Hi Sarah,

If the proposed areas of expansion of temporary access roads were not covered in existing wetland delineations for this project, those areas will need to have a wetland delineation performed and sent into DSL for review and concurrence. If the expanded temporary access roads will impact waters of the state, a permit may be required if one isn't already. If one is already, then those impacts will need to be included in the permit application and potentially mitigated for.

Heidi Hartman

Aquatic Resource Coordinator
*Baker, Gilliam, Grant, Hood River, Jefferson, Morrow,
Sherman, Umatilla, Union, Wallowa, Wasco & Wheeler Counties*
[Oregon Department of State Lands](#)
1645 NE Forbes Road, Suite 112
Bend, OR 97701
Office: 541-388-6060 | Fax: 541-388-6480 | Cell: 541-419-7650

From: ESTERSON Sarah * ODOE <Sarah.Esterson@oregon.gov>
Sent: Monday, July 16, 2018 1:42 PM
Cc: cityofa@gorge.net; cityofcondon@jncable.com; dufurcity@ortelco.net; cityofgv@embarqmail.com; cityhall@cityofmaupin.org; moro@embarqmail.com; mosiercityhall@cityofmosier.com; rgassman@ci.the-dalles.or.us; wascocity@embarqmail.com; angieb@co.wasco.or.us; michelle.colby@co.gilliam.or.us; MINER Jason * GOV <Jason.MINER@oregon.gov>; SADHIR Ruchi * ODOE <Ruchi.Sadhir@oregon.gov>; BAILEY Mark <Mark.Bailey@state.or.us>; JONES Randy <Randy.Jones@state.or.us>; SVELUND Greg <Greg.SVELUND@state.or.us>; CROWELL Courtney * GOV <Courtney.CROWELL@oregon.gov>; NIGG Eric <Eric.Nigg@state.or.us>; DRUBACK Lissa <Lissa.DRUBACK@state.or.us>; DRUBACK Lissa <Lissa.DRUBACK@state.or.us>; Ramoz.Gina@deq.state.Or.US; fuller.brian@deq.state.or.us; OBRIEN Audrey <Audrey.OBRIEN@state.or.us>; anderson.david@deq.state.or.us; WANG Yumei * DGMI <Yumei.WANG@oregon.gov>; HALLYBURTON Rob <rob.hallyburton@state.or.us>; JININGS Jon <jon.jinings@state.or.us>; MURPHY Tim <timothy.murphy@state.or.us>; BROWN Lauren <Lauren.BROWN@state.or.us>; HARTMAN Heidi <Heidi.M.Hartman@dsl.state.or.us>; STEVENSON Christine <christine.stevenson@dsl.state.or.us>; BLEAKNEY Leann <lbleakney@nwcouncil.org>; HEFFNER Michael <michael.heffner@state.or.us>; CANE Jason <jason.cane@state.or.us>; currinr@science.oregonstate.edu; rmeinke@oda.state.or.us; JOHNSON Jim * ODA <jjohnson@oda.state.or.us>; jeff.caines@aviation.state.or.us; John.P.WILSON@aviation.state.or.us; GERMOND Jon P <Jon.p.Germond@state.or.us>; THOMPSON Jeremy L <Jeremy.L.Thompson@state.or.us>; REIF Sarah J <Sarah.J.Reif@state.or.us>; TOKARCZYK John A * ODF <John.A.TOKARCZYK@oregon.gov>; samwoolseyrents@gmail.com; TAYLOR Trevor * OPRD <Trevor.Taylor@oregon.gov>; BEALS Alice * OPRD <Alice.Beals@oregon.gov>; RETTMANN Mark <mark.rettmann@state.or.us>; SAUTER Jerry K * WRD

<Jerry.K.Sauter@oregon.gov>; amy.l.pfeiffer@odot.state.or.us; WOODS Maxwell * ODOE

<Maxwell.Woods@oregon.gov>

Subject: Golden Hills Wind Project: Notice of Complete Request for Amendment 5 of the Site Certificate, Draft Proposed Order and Public Hearing - August 23, 2018 Comment Deadline

Good afternoon,

On July 6, 2018 the Oregon Energy Facility Siting Council (Council) and the Oregon Department of Energy (Department) received a complete Request for Amendment 5 of the Golden Hills Wind Project site certificate (RFA5). On July 13, 2018, the Department issued its Draft Proposed Order presenting recommended findings of fact related to Council standards at OAR Chapter 345 Divisions 22-24.

Background

The Golden Hills Wind Project is an approved wind energy generation facility to be located in Sherman County. The facility has not yet been constructed, but has been previously approved by Council for construction and operation of up to 125 wind turbines, with a peak generating capacity of up to 400 megawatts of electricity.

Summary of the amendment request

RFA5 seeks Council approval to amend its site certificate to allow flexibility in its final facility design, including larger wind turbine types that would increase maximum turbine blade tip height from 518 to 650 feet; increase the maximum turbine hub height from 312 to 404 feet; reduce minimum aboveground blade tip clearance from 65 to 46 feet; increase the height of meteorological towers from 312 to 404 feet; allow for expansion of temporary access roads from 40 to 100 feet; and, remove subsection (e) from condition PRE-DC-01 (which restricts the maximum combined weight of metals contained within turbine towers).

Attachments

Public Notice on Request for Comments on the Complete RFA5 and Draft Proposed Order, and Notice on the Draft Proposed Order Public Hearing is attached for your reference.

RFA5, draft proposed order and public notice are available on the Department's project website at:

<http://www.oregon.gov/energy/facilities-safety/facilities/Pages/GHW.aspx>.

Comment Deadline

Written comments on RFA5 and the draft proposed order must be received by the Department **by the close of the August 23, 2018 public hearing**. Comments on the amendment request and the draft proposed order must be received by the Department **by the close of the August 23, 2018 public hearing, and must be submitted in writing by mail, email, hand-delivery or fax per below:**

Sarah Esterson, Senior Siting Analyst
Oregon Department of Energy
550 Capitol Street NE, 1st Floor
Salem, OR 97301
Email: sarah.estereson@oregon.gov
Fax: 503-373-7806

Thank you, and please do not hesitate to contact me with any questions.

Sarah

Sarah T. Esterson

Energy Facility Siting Analyst
Oregon Department of Energy
550 Capitol St NE, 1st Floor

ESTERSON Sarah * ODOE

From: Christian Nauer <christian.nauer@ctwsbnr.org>
Sent: Friday, July 20, 2018 3:28 PM
To: ESTERSON Sarah * ODOE
Cc: Robert Brunoe
Subject: Re: Golden Hills Wind Project: Notice of Complete Request for Amendment 5 of the Site Certificate, Draft Proposed Order and Public Hearing - August 23, 2018 Comment Deadline

Dear Sarah,

Thank you for the opportunity to comment on the Golden Hills Wind Project: Notice of Complete Request for Amendment 5 of the Site Certificate (Sherman County).

As the technical reviewer for Section 106 of the National Historic Preservation Act (NHPA), concerns are with potential impacts to historic properties that may be located within the Area of Potential Effects (APE) for the Project. The Project APE is within the territories and areas of concern of the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO).

If the redesign of the Project includes any changes to the APE, then additional identification, evaluation, and protection of historic properties or cultural resources may be necessary. Please keep us in the loop on this Project.

Please keep us in the loop as these Projects develop.

Thank you again for your consideration.

Christian Nauer, MS

Archaeologist
Confederated Tribes of the Warm Springs Reservation of Oregon
Branch of Natural Resources

PO Box C

Warm Springs, OR 97761

christian.nauer@ctwsbnr.org

Office Phone 541.553.2026

Cell 541.460.8448

*The Confederated Tribes of the Warm Springs Reservation of Oregon have reserved treaty rights in Ceded Lands, as well as Usual and Accustomed and Aboriginal Areas, as set forth through the Treaty with the Middle Tribes of Oregon, June 25, 1855.

*Please know that review by the Tribal Historic Preservation Office does not constitute Government-to-Government consultation. Please ensure that appropriate Government-to-Government consultation is made with the Confederated Tribes of the Warm Springs Tribal Council.

On Jul 16, 2018, at 1:51 PM, Robert Brunoe <robert.brunoe@ctwsbnr.org> wrote:



Oregon
Kate Brown, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St NE Ste C
Salem, OR 97301-1266
Phone (503) 986-0690
Fax (503) 986-0793
www.oregonheritage.org



July 26, 2018

Ms. Sarah Esterson
OR Dept of Energy
550 Capitol St NE, 1st Flr
Salem, OR 97301

RE: SHPO Case No. 14-1150
Golden Hills Wind Project
Install of wind turbines
Multiple Legals, Sherman County

Dear Ms. Esterson:

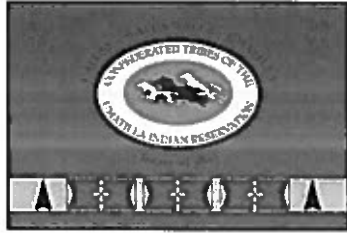
We have reviewed the additional materials provided by your agency on the project referenced above, which address our request for additional information sent on July 25, 2018. The Oregon SHPO agrees with the applicant's analysis in the preliminary Request for Amendment 5 that the increased height of the wind turbines will not adversely affect the National Register of Historic Places -listed DeMoss Springs Park or the identified segments of the Oregon National Historic Trail and Barlow Cutoff.

Please feel free to contact me if you have any questions, comments or need additional assistance.

Sincerely,

Ian P. Johnson, M.A.
Associate Deputy SHPO
(503) 986-0678
ian.johnson@oregon.gov





**Confederated Tribes *of the*
Umatilla Indian Reservation**
Department of Natural Resources
46411 Timine Way, Pendleton, Oregon 97801

MEMORANDUM

To: Sarah Esterson, Senior Siting Analyst
Oregon Department of Energy
Sent via email to: sarah.esterson@oregon.gov

From: Teara Farrow Ferman, Department of Natural Resources Interim Director *Teara Farrow Ferman*
Confederated Tribes of the Umatilla Indian Reservation
46411 Timine Way, Pendleton, OR 97801
TearaFarrowFerman@ctuir.org
541-276-3447

Date: August 17, 2018

RE: Confederated Tribes of the Umatilla Indian Reservation's Comments on the Golden Hills
Wind Project Complete Request for Amendment 5 and Draft Proposed Order

General Comments:

Thank you for contacting the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) regarding the Golden Hills Wind Project Complete Request for Amendment 5 and Draft Proposed Order. The CTUIR offers the following comments with the project.

Specific Comments:

Weed Control:

Noxious weeds continue to be a major concern with any ground disturbing activity. After review and having visited wind power generation sites in NE Oregon the amount of effort employed to eradicate noxious weed establishment and maintain weed free areas surrounding wind power sites is continually ignored and surrounding plant communities suffer. Plant communities that contribute to habitat and forage for large ungulates and other terrestrial species suffer in and around wind power sites. Please make it a priority to ensure that noxious weeds are adequately addressed and vegetation standards are established and complied with during the permitting process and throughout the life of the project.

Cumulative Impacts:

As more and more wind power projects come online the cumulative impacts from habitat loss are not being analyzed. Please ensure the permittee conduct an adequate analysis of the cumulative impacts of all wind power generation sites in the Columbian Basin.

Questions:

Please provide additional information so that impacts of the larger turbines proposed in this amendment may be assessed. The CTUIR respectfully requests answers to the following questions:

1. How different are the operating and performance characteristics of the larger turbines (e.g., how much more power will each turbine produce, what is the difference in the angular

velocity of the blade tips, difference in maximum wind rating, etc.)? Please be as specific as possible.

2. How different are the construction requirements (volume of ground displaced, anchor depth, etc.)?
3. What is the total mass of a larger turbine and how much greater is it than a smaller turbine?
4. What forces are exerted on the ground by the larger wind turbines during 1) stagnant wind conditions and 2) high wind events (wind velocity equal to turbine maximum wind rating)?



Oregon

Kate Brown, Governor



3040 25th Street, SE
Salem, OR 97302-1125
Phone: (503) 378-4880
Toll Free: (800) 874-0102
FAX: (503) 373-1688

August 20, 2018

Sarah Esterson
Energy Facility Siting Analyst
Oregon Department of Energy
550 Capitol St NE., 1st Floor
Salem, OR 97301

SUBJECT: Golden Hills Wind Project – Draft Proposed Order on Request for Amendment #5

The Oregon Department of Aviation (ODA) has reviewed the draft proposed order for the Request for Amendment #5 for the Golden Hills Wind Farm LLC application. After some internal discussion the ODA wishes to clarify its position on the project and has prepared the following comments that we request to be included in the Final Order, as prepared by the Oregon Department of Energy and adopted by the Energy Facility Siting Council (EFSC).

The current condition of approval PRE-PH-03 reads:

“Before beginning construction, the certificate holder shall submit to the FAA and the Oregon Department of Aviation (“ODA”) a Notice of Proposed Construction or Alteration identifying the proposed final locations of the turbines and related or supporting facilities and shall provide a copy of this notice to the Department. The certificate holder shall notify the Department of the FAA’s and ODA’s responses as soon as they have been received. [Final Order on ASC, Condition IV.I.7]”

ODA’s recommended change is as follows:

Prior to the commencement of construction the certificate holder shall submit to and receive back from the FAA and the Oregon Department of Aviation (“ODA”) in accordance with OAR 738-070-0060, a Notice of Proposed Construction or Alteration (FAA Form 7460-1) identifying the proposed final locations of the turbines and related or supporting facilities to determine if the structure(s) are a hazard to air navigation and aviation safety. The certificate holder shall provide a copy of this notice as well as all responses from the FAA and the ODA to the Department. In addition, the certificate holder shall submit to the ODA and the department all proposed mitigation options related to any affirmative hazard determination. The ODA retains its right to disagree with the FAA on their determination in accordance with OAR 738-070-0230 and may require or recommend mitigation measures for aviation safety. The obstruction evaluations for both the FAA and the ODA

are only good for 18 months. The site certificate holder shall keep up-to-date obstruction evaluations on file with timeframes commensurate with construction timelines.

In addition, it should be noted that in a detail review of the submitted material, Section 3.3 Table 1. Turbine Comparison, identified a change in the approved versus proposed changes.

Table 1. Turbine Comparison

Turbine Specification	Approved	Proposed
Maximum Hub Height	95 meters	123 meters
Maximum Blade Tip Height	158 meters	198 meters
Minimum Blade Tip Clearance	19.8 meters	14 meters

In accordance with ORS 836.530, the Department has adopted rules for Physical Hazards to Air Navigation (OAR 738-070). Specifically OAR 738-070-0110(1)(a) identifies any future object would be an obstruction to air navigation if it is over 500 feet above ground level at the site of the object. As stated above, the REVISED figures show the turbines above 500 feet. As a result by rule, these objects are automatically classified as “Obstructions”.

In keeping with the proposed changes to the condition of approval, to determine if these proposed turbines constitute a hazard while being consistent with Federal Aviation Administrative Advisory Circulars (FAA – AC 70/7461-1L – Obstruction Marking and Lighting) ODA recommends an airspace study and analysis of the overall project. This study would incorporate any potential impact to airport operations in and around Wasco State Airport as well as aircraft flying in proximity to the study area.

If the study determines the wind turbines not to be a hazard to air navigation, the project will still have to be marked and light in accordance with FAA AC 70/7461-1L.

Finally, ODA requests that all other current and updated ODA and FAA rules, standards and regulation are met at the time of the aeronautical study and that FAA form 7460-1 are submitted prior to construction of the project. This is important to state that Wasco State Airport is under Federal grant assurances and obligations, specifically:

Grant Assurance #20 Hazard Removal and Mitigation. The (airport sponsor) will take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards.

Grant Assurance # 21 – Compatible Land Use The (airport sponsor) will take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. In addition, if the project is for noise

compatibility program implementation, it will not cause or permit any change in land use, within its jurisdiction, that will reduce its compatibility, with respect to the airport, of the noise compatibility program measures upon which Federal funds have been expended.

**Please note that ODA and FAA rules, standards and regulations may have changed since the Final Order was issued on May 15, 2009.

Thank you for allowing ODA to comment on this proposed amendment(s) for the Golden Hills Wind Project. Feel free to contact me at (503) 378-2340 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeff Caines', with a stylized flourish at the end.

Jeff Caines, AICP

Land Use Planner

Oregon Department of Aviation

ESTERSON Sarah * ODOE

Subject: FW: YW to SE RE: Golden Hills Wind Project, Request for Amendment 5 - Additional Information for Review

From: WANG Yumei * DGMI

Sent: Tuesday, August 21, 2018 10:06 AM

To: ESTERSON Sarah * ODOE <Sarah.Esterson@oregon.gov>

Cc: WANG Yumei * DGMI <Yumei.WANG@oregon.gov>

Subject: RE: YW to SE RE: Golden Hills Wind Project, Request for Amendment 5 - Additional Information for Review

Sarah, Based on our conversation this morning, here is a revision.

DOGAMI has proposed condition changes that are intended to clarify pre-construction requirements to ensure that the evaluation and facility design are based on current rules and regulations.

GEN-SS-01: The certificate holder shall design and construct the facility, **including all components**, in accordance with requirements set forth by the **current** State's Building Code Division and any other applicable codes and design procedures, **such as the National Electric Safety Code (NESC)**. Prior to operation, the certificate holder shall provide confirmation to the Department that facility design and construction satisfies the requirements set forth by the State's Building Code Division and any other applicable codes and design procedures. **As part of the confirmation, codes and design procedures used should be presented in a clear, informative manner.** In 2019, it is likely that the Oregon Building Code Division will adopt new codes, and the certificate holder should anticipate this possible update in their proposed analyses and designs.

PRE-SS-01: Prior to construction, the certificate holder shall:

- (a) Submit a **draft** site-specific geotechnical investigation report to the Department and **DOGAMI** for review. The investigation and report shall conform to the Oregon State Board of Geologist Examiners guidelines titled "Guidelines for Engineering Geologic Reports (2014)" and "~~Guidelines for Site-Specific Seismic Hazard Reports for Essential and Hazardous Facilities and Major and Special-Occupancy Structures in Oregon.~~" available at: https://www.oregon.gov/osbge/Documents/engineeringgeologicreports_5.2014.pdf. The site-specific geotechnical investigation **shall include site-specific probabilistic seismic hazards analyses including Quaternary faults, landslide hazards evaluation, and non-seismic hazards evaluations, and shall include design and construction recommendations to meet public safety for the anticipated lifespan of the facility. Site-specific landslide hazards should be evaluated using lidar as base map data. As part of this work, all relevant codes, standards, and guidelines should be met and clearly documented, all analyses and design assumptions should be explained, and relevant data should be provided. Any geotechnical work that is planned for the future should be fully described.**
- (b) Submit information on ways to improve disaster resilience to lessen negative impacts to human safety to the Department and DOGAMI for review. As examples, this may include installing emergency generators and developing post-disaster recovery plans to ensure a quick restoration of power.
- (c) Submit information on future climate conditions that may impact human safety to the Department and DOGAMI for review. This may include the risk for future flooding, dust storms and wildfires.
- (d) The Department shall review and concur with the report, in consultation with DOGAMI, prior to construction.

PRE-SS-02: The certificate holder shall design, engineer and construct the facility to avoid dangers to human safety presented by non-seismic hazards. As used in this condition, "non-seismic hazards" include settlement, landslides, flooding and erosion.

PRE-SS-03: The certificate holder shall ensure that wind turbine corridors and major structures are constructed with sufficient setbacks from all steeper slopes to minimize the potential for **hazards**, creating unstable or marginally stable conditions.

ESTERSON Sarah * ODOE

From: Gary Marlette <garymarlette@yahoo.com>
Sent: Thursday, August 23, 2018 2:48 PM
To: ESTERSON Sarah * ODOE
Subject: Golden Hills Amendment 5

To: Sarah Esterson, Senior Siting Analyst

August 23, 2018

From: JoAnn Marlette

Golden Hills Amendment 5 should not be approved. This amendment is asking that Oregon be the experiment for building the tallest wind turbines in the United States. There is no way that the impacts of these turbines can be predicted and our state cannot afford to have additional damages in support of wind developments to produce energy that this state has no need for. The Oregon Department of Energy has, on an ongoing basis, ignored the damages to people and resources of this state in support of industrial wind and solar. This development is another example of that.

The setbacks from bordering private property and publicly used roads are not large enough to protect property, people, animals and pets from ice or other objects flung off the turbines. The increase in height of these turbines means objects will fly farther than in the case of any wind turbines ever built in Oregon, and yet the Oregon Department of Energy is planning to allow them to be placed in locations that are in the impact area for objects. The document, "A method for defining wind turbine setback standards" by Jonathan Rogers, Nathan Slegers and Mark Costello, Wind Energy 2012; 15:289-303, should be used to identify a safe setback distance. The Oregon Statutes and your rules: OAR 345-022-0040 state that you are supposed to show that the wind development will not compromise the safety and health of the public. This proposed site certificate does not meet that standard.

The Deschutes River and the Columbia Gorge Scenic Area are supposed to be protected areas that are designated by the US Government. Approval of wind turbines of this height will seriously damage the public views and value of these important rivers. Protected areas such as these are not to have the views destroyed even further by more wind developments creating even more damages. The Oregon Department of Energy can require that turbines not be placed in areas that can be seen in the daytime as well as lights damaging the nighttime views. The site certificate needs to require this change. OAR 345-022-0040 is not being followed in this proposed site certificate due to the serious damages that will be inflicted on these protected areas.

I urge you to make these changes rather than cause irreparable damages to important resources of the state.

Respectfully submitted,

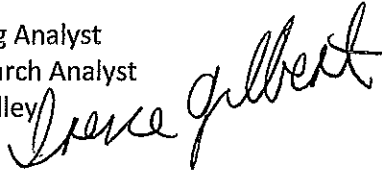
JoAnn Marlette

2031 Court Street #8

Baker City, OR 97814

Phone: 541-523-5851

To: Sarah Esterson, Senior Siting Analyst
From: Irene Gilbert, Legal Research Analyst
Friends of the Grande Ronde Valley
2310 Adams Ave.
La Grande, Oregon 97850



August 23, 2018

Comment regarding Golden Hills Wind Project, Amendment 5

This request should not be processed as an amended site certificate.

- Original Site Certificate is nearly 10 years old and some of the information is even older.
- The Amendment changes along with prior amendments have resulted in a development which is entirely different than the originally sited development and yet there are multiple references to prior decisions and use of site certificate conditions that were implemented as a result of needs identified for the prior development.
 - Originally the development was to include 420 foot turbines, now they are being planned for 650 feet.
 - Originally roads were to be 20 feet wide, now they may be up to 100 feet wide.
 - Originally there was a limit on the weight of the turbines, now that is to be exceeded.
- ODOE should not be using the amendment process to make major changes in a site certificate such as this, and the information and process should be the same as a new site certificate, as this is a completely different development than the one originally sited.
- ODOE should not be making a pre-determination that certain sections of the rules are not applicable. This change provides for a review of all eligibility factors, and the Department may not make a predetermination that portions of the rules do not apply. The changes to the amendment rules already limit the rules that can be contested beyond what many of us believe is legal, and this issue is currently being included in the appeal of these rules which is before the Oregon Court of Appeals. Further restrictions absent a change in the statutes appears to be nothing more than a power play on the part of the Department of Energy. For example, the increased weight of these turbines will necessitate heavier cranes and equipment which will increase soil compaction. Comments related to an issue such as that would be appropriate and should be considered.

I am making the following comments regarding changes and concerns with the current analysis of the Amendment Request Number 5:

1. *Per OAR 345-022-0030(3), the facility must comply with local government's acknowledged comprehensive plan and land use ordinances that are in effect on the date the applicant submits the application.* The site certificate needs to include the requirement in Sherman County Ordinance #39-2007 requiring wind energy facilities be located at least one mile from

incorporated cities. The prior exclusion of this requirement is no longer valid for the following reasons:

- A judge absent any formal court decision is not authorized to make legal determinations as was done in this case.
- The statute regarding a "goalpost law" no longer exist and has been deleted from the statutes.
- It is clear from reading the court decisions when this law was in effect that it was intended to preclude counties from changing the land use laws after an application had been filed. It did not apply when future changes occurred as apparently was believed by those referencing this law.
- Land Use Plans are to be reviewed based upon the language effective the date the application is filed.

A condition needs to be included in the site certificate indicating the prior decision to exempt this development from the local rule no longer applies.

2. The developer must be required to do pre-construction documentation of wells on non-participating landowner's property adjacent to the wind development. The wells need to be monitored during construction and operation of the wind development to assure the development has not resulted in changes including reduced capacity, sedimentation or toxic substances in the water in the area of the wind development and monitor wells during construction and operation.

ORS 469.501(g) and (k) relate to the need to provide safe water. Also, OAR 345-022-0110(1) states that there needs to be a determination that the construction and operation of the development is not likely to result in significant impacts to water.

There are no developments in Oregon which exceed 600 feet and very few in the United States and there are indications that the weight and vibrations caused by wind developments may impact wells. As a result, the Oregon Department of Energy and Energy Facility Siting Council cannot make a determination that the construction and operation of the development is not likely to result in significant impacts to water. Mitigation of the potential for impacts needs to occur through testing and monitoring of wells to assure safe drinking water is available to non-participant owners of property adjacent to the development. It also appears that developments which negatively impact wells would be out of compliance with the Ground Water Act.

--It has been documented that there is reason to believe that wind developments can affect wells.

--The site certificate process is to include conditions to provide for the safety and health of the public who may be negatively impacted by the development. The references are from multiple locations, multiple sources and multiple years. They provide adequate documentation that it is prudent to monitor impacts of this development due to the fact that it far exceeds the weight and resulting impacts on the transfer of water beneath the ground than any previous development.

Document attached shows impacts which may occur and which have been identified for multiple years:

"Wind Energy Impacts on Groundwater Resources" from the Wind Energy Siting Handbook, American Wind Energy Association.

"Wind turbines impact on groundwater to be discussed", Public Meeting planned August 10,

2016.

"Turbines have Negative Impact on our Drinking Water", published by GLBR SOS on March 27, 2018.

3. *The development poses a risk to private and commercial aircraft as it exceeds the 500 foot no fly zone.* It also poses a risk to Wasco Airport as indicated in previous comments submitted by the public. The developer needs to obtain documentation that the development will not increase the risk to airplanes flying in the area prior to the start of construction. Small planes are required to stay above 500 feet to avoid hazards. In this case, the developer is planning to construct turbines that will exceed the level at which planes, regardless of the types of navigational equipment they are using, or not using, and regardless of whether they are flying in daylight or darkness can expect there to be no objects that would result in a collision.

4. *The setbacks from roads and structures are not adequate to provide for the health and safety of the public as required by OAR 345-024-0010.* The risk from detached objects or ice being thrown from the turbines is real, and weather conditions in the winter in the area of the proposed development frequently result in icy conditions as evidenced by weather warnings related to highway hazards as well as the applicant's description of the site included in their Amendment Application. In addition, you will find attached a copy of "Analysis of throw distances of detached objects from horizontal-axis wind turbines" by Sarthatlak, Hamid; and Sorensen, Jens. This scientific paper published in **Fluid Mechanics, Department of Wind Energy**; Technical University of Denmark, Lygby, Denmark and also **Wind Energy**, 2016, (location found at bottom of article attached) gives a very thorough analysis of the aerodynamics of objects flying from wind turbines. Ice throw is identified as moving a distance of 100 to 600 meters(1968 feet). Since this is the most likely object to be thrown, a distance in the middle range of the distances reported, or 1,000 feet would be reasonable to reduce and mitigate the potential of harming people or animals. Given the reduced number of turbines at this location, this is a reasonable request to provide for the health and safety of the public.

5. *Documentation regarding impacts to the Columbia River Gorge is not adequate or relevant to a determination that the currently proposed turbines will not have a significant impact on this protected site.* Comments referenced from 2007 when the proposed turbines were to be 420 feet high, not 650 feet high, have no relevance to the currently proposed turbines. The applicant's argument that because there are already some encroachments on the protected area, it is justified to add additional ones is not justified absent a full evaluation of the cumulative impacts of the existing impacts and how those will be impacted by any additional visual intrusions. OAR 345-022-0040 requires that there not be significant adverse impacts to the areas listed in this section which includes specifically the Columbia River Gorge National Scenic Area. The primary value for which this area is protected is it's views, therefore, even a minimal negative impact should not be determined to be insignificant. As the designated management groups responsible for the Gorge, the US. Forest Service and The Gorge Commission should be contacted as special advisory groups regarding whether the impacts of this change in the visibility of turbines should be considered significant. Not only will the views be impacted during the day, but the blinking lights at night also pose a negative visual feature to this protected area during the nighttime hours. I travel through this area frequently, and each time I find the impacts of the turbines immediately outside the protected area to be

incredibly offensive to my perception of a quality viewscape. I have often heard others comment with similar thoughts. The proposed turbines will be approximately 450 feet taller than the transmission lines roadways, etc. that the developer states already impact the views. I do not believe these visual impacts can be compared to that of 650 foot wind generators.

6. The survey areas are not adequate to include all impacts.

Particularly troubling is the limitation to just the footprint of laydown areas, new substations and mitigation areas and existing roads. I can also find no indication that surveys will be performed on the transmission lines connecting this development to the grid, or the connecting corridors between turbine strings. Construction cannot be completed in areas which are not included in surveys, so I am not sure why a developer would want to exclude these areas from surveys. The survey boundaries need to be at least as wide as the required setbacks for protection of wildlife at the site and must include all land, such as wetland being impacted by the development action either permanently or temporarily as well as direct and indirect impacts to wildlife. OAR 345-022-060, OAR 345-022-070 and OAR 345-021-0010 all require the information regarding impacts which extend beyond the bases of structures or the actual road beds and to include the area of indirect impacts.

7. Impacts to birds and bats must continue to be monitored through the duration of the life of this project. This is the first time a turbine of this size has been allowed in Oregon, and they are rare in the country, thus there is very little information available which documents the impacts that they will have. The applicant has provided documentation that states that there are differing projections regarding wildlife impacts of these new turbines. It is unavoidable that this development will have direct impacts on birds and bats including threatened and endangered species. Oregon resources are being exposed to what amounts to an experiment by allowing the development of turbines of this height and weight. There is no time when the need for OAR 469.507 which requires the monitoring of environmental and ecological effects of construction and operation of energy facilities will be more apparent. The wildlife surveys and fatality monitoring needs to continue through the life of the project if this amendment request is approved. The developer would lead you to believe that increasing the circumference of the turbine blades is a small change in impacts. This is simply not accurate. It is not a simple 1:1 increase. For example, the original site certificate for this development was for turbine blades that were to span approximately 355 feet. This amendment calls for blades that will span approximately 605 feet. The area that blades 355 feet across covers would be 2.27 acres. Increasing the span of the blades to 605 feet means the blades will cover an area of 6.60 acres. Increasing the diameter of the blades by 250 feet results in the area of the rotor sweep being 3 times as large. For the impacts to birds and bats to be similar or less than the originally proposed turbines, this development would have to reduce the number of turbines to 1/3 the original number. This alone should result in a denial of this amendment request as the wildlife impacts are unsustainable given the fact that turbines do not discriminate regarding the status of birds and bats that are Threatened or Endangered.

8. The determination of appropriate bond amount to support restoration of the project area once the development is removed must include the cost of removal, preparation, transporting and disposal of the turbine blades, and concrete. The applicant has failed to provide this

information which makes it impossible to make the determination required by OAR 345-022-0050 regarding the costs of decommissioning. Much of the material in turbines is not currently recyclable, and thus will no doubt be taken to a public dump. In addition, the actual weight of the supporting structures and other components will impact these costs. With the changes which mean that China will no longer take our garbage, the assessment of available locations may change, also, the cost of disposal is likely to rise significantly. The alternative of recycling the turbine blades is prohibitive in terms of cost and creates environmental hazards due to the materials in the blades that must be broken down in order to recycle them.

9. The comments from the tribes included in the agency comments state that those contacted did not object to the development. They also clearly stated that they were not speaking for the tribe, and that the Department of Energy needed to contact the Tribal Council as the appropriate government to government group to speak. That has not been done. Prior to issuing a site certificate, the Oregon Department of Energy and Energy Facility Siting Council need to take the action necessary as opposed to referencing the statement that was received as meeting the requirement that they request input from impacted tribes.

While there are multiple other concerns with the failure of this development to meet the standards in order to approve a site certificate, it is apparent from reading the draft material on the ODOE website that the decision has already been made to allow this action to occur and to determine that the multitude of impacts are all "not significant". I will not spend further time outlining issues, however, this development should not be issued an amended site certificate.

Please provide these comments in their entirety in the decision regarding this development. Comments that are paraphrased often do not reflect the same message as peoples words, and when taken out of context can fail to communicate important information as was the case with the document froms the tribes impacted by this action.

RESEARCH ARTICLE

Analysis of throw distances of detached objects from horizontal-axis wind turbines

Hamid Sarlak and Jens N. Sørensen

Section of Fluid Mechanics, Department of Wind Energy, Technical University of Denmark, DK-2800 Lyngby, Denmark

ABSTRACT

This paper aims at predicting trajectories of the detached fragments from wind turbines, in order to better quantify consequences of wind turbine failures. The trajectories of thrown objects are attained using the solution to equations of motion and rotation, with the external loads and moments obtained using blade element approach. We have extended an earlier work by taking into account dynamic stall and wind variations due to shear, and investigated different scenarios of throw including throw of the entire or a part of blade, as well as throw of accumulated ice on the blade. Trajectories are simulated for modern wind turbines ranging in size from 2 to 20 MW using upscaling laws. Extensive parametric analyses are performed against initial release angle, tip speed ratio, detachment geometry, and blade pitch setting. It is found that, while at tip speeds of about 70 m/s (normal operating conditions), pieces of blade (with weights in the range of approximately 7–16 ton) would be thrown out less than 700 m for the entire range of wind turbines, and turbines operating at the extreme tip speed of 150 m/s may be subject to blade throw of up to 2 km from the turbine. For the ice throw cases, maximum distances of approximately 100 and 600 m are obtained for standstill and normal operating conditions of the wind turbine, respectively, with the ice pieces weighting from 0.4 to 6.5 kg. The simulations can be useful for revision of wind turbine setback standards, especially when combined with risk assessment studies. Copyright © 2015 John Wiley & Sons, Ltd.

KEYWORDS

wind turbine accidents; blade element theory; blade detachment; ice throw; aerodynamic model; HAWT

Correspondence

H. Sarlak, Section of Fluid Mechanics, Department of Wind Energy, Technical University of Denmark, DK-2800 Lyngby, Denmark.
E-mail: hsar@dtu.dk

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1. INTRODUCTION

The ever-growing number of wind turbines installed near inhabited areas, buildings and community facilities, such as bridges, power installations or highways, has resulted in an increasing concern by authorities to determine risk levels associated with wind turbine blade failure. From a safety point of view, the most serious failure is associated with splintering of rotor blades and detachment of debris, which could be thrown over long distances and damage people or property. Ice-throw from wind turbines installed in cold climate is also of high concern, especially for wind turbines erected near highways where the ice pieces thrown from a wind turbine may strike a passing car, which in the worst case may cause a fatal accident.

Various types of hazards regarding operation of wind turbines have recently been reported by Durstwitz and the Caithness Windfarm Information Forum.^{2,3} According to a recent survey by the Caithness Windfarm Information Forum, blade failures resulting in either whole blades or pieces of blades being thrown from the turbine are the most important causes of turbine accidents.³ A comparative graph showing the growth of wind turbine accidents over the past four decades is shown in Figure 1, where the share of blade accidents and accidents due to fire, which may eventually cause throw of fire patches, are also presented. Due to such accident data, energy authorities all over the world have tried to enforce safety distances around wind turbines and wind farms. The safety distance is a distance within which it is not allowed to build human structures such as buildings and roads. Shown in Table I is an example of the safety distance standards defined by different authorities. It can be seen from the table the values of offset safety distances fall within an extensive range of

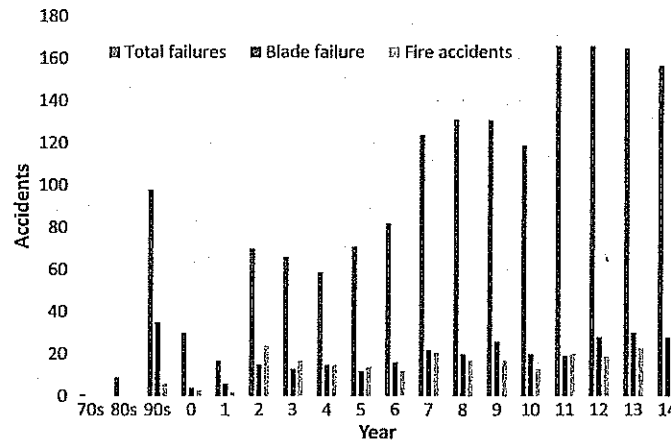


Figure 1. Comparison of wind turbine accidents and particularly blade failure data in a period from 1970s until 2014 (data taken from Caithness Windfarms³).

Table I. Safety distances of wind turbines from human structures as practiced in different regions of the world.¹⁷

Authority/source	Safety distance [m] (ft)
France	1609 (5280)
Germany	1609 (5280)
Rural Manitoba, Canada (1981)	(8500)
US National Research Council	762 (2500)
IL, USA	457 (1500)
Riverside County, CA, USA	3218 (10560)
MI, USA	304 (1000)

scales between 3.2km and 300m, and that the setback standards are not even similar in different regions of the same country. To standardize such safety guidelines, it is useful to employ mathematical models of the throw in various conditions and risk assessment tools to associate the probability of failure in each particular setting.

Motions of solid particles in fluids were first addressed analytically by Kirchhoff.⁴ He showed that the equations of motion for a solid body in an ideal fluid reduce to a set of ordinary differential equations (ODE) based on Euler's equations. Further experimental investigations on falling objects revealed, despite originating from Euler's equations, various states of chaotic motion. It was also mathematically shown that Kirchhoff's equations had been prone to yield chaotic solutions [5]. Tanabe *et al.*⁶ developed a set of two-dimensional equations of motion (including rotation) based on simple mechanics in which plates of zero thickness were subject to lift, friction and gravity forces. Based on those assumptions, they found five different falling patterns, ranging from a periodic movement to chaotic random motions depending on the density ratio between the solid and the surrounding fluid and on the length of the object. Pesavento and Wang⁷ and Andersen *et al.*⁸ performed more detailed studies to determine the motion of a falling two-dimensional elliptic object using direct numerical simulation of the Navier–Stokes equations. They took added mass and added moment of inertia into account and analyzed the transient motion and local jumps of the falling object thoroughly.

Due to complications in a real-life blade accidents (erratic motions, high Reynolds numbers, complex geometries etc.), the fundamental studies mentioned above could only partially help understanding the physics of wind turbine blade throw patterns. To cope with the wind turbine problems, simplified approaches were used. Macqueen *et al.*,⁹ for instance, studied the problem of blade-throw from wind turbines, using classical ballistics and also assumption of constant lift and drag. A lift coefficient of $Cl = 0.8$ and a drag coefficient of $Cd = 0.4$ were used for the gliding simulations, with $Cl = 0.0$ and $Cd = 1.0$ for the tumbling motion. However, the probability that gliding would occur was deemed very small. Their maximum throw studies using simple ballistic analysis, that is, by neglecting aerodynamic forces, showed that in the extreme throw velocity of approximately 310m/s, the maximum throw length reaches 10km.

One of the first detailed studies on the aerodynamics of a detached wind turbine blade was performed by Sørensen¹ using a blade element approach. In this approach, the detached blade is divided into a number of sections and the aerodynamic loads are determined for each section. The total external aerodynamic load on the whole blade would then be determined as the summation of the individual forces on each section.

Recently, Rogers *et al.*¹⁰ used a dynamic model employing quaternions instead of Euler angles and rotation vectors to form the orientation matrix and performed Monte Carlo simulations of a large set of initial conditions in order to obtain a range of the throw distances.

Ice throw has also been investigated, especially for the turbines erected in the cold climate. Seifert *et al.* measured ice-throw accidents together with a simple aerodynamic model and performed risk analysis of the ice fragments thrown from the blades.¹¹ Recently, a model of ice throw for a wind turbine in operation was presented by Biswas *et al.*,¹² in which calculations were carried out for ice pieces by neglecting lift and using a fixed drag coefficient of $C_d = 1.0$. It was also estimated that including the highest possible, lift increases the throw distance by approximately a factor of two.

The problem of blade/ice throw has also been investigated through the window of probabilistic methods. Such methods deal with risk levels and probabilities that a certain throw distance will occur. Such studies are typically performed together with a dynamic model for calculating the throw distances. Macqueen *et al.*,⁹ Morgan,¹³ Morgan and Bossanyi¹⁴ and Rogers *et al.*¹⁰ carried out risk analyses of ice throw to determine safety guidelines for wind developments in ice-prone areas. Sørensen¹⁵ proposed a statistical model that determines risk levels of debris hitting people. Similarly, Carbone and Afferrante¹⁶ performed a combined probabilistic and dynamic analyses to quantify hazards due to the blade throw.

In the present work, detailed aerodynamic analysis are performed for simulating flying debris. The cases include blade throw in which the blade together with its components is thrown, a case in which only a shell laminate is thrown and a case involving detachment of ice fragments. The governing equations of motion form a set of 18 ODEs responsible for the six degree-of-freedom motion. The resulting system of discretized equations are solved using an ordinary time integration method. Throw distances for four different turbine sizes ranging from 2.3 to 20 MW are compared, by employing simple upscaling rules. The computations are carried out for different wind and tip speeds.

2. MATHEMATICAL MODELING

The equations of motion for a detached blade include equations of translation and equations of rotation. These are obtained using Newton's second law and Euler's equations of motion, with the aerodynamic forces obtained from tabulated airfoil data. To be able to quantify the rotational motion of the detached blade, the moments of inertia around the rotation axes are calculated. This, however, cannot be calculated in a fixed coordinate system (i.e., an inertial system) since both the moments of inertia and the rotational speeds are varying and a solution would become very complicated. Instead, the equations are computed around the body-fixed principal axis, and the obtained values are subsequently transformed to the global (inertial) coordinate system to represent the absolute location and orientations. Two coordinate systems are defined here: a global coordinate system $x = (x, y, z)$ with the origin on the tower basement and orthonormal right-handed unit vectors $(\vec{i}, \vec{j}, \vec{k})$, with the y -axis in the wind direction and the z -axis in the upward direction. A body-fixed coordinate system $b = (x_b, y_b, z_b)$ is defined by an orthonormal right-handed unit vector $(\vec{r}_1, \vec{r}_2, \vec{r}_3)$, with the origin located at the center of gravity of the detached blade fragment and the third axis parallel to the length axis of the blade (Figure 2).

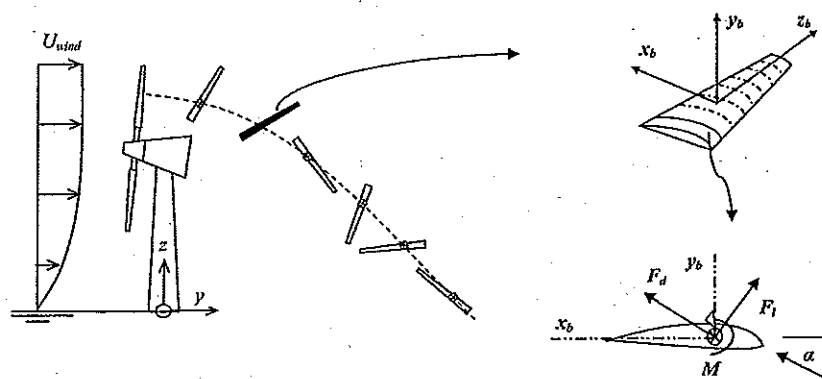


Figure 2. Sketch of the problem and definition of coordinate systems.

The orientation of the detached part is determined through a matrix \mathbf{R} , which gives the transformation from global coordinates to the body-fixed coordinates

$$\begin{bmatrix} \vec{r}_1 \\ \vec{r}_2 \\ \vec{r}_3 \end{bmatrix} = [\mathbf{R}] \begin{bmatrix} \vec{i} \\ \vec{j} \\ \vec{k} \end{bmatrix} = \begin{bmatrix} r_{11} & r_{12} & r_{13} \\ r_{21} & r_{22} & r_{23} \\ r_{31} & r_{32} & r_{33} \end{bmatrix} \begin{bmatrix} \vec{i} \\ \vec{j} \\ \vec{k} \end{bmatrix} \text{ and similarly, } \begin{bmatrix} \vec{i} \\ \vec{j} \\ \vec{k} \end{bmatrix} = [\mathbf{R}^{-1}] \begin{bmatrix} \vec{r}_1 \\ \vec{r}_2 \\ \vec{r}_3 \end{bmatrix} \quad (1)$$

Equation (1) holds for transformation of any variable between the two coordinate systems. This way of defining a vectorized rotation matrix (as opposed to Euler's scalar angles) ensures uniqueness of orientation angles and avoids the problem known as gimbal lock.

The full six degree-of-freedom motion is governed by Newton's second law of motion and Euler's equations of motion:

$$m\ddot{\mathbf{x}}_g = \mathbf{F} + m\mathbf{g} \quad (2)$$

$$\mathbf{I}\dot{\boldsymbol{\omega}}_b = \boldsymbol{\omega}_b \times (\mathbf{I}\boldsymbol{\omega}_b) = \mathbf{M} \quad (3)$$

where m is the mass of the blade, \mathbf{x}_g is the position vector of the center of gravity, \mathbf{F} is the aerodynamic force acting on the center of gravity, \mathbf{g} is the gravitational acceleration, \mathbf{I} is the moment of inertia tensor, $\boldsymbol{\omega}$ is the angular velocity in the rotating frame of reference, \mathbf{M} is the aerodynamic force acting along the principal axis of the moment of inertia tensor and (\cdot) denotes differentiation with respect to time. To close the system, the following relationship between the motion of the unit vectors of the body (the blade fragment) and the angular velocity is used:

$$\dot{\mathbf{r}} = \boldsymbol{\omega} \times \mathbf{r} \quad (4)$$

where $\boldsymbol{\omega}$ is the angular velocity of the blade fragment in the inertial coordinate system, which by equation (1) is transformed into the local body-fixed coordinate system. The total set of equations are solved using a fourth-order Runge-Kutta-Nystrom or a third-order Adams-Bashforth method. For more information about the mathematical and numerical treatment of the equations, readers are referred to the early work of Sørensen.¹

2.1. Aerodynamic modeling

For the solution of the system of ODEs, a blade element approach is employed in which each blade is divided into n sections along the span. In each section, the external forces and moments are calculated from airfoil data based on the local wind speed and relative velocities.

The three-dimensional edge effects are to some extent considered through the finite aspect ratio assumption of the blade, and the aerodynamic coefficients of lift and drag are calculated for all angles of attack based on flat-plate theory. The induced velocities are, however, neglected, and the Reynolds-number dependence of the airfoil data is disregarded. Once the aerodynamic coefficients are found, the lift, drag and moments on the blade fragment are computed as

$$L_i = \frac{1}{2}\rho v_i^2 A_i C_{L_i}, \quad D_i = \frac{1}{2}\rho v_i^2 A_i C_{D_i} \quad (5)$$

where L_i and D_i are lift and drag forces on the i -th section, ρ is the air density, v_i is the local relative airspeed, $A_i = c_i \Delta r_i$ is the local planform area where c_i and Δr_i are the local chord and the section lengths, and C_{L_i} and C_{D_i} are the sectional lift and drag coefficients at the desired angle of attack.

The static forces aerodynamic coefficients of the airfoil only depend on the angle of attack. Unsteady effects at high angles of attack are included by using the dynamic stall model of Øye.¹⁸ In this model, the dynamic lift coefficient is obtained by interpolating between the lift coefficient of an airfoil in a fully attached flow and a lift coefficient of the airfoil when the flow around the airfoil is fully separated, i.e.,

$$C_{l,dyn} = f_s C_{l,inv}(\alpha) + (1 - f_s) C_{l,fs}(\alpha) \quad (6)$$

where $C_{l,inv}$ is the lift coefficient for a fully attached flow (i.e., inviscid flow assumption) and $C_{l,fs}$ is the lift coefficient for fully separated flow. The stall-changing rate is defined as

$$\frac{df_s}{dt} = \frac{f_s^{st} - f_s}{\tau} \quad (7)$$

where f_s is the time-dependent separation function, which can be thought of as the unsteady weighting function between the fully attached and the fully separated flow. f_s^{st} is a function of airfoil section,

$$f_s^{st}(\alpha) = \frac{C_{l,st}(\alpha) - C_{l,fs}(\alpha)}{C_{l,inv}(\alpha) - C_{l,fs}(\alpha)} \quad (8)$$

and τ is an empirically determined time constant giving the time lag between the dynamic value of f_s and its static value. It follows from equation (7) that

$$f_s(t + \Delta t) = f_s^{st} + (f_s(t) - f_s^{st}) \exp\left(\frac{-\Delta t}{\tau}\right) \quad (9)$$

2.2. The atmospheric boundary layer effects

The inlet wind is included as a velocity profile corresponding to the Atmospheric Boundary Layer (ABL). As a result, in addition to simulating uniform inflow,¹ it is possible to simulate throw distances for blades thrown in wind fields following a power or logarithmic law, depending on the specific site information. The ABL wind profile as a function of height and atmospheric conditions reads

$$u_z = \frac{u_*}{\kappa} \left[\ln\left(\frac{z}{z_0}\right) + \psi(z, z_0, L) \right] \quad (10)$$

where u_* is the friction velocity, κ is the von Karman constant (~ 0.41), z_0 is the roughness length, ψ is a function of atmospheric stability and L is the Monin–Obukhov stability parameter (see Wyngaard¹⁹ for more details).

If no data are available in a specific site, and neutral ABL is assumed, a power law $u(z) = u_{hub}(z/z_{hub})^\alpha$, $\alpha \sim 0.14$ will be used for the wind velocity at different heights having the wind velocity at hub height as an input. The power-law method is used for the parametric studies in this paper.

Using the mentioned wind profile and denoting the local position vector of a point p on the wing as \vec{r}_{pb} , the local relative wind velocity \vec{u}_{pb} , as seen by the blade fragment, is given as

$$\vec{u}_{pb} = [\mathbf{R}] \cdot (\vec{u}_{wind} - \vec{u}_g) - \vec{\omega}_b \times \vec{r}_{pb} \quad (11)$$

where the wind vector is assumed to be $\vec{u}_{wind} = (0, u_y, 0)$, neglecting the vertical and lateral components.

3. SIMULATION RESULTS

Simulations of both blade-throw and ice-throw distances are performed by solving the equations derived in the previous sections using the in-house aerodynamic code *Savbal*^{*}. The overall procedure for the solution consists of three stages, comprising coordinate transformation, aerodynamics load assessment and time integration. The initial position, orientation and velocities of the detached part are first evaluated at their local coordinates. Based on these values, an iterative procedure starts where the local velocities are evaluated, according to exerted aerodynamic loads, and integrated to give the location and orientation of the fragment in global coordinates until the fragment reaches the ground level.

For the blade-throw analysis, cases with different detached lengths and tip speeds are compared in two sub-cases: (1) the whole blade together with its sandwich structure is thrown and (2) only the shell layer of the blade is thrown. For ice-throw analysis, it turns out that the drag to mass ratio plays an important role for the magnitude of the throw distance. As a result, a few cases with different $C_d A/m$ ratios (as discussed by Biswas *et al.*¹²) with both standstill and running turbine conditions are simulated. The analyses are performed for different wind turbine sizes.

3.1. Turbine upscaling laws

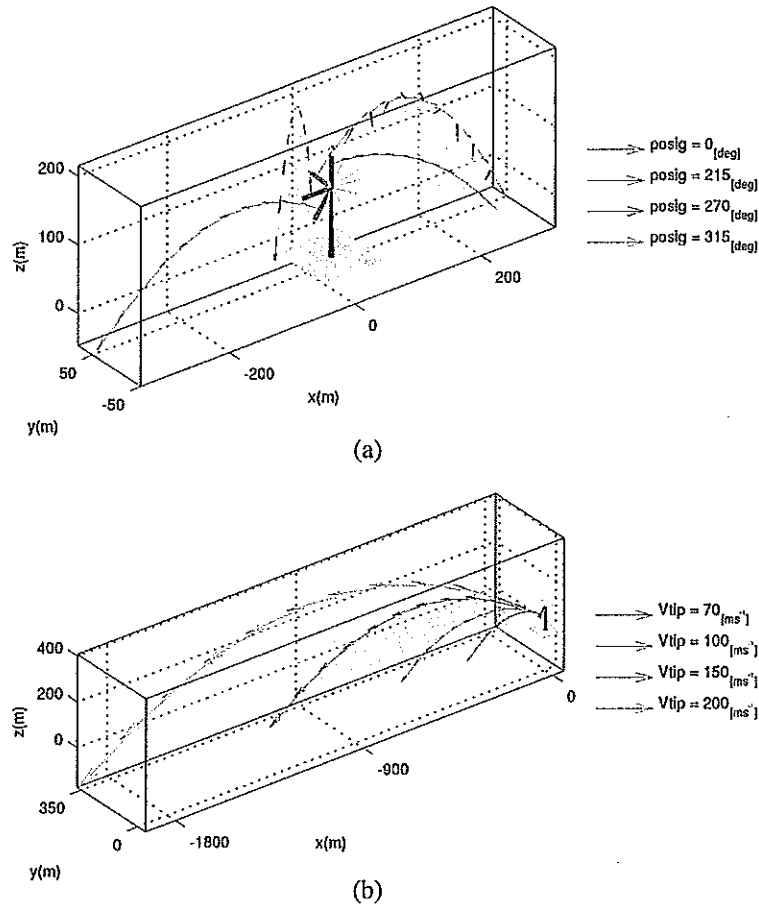
The throw distance analysis was initially performed for a 2.3 MW turbine using publicly available data. A series of empirical relations was then used to upscale the data for the larger turbines, and the analyses were performed for four different wind turbine sizes, i.e., 2.3, 5, 10 and 20 MW. The scale-up factors are first obtained for the blade length, which scales as the square root of the power ratio. Therefore, denoting the blade length, mass (applicable to both total sandwich structure and the shell laminate masses) and mass moment of inertia for the reference turbine with index a , i.e., r_a , m_a and I_a , respectively, the corresponding values for the upscaled turbine, index b , can be obtained as

$$r_b = r_a \left(\frac{P_b}{P_a}\right)^{S_l}, \quad m_b = m_a \left(\frac{r_b}{r_a}\right)^{S_m}, \quad I_b = I_a \left(\frac{m_b}{m_a}\right) \left(\frac{r_b}{r_a}\right)^2 = I_a \left(\frac{r_b}{r_a}\right)^{S_m+2} \quad (12)$$

^{*}The computing code *Savbal* will be available upon request for further studies on this field.

Table II. Characteristics of different turbine sizes considered in the throw analyses.

Size	$L^* = \frac{L}{R}$	L (m)	m (kg)	I_x (kg·m ²)	I_y (kg·m ²)	I_z (kg·m ²)
2.3 MW $R = 45$ m, $H = 100$ m	1.0	45	7.3E+3	0.1E+7	0.1E+7	0.3E+04
	0.5	22.5	2.4E+3	0.1E+6	0.1E+6	0.40E+03
	0.2	10	4.1E+2	0.4E+04	0.4E+04	0.2E+02
5 MW $R = 68$ m, $H = 147$ m	1.0	66	2.6E+04	0.9E+07	0.9E+07	0.2E+05
	0.5	33	8.2E+03	0.1E+07	0.1E+07	0.3E+04
	0.2	14	1.7E+3	0.3E+05	0.3E+05	0.2E+03
10 MW $R = 93$ m, $H = 208$ m	1.0	93	8.2E+04	0.5E+08	0.5E+08	0.1E+06
	0.5	46.5	2.7E+04	0.6E+07	0.6E+07	0.2E+05
	0.2	20	5.3E+3	0.2E+06	0.2E+06	0.1E+04
20 MW $R = 132$ m, $H = 294$ m	1.0	132	2.6E+05	0.3E+09	0.3E+09	0.9E+06
	0.5	66	8.7E+04	0.4E+08	0.4E+08	0.1E+06
	0.2	29	1.6E+04	0.1E+07	0.1E+07	0.8E+04

**Figure 3.** Schematic graphs of the throw distances for half-blade detachment changing (a) the initial release angles (upward-clockwise reference) and (b) the tip speed velocities for the 2.3 MW reference turbine.

where $\mathbf{I} = (I_x, I_y, I_z)$. In the previous relations, $S_l = 1/2$ and S_m depends on actual scaling laws when increasing the size of the rotor. From simple upscaling rules, S_m would be equal to 3, but because of more elaborate rotor designs, this parameter is usually found to be somewhat smaller. In the present work, we employ $S_m = 2.3$ (see UpWind²⁰ and TPI Composites²¹ for more information on turbine scaling).

3.2. Full-blade throw analysis

In this section, the throw distance analyses are performed for four different turbine sizes based on the upscaling rules presented previously. Here, the term full blade refers to the case of blade shell including stiffening members (upper and lower shells, spar, etc.). The dimensions and other characteristics of each turbine size are reported in Table II. In accordance with the copyright policies of the turbine manufacturers, the data for the reference turbine (2.3 MW) do not correspond to an existing turbine but are chosen to mimic a real turbine.

The analysis included a parametric study, where the effects of the length of the detached parts, incoming wind speeds, blade tip speeds and wind turbine size on the blade-throw distances were investigated. The height of the tower is in all considered cases assumed to be equal to the rotor diameter. Figure 3 shows three-dimensional visualizations of the throw distances of a half-blade piece thrown of the 2.3 MW machine for different initial conditions. The small colored patches in the figure shows the instantaneous orientation of the detached part. For the sake of clarity, only some selected curves are shown in the figure. Figure 3(a) shows the effect of release angle on the throw distance, and Figure 3(b) shows the effect

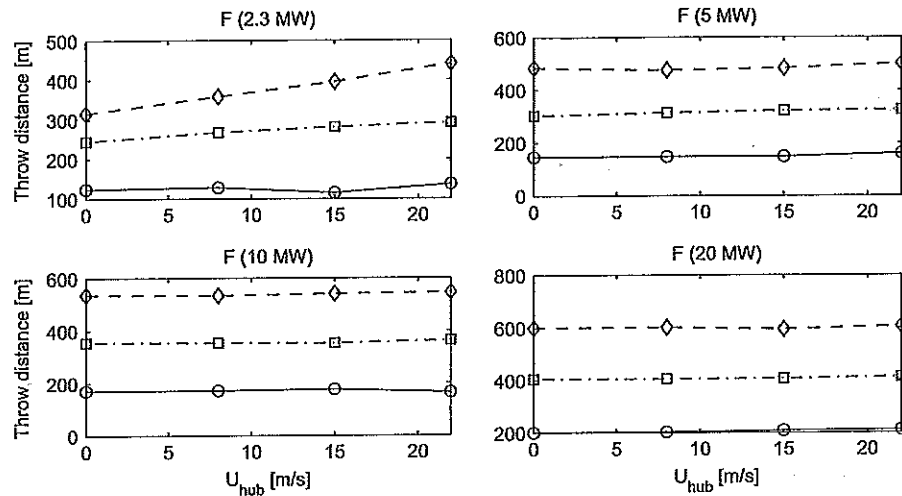


Figure 4. Throw distance calculations of full blade with three different detached lengths for 2.3, 5, 10 and 20 MW turbines at the normal operating condition of $V_{tip} = 70$ m/s. The horizontal axis shows the wind speed at the hub height and the vertical axis represents the throw distance. $\diamond \diamond \diamond$: $L^* = 0.2$; $\square \square \square$: $L^* = 0.5$; and $\circ \circ \circ$: $L^* = 1$.

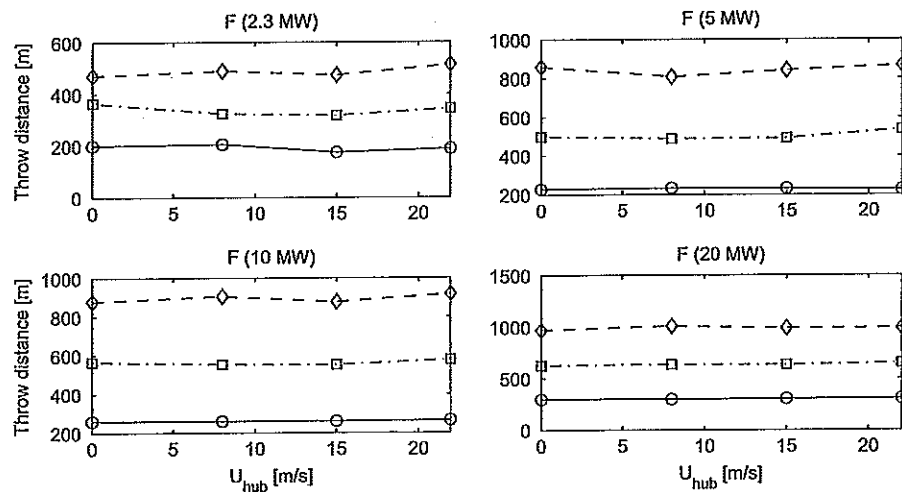


Figure 5. Throw distance calculations of full blade with three different detached lengths at a high tip speed of $V_{tip} = 100$ m/s. Legends are similar to those in Figure 4.

of release tip velocity. As can be seen, the release tip speed is a very important factor influencing the maximum throw distances. Normal operating conditions with $V_{tip} = 70$ m/s result in throw distances of about 500 m long, whereas a tip speed of $V_{tip} = 150$ m/s may lead to throw distances up to 2 km.

For the quantitative analysis performed in the next section, the fragments are thrown at a release angle of 45° from the horizon (225° measured upward-clockwise) in all calculations. The full-blade and blade-shell throw calculations are performed using flat-plate assumption for the aerodynamic coefficients.

Figures 4, 5 and 6 show the throw distances for three different fragments of the full blade for a combination of three blade tip speeds ($v_{tip} = 70, 100, 150$ m/s) and four different incoming wind velocities (with power-law profiles) ranging between 0 and 22 m/s at hub height.

The figures are divided into three groups, the first group (Figure 4) shows the throw distances, relative to the tower position, for different incoming wind speeds (shown on the horizontal axis) and different detachment lengths at a tip speed of $V_{tip} = 70$ m/s. The detachment length L^* , shown with markers, is the length of the detached piece, measured from the blade tip and normalized by the blade length. The throw distances are calculated and plotted for the four considered wind turbine sizes ranging from 2.3 to 20 MW. As can be seen, except for the 2.3 MW machine, the effect of the incoming wind on the throw distance is almost negligible. Similarly, the effect of turbine size on the throw distance is minimal and the main

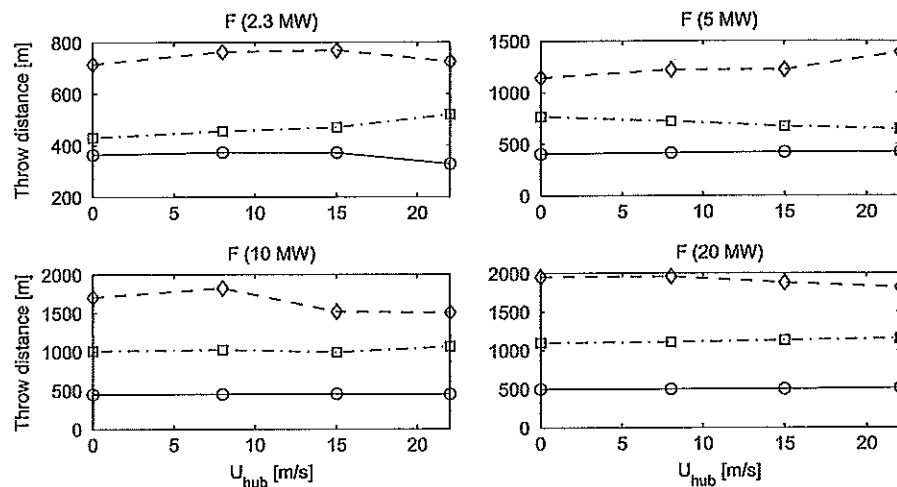


Figure 6. Throw distance calculations of full blade with three different detached lengths at an extreme tip speed of $V_{tip} = 150$ m/s. Legends are similar to those in Figure 4.

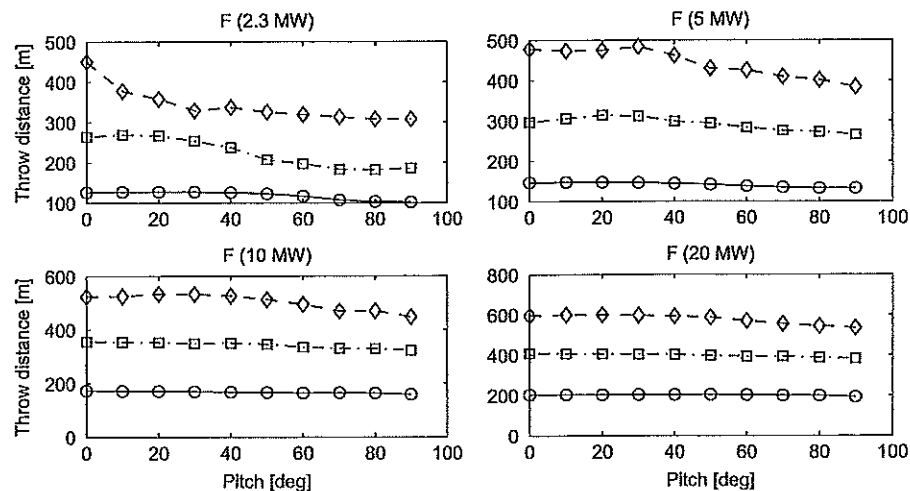


Figure 7. Sensitivity of throw distances of full blade to the initial pitch setting for 2.3, 5, 10 and 20 MW turbines operating at $V_{tip} = 70$ m/s. $\diamond \diamond \diamond$: $L^* = 0.2$; $\square \square \square$: $L^* = 0.5$; and $\circ \circ \circ$: $L^* = 1$.

parameter governing the throw distance is the detachment length. The minimum throw distance is obtained for the heaviest fragment ($L^* = 0.2$) thrown from the 2.3 MW turbine, while the maximum throw distance of all cases at $V_{tip} = 70$ m/s is around 600 m for the lightest fragment ($L^* = 0.2$).

Figure 5 shows the same graphs for the higher tip speed of $V_{tip} = 100$ m/s, where the maximum throw distances for the smallest and largest turbines are about 500 and 1000 m, respectively, while the minimum throw distance is reached for a full-blade throw ($L^* = 1$) of a 2.3 MW turbine. Also, it is clear that the effect of the hub-height wind velocity is still very small. Figure 6 shows the same plots for the most extreme case considered, i.e., using a tip speed of $V_{tip} = 150$ m/s. Here, the thrown pieces reach throw distances ranging from approximately 350 m for the full-blade throw for a 2.3 MW turbine to about 2000 m for the lightest fragment thrown from the 20 MW turbine.

As can be seen from the red curve in Figure 6 for the 10 MW turbine (bottom-left), the throw distance has unexpectedly decreased when increasing the wind speed from 10 to 15 m/s. This behavior is somehow repeated to a smaller extent in other cases, especially at higher tip velocities. The unexpected results can happen because of the fact that a small change in the initial conditions can change the force/moment distributions on the fragments, thereby changing the trajectory drastically. To investigate the erratic motion further, the effect of initial pitch setting on the trajectory is analyzed in the next section.

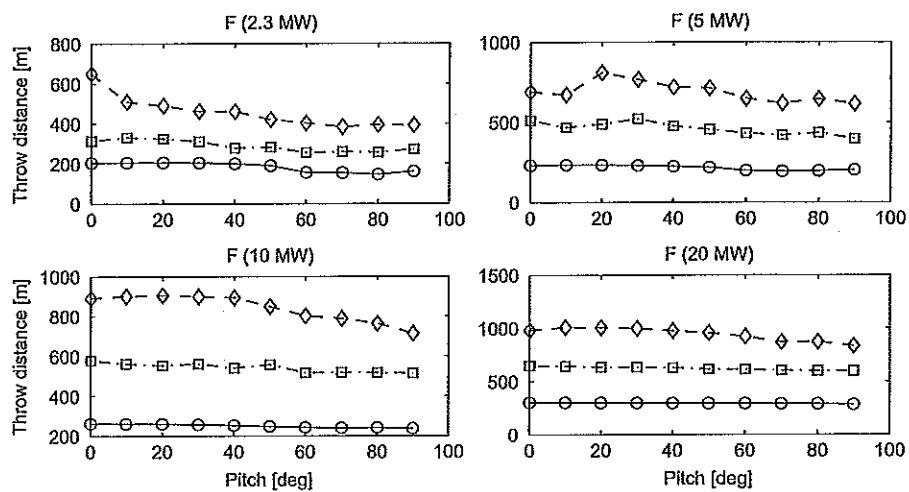


Figure 8. Sensitivity of throw distances of full blade to the initial pitch setting at $V_{tip} = 100$ m/s. Legends are similar to those in Figure 7.

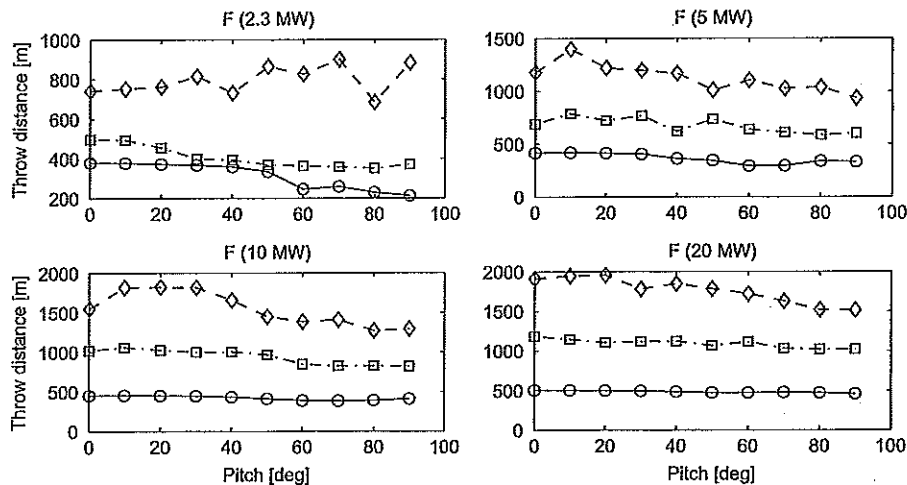


Figure 9. Sensitivity of throw distances of full blade to the initial pitch setting at $V_{tip} = 150$ m/s. Legends are similar to those in Figure 7.

3.2.1. Effect of initial pitch settings.

As explained earlier, analyses of the throw trajectories show that the throw distance for a particular wind turbine sometimes exhibits an erratic behavior going from one dominant solution to another with only a slight change in the initial conditions.

Table III. Aspect ratios, reference chord length C_{ref} and detached mass m of the blade shells ($\rho_{shell} = 1700 \text{ kg/m}^3$) used for throw simulation from turbines of different sizes.

Cases — AR	2.3 MW		5 MW		10 MW		20 MW	
	C_{ref} (m)	m (kg)	C_{ref} (m)	m (kg)	C_{ref} (m)	m (kg)	C_{ref} (m)	m (kg)
AR = 1		34		83		184		408
AR = 5	1	170	1.5	415	2.1	920	3	2040
AR = 10		340		830		1840		4080

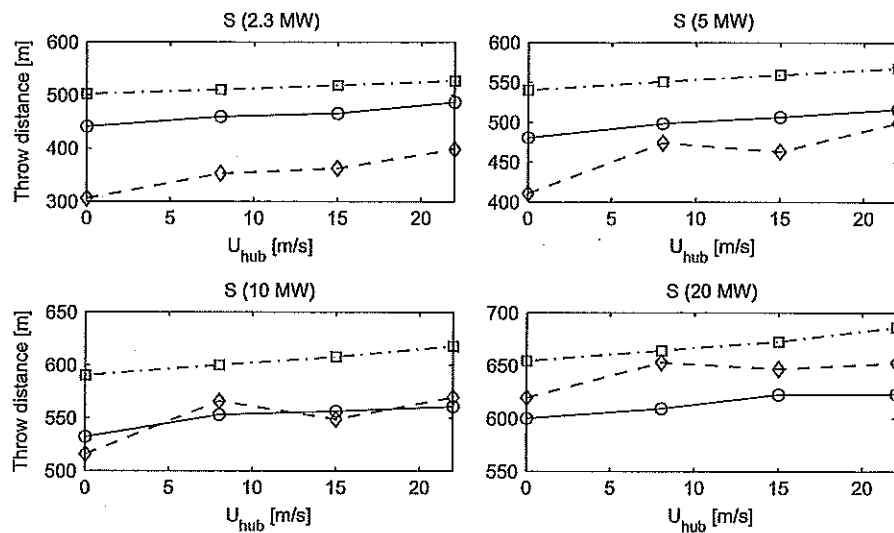


Figure 10. Throw distance calculations of blade shell with three different aspect ratios (invariant chord length for each turbine) for 2.3, 5, 10 and 20 MW turbines at a normal operating condition of $V_{tip} = 70 \text{ m/s}$. $\diamond \diamond \diamond$: AR = 1; $\square \square \square$: AR = 5; and $\circ \circ \circ$: AR = 10.

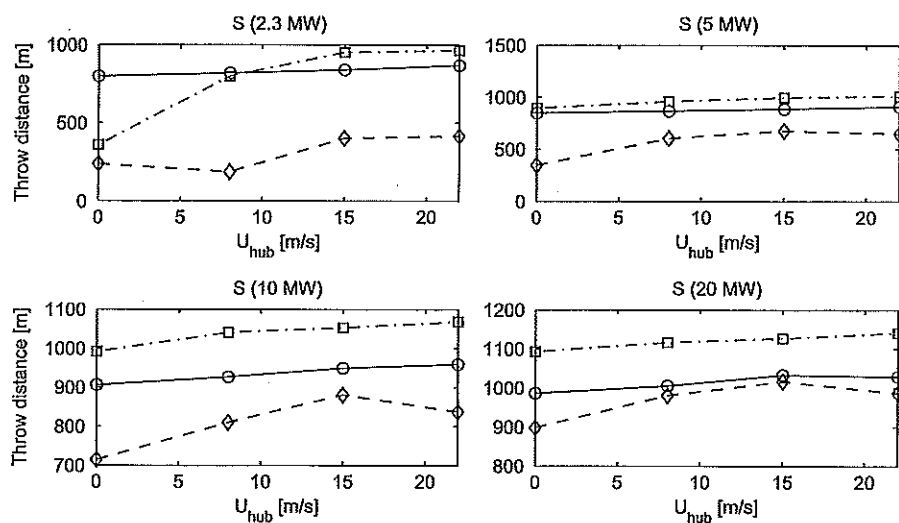


Figure 11. Throw distance calculations of blade shell at high tip speed of $V_{tip} = 100 \text{ m/s}$. Legends are similar to those in Figure 10.

To understand this behavior, a sensitivity study is performed to investigate the effects of the initial pitch settings on the trajectory. Figures 7–9 demonstrate the pitch angle dependence of the full-blade throw distances for different turbine sizes and tip speeds, where the throw distances are obtained for release pitch angles ranging from 0° to 90° . As can be seen, the pitch setting has a substantial impact especially for the lighter parts. In general, higher throw distances are achieved using fragments thrown at lower pitch angles, which are due to the reduced drag. The effect of pitch angle on the heavier pieces (green and blue curves) is, however, smaller. The reason for this is that the aerodynamics plays a less significant role for the heavy parts in the throw distance calculation and the distance is mainly governed by the inertial forces. For the extreme tip velocity, and especially for the 2.3 MW turbine, increasing the pitch angle produces erratic throw distances for the lightest fragments. The exact reason for such erratic behavior has not been yet understood, but it is most likely explained by the physics of the problem, as explained earlier.

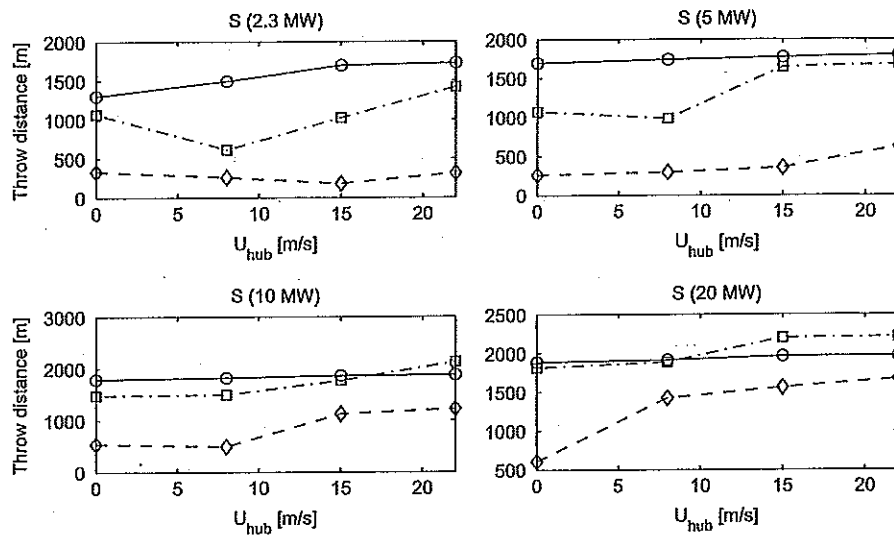


Figure 12. Throw distance calculations of blade shell at an extreme tip speed of $V_{tip} = 150$ m/s. Legends are similar to those in Figure 10.

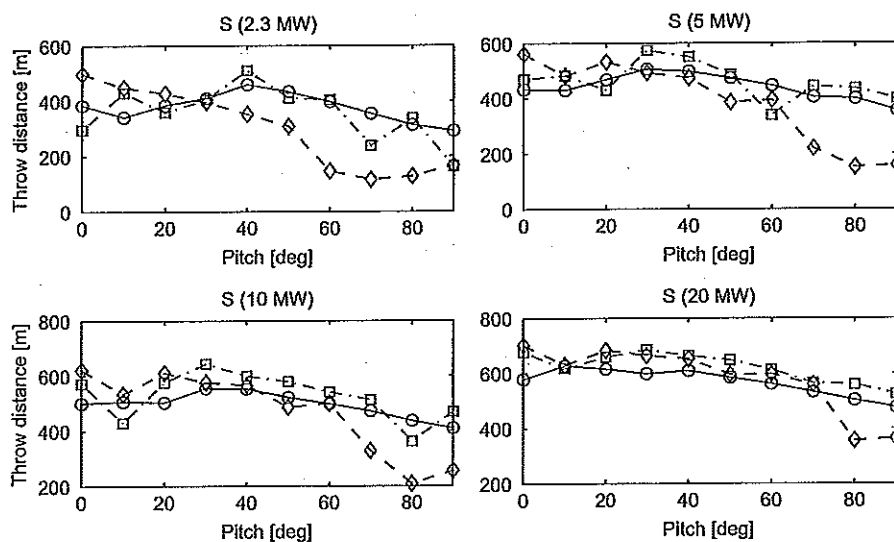


Figure 13. Sensitivity of throw distances of blade shell to the initial pitch setting at $V_{tip} = 70$ m/s. Legends are the same as in Figure 10.

3.3. Blade-shell throw analysis

An analysis of available data from blade failure accidents shows that depending on the manufacturing method and the structural integrity of the blade, it might first shatter into lighter parts, with the consequence that the shell layer is most likely to be thrown away. Three cases of different aspect ratios are considered for the shell throw analyses. For the reference case of 2.3 MW turbine, an average chord of 1 m and a shell thickness of 2 cm are chosen, and three aspect ratios (where AR is defined as the ratio of span to average chord) of 1, 5 and 10 are investigated. Then keeping the same AR, the analysis is repeated for each of the turbines introduced in the preceding sections. The density of the shell, consisting of fiber and glass, is assumed to be 1700 kg/m^3 . Table III shows the test cases used for blade shell throw simulations.

Throw distances for the four different turbine sizes with the same working conditions as those for the full-blade case are plotted in Figures 10–12. Here, the non-dimensional length is replaced by the aspect ratio of the blade shell and three different aspect ratios are considered. As can be seen, increasing the hub-height wind speed and the turbine size generally results in larger throw distance. Nevertheless, an erratic behavior, as mentioned in the previous section, appears in the

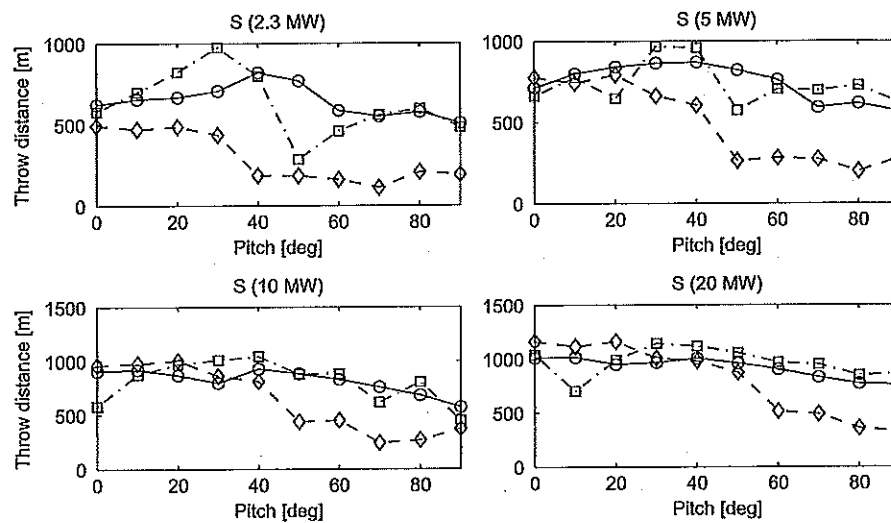


Figure 14. Sensitivity of throw distances of blade shell to the initial pitch setting at $V_{tip} = 100 \text{ m/s}$. Legends are the same as in Figure 10.

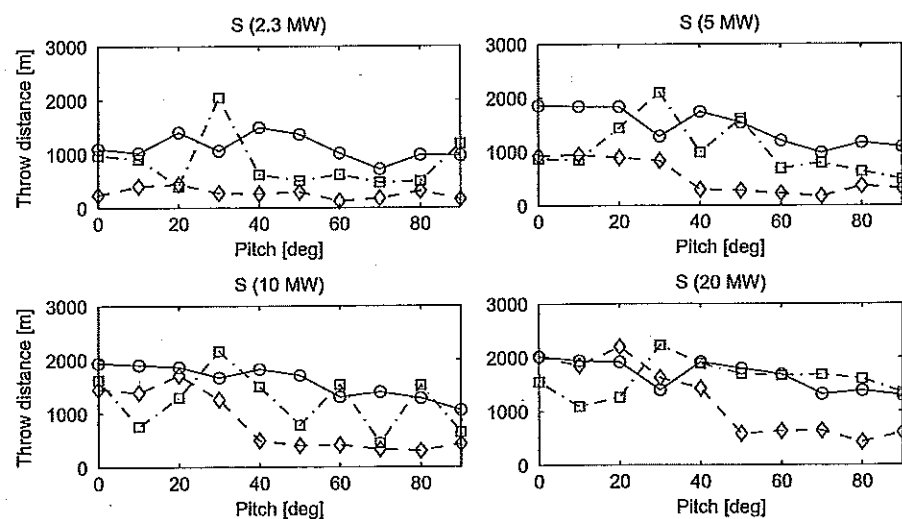


Figure 15. Sensitivity of throw distances of blade shell to the initial pitch setting at $V_{tip} = 150 \text{ m/s}$. Legends are the same as in Figure 10.

simulation results. By comparing the shell-throw graphs with the corresponding figures from the full-blade analysis, the throwing range of the blade shells and that of the full-blade structure are seen to be of the same order of magnitude. That is, the range is between 300 m for the 2.3 MW turbine operating at $V_{tip} = 70$ m/s and a maximum of 2200 m obtained for the 20 MW turbine in the extreme case of $V_{tip} = 150$ m/s. However, unlike the full-blade throw cases, the case with the smallest length ($AR = 1$) reaches the least throw distance, whereas for the full blade, the smallest fragment reaches the highest distance. This is most probably due to the fact that the small shell object is lighter and the corresponding inertial force is relatively small as compared with the drag forces.

As a comparison, the throw distances obtained for the ballistic motion of an equivalent particle in vacuum was also performed (results not shown), in which case there is no aerodynamic forcing on the objects. The results revealed that the ballistic throw distances are the most extreme cases in terms of throw distance.

3.3.1. Effect of initial pitch settings.

Similar to Section 3.2.1, the role of initial pitch setting on the trajectory of thrown blade-shell debris is assessed. Figures 13–15 show the pitch angle dependence of the throw distances for different turbine sizes and tip speeds for the blade-shell cases. Similar to the full-blade throw cases, the pitch setting has a substantial impact on the throw distance of thrown blade-shell structures. One major difference with the full-blade cases is, however, that the effect of the shell aspect ratios on the throw distance is much less significant and all of the cases show similar behavior with $AR = 1$ cases (red diamonds), predicting smaller throw distances in general.

3.4. Ice throw

For the analysis of the ice throw, the same procedure as for the blade throw is applied except that the throw analysis is not performed for the extreme tip speed conditions but only for the standstill where the tip speed is zero, and the running conditions, where the turbine is assumed to rotate in its normal operational mode at a tip speed of 70 m/s. For the icing case,

Table IV. Aspect ratios, reference chord length C_{ref} and detached mass m of the ice fragments ($\rho_{ice} = 0.7 \text{ kg/m}^3$) used for throw simulation of turbines of different sizes.

Cases → AR	2.3 MW		5 MW		10 MW		20 MW	
	C_{ref} (m)	m (kg)	C_{ref} (m)	m (kg)	C_{ref} (m)	m (kg)	C_{ref} (m)	m (kg)
$AR = 1$	0.1	0.18	0.15	0.43	0.2	0.97	0.3	2.16
$AR = 2$		0.36		0.87		1.95		4.33
$AR = 3$		0.54		1.31		2.94		6.49

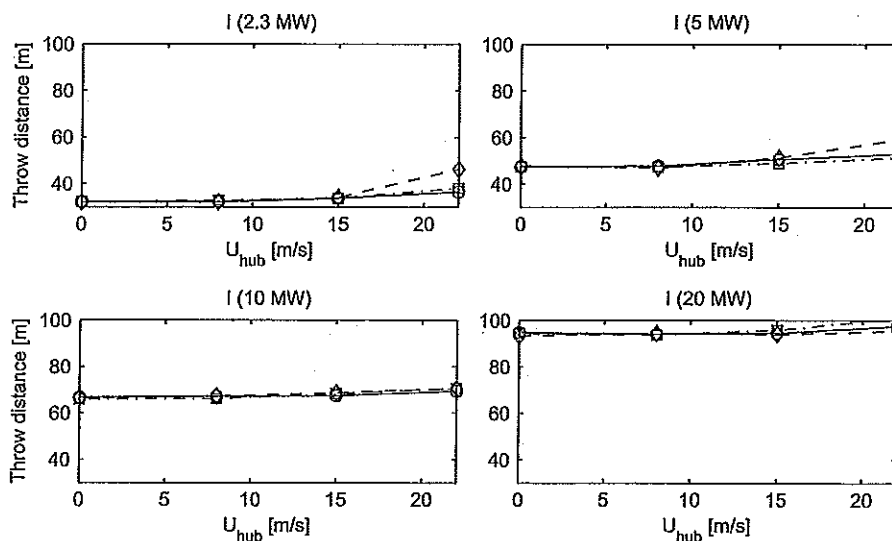


Figure 16. Throw distance calculations of ice fragments for three different aspect ratios for 2.3, 5, 10 and 20 MW turbines in standstill operation ($V_{tip} = 0$ m/s). $\diamond \diamond \diamond$: $AR = 1$; $\square \square \square$: $AR = 2$; and $\circ \circ \circ$: $AR = 3$.

a density of 700 kg/m^3 is used (see also Seifert *et al.*¹¹). The dimensions of the tested ice fragments and corresponding turbine sizes are shown in Table IV. According to field studies performed by, e.g., Cattin *et al.*,²² most of the ice fragments thrown away from turbine are broken into objects that typically are smaller than 1 kg. However, fragments as heavy as up to 1.8 kg have also been observed. Because the pieces are so light, the throw distance of an ice piece is mainly governed by the drag forces applied on it (which are only functions of mass–area ratio) and the incoming wind.

Similar to the previous section, studies of the effects of different parameters on throw distances are performed and plotted in Figures 16 and 17 with the graphs structured in the same way as in the previous sections.

For the simulations, no lift is considered and the drag coefficient according to the flat-plate assumption is used. Figure 16 shows that the throw distances of the standstill case range from 30 to 100 m for different turbine sizes and incoming wind speeds. For the running conditions however, the fragments can reach distances up to 600 m. It is also clear from the figure that in many cases the aspect ratio does not play a significant role in the determination of throw distances.

3.5. Maximum throw distances

This section presents a summary of the previous results in terms of maximum throw distances. The maximum throw distances are obtained from the entire set of previous simulations regardless of the size and upcoming wind speed and plotted in Figure 18 for the full-blade and blade-shell cases and in Figure 19 for the ice-throw cases, respectively. In all

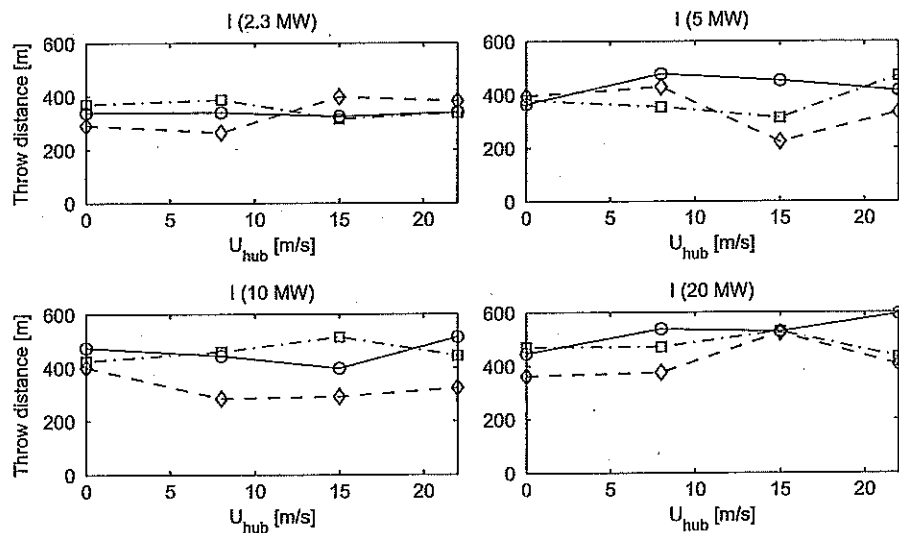


Figure 17. Throw distance calculations of ice fragments for three different aspect ratios for turbines in normal operation ($V_{tip} = 70 \text{ m/s}$). Legends are the same as in Figure 16.

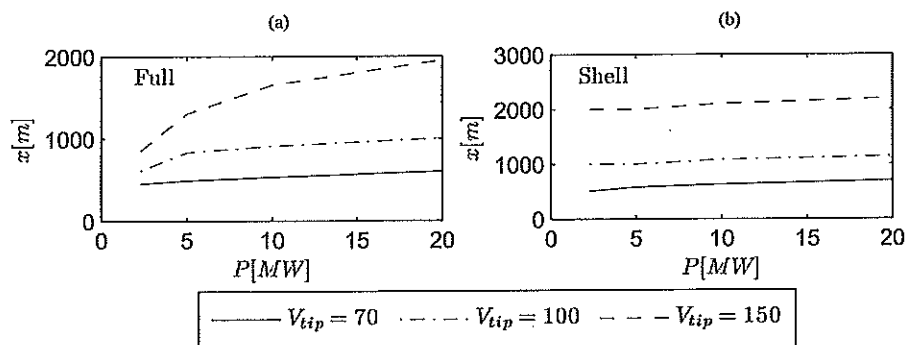


Figure 18. Maximum throw distances obtained for (a) full blade and (b) blade shell in different operating conditions. Blue line: $V_{tip} = 70 \text{ m/s}$ as a function of turbines power.

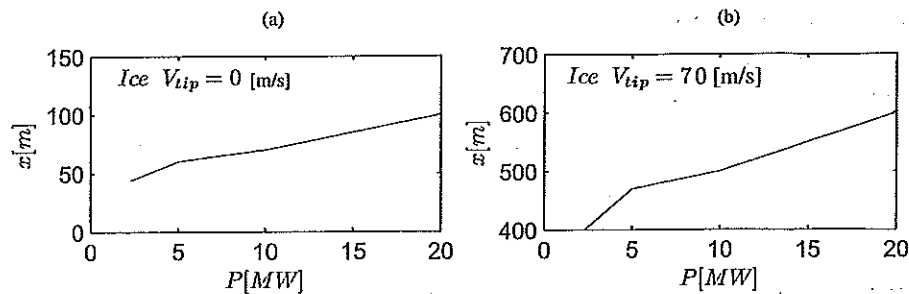


Figure 19. Maximum throw distances obtained for the ice throw in (a) standstill operation, i.e., $V_{tip} = 0$ m/s and (b) normal operating condition, i.e., $V_{tip} = 70$ m/s as a function of turbines power.

figures, the horizontal axis shows the turbine capacity and the vertical axis represents the maximum throw distance. It can be concluded that, in general, the tip speed has a large impact on the throw distances. From Figure 18(a), the turbine size does not affect the throw distances drastically for the lower tip speeds, whereas throw distances at high tip speeds experience a significant growth with increasing turbine size. Figure 18(b), on the other hand, shows that the effect of turbine size on the throw distance for the shell parts is almost negligible.

4. CONCLUDING REMARKS

Trajectory analysis of detached parts of blades and ice fragments thrown from horizontal-axis wind turbines was studied extensively using Newton's and Euler's equations of motion and rotation, employing a blade element approach for the aerodynamics. Full-blade and blade-shell analyses were performed for turbines running under different tip velocities. Turbine upscaling laws were derived, and simulations of throw distances were performed for four different turbine sizes, ranging from existing 2.3 MW machines to future 20 MW turbines.

In some cases, erratic behavior was observed in the computations, where a small change in one parameter could influence throw distance drastically. The behavior was believed to depend highly on the initial conditions. A likely explanation is that a small change in positioning and velocity components in some cases alters the distribution of forces on the detached objects and causes significant changes in the trajectory.

Maximum throw distances obtained at different tip speeds and detachment sizes were analyzed, and it was shown that the tip speed plays the most important role in the throw distance. From the full-blade throw analysis, it was shown that, when released at extreme tip speeds, throw distance picks up more rapidly with the tip speed rather than throw at lower tip speeds (looking at the absolute throw distances). The considered [thrown] full-blade pieces reached approximately 700, 900 and 2000 m at tip speeds of 70, 100 and 150 m/s, respectively. For the blade shell, throw distances were found to be approximately constant as turbine size escalates, and of the same order of magnitude as in the full-blade throw. Throw calculations were also obtained at the tip speeds of $V_{tip} = 0$ and $V_{tip} = 70$ m/s for ice pieces of three different aspect ratios and it was seen that the maximum throw distances scaled almost linearly with the turbine size irrespective of the tip speed. The ice-throw distances reached about 100 and 600 m in standstill $V_{tip} = 0$ m/s and normal operating conditions $V_{tip} = 70$ m/s, respectively. The throw distances presented by this study were obtained with respect to a set of initial parameters without taking into account their probabilities of occurrence. The authors are extending the current study to include the risk levels associated with each of the cases.

REFERENCES

1. Sørensen JN. On the calculation of trajectories for blades detached from horizontal axis wind turbines. *Journal of Wind Engineering* 1984; 8(3): 160–175.
2. Durstwitz M. *A Statistical Evaluation of Icing Failures in Germany's 250 MW Wind Programme*, BOREAS VI. Pyhatunturi: Finland, 2003.
3. Caithness Windfarms. Summary of Wind Turbine Accident data to 30th September 2012, 2012. Available: <http://www.caithnesswindfarms.co.uk/page4.htm>, visited Dec 2014.
4. Kirchhoff G. *Mechanik*. Teubner: Leipzig, pp. 232–250, 1897.
5. Aref H, Jones SW. Chaotic motion of a solid through ideal fluid. *Physics of Fluids A* 1993; 5(12): 3026–3028.
6. Tanabe Y, Kaneko K. Behaviour of falling paper. *Physical Review Letters* 1994; 73(10): 1372–1375.

7. Pesavento U, Jane Wang Z. Falling paper: Navier-Stokes solutions, model of fluid forces and center of mass elevation. *Physical Review Letters* 2004; **93**(14): 144501–1:4.
8. Andersen A, Pesavento U, Jane Wang Z. Unsteady aerodynamics of fluttering and tumbling plates. *Journal of Fluid Mechanics* 2005; **541**: 65–90.
9. Macqueen JF, Ainslie JF, Milborrow DJ, Turner DM, Swift-hook DT. Risks associated with wind-turbine blade failures. *IEEE Proceedings-Part A* 1983; **130**(9): 574–586.
10. Rogers J, Slegers N, Costello M. A method for defining wind turbine setback standards. *Journal of Wind Energy* 2012; **15**(2): 289–303.
11. Seifert H, Westerhellweg A, Kroning J. Risk analysis of ice-throw from wind turbines. *Proceedings BOREAS 6*, Pyha, Finland, 2003; 1–9.
12. Biswas S, Taylor P, Salmon J. A model of ice-throw trajectories from wind turbines. *Journal of Wind Energy* 2012; **15**(7): 889–901.
13. Morgan C, Bossanyi E, Seifert H. Assessment of safety risks arising from wind turbine icing. *Proceedings of BOREAS IV Conference*, Hetta, Finland, 1998; 113–121.
14. Morgan CA, Bossanyi EA. Wind turbine icing and public safety – a quantifiable risk. *Proceedings of BOREAS III Conference*, Sariselka, Finland, 1996; 141–144.
15. Sørensen J. Prediction of site risk levels associated with failures of wind turbine blades. In *European Wind Energy Conference*. H.S. Stephens & Associates: Bedford, England, 1984; 344–349.
16. Carbone G, Afferrante L. A novel probabilistic approach to assess the blade throw hazard of wind turbines. *Renewable Energy* 2013; **51**: 474–481.
17. Ragheb M. Safety of wind systems. Available: <http://www.windfarmaction.files.wordpress.com/2011/10/safety-of-wind-systems.pdf> [accessed on Dec 2014].
18. Øye S. Dynamic stall simulated as time lag of separation. In *Proceedings of the Fourth IEA Symposium on the Aerodynamics of Wind Turbines*, K McAnulty (ed.). ETSU, Harwell, 1991; 6.1–7.
19. Wyngaard J. *Turbulence in the Atmosphere*, (1st ed). Cambridge University Press: Cambridge, UK, 2010.
20. UpWind, Design limits and solutions for very large wind turbines. *European Wind Energy Association (EWEA) Technical Report*, Brussels, Belgium, 2011. Available: www.ewea.org [Accessed on Dec 2014].
21. Parametric study for large wind turbine blades. *Sand2002-2519 Report*, Sandia National Laboratories USA, 2002.
22. Cattin R, Kunz S, Heimo A, Russi G, Russi M, Tiefgraber M. Wind turbine ice-throw studies in the Swiss Alps. *Proceedings of the EWEA Conference*, Milan, Italy, 2007; 1–5.

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

Wind Energy Impacts on Groundwater Resources



If a wind energy project is proposed for a site that is within a groundwater recharge area, any contaminants released at the site have the potential to be carried downward with the infiltrating stormwater, leading to contamination of the aquifer. Groundwater discharge points occur as seepage into wetlands, lakes, and streams. If a site is proposed in a groundwater discharge area, surface disturbances (such as construction or the building of stormwater retention facilities) that disrupt the local hydrology can lead to such consequences as draining the wetland or causing stream flow to become intermittent, even if the activity does not occur directly in the wetland or surface water.

During construction blasting can have an adverse impact on water supplies. Groundwater yields (including both wells and springs) are influenced by the flow of groundwater through the aquifer materials. Any disruption to these materials can potentially affect both groundwater flow and water quality. In some cases, vibrations from blasting can cause aquifer materials to collapse and compact, thereby limiting flow. In addition, bedrock fractures may be created that draw in flow from other portions of bedrock with poorer water quality, and the use of blasting agents that contain perchlorate may result in groundwater contamination.

—Wind Energy Siting Handbook, American Wind Energy Association

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Turbines Have Negative Impact on our Drinking Water

Published by **GLBR SOS** on March 27, 2018

Don't be fooled by claims that wind turbines create a reliable source of energy without impacting your drinking water. Did you know:

Established wind farms have disrupted drinking water supplies in Canada.

A group of Canadians formed Water Wells First in Ontario in February 2016 after they felt energy companies and the government were not taking seriously the effect that wind turbine construction has had on their wells. During construction, residents reported visible dirt in drinking water from wells.

Advocates said it was a temporary problem. Once construction was completed, the water would return to its former pristine state. However, nearby families have had no such luck. The turbines are operational and the well water throughout the area has a strong odor and contains visible, black sediment.



Wind turbines impact on groundwater to be discussed

Public meeting planned Aug. 10 | By David Gough, Postmedia Network | Sunday, August 7, 2016 | www.wallaceburgcourierpress.com

A town-hall style meeting is scheduled for Aug. 10 at Country View Golf Course to discuss issues with wind turbines affecting groundwater in the former Dover Township.

The meeting is scheduled to begin at 7 p.m.

The meeting is being organized by Water Wells First, a grassroots organization that has concerns about the impact that the pile driving construction and subsequent operation of the wind turbines will have on water wells in the proposed North Kent Wind Project area.

Those concerns are due to what has happened in the former Dover Township area. A number of people have come forward and said families have suffered from turbid waters ever since a wind farm was constructed in the area a few years ago. A number of people said they have experienced the dirty well water due to the vibrations from pile driving during construction, which they say used sediment to be disturbed and polluted their aquifer.

Water Wells First said Dover Township residents continue to have dirty water due to the ongoing operation of the turbines, which results in seismic coupling – resulting in ongoing sediment problems.

Water Wells First said it isn't just a little bit of sand in the water, as it is enough to destroy water pumps and make the water completely undrinkable.

[rest of article available at source ^[1]]

URL to article: <https://www.wind-watch.org/news/2016/08/08/wind-turbines-impact-on-groundwater-to-be-discussed/>

URLs in this post:

[1] rest of article available at source:

<http://www.wallaceburgcourierpress.com/2016/08/07/wind-turbines-impact-on-groundwater-to-be-discussed>

ESTERSON Sarah * ODOE

From: Christian Nauer <christian.nauer@ctwsbnr.org>
Sent: Friday, July 20, 2018 3:28 PM
To: ESTERSON Sarah * ODOE
Cc: Robert Brunoe
Subject: Re: Golden Hills Wind Project: Notice of Complete Request for Amendment 5 of the Site Certificate, Draft Proposed Order and Public Hearing - August 23, 2018 Comment Deadline

Dear Sarah,

Thank you for the opportunity to comment on the Golden Hills Wind Project: Notice of Complete Request for Amendment 5 of the Site Certificate (Sherman County).

As the technical reviewer for Section 106 of the National Historic Preservation Act (NHPA), concerns are with potential impacts to historic properties that may be located within the Area of Potential Effects (APE) for the Project. The Project APE is within the territories and areas of concern of the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO).

If the redesign of the Project includes any changes to the APE, then additional identification, evaluation, and protection of historic properties or cultural resources may be necessary. Please keep us in the loop on this Project.

Please keep us in the loop as these Projects develop.

Thank you again for your consideration.

Christian Nauer, MS

Archaeologist
Confederated Tribes of the Warm Springs Reservation of Oregon
Branch of Natural Resources

PO Box C

Warm Springs, OR 97761

christian.nauer@ctwsbnr.org
Office Phone 541.553.2026
Cell 541.460.8448

*The Confederated Tribes of the Warm Springs Reservation of Oregon have reserved treaty rights in Ceded Lands, as well as Usual and Accustomed and Aboriginal Areas, as set forth through the Treaty with the Middle Tribes of Oregon, June 25, 1855.

*Please know that review by the Tribal Historic Preservation Office does not constitute Government-to-Government consultation. Please ensure that appropriate Government-to-Government consultation is made with the Confederated Tribes of the Warm Springs Tribal Council.

On Jul 16, 2018, at 1:51 PM, Robert Brunoe <robert.brunoe@ctwsbnr.org> wrote:

Attachment D: Draft Habitat Mitigation and Revegetation Plan

Golden Hills Wind Project: Habitat Mitigation & Revegetation Plan

1.0 Introduction

Golden Hills Wind Farm, LLC (certificate holder) received a Site Certificate from the Energy Facility Siting Council in 2009 authorizing the construction and operation of a 400 megawatt (MW) wind energy generation facility in Sherman County, Oregon. The potential turbine strings are spread along ridgecrests located approximately 2.5 miles (mi.) northeast of the town of Wasco, Oregon. In addition to the turbine strings, additional facilities such as access roads, underground and overhead transmission lines, and a substation are being constructed to implement the project.

Golden Hills Wind Farm LLC agrees to mitigate impacts associated with the temporary and temporal loss of habitat, and permanent habitat impacts. The goal for temporarily disturbed habitat areas (such as road shoulders, underground electric cable trenches, and the temporarily disturbed area around tower sites) is to return the disturbed habitat to pre-construction (or better) conditions.

In addition to areas temporarily disturbed during facility construction, certain areas will be permanently affected by the placement of facility components for the life of the facility. These permanently disturbed areas include the location of new or widened roads, the area under tower bases, and the substation area.

Construction of the facility would result in temporary impacts to Category 2, 3, 4 and 6 habitat; operation of the facility would result in permanent impacts to Category 3, 4 and 6 habitat. As presented in Table 1, based on pre-construction estimates, approximately 2.9 acres of Category 2, 57.0 acres of Category 3, 6.5 acres of Category 4, and 1,000.2 acres of Category 6 habitat will be temporarily disturbed. Temporary impacts to Category 2, 3 and 4 habitat will require mitigation. As presented in Table 2, based on pre-construction estimates, approximately 5.5 acres of Category 3, 0.1 acres of Category 4, and 126.7 acres of Category 6 habitat will be permanently disturbed. Permanent impacts to Category 3 and 4 habitat will require mitigation. Mitigation of temporary and permanent habitat impacts must comply with the Council's Fish and Wildlife Habitat standard (OAR 345-022-0060), which requires a demonstration of compliance with ODFW's OAR 635-415-0025 mitigation goals and policies.

Temporary impacts to Category 2 Shrub-steppe would result in a temporal loss of habitat. Temporal loss refers to loss of habitat function and values from the time an impact occurs to the time when the restored habitat provides a pre-impact level of habitat function. Habitat subtypes identified within the site boundary, based on pre-construction estimates, including Conservation Recovery Enhancement Program (CREP), Conservation Reserve Program (CRP) and Grassland, are reasonably expected to be restored within a shorter duration timeframe (i.e. 2-3 years) than Shrub-Steppe (5+ years) and therefore would not be expected to result in temporal loss requiring compensatory mitigation beyond the establishes revegetation requirements of this plan.

To address the temporal loss of temporarily impacted Category 2 Shrub-steppe habitat quality ,

and to satisfy ODFW's Category 2 habitat mitigation goal of "no net loss of either habitat quantity or quality and to provide a net benefit of habitat quantity or quality," the certificate holder agrees to enhance or create an additional 0.5 acres of Category 2 Shrub-steppe (representing 0.5:1 acre ratio) within a designated mitigation area. This is in addition to revegetation of the temporarily impacted area to pre-impact habitat quality and function. Temporary impacts to the remaining Category 2, 3 and 4 habitat subtypes including CREP, CRP and Grassland would be mitigated through required revegetation efforts, as described further in this plan. In the event that temporary impacts to CREP, CRP and Native Grassland habitat subtypes within Category 3 and 4 habitat are not restored within a short timeframe (i.e. 2-3 years) following completion of construction, the Department in consultation with ODFW may require compensatory mitigation.

To address the permanent loss of Category 3 and 4 habitat, and to satisfy ODFW's Category 3 and 4 habitat mitigation goal of "no net loss of either habitat quantity or quality," the certificate holder agrees to enhance or create 5.5 acres of Category 3 habitat and 0.1 acre of Category 4 habitat (representing a 1:1 acre ratio) within a designated mitigation area.

Table 1: Summary of Estimated Temporary Wildlife Habitat Impacts

Habitat Description	Temporary Impact (Acres)	Mitigation (Mitigation Area Ratio [Acres] or Revegetation)	Mitigation Area (Acres)
Category 2			
Conservation Reserve Enhancement Program (CREP)	2.0	Revegetation	0.0
Shrub-steppe (SS)	0.9	0.5:1	0.5
Category 2 Total =	2.9		0.5
Category 3			
Conservation Reserve Program (CRP)	17.2	Revegetation	0.0
Grassland	39.8	Revegetation	0.0
Category 3 Total =	57.0		0.0
Category 4			
Grassland	6.5	Revegetation	0.0
Category 4 Total =	6.5		0.0
Mitigation Area Required for Temporal Loss of Category 2 Habitat =			0.5

Table 2: Summary of Estimated Permanent Wildlife Habitat Impacts

Habitat Description	Permanent Impact (Acres)	Mitigation Area (Mitigation Area Ratio, Acres)	Mitigation Area (Acres)
Category 3			
CRP	1.3	1:1	1.3
Grassland	4.2	1:1	4.2
Category 3 Total =	5.5		5.5
Category 4			
Grassland	0.1	1:1	0.1
Category 4 Total =	0.1		0.1
Mitigation Area Required for Permanent Loss of Category 3 and 4 Habitat =			5.6

Approximately 127 acres of cultivated agriculture land may be impacted by permanent facilities. Impacts to the agriculture land will be mitigated by:

- Developing a noxious weed control plan following guidelines based upon consultation with the Sherman County Soil and Water Conservation District and ODFW. The noxious weed control plan will be approved by ODOE and finalized prior to construction.
- The noxious weed control plan will be implemented utilizing Best Management Practices (BMPs) to minimize topsoil loss, and complying with an erosion and sedimentation control plan approved by DEQ as part of the NPDES program in areas adjacent to drainage features.
- Sherman County Soil and Water Conservation District will be consulted for proper procedures for restoring agricultural quality to its original condition.

To achieve these habitat mitigation objectives, this plan has been prepared to guide revegetation efforts and enhancement efforts within the compensatory mitigation area. Seed mixes, planting methods, and weed control techniques have been developed specifically for the project area through consultations with the affected agencies, reviews of current literature, and site visits by revegetation specialists. The plan also specifies monitoring procedures to evaluate the success of revegetation and habitat mitigation area enhancement efforts.

2.0 Facility Description

The facility is approved to be located on private land in an unincorporated area of Sherman County. The facility will interconnect with the Bonneville Power Administration's (BPA) transmission system near Klondike Schoolhouse Substation (200 MW). Transmission from the facility substation to the interconnection point will involve one 8-mile long overhead transmission line.

The facility will consist of a number of turbine strings, with up to 125 turbines. Hub height of the turbines will be up to approximately 95 m (312 feet) tall with a rotor diameter up to 126 m (413 feet), and the total maximum turbine height measuring up to 158 m (518 feet). Up to six permanent meteorological towers will be built. The turbines will be linked by access roads and a 34.5-kV transmission line. The approximately 55-mile long power collection system will be largely underground, but might be overhead in some locations.

One substation is approved for construction and operation. In addition, an operations and maintenance (O&M) facility (including a shop), a control room, a maintenance yard, a kitchen, an office, a washroom, and other provisions typical of this type of facility, will be built.

This facility will convert approximately 132 total acres to permanent structures and roads. Other facilities which will permanently disturb habitat include turnaround areas, substation site, and transmission line pole bases. Less than 5% of the permanent habitat impacts will occur to CRP grassland and native grassland habitats; the remainder of the impact will occur on cultivated land.

It will also be necessary to temporarily disturb additional areas during construction of the facility. Laydown areas and equipment work areas at the tower sites will be needed to construct the turbines. Construction of access roads will also require the temporary disturbance of habitat in addition to permanent disturbance of the roadbed. Construction of powerlines, both above and below ground, will also temporarily impact habitat. For the underground lines, temporary impacts are similar to pipeline installation, while for the overhead lines, disturbance is primarily limited to the tower bases. Additionally, miscellaneous facilities such as staging areas, parking lots, and turnouts will be constructed on a temporary basis. In total, it is estimated that 1,069 acres will be temporarily disturbed during construction; 943 acres of that area will be on land used for agriculture, which is considered Category 6 habitat by ODFW.

3.0 Site Setting

3.1 Physiography, Geology, and Soils

The turbine string sites are located on ridgetops that run along northeast-southwest lines, as well as on flat terrain. Topography within the site boundary is characterized by gently rolling hills with slopes from 0° to 70°. Steeper topography is associated with the Grass Valley Canyon and associated side drainages. Elevations of the turbines strings ranges from 1,066 ft. to 2,201 ft (325 m to 671 m) above mean sea level. Soils within the site boundary are primarily deep, well-drained loams, and are used to cultivate small grains and hay or for livestock grazing (Macdonald et al. 1999).

3.2 Climate

Sherman County averages 11.11 inches (in.) of precipitation annually, most of which falls from October through March. Average winter snowfall is 18.9 in. The average air temperature in winter is 32.9° F and the average summer temperature is 65.4° F (Macdonald et al. 1999).

3.3 Landcover/General Vegetation

Land coverages in the facility area consist primarily of cultivated agriculture (dryland wheat; 83%), followed by shrub-steppe/grassland (10%) and Conservation Reserve Program (CRP) grassland (4%), with less than 2% each of developed, riparian tree, riparian-intermittent stream (IS), upland tree, and Conservation Reserve Enhancement Program (CREP) habitats.

Vegetation communities in the facility vicinity are primarily bunchgrass and shrub-steppe associations including some historic climax communities. Grasses include: bluebunch wheatgrass (*Pseudoroegneria spicata* ssp. *spicata*), Idaho fescue (*Festuca idahoensis*), and Sandberg bluegrass (*Poa secunda*). Forbs representative of these communities include arrowleaf balsamroot (*Balsamorhiza sagittata*), milkvetch (*Astragalus* sp.), lomatium (*Lomatium dissectum*), common yarrow (*Achillea millefolium*), lupine (*Lupinus* sp.), phlox (*Phlox* sp.), and pussytoes (*Antennaria* sp.). Shrub species include gray rabbitbrush (*Ericameria nauseosa*), Greene's rabbitbrush (*Ericameria greenei*), and basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*). In heavily disturbed areas, the following weedy and noxious species occur: cereal rye (*Secale cereale*), cheat grass (*Bromus tectorum*), Russian thistle (*Salsola kali*), tumblemustard (*Thelypodopsis* sp.), China lettuce (*Lactuca serriola*), prostrate knotweed (*Polygonum aviculare*), and knapweed (*Centaurea* sp.) Much of the area has been cultivated with monoculture crops of wheat and other small grains.

3.4 Land Use

The site boundary is located on privately-owned land. As mentioned above, much of the area is used for agricultural activities and cattle grazing. The cultivated land is used for production of small grain crops, primarily dryland wheat and barley. The grazed land is either native

shrub-steppe or land previously set aside in the federal Conservation Reserve Program.

3.4 Environmental Conditions

A variety of environmental conditions within the region and facility area make the establishment of desirable plant species difficult. Low precipitation and sandy soils provide very little available moisture for germinating seeds. In addition, extensive past and present disturbance to the vegetative communities has created many areas dominated by non-native, weedy species. These species could spread to areas disturbed by construction activities and compete with planted species for the limited resources. Finally, high winds in the area further complicate efforts to establish desirable vegetation.

4.0 Revegetation Procedures (Temporarily Disturbed Areas)

The following methods and protocol are to be followed for all areas of temporary ground and/or vegetation disturbance in the upland habitats throughout the site boundary. Because no disturbance to wetland habitats is expected, no wetland revegetation methods have been specified.

4.1 Pre-Disturbance Wildlife Habitat Vegetation Inventory

The site certificate for the facility requires restoration of disturbed areas to satisfy the requirements of the Fish and Wildlife Habitat standard (OAR 345-022-0060), which aligns with the mitigation goals and policies within the ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635 Division 415). In order to meet the 'no net loss of habitat quality' goal of the mitigation policy, the certificate holder shall revegetate disturbed areas according to a set of agreed-upon success criteria that return the site to pre-disturbance condition. Revegetation success is measured at approved, fixed-point monitoring sites within the disturbed area and compared to habitat conditions of approved, fixed-point reference sites. Reference sites are used as a proxy for pre-disturbance condition while accounting for change outside the control of the certificate holder such as climatic variability and landscape-scale shifts in plant communities.

Prior to facility construction, the certificate holder shall identify reference and monitoring sites in consultation with ODFW and the Department. Reference sites should be identified that closely resemble the pre-disturbance characteristics of the revegetation area monitoring site as indicated by site conditions, including vegetation density, relative proportion of desirable vegetation and species diversity of desirable vegetation. "Desirable vegetation" means those species included in the seed mix or native or native-like species, excluding noxious weeds. The certificate holder shall consider land use patterns, soil type, local terrain and noxious weed densities in selecting monitoring and reference sites.

It is likely that different reference sites will be needed to represent different pre-disturbance habitat conditions of the disturbed area monitoring sites. Once monitoring and reference sites are selected by the certificate holder and approved by the Department and ODFW, the monitoring and reference sites shall remain in the same location unless approval for use of a

differing reference site is obtained by the Department and ODFW.

Pre-disturbance wildlife habitat conditions of the reference and monitoring sites shall be determined based on a pre-construction vegetation inventory, to be conducted by a qualified biologist. The pre-construction wildlife habitat vegetation inventory shall include:

- The ODFW habitat category for the area disturbed (Consistent with the evaluation approved per Condition III.C.1)
- Photos representing the habitat,
- Vegetation density (percent cover, percent bare ground, percent cover by plant species)
- Vegetation structural stage, slope, soil type
- An assessment of the relative proportion of desirable vegetation as determined by the average number of stems of desirable vegetation per square foot or by a visual scan of the area, noting overall recovery status.¹
- As assessment of species diversity of desirable vegetation.

The pre-disturbance vegetation inventory shall be submitted for review and approval by the Department, in consultation with ODFW prior to the agency consultation described in Section 4.2 of this plan.

4.2 Pre-Revegetation Agency Consultation and Revegetation Methods

Prior to construction, the certificate holder shall consult with ODFW, ODOE and Sherman County Weed Control Authority to discuss the pre-disturbance vegetation inventory including habitat category and habitat subtype conditions, monitoring and reference site locations and conditions, revegetation methods, erosion and sediment control measures, and implementation schedule.

During construction, the certificate holder will implement site stabilization measures including seeding of temporarily disturbed areas according to its National Pollutant Discharge Elimination System (NPDES) 1200-C general construction permit. Six months prior to commercial operation, the certificate holder will meet with ODFW, ODOE, and Sherman County Weed Control Authority to review the actual extent and conditions of temporarily disturbed areas, confirm the revegetation methods agreed to during pre-construction review are still appropriate, and to re-visit reference and monitoring sites.

4.2 Seed Mixture (Temporarily Disturbed Non-Agricultural Upland Areas)

As noted in section 2.0 above, the facility is expected to result in temporary disturbance to approximately 67 acres of non-agricultural land, subject to verification as part of the preconstruction habitat impact assessment required per Condition III.C.1. The certificate holder will reseed this area after construction. One seed mixture was developed for use in

¹ Desirable vegetation is defined as native plant species and non-native plant species not occurring on state or county noxious weed lists.

revegetating all temporarily disturbed upland habitats within the site boundary (Table 3). This seed mixture will be used, unless an alternative mixture is requested by a landowner, or agency biologist. The certificate holder will submit a request for approval from the Department, in consultation with ODFW, for any alternative mixture. To re-establish plant communities of most value to wildlife, native species are included in the seed mixture, as well as certain non-native species that ODFW has determined to be beneficial to wildlife. Species were selected based on a variety of factors including tolerance to xeric conditions and seed availability.

4.3 Seed Planting Methods

During the first five years following facility construction, planting should be done within disturbed areas annually, or as needed, in March-April (for disturbance that occurs during the winter and spring), and/or in October-November (for disturbance that occurs in the summer and fall). Disturbed, unseeded ground may require annual chemical or mechanical weed control in May or June, before weeds have a chance to go to seed.

In general, a weed-free seedbed should be prepared using conventional tillage equipment. Herbicide should be sprayed to control weedy and/or noxious species, following Oregon's buffer requirements for pesticide use (e.g., 300 feet from water sources). Summer fallowing may be required.

During the first five years following facility construction, areas to be seeded should be disked twice in early spring and spot-sprayed on the ground with an herbicide annually or as needed based on the preceding year's seed planting activities. This area should then be harrowed prior to seeding, ideally by the beginning of April. A conventional seed drill shall be used, except in areas where a rangeland drill is deemed more applicable, with a spacing less than 12 inches and at a depth of 1/8-1/4 inch. The prescribed seed mixture (Table 3) should be drilled at a rate of 12 pounds of pure live seed (PLS) per acre. If fallowing the area is to be used to increase soil moisture content, then the same procedure should be followed, but without seeding. If bare, disturbed soil is not seeded immediately, it will be protected from erosion. Seeding would then occur the following spring.

Completion of seed planting in accordance with the above-described methods should be included in the Revegetation Records as described in Section 4.5 of this plan.

4.4 Restoration of Cropland

The certificate holder shall consult with the landowner and farm operator to determine appropriate reseeding on disturbed cropland, including species composition, seed and fertilizer application rates and application methods.

4.5 Revegetation Records

The certificate holder shall maintain a record of revegetation activities. In the record, the certificate holder shall include the date that construction activity was completed in the area

to be restored, a description of the affected area (location, acres affected and pre-disturbances condition) and supporting figures representing the revegetated area, the date that revegetation work began and a description of the work done within the affected area. The certificate holder shall update the revegetation records as revegetation work occurs. The certificate holder shall report revegetation activities to the Department every-six months for the first 5-years after the completion of facility construction. After five years, any revegetation actions will be described in the annual report per OAR 345-026-0080(e).

4.6 Monitoring Procedures (Temporarily Disturbed Habitats)

Following completion of construction, the certificate holder will submit its vegetation monitoring methodology to ODFW and the Department for approval prior to monitoring. Within each revegetation area monitoring site, the investigator shall evaluate the progress of wildlife habitat recovery in comparison to the reference sites. The investigator shall evaluate the following site conditions (within the general revegetation area, revegetation monitoring sites, and within the reference sites):

- Degree of erosion due to disturbance activities (high, moderate or low).
- Vegetation density.
- Relative proportion of desirable vegetation as determined by the average number of stems of desirable vegetation per square foot or by a visual scan of the area, noting overall recovery status.²
- Species diversity of desirable vegetation.

Following the initial year of seeding, monitoring will occur annually for the first five years. After the first growing season following initial seeding (Year 1), a qualified investigator shall inspect all areas of revegetation, including each revegetation area monitoring site, to assess revegetation success based on the success criteria and to recommend remedial actions, if needed.

During the initial 5-years of annual monitoring, the certificate holder's qualified investigator (ecologist or botanist) shall evaluate whether a revegetated wildlife habitat area is trending toward meeting the success criteria by comparing the approved, fixed-point revegetation area monitoring site to an approved, fixed-point reference site. The certificate holder's qualified investigator shall compare the revegetation area monitoring sites to the selected reference sites, unless some event (such as wildfire, tilling, or intensive livestock grazing) has changed the vegetation conditions of a reference site so that it no longer represents undisturbed conditions of the revegetation area monitoring site. If such events have eliminated all suitable reference sites for a revegetation area monitoring site, the investigator, in consultation with the Department and ODFW, shall select one or more new reference sites. Following the selection of a new reference site, an updated table and latitude/longitudinal data shall be provided to the Department within a 6-month revegetation record report or annual compliance report, whichever report is submitted first.

The certificate holder shall submit, electronically, to the Department and ODFW the investigator revegetation inspection report in a semi-annual report. The report shall include the investigator's assessment of whether the revegetated area monitoring sites are trending toward meeting the success criteria; whether the monitoring sites adequately represent revegetation success of equivalent habitat/habitat subtype of non-monitoring site revegetated areas; assessment of factors impacting the ability of the revegetated area monitoring sites to trend towards meeting

² Desirable vegetation is defined as native plant species and non-native plant species not occurring on state or county noxious weed lists.

the success criteria; description of appropriate weed control measures as recommended by the Department in consultation with ODFW and Sherman County Weed Control Authority; and, any remedial actions recommended.

If an area is not trending toward meeting the success criteria at Year 5 and has not been converted by the landowner to an inconsistent use, the certificate holder may propose and the Department may require remedial action and additional monitoring based on an evaluation of site capability. As an alternative, the certificate holder or the Department, in consultation with ODFW, may conclude that revegetation of the area was unsuccessful and propose appropriate mitigation for the permanent loss of habitat quality and quantity. The certificate holder shall implement the remedial action plan, subject to the approval of the Department in consultation with ODFW.

4.7 Success Criteria

In each monitoring report to the Department, the certificate holder shall provide an assessment of revegetation success for all previously-disturbed wildlife habitat areas. While the monitoring report shall evaluate whether all previously-disturbed wildlife habitat areas are trending towards revegetation success, the success criteria are evaluated based on the revegetation success of the approved revegetated monitoring sites compared to the approved, reference sites. A wildlife habitat area is successfully revegetated when the habitat quality is equal to, or better than, the habitat quality of the pre-construction ODFW habitat category of the reference sites as follows:

- Vegetation density is equal to or greater than that of the reference site.
- Relative proportion of desirable vegetation is equal to or greater than that of the reference site.
- Species diversity of desirable vegetation is equal to or greater than that of the reference site

When the Department, in consultation with ODFW, finds that the conditions of the wildlife habitat area revegetation monitoring sites satisfy the criteria for revegetation success, the Department shall conclude that the certificate holder has met the restoration obligations for that area. If the Department finds that the landowner has converted a temporarily disturbed wildlife habitat area to a use that is inconsistent with these success criteria, prior to the area achieving success criteria, the Department shall conclude that the certificate holder has no further obligation to restore the area for wildlife habitat uses and that the area shall be considered permanently disturbed. However, the certificate holder shall be responsible for meeting the obligations of the Council's Fish and Wildlife Habitat standard, including providing compensatory mitigation for these areas. Mitigation shall be determined by the Department, in consultation with ODFW.

5.0 Habitat Improvement Procedures (Mitigation Area)

5.1 Introduction

To mitigate for temporal and permanent loss of habitat due to placement of facilities (e.g., turbines, access roads), the certificate holder is required to rehabilitate habitat on a 0.5:1 acre ratio for temporary impacts to Category 2 Shrub-steppe and 1:1 acre ratio for Category 3 and 4 habitat of equivalent habitat quality, located in the vicinity of the facility. The total amount of grassland and shrub-steppe land (including CRP) estimated to be temporally and permanently disturbed by the facility, and for which compensatory mitigation is proposed is 6.1 acres.

However, final impact areas will be calculated based on the pre-construction habitat assessment as required per Condition III.C.1. One parcel of land of similar size (approximately 22 acres) will be selected from the mitigation area for habitat enhancement based on a number of factors including:

- cost-effectiveness for quality implementation, management, and monitoring
- likelihood of successful enhancement benefiting wildlife
- willingness of landowner to participate in mitigation approach/activities

5.2 Pre-Management Inventory

Prior to any management implementation (e.g., removal of grazing), the certificate holder will conduct a habitat inventory of the mitigation parcel, to be conducted by a qualified botanist or revegetation specialist. This person will examine a representative cross-section of plots within the mitigation parcel. The mitigation area habitat assessment will include an analysis and supporting figures, including the following:

- ODFW habitat categories for the entire site,
- Photos representing the habitat at each plot,
- Assessment of dominant plant species at each plot
- The percentage of vegetative ground cover at each plot
- Previously recorded wildfires within the mitigation area and remedial action taken on the entire site,
- An assessment of the presence of invasive weeds on the entire site,
- An assessment of special status plants and animals within the mitigation area, based on literature review and any recorded observations

In addition, the certificate holder's qualified biologist shall conduct an avian survey, based upon survey protocol approved by the Department, in consultation with ODFW. The habitat assessment and avian survey results for the mitigation area shall be submitted for review and approval by the Department, in consultation with ODFW, prior to commencing management activities.

5.3 Mitigation Area Management Actions

The management actions described in Section 5.3 shall be monitored by the certificate holder's

qualified biologist yearly for the first five years. If, after five years, the Department in consultation with ODFW determines that the success criteria identified in Section 5.5. have been achieved for the mitigation area, monitoring of management actions shall occur every five years for the life of the facility; otherwise, annual monitoring shall continue until the Department, in consultation with ODFW, confirms that the success criteria has been achieved. Monitoring will include an evaluation by a qualified biologist of the following parameters:

- The ODFW habitat categories for the entire site,
- Photos representing the habitat at each plot,
- An assessment of dominant plant species at each plot
- The percentage of vegetative ground cover at each plot
- Record any wildfires within the mitigation area and remedial action taken on the entire site,
- An assessment of the presence of invasive weeds on the entire site
- Conduct avian surveys within mitigation area with one station set up at each plot, and
- Record observations of special status plants and animals within the mitigation area

The certificate holder shall submit the monitoring reports with the annual report required per OAR 345-026-0080(e).

5.3.1 Fencing and Grazing

The parcel will be fenced prior to treatment to exclude cattle and other domestic ungulates. It is expected that regular maintenance will be required to keep the fences functioning. Gates will be installed at regular intervals along the perimeter.

The certificate holder shall prohibit grazing within the habitat mitigation area. Eliminating livestock grazing within the mitigation area will facilitate recovery of native bunchgrass and sagebrush in areas where past grazing has occurred, potentially resulting in better vegetative structure and complexity for a variety of wildlife.

5.3.2 Site Preparation and Planting Methods

Methods and seed mixtures used for revegetation of mitigation areas will follow those described above for temporarily disturbed areas. The mitigation site has been planted in grasses, therefore the site shall be planted and seeded using the same planting and seeding methods described for disturbed sites at sections 4.2 and 4.3 above. Ground cover canopy and height will be enhanced by the grazing exclusion.

In addition to the plantings described above, the certificate holder shall install a wildlife watering guzzler per ODFW specifications.

5.3.3 Maintenance

Because these improvements are mitigation for permanent and temporal habitat loss, it is necessary to maintain the fences and seedings over the life of the facility (currently anticipated to be 30 years).

This may include such maintenance activities as fence repair, periodic chemical or mechanical weed control, monitoring of improvement success, and re-seeding (in areas where native species establishment falls below the percentages specified in the success criteria described below).

5.3.4 Fire Control

The certificate holder shall implement a fire control plan for wildfire suppression within the mitigation area. The certificate holder shall provide a copy of the fire control plan to the Department before starting habitat enhancement actions. The certificate holder shall include in the plan appropriate fire prevention measures, methods to detect fires that occur and a protocol for fire response and suppression. The certificate holder shall maintain fire control for the life of the facility.

5.4 Success Criteria

Mitigation of the permanent and temporal habitat impacts of the facility may be considered successful if the certificate holder protects and enhances sufficient habitat within the mitigation area to meet the ODFW goals of no net loss of habitat in Categories 2, 3 and 4 and a net benefit in habitat quantity or quality for impacts to habitat in Categories 2. The certificate holder must protect the quantity and quality of habitat within the mitigation area for the life of the facility.

The certificate holder shall determine the actual mitigation area requirements, subject to Department approval, before beginning construction of the facility. If the land selected for the mitigation area does not already contain sufficient habitat in each category to meet these requirements, then the certificate holder must demonstrate improvement of habitat quality sufficient to change lower-value habitat to a higher value (for example, to convert Category 3 habitat to Category 2). The certificate holder may demonstrate improvement of habitat quality based on evidence of indicators such as increased avian use by a diversity of species, more abundant seed production of desirable native bunchgrass, natural recruitment of sagebrush and successful weed control. If the certificate holder cannot demonstrate that the habitat mitigation area is trending toward the habitat quality goals described above within three years, the certificate holder shall investigate the cause of the failure and report the results of the investigation to ODOE within in the monitoring report submitted in the annual report. If the investigation shows that the site is unlikely to reach the required habitat quality, then the certificate holder shall propose an alternate site for Department approval in time for the next planting season. If the investigation shows that the cause of the failure was inadequate implementation of the habitat improvement procedures, then the certificate holder shall repeat those procedures and begin post implementation monitoring as before.

After the Department, in consultation with ODFW, has confirmed that the habitat quantity goals have been achieved, the certificate holder's qualified biologist shall verify, during subsequent monitoring visits, that the mitigation area continues to meet ODFW's "no net loss" and "net benefit" goals described above. The certificate holder's qualified biologist shall recommend remedial action if the habitat quality within the mitigation area falls below the habitat quantity goals listed above. The Department may require other corrective measures and additional monitoring as necessary to ensure that the habitat quantity goals are achieved and maintained.

6.0 Amendment of the Plan

This Habitat Mitigation and Revegetation Plan may be amended from time to time by agreement of the certificate holder and the Department. Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan. The Department shall notify the Council of all amendments, and the Council retains the authority to approve, reject or modify any amendment of this plan agreed to by the Department.

7.0 References

Macdonald, Gerald D., James M. Lamkin, and Roger H. Borine. 1999. Soil Survey of Sherman County, Oregon. Natural Resources Conservation Service, U.S. Department of Agriculture.

Table 3. Seed mixture and rate (Pure Live Seed, PLS, lbs/acre) to be used for revegetation of temporarily disturbed areas.

Common Name	Scientific Name	Pounds (PLS)/ Acre
Luna pubescent wheatgrass *	<i>Thinopyrum intermedium</i>	1
Sherman big bluegrass	<i>Poa ampla</i>	1
Magnar basin wildrye	<i>Leymus cinereus</i>	1
Whitmar beardless wheatgrass	<i>Pseudoroegneria spicata</i> ssp. <i>inermis</i>	2
Small burnett *	<i>Sanguisorba minor</i>	0.5
Alfalfa*	<i>Medicago sativa</i>	1.5
Sandberg bluegrass	<i>Poa secunda</i>	2
Idaho fescue	<i>Festuca idahoensis</i>	2
Basin big sagebrush	<i>Artemisia tridentata</i> ssp. <i>Tridentate</i>	1
TOTAL		12

* non-native species determined by ODFW to be beneficial to wildlife

APPENDIX A

HABITAT MITIGATION PROJECT

GOLDEN HILLS HABITAT MITIGATION PROJECT

OFF-SITE UPLAND GRASSLAND SHRUB-STEPPE ENHANCEMENT

JOHN DAY RIVER BASIN

SITE DESCRIPTION AND PROPOSED MITIGATION MANAGEMENT

John Day River Rim – Upland Grassland Shrub-steppe Enhancement

Current Condition

The mitigation area is located “off-site” approximately 5 miles southeast of the Golden Hills Wind Farm layout (Figure 1). The enhancement area is within approximately 330 acres of fenced rangeland, with large tracts of CRP located immediately to the north and south, and BLM land to the east. The entire property has been extensively grazed historically and recently by livestock, yet harbors mature big sagebrush on the hillside slopes and interior drainage. The site is at the uppermost region of the Willow Springs Canyon tributary of the John Day River, approximately two miles up-drainage of the river (Figure 1). The area selected for enhancement is approximately 21.9 acres within a 40 acre deep-soil parcel (Figure 2). The 21.9 acre enhancement area may be reduced or increased based upon finalized calculations for habitat impacts from the Golden Hills Wind Facility layout. This mitigation parcel includes an upland 1 to 7 degree slope deep-soil area classified by USDA NRCS as 1B Anderly silt loam (1-30 inch typical depth profile; Figure 3). This soil type is considered prime farmland if irrigated. The area has historically been cultivated and seeded to provide better forage for cattle, although currently non-native undesirable cheatgrass dominates the area (see Appendix A photos). Horizontal and vertical vegetative structure, especially of native grasses and forbs, is largely depleted due to livestock grazing impacts (Appendix A). The enhancement area is adjacent to CRP to the west/southwest and BLM to the north, east, and southeast. Areas on all sides of the previously cultivated area have stands of blue bunch wheatgrass, with a variety of forbs including balsamroot, big sagebrush, rigid sagebrush, phlox species, pussy toes, lupine, daisy fleabane, yarrow, and green rabbitbrush (Appendix A).

Potential for Wildlife Habitat Enhancement

This site has the potential to provide more diverse grassland in greater quantity with greater horizontal and vertical structure. If enhanced, the parcel would provide better nesting habitat for grassland bird species, including loggerhead shrikes, and also provide higher quality forage and cover for big game. Limited big game forage such as sandberg bluegrass, bluebunch wheatgrass, and various forbs, would be enhanced with livestock exclusion providing better fall, winter, and early spring rangeland for big game. Summer habitat for ground-nesting birds would also be

enhanced. Enhancement would also likely provide better hunting grounds for raptors as well. Due to the elevational gradient and mixed soil depths, the site has the potential to provide several different quality ecotones.

Proposed Management for Enhancement

Eradication or control of non-desirable invasive/noxious species would be conducted by either using small controlled prescribed burns or spot spraying with herbicide. The area would be reclaimed for desirable grassland/shrub-steppe wildlife habitat using the revegetation methods described in section 4.0 of the Golden Hills Wind Farm revegetation plan for temporarily disturbed upland non-agriculture lands. The entire mitigation parcel would be fenced off and not grazed by domestic livestock. Given the selected mitigation parcel is currently heavily grazed and predominantly cheatgrass, there exists a high potential for successful reclamation of high quality wildlife habitat. In addition, a water catchment (“guzzler”) would be installed providing a water source for wildlife. Prior to any land management change, the ecological condition of the site should be assessed using Oregon protocols for rangeland inventory and evaluation (USDA 2004). This assessment would include photo documentation of the site with additional notes regarding wildlife habitat condition. Post-management site assessment, for example every 5 years, should also be agreed upon by ODFW allowing adaptive management needs.

Advantages

This site lacks public road access and is remote and infrequently disturbed by humans, used largely for hunting by landowner only. The site is approximately 5 miles from the proposed Golden Hills Wind Farm (Figure 1). The landowner has expressed willingness to enter into at least a 25 year conservation easement agreement for the site. The enhancement parcel has suitable soils for successful seeding and is surrounded by existing stands of grassland/shrub-steppe. The area is adjacent to a watershed with riparian habitat to the north, and cliff and riparian corridor habitat of the John Day River to the east; enhancing landscape-level wildlife forage, thermal and security cover, and water. This location presents the opportunity to enhance grassland/shrub-steppe quality and quantity that is limited in availability for wildlife. Successful enhancement would provide greater connectivity between adjacent large tracts of CRP and BLM lands, creating a larger overall mosaic of quality wildlife habitat.

Reference

USDA. 2004. National Range and Pasture Handbook: Amendment 2 600.0401a; Oregon Protocols for Rangeland and Pature / Hayland Inventory and Evaluation. United States Department of Agriculture, Natural Resources Conservation Service, Grazing Lands Technology Institute.

Figure 1. Miller property with mitigation area in relation to the Golden Hills Wind Farm location.

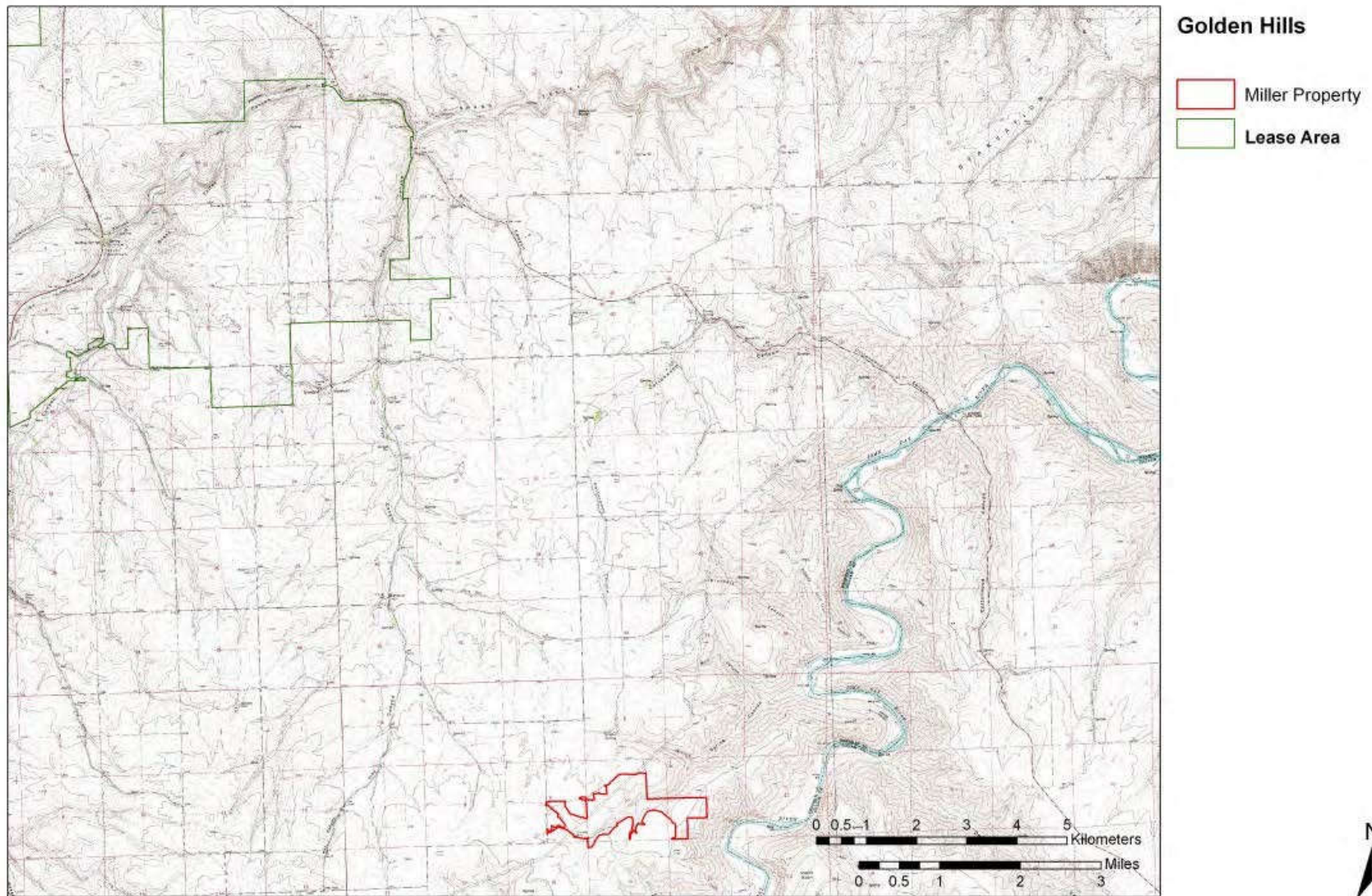


Figure 2. Upland mitigation enhancement parcel within the Miller property rangeland area.

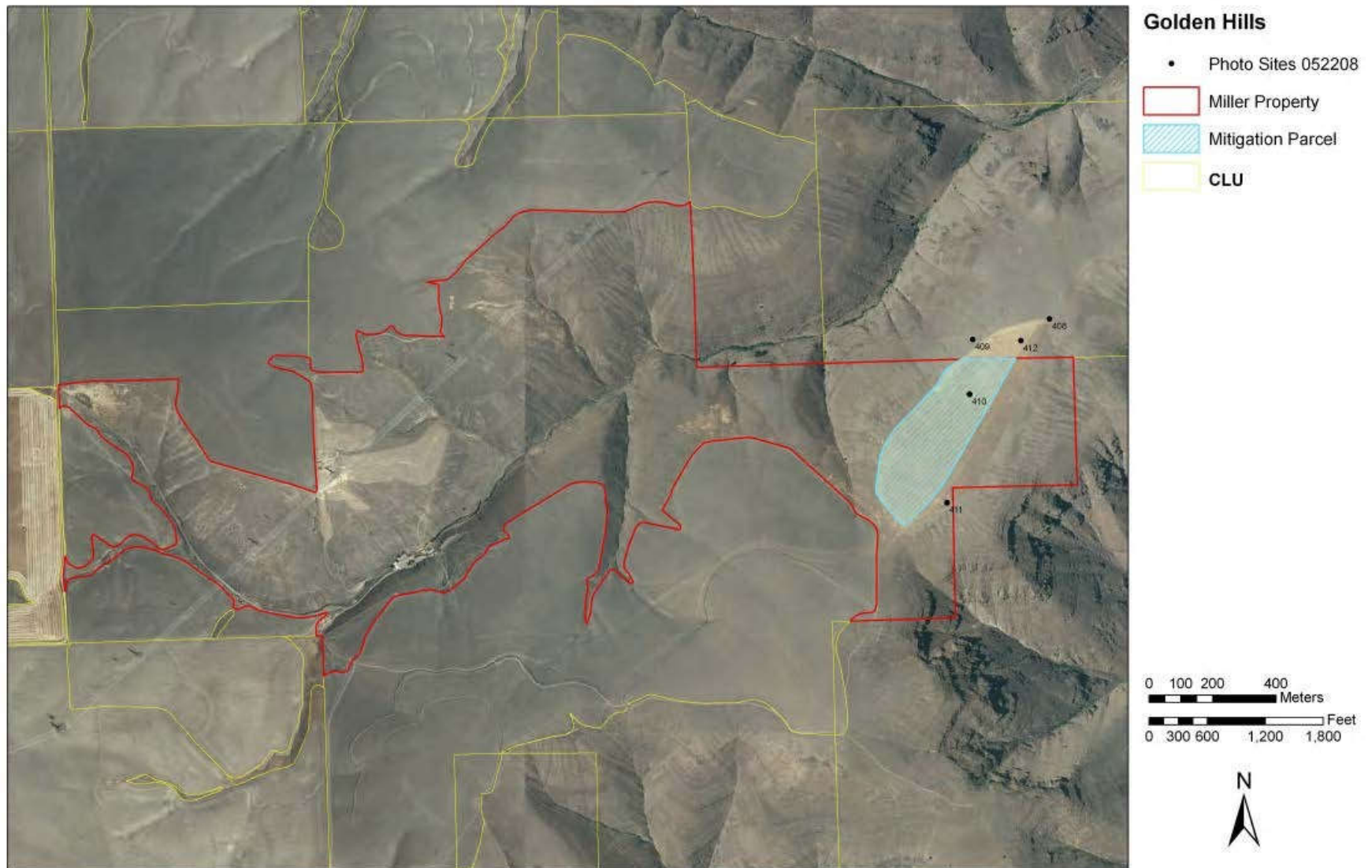
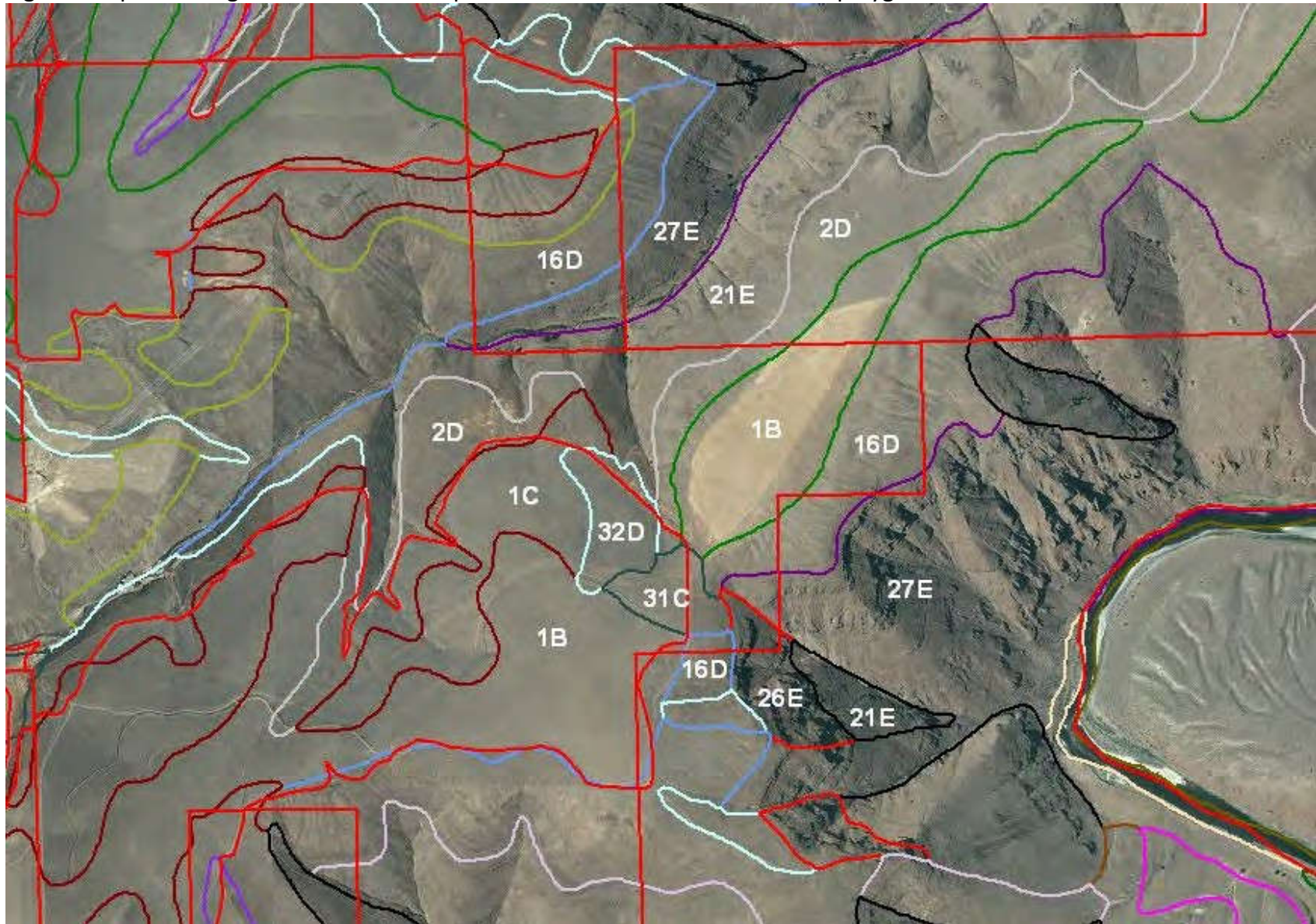


Figure 3. Upland mitigation enhancement parcel USDA NRCS soil classification polygons.



Appendix A (Photo Sites 408-412). Mitigation Enhancement Parcel pictures of vegetation and grazing impacts. PHOTO SITE 408 – ENHANCEMENT PARCEL WITH ADJACENT BUNCHGRASS



PHOTO SITE 409 – ENHANCEMENT PARCEL WITH ADJACENT BUNCHGRASS (FOREGROUND)



PHOTO SITE 410 – ENHANCEMENT PARCEL



PHOTO SITE 411 – ENHANCEMENT PARCEL WITH ADJACENT BUNCHGRASS



PHOTO SITE 412 – ENHANCEMENT PARCEL



PHOTO – ENHANCEMENT PARCEL WITH CATTLE GRAZING MAY 22, 2008



PHOTO – ENHANCEMENT PARCEL WITH ADJACENT SAGEBRUSH/BUNCHGRASS (FOREGROUND) AND DRILL MAY 22, 2008



Attachment E: Raptor Nest Survey Protocol



ENVIRONMENTAL & STATISTICAL CONSULTANTS

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MEMORANDUM

Date: September 11, 2014
To: Golden Hills Wind Farm LLC
From: WEST, Inc.
Subject: Proposed raptor nest survey protocol for Golden Hills Wind Project

Introduction

Golden Hills Wind Farm LLC (Golden Hills) is in the process of requesting an extension of the site certificate for the Golden Hills Wind Project (GHWP) in Sherman County, OR. During review of the application to extend the site certificate, it was recommended by Oregon Department of Fish and Wildlife (ODFW) that additional raptor nest surveys be conducted prior to the start of construction utilizing currently recommended survey protocols to update the data gathered during previous surveys. Raptor nest surveys for the GHWP were last conducted in 2007 and covered the project area boundary and a 2-mile buffer, with an extended survey area to the east of the project along Grass Valley Canyon and the John Day River, which specifically targeted cliff nesting species such as golden eagles and peregrine falcons. This memo was prepared to summarize the proposed survey protocol that Golden Hills intends to implement at the GHWP to satisfy the recommendation of ODFW.

Proposed Raptor Nest Survey Methods

The objective of the raptor nest survey will be to locate nests of raptors that may be subject to disturbance and displacement effects from construction and operation of the GHWP. The initial raptor nest survey will be conducted prior to leaf out to enhance the ability of observers to located nests in deciduous trees and will be timed with the early courtship period for golden eagles. This means the initial survey will likely occur late January or early February. To better document nest occupancy at all nests located during the initial survey, a follow-up survey will be conducted later in the nesting season (~April) when most species should be actively incubating eggs or brooding young.

Nest surveys will be conducted from a helicopter flown at an altitude of tree-top level to approximately 250 ft (76 m) aboveground. Surveys will target all potential raptor nesting substrates, with an emphasis on tree and cliff nesting raptors, such as red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), great-horned owl (*Bubo virginianus*), golden



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eagle (*Aquila chrysaetos*) and peregrine falcon (*Falcon peregrinus*). Other species that nest on the ground, or in cavities, will be recorded if observed, but will not be the focus of surveys as they are difficult to detect from the air. Systematic surveys for all raptor nests will be conducted within 2-miles of proposed turbine corridors, with additional surveys targeting golden eagle nests conducted out to a maximum of 10 miles from proposed turbine corridors. Per the USFWS Eagle Conservation Plan Guidance (ECP Guidance; USFWS 2013), if recent data (i.e., with the past 5 years) are available on spacing of occupied eagle nests for the project-area nesting population, the data may be used to delineate an appropriate survey area boundary, as described in Appendix H of the ECP Guidance. If recent survey data suggest a final survey area buffer that is less than 10 miles, it will be brought to the attention of the USFWS/ODFE prior to implementation.

The Oregon Eagle Foundation (OEF) has been conducting surveys for eagle nests and monitoring known golden eagle nests throughout Oregon for several years (Isaacs 2013). Prior to implementing surveys, OEF will be contacted regarding the location of known nesting sites and recent monitoring efforts in the vicinity of the GHWP. Coordination with OEF, and potentially others (e.g., ODFW, other developers), will be used to minimize survey overlap/duplication and reduce potential disturbance from survey efforts at known nest sites. To the extent practicable, surveys will follow the methods described in the USFWS Eagle Conservation Plan Guidance document (USFWS 2013). The initial survey will include a detailed search of all potentially suitable nesting substrates, while the second survey will only target nests identified during the initial survey. New nests identified while traveling between known sites will also be documented during the second survey.

When a nest is observed, the helicopter will be moved to a position where nest status and species present can be determined. Efforts will be made to minimize disturbance to breeding raptors; generally, the greatest possible distance at which the species can be identified will be maintained, with distances varying depending upon nest location and wind conditions. Data recorded for each nest location will include species occupying the nest, nest status (inactive, eggs present, incubating, young present, adult present, unknown, or other), nest substrate (tree, shrub, rocky outcrop, cliff, or power line), number of eggs or young present, time and date of observation, and the nest location (recorded with handheld GPS units). Locations of inactive nests will be recorded and mapped as they may be occupied during subsequent years.

References

- Isaacs, F.B. 2013. Golden eagles (*Aquila chrysaetos*) nesting in Oregon 2011-2013: Draft Annual Report, 31 December 2013. Oregon Eagle Foundation, Inc., Klamath Falls, Oregon. USA.
- US Fish and Wildlife Service (USFWS). 2013. Eagle Conservation Plan Guidance. Module 1 - Land-Based Wind Energy. Version 2. Division of Migratory Bird Management, USFWS. April 2013. Available online at: [http://www.fws.gov/migratorybirds/Eagle Conservation Plan Guidance-Module%201.pdf](http://www.fws.gov/migratorybirds/Eagle%20Conservation%20Plan%20Guidance-Module%201.pdf)

Attachment F: Draft Wildlife Monitoring and ~~Adaptive Management~~Mitigation Plan

ATTACHMENT **AF**

GOLDEN HILLS WIND PROJECT

DRAFT AMENDED WILDLIFE MONITORING AND MITIGATION PLAN

This plan describes wildlife monitoring that the certificate holder shall conduct during operation of the Golden Hills Wind Project (GHWP).¹ The monitoring objectives are to determine whether operation of the facility causes significant fatalities of birds and bats and to determine whether the facility results in a loss of habitat quality. Golden Hills wind power project consists of a number of turbine strings, with up to ~~267-125~~ turbines. Each turbine ~~will~~ could likely either be a 1.65 MW or 2.5 4.2 MW in capacity turbine. Hub height of the turbines will be up to approximately ~~80-123~~ (m) tall with a rotor diameter of up to 150m either 82m (1.65 MW) or 96m (2.5 MW). Up to six permanent meteorological towers will be built. The turbines will be linked by access roads and a 34.5-kV transmission line. The 62-mile-long power collection system will be largely underground, but might be overhead in some locations.

The certificate holder shall use experienced personnel to manage the monitoring required under this plan and properly trained personnel to conduct the monitoring, subject to approval by the Oregon Department of Energy (Department) as to professional qualifications. For all components of this plan except the Raptor Nesting Surveys and the Wildlife Incident Response and Handling System, the certificate holder shall direct a qualified independent third-party biological monitor, as approved by the Department, to perform monitoring tasks.

The Wildlife Monitoring and Mitigation Plan for the GHWP has the following components:

- 1) Fatality Monitoring Program including:
 - a) Removal Trials
 - b) Searcher Efficiency Trials
 - c) Fatality Monitoring Search Protocol
 - d) Statistical Analysis
- 2) Raptor Nesting Surveys
- 3) Avian Use and Behavior Surveys
- 4) Wildlife Incident Response and Handling System

Following is a discussion of the components of the monitoring plan, statistical analysis methods for fatality data, data reporting and potential mitigation.

The selection of the mitigation actions that the certificate holder may be required to implement under this plan should allow for flexibility in creating appropriate responses to monitoring results that cannot be known in advance. If the Department determines that

¹ This plan is incorporated by reference in the site certificate for the GHWP and must be understood in that context. It is not a “stand-alone” document. This plan does not contain all mitigation required of the certificate holder.

mitigation is needed, the certificate holder shall propose appropriate mitigation actions to the Department and shall carry out mitigation actions approved by the Department, subject to review by the Oregon Energy Facility Council (Council).

1. Fatality Monitoring

(a) Definitions and Methods

Seasons

This plan uses the following dates for defining seasons:

Season	Dates
Spring Migration	March 16 to May 15
Summer/Breeding	May 16 to August 15
Fall Migration	August 16 to October 31
Winter	November 1 to March 15

Search Plots

The certificate holder shall conduct fatality monitoring within search plots. The certificate holder, in consultation with the Oregon Department of Fish and Wildlife (ODFW), will select search plots based on a systematic sampling design that ensures the selected search plots are representative of the habitat in different parts of the site. Each search plot will contain one turbine. Search plots will be square or circular. Circular search plots will be centered on the turbine location and will have a radius equal to the maximum blade tip height of the turbine contained within the plot. "Maximum blade tip height" is the turbine hub-height plus one-half the rotor diameter. Square search plots will be of sufficient size to contain a circular search plot as described above.

The certificate holder shall provide maps of the search plots to the Department and ODFW before beginning fatality monitoring at the facility. The certificate holder will use the same search plots for each search conducted during each monitoring year. During the second monitoring year, new search plots will be selected from the turbines not sampled during the first monitoring year.

Sample Size

The sample size for fatality monitoring is the number of turbines searched per monitoring year. The certificate holder shall conduct fatality monitoring during the each monitoring year in search plots at 1/3 of the turbines. If fewer than 150 turbines are built, GHWF shall monitor a minimum of 50 turbines.

1 ~~As described in Exhibit B of the ASC, GHWF may choose a combination of smaller~~
2 ~~turbines with rotor diameter of 82 meters, or larger turbines with rotor diameter greater than~~
3 ~~82 meters.~~ If the final design of GHWP includes ~~both large and small turbines~~ more than one
4 wind turbine model, then GHWF shall, before beginning fatality monitoring, consult with an
5 independent expert with experience in statistical analysis of avian fatality data to determine
6 whether it would be possible to design a 50-turbine sample with a sufficient number of turbines
7 in each size class to allow statistical comparison of fatality rates for all birds as a group. GHWF
8 shall submit the expert's written analysis to the Department. If the analysis shows that a
9 comparison study is possible and if the Department approves, GHWF shall sample the
10 appropriate number of turbines in each class and conduct the comparison study. GHWF may
11 choose to sample more than 50 turbines in a each monitoring year, if a larger sample size would
12 allow the comparison study to be done; however, the monitored turbines shall include
13 representation from each turbine model option used at the facility in order to compare, as
14 possible, fatalities between turbine models.

15 Scheduling and Sampling Frequency

16
17
18 Fatality monitoring will begin upon the commencement of commercial operation of the
19 facility.

20
21 The first fatality monitoring year will commence on the first day of the month following
22 the commercial operation date of the facility and will conclude twelve months later (for
23 example, if commercial operation begins in October of 2008, the monitoring year will
24 commence on November 1, 2008, and conclude on October 31, 2009). Subsequent monitoring
25 years will follow the same schedule (for example, the second monitoring year would begin
26 November 1 of the year in which monitoring is performed, and conclude October 31 of the
27 following year)

28
29 In each monitoring year, the certificate holder shall conduct fatality-monitoring searches
30 at the rates of frequency shown below. Over the course of one monitoring year, the certificate
31 holder would conduct 16 searches², as follows:

Season	Frequency
Spring Migration	2 searches per month (4 searches)
Summer/Breeding	1 search per month (3 searches)
Fall Migration	2 searches per month (5 searches)
Winter	1 search per month (4 searches)

33 Duration of Fatality Monitoring

34
35
36 GHWF shall perform one complete monitoring cycle during its first full year of
37 operation. At the end of the first year of monitoring, GHWF will report the results for joint

² GHWF may omit the searches on some turbines, if searches are not possible due to safety reasons .

1 evaluation by ODOE, GHWF and ODFW. In the evaluation, results for GHWP will be compared
2 with the threshold table in section 1(g) of this plan, and with analogous fatality monitoring
3 results for Klondike III, Biglow Canyon, Combine Hills, Nine Canyon, Hopkins Ridge and, if
4 available, Leaning Juniper. Fatality monitoring results from other wind power facilities in the
5 Columbia Basin may also be included, if available. If fatality results for the first year of
6 monitoring at GHWP do not exceed any of the thresholds of concern and are within the range
7 of all results from the facilities listed above, then GHWF will perform its second year of
8 monitoring in year 5 of operations.

9
10 Otherwise, GHWF shall propose additional mitigation within 6 months, for ODOE and
11 ODFW review. Alternately, GHWF may opt to perform a second year of fatality monitoring
12 immediately if it believes that the results of year 1 monitoring were anomalous. If GHWF takes
13 this option, then it will still perform the monitoring in year 5 of operations described above.

14 15 Meteorological Towers

16
17 ~~The facility will most likely use~~The facility must be built using non-guyed meteorological
18 towers. Non-guyed towers are known to cause little if any bird and bat mortality; however, if
19 the certificate holder uses the largest meteorological tower option (123 m) approved in
20 Amendment 5, due to the lack of installed towers of this height and any data on avian and bat
21 fatalities associated with those towers, the monitoring studies shall include all permanent
22 meteorological towers built at 123 m.

23
24 Data from other wind facilities has shown that shorter towers are unlikely to cause bird
25 and bat mortality, and if the certificate holder uses towers under 123 m, monitoring is not
26 required at such towers. Therefore, monitoring will not occur at non-guyed meteorological
27 towers. If the meteorological towers are guyed, the certificate holder shall search all towers on
28 the same monitoring schedule as fatality monitoring. The certificate holder will use circular
29 search plots. The radius of the circular search plots will extend a minimum of 5 meters beyond
30 the most distant guy wire anchor point.

31 32 (b) Removal Trials

33
34 The objective of the removal trials is to estimate the length of time avian and bat
35 carcasses remain in the search area. Carcass removal studies will be conducted during each
36 season in the vicinity of the search plots. Estimates of carcass removal rates will be used to
37 adjust carcass counts for removal bias. "Carcass removal" is the disappearance of a carcass
38 from the search area due to predation, scavenging or other means such as farming activity.
39 Removal rates will be estimated by size class, habitat and season.

40
41 During the first year, the certificate holder shall conduct carcass removal trials within
42 each of the seasons defined above during the years in which fatality monitoring occurs. During
43 the first year in which fatality monitoring occurs, trials will occur in at least eight different
44 calendar weeks in a year, with at least one calendar week between starting dates. Trials will be

spread throughout the year to incorporate the effects of varying weather, farming practices and scavenger densities. At least two trials will be started in each season. Each trial will use at least 6 carcasses. For each trial, 3 small bird carcasses and 3 large bird carcasses will be distributed in cultivated agriculture habitat and 3 small bird carcasses and 3 large bird carcasses will be distributed in non-cultivated habitat (grassland/shrub-steppe and CRP). In a year, approximately 48 carcasses will be placed in cultivated agriculture and 48 carcasses in non-cultivated grassland/shrub-steppe and CRP for a total of about 96 trial carcasses. The number of removal trials may be adjusted up or down during the second year of fatality monitoring, subject to approval by the Department, if the certificate holder can demonstrate that the calculation of fatality rates will continue to have statistical validity with the new sample size.

The “small bird” size class will use carcasses of house sparrows, starlings, commercially available game bird chicks or legally obtained native birds to simulate passerines. The “large bird” size class will use carcasses of raptors provided by agencies, commercially available adult game birds or cryptically colored chickens to simulate raptors, game birds and waterfowl. If fresh bat carcasses are available, they may also be used.

To avoid confusion with turbine-related fatalities, planted carcasses will not be placed in fatality monitoring search plots. Planted carcasses will be placed in the vicinity of search plots but not so near as to attract scavengers to the search plots. The planted carcasses will be located randomly within the carcass removal trial plots.

Carcasses will be placed in a variety of postures to simulate a range of conditions. For example, birds will be: 1) placed in an exposed posture (e.g., thrown over the shoulder), 2) hidden to simulate a crippled bird (e.g., placed beneath a shrub or tuft of grass) and, 3) partially hidden. Trial carcasses will be marked discreetly for recognition by searchers and other personnel. Trial carcasses will be left at the location until the end of the carcass removal trial.

It is expected that carcasses will be checked as follows, although actual intervals may vary. Carcasses will be checked for a period of 40 days to determine removal rates. They will be checked about every day for the first 4 days, and then on day 7, day 10, day 14, day 20, day 30 and day 40. This schedule may vary depending on weather and coordination with the other survey work. At the end of the 40-day period, the trial carcasses and scattered feathers will be removed.

(c) Searcher Efficiency Trials

The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities that searchers are able to find. The certificate holder shall conduct searcher efficiency trials on the fatality-monitoring search plots in both grassland/shrub-steppe and cultivated agriculture habitat types. Searcher efficiency will be estimated by size class, habitat type, and season. Estimates of searcher efficiency will be used to adjust carcass counts for detection bias.

1 Searcher efficiency trials will be conducted in each season as defined above, during the
2 years in which the fatality monitoring occurs. Trials will be spread throughout the year to
3 incorporate the effects of varying weather, farming practices and scavenger densities. At least
4 two trials will be conducted in each season. Each trial will use about 12 carcasses, although the
5 number will be variable so that the searcher will not know the total number of trial carcasses
6 being used in any trial. For each trial, both small bird and large bird carcasses will be used in
7 about equal numbers. "Small bird" and "large bird" size classes and carcass selection are as
8 described above for the removal trials. An equal proportion of the trial carcasses will be
9 distributed in cultivated agriculture habitat and in non-cultivated habitat (grassland/shrub
10 steppe and CRP). In a year, about 48 carcasses will be placed in cultivated agriculture and about
11 48 in non-cultivated grassland/shrub steppe and CRP for a total of about 96 trial carcasses. The
12 number of searcher efficiency trials may be reduced to one per season during the second year
13 of fatality monitoring, subject to approval by the Department, if the certificate holder can
14 demonstrate that the calculation of fatality rates will continue to have statistical validity with
15 the reduced sample size.

16
17 Personnel conducting searches will not know in advance when trials are conducted; nor
18 will they know the location of the trial carcasses. If suitable trial carcasses are available, trials
19 during the fall season will include several small brown birds to simulate bat carcasses. Legally
20 obtained bat carcasses will be used if available.

21
22 On the day of a standardized fatality monitoring search (described below) but before
23 the beginning of the search, efficiency trial carcasses will be placed at random locations within
24 areas to be searched. If scavengers appear attracted by placement of carcasses, the carcasses
25 will be distributed before dawn.

26
27 Searcher efficiency trials will be spread over the entire season to incorporate effects of
28 varying weather and vegetation growth. Carcasses will be placed in a variety of postures to
29 simulate a range of conditions. For example, birds will be: 1) placed in an exposed posture
30 (thrown over the shoulder), 2) hidden to simulate a crippled bird and 3) partially hidden.

31
32 Each non-domestic carcass will be discreetly marked so that it can be identified as an
33 efficiency trial carcass after it is found. The number and location of the efficiency trial carcasses
34 found during the carcass search will be recorded. The number of efficiency trial carcasses
35 available for detection during each trial will be determined immediately after the trial by the
36 person responsible for distributing the carcasses.

37
38 If new searchers are brought into the search team, additional detection trials will be
39 conducted to ensure that detection rates incorporate searcher differences. If GHWF does not
40 perform a second year of monitoring until the 5th year of operation, then searcher efficiency
41 and removal trials shall be repeated to ensure that the removal and detection rates used to
42 estimate overall fatalities account for new searchers and changed predation or scavenger
43 behavior patterns.

1 (d) Coordination with the other Wind Projects
2

3 It is anticipated that other wind projects in Sherman County may be monitored at the
4 same time that Golden Hills is monitored. If these projects are permitted through EFSEC, they
5 will require similar wildlife monitoring. Subject to the approval of both certificate holders and
6 the Department, the number of trials at each site and the number of trial carcasses used at
7 each site can be reduced by combining the removal data and efficiency data from multiple
8 facilities, if the certificate holder can demonstrate that the calculation of fatality rates will
9 continue to have statistical validity for both facilities and that combining the data will not affect
10 any other requirements of the monitoring plans for either facility.
11

12 (e) Fatality Monitoring Search Protocol
13

14 The objective of fatality monitoring is to estimate the number of bird and bat fatalities
15 that are attributable to facility operation and associated variances. The certificate holder shall
16 conduct fatality monitoring using standardized carcass searches.
17

18 The certificate holder shall use a worst-case analysis to resolve any uncertainty in the
19 results and to determine whether the data indicate that additional mitigation should be
20 considered. The Department may require additional, targeted monitoring if the data indicate
21 the potential for significant impacts that cannot be addressed by worst-case analysis and
22 appropriate mitigation.
23

24 The certificate holder shall estimate the number of avian and bat fatalities attributable
25 to operation of the facility based on the number of avian and bat fatalities found at the facility
26 site. All carcasses located within areas surveyed, regardless of species, will be recorded and, if
27 possible, a cause of death determined based on blind necropsy results. If a different cause of
28 death is not apparent, the fatality will be attributed to facility operation. The total number of
29 avian and bat carcasses will be estimated by adjusting for removal and searcher efficiency bias.
30

31 Personnel trained in proper search techniques ("the searchers") will conduct the carcass
32 searches by walking parallel transects within the search plots.³ Transects will be initially set at 6
33 meters apart in the area to be searched. A searcher will walk at a rate of about 45 to 60 meters
34 per minute along each transect searching both sides out to three meters for casualties. Search
35 area and speed may be adjusted by habitat type after evaluation of the first searcher efficiency
36 trial. The searchers will record the condition of each carcass found, using the following
37 condition categories:
38

- 39 ■ Intact – a carcass that is completely intact, is not badly decomposed and shows no
40 sign of being fed upon by a predator or scavenger

³ Where search plots are adjacent, the search area may be rectangular.

- Scavenged – an entire carcass that shows signs of being fed upon by a predator or scavenger, or portions of a carcass in one location (e.g., wings, skeletal remains, legs, pieces of skin, etc.)
- Feather Spot – 10 or more feathers at one location indicating predation or scavenging or 2 or more primary feathers

All carcasses (avian and bat) found during the standardized carcass searches will be photographed as found, recorded and labeled with a unique number. Distance from observer to the carcass will be measured (to the nearest 0.25 meters), as will the perpendicular distance from the transect line to the carcass. Each carcass will be bagged and frozen for future reference and possible necropsy. A copy of the data sheet for each carcass will be kept with the carcass at all times. For each carcass found, searchers will record species, sex and age when possible, date and time collected, location, condition (e.g., intact, scavenged, feather spot) and any comments that may indicate cause of death. Searchers will map the find on a detailed map of the search area showing the location of the wind turbines and associated facilities such as power lines. The certificate holder shall coordinate collection of state endangered, threatened, sensitive or other state protected species with ODFW. The certificate holder shall coordinate collection of federally-listed endangered or threatened species and Migratory Bird Treaty Act protected avian species with the U.S. Fish and Wildlife Service (USFWS). The certificate holder shall obtain appropriate collection permits from ODFW and USFWS.

The searchers might discover carcasses incidental to formal carcass searches (e.g., while driving within the project area). For each incidentally discovered carcass, the searcher shall identify, photograph, record data and collect the carcass as would be done for carcasses within the formal search sample during scheduled searches

If the incidentally discovered carcass is found within a formal search plot, the fatality data will be included in the calculation of fatality rates. If the incidentally discovered carcass is found outside a formal search plot, the data will be reported separately.

The certificate holder shall coordinate collection of incidentally discovered state endangered, threatened, sensitive or other state protected species with ODFW. The certificate holder shall coordinate collection of incidentally discovered federally-listed endangered or threatened species and Migratory Bird Treaty Act protected avian species with the USFWS.

The certificate holder shall develop and follow a protocol for handling injured birds. Any injured native birds found on the facility site will be carefully captured by a trained project biologist or technician and transported to Jean Cypher (wildlife rehabilitator) in The Dalles, the Blue Mountain Wildlife Rehabilitation Center in Pendleton or the Audubon Bird Care Center in Portland in a timely fashion.⁴ The certificate holder shall pay costs, if any are charged, for time and expenses related to care and rehabilitation of injured native birds found on the site, unless the cause of injury is clearly demonstrated to be unrelated to the facility operations.

⁴ The people and centers listed here may be changed with Department approval.

(f) Statistical Methods for Fatality Estimates

The estimate of the total number of wind facility-related fatalities is based on:

- (1) The observed number of carcasses found during standardized searches during the two monitoring years for which the cause of death is attributed to the facility.⁵
- (2) Searcher efficiency expressed as the proportion of planted carcasses found by searchers.
- (3) Non-removal rates expressed as the estimated average probability a carcass is expected to remain in the study area and be available for detection by the searchers during the entire survey period.

Definition of Variables

The following variables are used in the equations below:

c_i	the number of carcasses detected at plot i for the study period of interest (e.g., one year) for which the cause of death is either unknown or is attributed to the facility
n	the number of search plots
k	the number of turbines searched (includes the turbines centered within each search plot and a proportion of the number of turbines adjacent to search plots to account for the effect of adjacent turbines on the 90-meter search plot buffer area)
\bar{c}	the average number of carcasses observed per turbine per year
s	the number of carcasses used in removal trials
s_c	the number of carcasses in removal trials that remain in the study area after 40 days
se	standard error (square of the sample variance of the mean)
t_i	the time (days) a carcass remains in the study area before it is removed
\bar{t}	the average time (days) a carcass remains in the study area before it is removed
d	the total number of carcasses placed in searcher efficiency trials
p	the estimated proportion of detectable carcasses found by searchers
l	the average interval between searches in days
$\hat{\pi}$	the estimated probability that a carcass is both available to be found during a search and is found
m_t	the estimated annual average number of fatalities per turbine per year, adjusted for removal and observer detection bias
C	nameplate energy output of turbine in megawatts (MW)

⁵ If a different cause of death is not apparent, the fatality will be attributed to facility operation.

Observed Number of Carcasses

The estimated average number of carcasses (\bar{c}) observed per turbine per year is:

$$\bar{c} = \frac{\sum_{i=1}^n c_i}{k} . \quad (1)$$

Estimation of Carcass Removal

Estimates of carcass removal are used to adjust carcass counts for removal bias. Mean carcass removal time (\bar{t}) is the average length of time a carcass remains at the site before it is removed:

$$\bar{t} = \frac{\sum_{i=1}^s t_i}{s - s_c} . \quad (2)$$

This estimator is the maximum likelihood estimator assuming the removal times follow an exponential distribution and there is right-censoring of data. Any trial carcasses still remaining at 40 days are collected, yielding censored observations at 40 days. If all trial carcasses are removed before the end of the trial, then s_c is 0, and \bar{t} is just the arithmetic average of the removal times. Removal rates will be estimated by carcass size (small and large) and season.

Estimation of Observer Detection Rates

Observer detection rates (i.e., searcher efficiency rates) are expressed as p , the proportion of trial carcasses that are detected by searchers. Observer detection rates will be estimated by carcass size and season.

Estimation of Facility-Related Fatality Rates

The estimated per turbine annual fatality rate (m_t) is calculated by:

$$m_t = \frac{\bar{c}}{\hat{\pi}} , \quad (3)$$

where $\hat{\pi}$ includes adjustments for both carcass removal (from scavenging and other means) and observer detection bias assuming that the carcass removal times t_i follow an exponential distribution unless a different assumption about carcass removal is made with the approval of the Department. Under these assumptions, this detection probability is estimated by:

$$\hat{\pi} = \frac{\bar{t} \cdot p}{I} \cdot \left[\frac{\exp\left(\frac{I}{\bar{t}}\right) - 1}{\exp\left(\frac{I}{\bar{t}}\right) - 1 + p} \right]. \quad (4)$$

The estimated per MW annual fatality rate (m) is calculated by:

$$m = \frac{m_t}{C}. \quad (5)$$

The certificate holder shall calculate fatality estimates for: (1) all birds, (2) small birds, (3) large birds, (4) raptors, (5) target grassland birds, (6) nocturnal avian migrants, 7) avian State Sensitive Species listed under OAR 635-100-0040, and 8) bats. The final reported estimates of m , associated standard errors and 90% confidence intervals will be calculated using bootstrapping (Manly 1997). Bootstrapping is a computer simulation technique that is useful for calculating point estimates, variances and confidence intervals for complicated test statistics. For each iteration of the bootstrap, the plots will be sampled with replacement, trial carcasses will be sampled with replacement and \bar{c} , \bar{t} , p , $\hat{\pi}$ and m will be calculated. A total of 5,000 bootstrap iterations will be used. The reported estimates will be the means of the 5,000 bootstrap estimates. The standard deviation of the bootstrap estimates is the estimated standard error. The lower 5th and upper 95th percentiles of the 5000 bootstrap estimates are estimates of the lower limit and upper limit of 90% confidence intervals.

Nocturnal Migrant and Bat Fatalities

Differences in observed nocturnal avian migrant and bat fatality rates for lit turbines, unlit turbines that are adjacent to lit turbines, and unlit turbines that are not adjacent to lit turbines will be compared graphically and statistically.

(g) Mitigation

Mitigation may be appropriate if analysis of the fatality data collected after the first monitoring year shows fatality rates for avian species that exceed a threshold of concern. For the purpose of determining whether a threshold has been exceeded, the certificate holder shall calculate the average annual fatality rates for the species groups after the initial two years of monitoring. Based on current knowledge of the species that are likely to use the habitat in the area of the facility, the following thresholds apply to the GHWP:

Species Group	Threshold of Concern (fatalities per MW)
Raptors (All eagles, hawks, falcons and owls, including burrowing owls.)	0.09
Raptor species of special concern (Swainson's hawk, ferruginous hawk, peregrine falcon, golden eagle, bald eagle, burrowing owl and any federal threatened or endangered raptor species.)	0.06
Target grassland birds (All native bird species that rely on grassland habitat and are either resident species, occurring year round, or species that nest in the area, excluding horned lark, burrowing owl and northern harrier.)	0.59
State sensitive avian species listed under OAR 635-100-0040 (Excluding raptors listed above.)	0.20
Bat species as a group	2.50
Guyed Meteorological Tower Mortality	
Raptor T&E species and raptor species of special concern, as a group (Swainson's hawk, ferruginous hawk, golden eagle and burrowing owl; bald eagle, peregrine falcon, and any other federal threatened or endangered raptor species)	0.20/guyed tower
Avian State Sensitive Species listed under OAR 635-100-0040 (Excluding raptors)	0.20/guyed tower

Before the end of the first monitoring year, GHWF shall form a technical advisory committee (TAC) that will include at least GHWF, ODOE and ODFW. Other stakeholders, such as USFWS, may also serve on the TAC. The TAC shall consider the fatality monitoring results from Klondike III, Biglow Canyon, Nine Canyon, Leaning Juniper, Hopkins Ridge, Combine Hills, and other wind projects in Sherman County if available, and determine if the thresholds should be adjusted.

In addition, mitigation may be appropriate if fatality rates for individual species (especially State Sensitive Species) are higher than expected and at a level of biological concern. If the data show that a threshold of concern for a species group has been exceeded or that the fatality rate for any individual species is at a level of biological concern, mitigation shall be required if the Department determines that mitigation is appropriate based on analysis of the data and any other significant information available at the time. If mitigation is appropriate, the certificate holder, in consultation with ODFW, shall propose mitigation measures designed to benefit the affected species. This may take into consideration whether mitigation required or provided for other impacts, such as raptor nesting or grassland bird displacement, would also benefit the affected species.

The certificate holder shall implement mitigation as approved by the Council. The Department may recommend additional, targeted data collection if the need for mitigation is unclear based on the information available at the time. The certificate holder shall implement such data collection as approved by the Council.

GOLDEN HILLS WIND PROJECT

FINAL ORDER on Amendment 5 – TBD

Attachment F: Wildlife Monitoring and Mitigation Plan

Page F-12

Mitigation shall be designed to benefit the affected species group. Mitigation may include, but is not limited to, protection of nesting habitat for the affected group of native species through a conservation easement or similar agreement. Tracts of land that are intact and functional for wildlife are preferable to degraded habitat areas. Preference should be given to protection of land that would otherwise be subject to development or use that would diminish the wildlife value of the land. In addition, mitigation measures might include: enhancement of the protected tract by weed removal and control; increasing the diversity of native grasses and forbs; planting sagebrush or other shrubs; constructing and maintaining artificial nest structures for raptors; reducing cattle grazing; improving wildfire response; and local research that would aid in understanding more about the species and conservation needs.

If the threshold for bats species as a group is exceeded, the certificate holder shall contribute to Bat Conservation International or to a Pacific Northwest bat conservation group (\$10,000 per year for three years) to fund new or ongoing research in the Pacific Northwest to better understand impacts to the bat species impacted by the facility and to develop possible ways to reduce impacts to the affected species.

In addition, mitigation may be appropriate if fatality rates for a State Sensitive bat species listed under OAR 635-100-0040 are higher than expected and at a level of concern. If the data show that a threshold of concern for a species group has been exceeded or that the fatality rate for any individual species is at a level of concern, mitigation shall be required if the Department determines that mitigation is appropriate based on analysis of the data and any other significant information available at the time. If mitigation is appropriate, the certificate holder, in consultation with ODFW, shall propose mitigation measures designed to benefit the affected species. The certificate holder shall implement mitigation as approved by the Council.

2. Raptor Nest Surveys

The objectives of raptor nest surveys are to estimate the size of the local breeding populations of tree or other above-ground-nesting raptor species in the vicinity of the facility and to determine whether operation of the facility results in a reduction of nesting activity or nesting success in the local populations of the following raptor species: Swainson's hawk, ferruginous hawk and golden eagle. The certificate holder shall direct a qualified biologist, approved by the Department, to conduct the raptor nest surveys. The certificate holder may select other qualified biologists to conduct the raptor nest surveys, subject to Department approval.

(a) Survey Protocol

For the species listed above, aerial and ground surveys will be used to gather nest success data on active nests, nests with young and young fledged. The certificate holder will share the data with state and federal biologists. The certificate holder shall conduct two years of post-construction raptor nest surveys for the completed facility during the sensitive nesting

1 and breeding season. One year of post-construction surveys will be done in the first nesting
2 season after construction is completed. The second year of post-construction surveys will be
3 done at a time recommended by the certificate holder and approved by the Department. The
4 certificate holder may collaborate with other certificate holders in the vicinity of the facility in
5 the development of useful information about future impacts on raptor nesting activity and
6 nesting success.

7
8 Prior to the raptor nesting surveys, the certificate holder shall review the locations of
9 known raptor nests based on the GHWP, the Biglow Canyon Wind Farm and Klondike Wind
10 Project pre-construction surveys as well as any nest survey data collected after construction. All
11 known nest sites and any new nests observed within the GCWF site and within two miles of the
12 GHWP site will be given identification numbers. Nest locations will be recorded on U.S.
13 Geological Survey 7.5-minute quadrangle maps. Global positioning system coordinates will be
14 recorded for each nest and integrated with the baseline database. Locations of inactive nests
15 will also be recorded as they may become occupied during future years.

16
17 During each raptor nesting monitoring year, the certificate holder shall conduct a
18 minimum of one helicopter survey in late May or early June within the GHWP site and a 2-mile
19 zone around the turbines to determine nest occupancy. Determining nest occupancy will likely
20 require two visits to each nest: The second visit may be done by air or by ground as
21 appropriate. For occupied nests of the species identified above, the certificate holder shall
22 determine nesting success by a minimum of one ground visit to determine species, number of
23 young and nesting success. "Nesting success" means that the young have successfully fledged
24 (the young are independent of the core nest site). Nests that cannot be monitored due to the
25 landowner denying access will be checked from a distance where feasible.

26 27 (b) Mitigation

28
29 The certificate holder shall analyze the raptor nesting data collected after two
30 monitoring years to determine whether a reduction in either nesting success or nest use has
31 occurred in the vicinity of the GHWP. If the analysis indicates a reduction in nesting success by
32 Swainson's hawk, ferruginous hawk or golden eagle within two miles of the facility (including
33 the area within the GHWP site), then the certificate holder shall propose appropriate mitigation
34 and shall implement mitigation as approved by the Council. At a minimum, if the analysis shows
35 that any of these species has abandoned a nest territory within the facility site or within ½ mile
36 of the facility site, or has not fledged any young over the two survey years within the facility site
37 or within ½ mile of the facility site, the certificate holder shall assume the abandonment or
38 unsuccessful fledging is the result of the facility unless another cause can be demonstrated
39 convincingly. If the GHWP facility and the Klondike III facility are both required to provide
40 mitigation for the same nest, the two certificate holders shall coordinate the required
41 mitigation with the approval of the Department.

42
43 Given the very low buteo nesting densities in the area, statistical power to detect a
44 relationship between distance from a wind turbine and nesting parameters (e.g., number of

1 fledglings per reproductive pair) will be very low. Therefore, impacts may have to be judged
2 based on trends in the data, results from other wind energy facility monitoring studies and
3 literature on what is known regarding the populations in the region.
4

5 If the analysis shows that mitigation is appropriate, the certificate holder shall propose
6 mitigation for the affected species in consultation with the Department and ODFW, and shall
7 implement mitigation as approved by the Council. Mitigation should be designed to benefit the
8 affected species or contribute to overall scientific knowledge and understanding of what causes
9 nest abandonment or nest failure. Mitigation may be designed to proceed in phases over
10 several years. It may include, but is not limited to, additional raptor nest monitoring, protection
11 of natural nest sites from human disturbance or cattle activity (preferably within the general
12 area of the facility), or participation in research projects designed to improve scientific
13 understanding of the needs of the affected species. Mitigation may take into consideration
14 whether mitigation required or provided for other impacts, such as fatality impacts or grassland
15 bird displacement, would also benefit the raptor species whose nesting success was adversely
16 affected.
17

18 (c) Long-term Raptor Nest Monitoring and Mitigation 19

20 In addition to the two years of post-construction raptor nest surveys described in
21 subsection (a), GHWF shall conduct long-term raptor nest surveys at five year intervals for the
22 life of the facility. GHWF shall conduct the first long-term raptor nest survey in the ninth year
23 after construction is completed. In conducting long-term surveys, GHWF shall follow the same
24 survey protocols as described above in subsection (a) unless GHWF proposes an alternative
25 protocol that is approved by the Department. In developing an alternative protocol, GHWF shall
26 consult with ODFW.
27

28 GHWF shall analyze the raptor nesting data collected after each year of long-term raptor
29 nest surveys to determine whether a reduction in either nesting success or nest use has
30 occurred in the vicinity of the GHWP. If the analysis indicates a reduction in nesting success or
31 nest use by Swainson's hawks, golden eagles, or ferruginous hawks within the facility site or
32 within 2 miles of the site, then GHWF shall propose appropriate mitigation for the affected
33 species as described in subsection (b) and shall implement mitigation as approved by the
34 Council. At a minimum, if the analysis shows that any raptors of these species have abandoned
35 a nest territory within the facility site or within ½ mile of the facility site or has not fledged any
36 young within that same area, GHWF shall assume the abandonment or unsuccessful fledging is
37 due to operation of the facility unless another cause can be demonstrated convincingly.
38

39 Any reduction in nesting success or nest use could be due to operation of the GHWP
40 facility, operation of another wind facility in the vicinity or some other cause. GHWF shall
41 attribute the reduction to operation of GHWP if the wind turbine closest to the affected nest
42 site is a GHWP turbine unless GHWF demonstrates, and the Department agrees, that the
43 reduction was due to a different cause.
44

1 Given the low raptor nesting densities in the area, statistical power to detect a
2 relationship between distance from a wind turbine and nesting parameters (e.g. number of
3 fledglings per reproductive pair) will be very low. Therefore, impacts may have to be judged
4 based on trends in the data, results from other wind energy facility monitoring studies and
5 literature on what is known regarding the population in the region.

6 7 **3. Avian Use and Behavior Surveys**

8
9 Searchers will also record bird species observed and their behavior relative to turbine
10 locations before or after each standardized carcass search (as described in Section 1(e) above).
11 Observations will be recorded during 5-minute surveys at each turbine sampled during the
12 fatality-monitoring program, using standard variable circular plot point count survey methods.
13 Collection and recording of these additional observations of live birds will be carried out in a
14 manner that does not distract searchers from carrying out the standardized carcass searches.

15
16 All of these avian use and behavior data, as well as raptor and waterfowl mortality
17 observed at the turbines near these stations, will be used to understand direct and indirect
18 impacts of the GHWP facility on raptors, waterfowl and other avian species. The certificate
19 holder shall include an analysis of this data in the reports described in Section 5.

20 21 **4. GHWP Wildlife Incident Response and Handling System**

22
23 The Wildlife Incident Response and Handling System is a monitoring program set up for
24 responding to and handling avian and bat casualties found by construction and maintenance
25 personnel during construction and operation of the facility. This monitoring program includes
26 the initial response, the handling and the reporting of bird and bat carcasses discovered
27 incidental to construction and maintenance operations ("incidental finds"). Construction and
28 maintenance personnel will be trained in the methods needed to carry out this program.

29
30 All carcasses discovered by construction or maintenance personnel will be
31 photographed, recorded and collected.

32
33 If construction or maintenance personnel find carcasses within the plots for protocol
34 searches, they will notify a qualified biologist, as approved by the Department, who will collect
35 the carcasses. The fatality data will be included in the calculation of fatality rates.

36
37 If construction or maintenance personnel discover incidental finds that are not within
38 plots for fatality monitoring protocol searches, they will notify a qualified biologist, as approved
39 by the Department, and the carcass will be collected by a carcass-handling permittee (a person
40 who is listed on state and federal scientific or salvage collection permits). Data for these
41 incidental finds will be reported separately from standardized fatality monitoring data.

42
43 The certificate holder shall coordinate collection of state endangered, threatened,
44 sensitive or other state protected species with ODFW. The certificate holder shall coordinate

1 collection of federally-listed endangered or threatened species and Migratory Bird Treaty Act
2 protected avian species with the USFWS.

3 4 **5. Data Reporting**

5
6 The certificate holder will report the monitoring data and analysis to the Department.
7 Monitoring data include fatality monitoring program data, raptor nest survey data, avian use
8 and behavior survey data and data on incidental finds by fatality searchers and GHWF
9 personnel. The report may be included in the annual report required under OAR 345-026-0080
10 or may be submitted as a separate document at the same time the annual report is submitted.
11 In addition, the certificate holder shall provide to the Department any data or record generated
12 in carrying out this monitoring plan upon request by the Department.

13
14 The certificate holder shall immediately notify USFWS and ODFW, respectively, in the
15 event that any federal or state endangered or threatened species are killed or injured on the
16 facility site.

17
18 The public will have an opportunity to receive information about monitoring results and
19 to offer comment. Within 30 days after receiving the annual report of monitoring results, the
20 Department will make the report available to the public on its website and will specify a time in
21 which the public may submit comments to the Department.⁶

22 23 **6. Amendment of the Plan**

24
25 This Wildlife Monitoring and Mitigation Plan may be amended from time to time by
26 agreement of the certificate holder and the Council. Such amendments may be made without
27 amendment of the site certificate. The Council authorizes the Department to agree to
28 amendments to this plan; ~~and to any additional~~ mitigation actions that may be required under
29 this plan must be approved by amendment of the plan by Council. The Department shall notify
30 the Council of all amendments and mitigation actions, and the Council retains the authority to
31 approve, reject or modify any amendment of this plan or mitigation action agreed to by the
32 Department.

33
34

⁶ The certificate holder may establish a Technical Advisor Committee (TAC) but is not required to do so. If the
certificate holder establishes a TAC, the TAC may offer comments to the Council about the results of the
monitoring required under this plan.

Attachment G: Draft Erosion Sediment Control Plan

Erosion and Sediment Control Plan Worksheet

Project Name: Golden Hills Wind Farm

Prepared By: Sean P. Sullivan, L.A. (Oregon No. 412)

Company Name: David Evans and Associates, Inc.

Telephone: 503-223-6663

Please answer the following questions as indicated. If needed, additional space is provided for you at the end of this form. You may also attach any information you feel is pertinent to the project.

1. Is your Erosion and Sediment Control Plan for an activity that covers 20 acres or more of disturbed land?

☒ YES ☐ NO

If yes, the plan must be prepared by an Oregon Registered Professional Engineer, Oregon Registered Landscape Architect, or Certified Professional in Erosion and Sediment Control (Soil and Water Conservation Society). Please complete question #4.

2. Does your Erosion and Sediment Control Plan require engineered facilities such as settling basins and/or diversion structures?

☐ YES ☒ NO

If yes, the plan must be prepared by an Oregon Registered Professional Engineer.

3. If you answered "YES" to question #1 or 2, please provide the following information and use the space provided to imprint your seal.

Name: Sean P. Sullivan, L.A. (Oregon No. 412)

Address: David Evans and Associates, Inc.

2100 SW River Parkway

Portland, OR 97201

Telephone: 503.223.6663

Imprint Seal Above

4. Describe the nature of the construction activity: The Applicant proposes to construct a wind generation project in Sherman County, Oregon. The proposed project will involve construction of up to 267 turbines and generate up to 400 MW of power.

5. Describe in detail the phases of construction and the erosion control measures to be implemented during each phase. Also complete the table on the next page to assist with the narrative description.

See Attached.

Fill in the year(s) and the month(s) at the top of the chart during which the project will occur, and check the appropriate boxes to indicate when the items in the left column will be performed and/or installed. You may photocopy the chart if your project will last longer than 12 months.

YEAR: 2008	2008											
MONTH:	1	2	3	4	5	6	7	8	9	10	11	12
CLEARING				x								
EXCAVATION				x	x							
GRADING				x	x	x	x	x				
CONSTRUCTION				x	x	x	x	x	x	x	x	x
EROSION CONTROLS:												
Vegetative Buffer Strips				x	x	x	x	x	x	x	x	x
Mulching				x	x	x	x	x	x	x	x	x
Netting/Mats/Blankets												
Temporary Seeding												
Permanent Seeding										x	x	x
Sod Stabilization												
Other: Graveling				x	x	x	x	x	x	x	x	x
SEDIMENT CONTROLS:												
Silt Fencing				x	x	x	x	x	x	x	x	x
Straw Bales				x	x	x						
Sediment Traps				x	x	x						
Sediment Basins												
Storm Inlet Protection												
Drainage Swales												
Check Dams												
Contour Furrows												
Terracing												
Pipe Slope Drains												
Rock Outlet Protection												
Other: Sediment moat				x	x	x						

6. Describe the origin and nature of fill material to be used:

Native soils will be excavated for construction of the concrete turbine pads and temporary staging areas. These soils will be stockpiled until after construction when they will be redistributed over the temporarily disturbed areas.

7. Describe the soils present on the site and erosion potential of the soils.

Soil type(s): The near surface soils at the project area were identified using the U.S. Soil Conservation Service (SCS) Soil Survey of Sherman County, Oregon. The near surface soils in the project area are grouped into five General Soil Units: Walla Walla-Anderly, Wato Anders, Wrentham-Lickskillet-Rock Outcrop, Lickskillet-Nansene, and Mikkalo-Ritzville.

The Walla Walla-Anderly series soils are extensive on mesas in the north-central part of Sherman County in mostly smooth and gently sloping areas. They have formed from loess over basalt in a 12- to 13-inch precipitation zone. This General Soil Unit is approximately 73 percent Walla Walla soils and 22 percent Anderly soils. The rest is soils of minor extent. Walla Walla soils are very deep or deep and are well drained. The surface layer is very dark brown silt loam. The subsoil is dark brown silt loam. Anderly soils are moderately deep and well drained. The surface layer is very dark grayish brown silt loam. The subsoil is dark brown silt loam. Of minor extent in this unit are very deep Endersby soils on terraces, very deep Hermiston soils on flood plains, and shallow Kuhl soils on north-facing canyonsides. The soils in this unit are used mainly for wheat and barley grown in a grain-summer fallow system, for alfalfa hay, and as pasture. Areas too steep for cultivation are used for livestock grazing and as wildlife habitat.

The Wato Anders series soil are extensive on mesas in the northwestern part of Sherman county in gently sloping and steep areas. They have formed from loess over basalt in a 12- to 13- inch precipitation zone. This General Soil Unit is approximately 82 percent Wato soils and 10 percent Anders soils. The rest is soils of minor extent. Wato soils are very deep and well drained. The surface layer is very dark brown very fine sandy loam. The subsoil is dark brown very fine sandy loam. Anders soils are moderately deep and well drained. The surface layer is very dark grayish brown very fine sandy loam. The subsoil is dark brown very fine sandy loam, silt loam, or gravelly silt loam. Of minor extent in this unit are very deep Quincy soils on dunes and terraces adjacent to the Columbia River and its tributaries. The soils in this unit are used mainly for wheat and barley grown in a grain-summer fallow system and for alfalfa hay. Areas too steep for cultivation are used for livestock grazing and as wildlife habitat.

Wrentham-Lickskillet-Rock Outcrop series soils are moderately deep and shallow, well drained silt loam and very stony loam that formed in loess over basalt and in residuum derived from basalt in an 11- to 12-inch precipitation zone. They occur mainly in canyons. This map unit is adjacent to the Deschutes and John Day Rivers, in the southern part of the county. This map unit consists of about 30 percent Wrentham soils, 30 percent Lickskillet soils, and 26 percent Rock outcrop. Wrentham soils are moderately deep and well drained. The surface layer is very dark brown silt loam. The subsoil is dark brown extremely cobbly silt loam. Lickskillet soils are shallow and well drained. The surface layer is very dark grayish brown very stony loam. The upper part of the subsoil is dark brown very gravelly loam, and the lower part is dark brown very gravelly clay loam, very gravelly loam, or very cobbly loam. Rock outcrop consists of areas of exposed bedrock on the shoulders and convex side slopes of very steep canyons. The soils in this unit are used mainly for livestock grazing and as wildlife habitat.

Lickskillet-Nansene series soils are composed of shallow and deep, well drained very stony loam and silt loam that have formed in residuum derived from basalt and in loess over basalt in a 12- to 13-inch precipitation zone. This map unit is located in the northern part of Sherman County. It is about 45 percent Lickskillet soils and 12 percent Nansene soils. The rest consists of soils of minor extent. Lickskillet soils are shallow and well drained. The surface layer is very dark grayish brown very stony loam. The upper part of the subsoil is dark brown very gravelly loam, and the lower part is dark brown very gravelly clay loam, very gravelly loam, or very cobbly loam. Nansene soils are deep and well drained. The surface layer and subsoil are very dark brown silt loam. The substratum is dark brown silt loam. Of minor extent in this unit are very shallow Bakeoven soils on ridgetops and benches of canyons, very deep Sagemoor soils on dissected terraces, and moderately deep Wrentham soils on north-facing canyonsides. This soil unit is used mainly for livestock grazing and as wildlife habitat.

The Mikkalo-Ritzville General Soil Unit consists of moderately deep and deep, well drained silt loam that has formed in loess over basalt in a 9- to 11-inch precipitation zone, typically on mesas. This map unit is in the northeastern corner of the survey area. It is about 56 percent Mikkalo soils and 38 percent Ritzville soils. The rest is soils of minor extent. Mikkalo soils are moderately deep and well drained. The surface layer is very dark grayish brown silt loam. The subsoil is dark brown, calcareous silt loam. Ritzville soils are deep and well drained. The surface layer is dark brown silt loam. The subsoil is dark yellowish brown, calcareous silt loam. Of minor extent in this unit are shallow Lickskillet Soils. The soils in this unit are used mainly for wheat and barley grown in a grain-summer fallow system. Areas too steep for cultivation are used for livestock grazing and as wildlife habitat.

b) Erosion Potential: Based on the soil types present, soil erosion potential at the facility site varies, being high in some areas and not high in others (USDA 1964; Table 2).

Table 2. Detailed soil map units present on project site and their properties.

Soil Series	Drainage Class	Erosion Potential
Anderly silt loam, 1 to 7 percent slopes	Well drained	Highly
Anderly silt loam, 7 to 15 percent slopes	Well drained	Highly
Anderly silt loam, 15 to 35 percent south slopes	Well drained	Highly
Anderly silt loam, 15 to 35 percent north slopes	Well drained	Highly
Anders very fine sandy loam, 15 to 35 percent slopes	Well drained	Highly
Endersby fine sandy loam, 0 to 3 percent slopes	Somewhat excessively drained	Not highly
Endersby-Hermiston complex, 0 to 3 percent slopes	Well drained	Not highly
Kuhl very stony very fine sandy loam, 3 to 20 percent slopes	Well drained	Highly
Kuhl-Rock outcrop complex, 20 to 40 percent north slopes	Well drained	Highly
Lickskillet-Rock outcrop complex, 40 to 70 percent south slopes	Well drained	Not highly
Lickskillet very stony loam, 7 to 40 percent south slopes	Well drained	Not highly
Lickskillet-Bakeoven complex, 2 to 20 percent slopes	Well drained	Not highly
Mikkalo silt loam, 2 to 7 percent slopes	Well drained	Highly
Mikkalo silt loam, 7 to 15 percent slopes	Well drained	Highly
Nansene-Rock outcrop complex, 35 to 70 percent north slopes	Well drained	Not highly
Rock outcrop-Rubble land-Lickskillet complex, 50 to 80 percent south slopes	Well drained	Not highly
Walla Walla silt loam, 1 to 7 percent slopes	Well drained	Not highly
Walla Walla silt loam, 7 to 15 percent slopes	Well drained	Not highly
Walla Walla silt loam, 15 to 35 percent north slopes	Well drained	Not highly
Walla Walla silt loam, 15 to 35 percent south slopes	Well drained	Not highly
Wato very fine sandy loam, 3 to 7 percent slopes	Well drained	Not highly
Wato very fine sandy loam, 7 to 15 percent slopes	Well drained	Not highly
Wato very fine sandy loam, 15 to 35 percent north slopes	Well drained	Not highly
Riverwash*		

8. Submit two copies of site maps and constructions plans. The following checklist is provided for your convenience:

IS THE FOLLOWING INFORMATION PROVIDED AND DETAILED ON THE MAPS SUBMITTED TO THE DEQ?	YES	NO	NOT APP.	EXHIBIT
a. The complete development, including any phases.	x			Figure C-2
b. The areas of soil disturbance on the site, including areas that will be cleared, graded or excavated.	x			Figure C-2
c. The areas of cut and fill.	x			Figure C-2
d. The drainage patterns and slopes of the land both before and after major grading activities.	x			Figure C-2
e. The location of existing and proposed storm drains and outfalls.			x	
f. The receiving water body for drainage from the site.	x			Figure C-2
g. The areas used for storage of soils or wastes. (laydown areas)	x			Figure C-2
h. The location of all erosion and sediment control facilities and/or structures.			x	
i. The areas on the site where vegetative practices will be used.			x	
j. The location of existing and future impervious structures and areas.	x			Figure C-2
k. The location and name of all springs, wetlands, and surface waterbodies near the project.	x			Figure C-2
l. The boundaries of the 100 year flood plain if known.			x	
m. The location of graveled access entrance and exit drives and graveled parking areas to be used by construction vehicles. (at each turbine string entrance)	x			Figure C-2
n. The locations of graveled roads traveled by more than 25 vehicles per day.	x			Figure C-2
o. Installation details of vegetative and other erosion control practices (vegetative buffer strips, seeding, mulching, erosion blankets, etc.).			x	
p. Installation details of sediment control practices (silt fences, straw bale dikes, storm drain inlet protection, etc.). (per DEQ BMP for Stormwater Discharges Associated with Construction Activities guide)	x			
q. List the temporary and permanent vegetative seed in the seed mix. *	x			
r. If concrete work is done on site, then note the concrete truck washout procedure used and locate any sump, if used, on the drawing.			x	

* No temporary seeding is proposed because of arid conditions during construction period. Mulch will be used instead. Permanent seeding will be completed in Fall 2008.

9. Describe the truck drippage precautions you will take to prevent discharge of water from trucks hauling wet soils or stone excavated from the site: See Attached.

10. Describe the procedures you will use to assure prompt maintenance and repair of graded surfaces and erosion and sediment control measures: See Attached.

Attachments

5. Describe in detail the phases of construction and the erosion control measures to be implemented during each phase. Also complete the table on the next page to assist with the narrative description.

Response: Construction activities for the project are anticipated to begin in the second quarter of 2008 and conclude in the fourth quarter of 2008. Phases of construction and the erosion control measures (best management practices or “BMPs”) to be implemented during each phase are generally as follows:

Mobilization, Staging, and Laydown

It is anticipated that one or more general contractors would mobilize to the project area and would require staging areas for temporary construction offices, temporary laydown facilities, and materials staging (Figure C-2). These staging areas would be used to park construction vehicles, construction employees’ personal vehicles, and other construction equipment.

Laydown areas will be required during tower construction and turbine installation. Tower sections, nacelles, blades, and appurtenances would be temporarily stored in laydown facilities as each turbine is constructed. Fueling and chemical/solvent storage will occur at staging areas at each turbine string. At the end of the turbine string, an area approximately 300 feet in diameter (1.6 acres) would be needed to allow construction equipment to turn around.

BMPs anticipated for use during this phase include silt fences placed on the down slope side of the staging areas, gravel construction entrances, gravel laydown facilities, and container and waste storage bins/dumpsters. Additionally, the following BMPs would also be developed to prevent or minimize the mixing of runoff with pollutants such as hydraulic fluid, fuel, and lubricants: written spill prevention and response procedures, employee training on spill prevention and proper disposal, emergency spill kits, and regular maintenance schedule for vehicles and equipment.

After completion of construction within the expanded site boundary, these temporary staging/laydown areas would be restored to their pre-construction conditions. Disturbed areas would be re-seeded to wheat or native grasses as appropriate to establish permanent vegetation. Silt fences and other BMPs would be removed once vegetation provides soil stabilization.

Road Construction

To the extent possible, existing roads would be used to minimize the need to construct new roads. New roads would be constructed to provide access to the turbine locations (Figure C-2). All unpaved roads used for construction purposes would be graveled or paved as appropriate, or effective BMPs would be placed on the road or down slope of the road to prevent the discharge of fugitive sediment in lieu of graveling.

A variety of BMPs would be used during road construction to control erosion and sedimentation. These BMPs may be used individually or in concert as site conditions and levels of disturbance warrant. BMPs for road construction include graveling, watering or applying other dust palliatives, preserving existing vegetation, silt fence, mulching, and reestablishing permanent vegetation. Silt fences would be removed once vegetation stabilized soils.

Underground Utility Construction

Underground electrical and communications cables would be placed in a trench approximately 2 feet wide and at least 3 feet deep, generally along the length of the proposed turbine access roads and County roads linking turbine strings to two collector substations within the Project. Topsoil would be stripped and stockpiled adjacent to the work area. The remaining trench excavation would be sidecast adjacent to the trench and later used as backfill. Upon the installation of electrical cables, and communications cables, the trench would be backfilled with native material and then top-dressed with the salvaged topsoil. The trench excavation would be reseeded with wheat or native seed as appropriate.

BMPs for underground utility construction include phasing the work as practical to minimize disturbance at any given time, preserving existing vegetation, and reestablishing permanent vegetation. If construction persists in the wet season, additional BMPs such as covering the sidecast and topsoil stockpiles would be considered.

Turbine Foundation Construction

It is anticipated that up to 267 turbine foundations would be designed by conventional methods including: (1) spread foundations below the loess (i.e., wind-formed soils), (2) drilled shaft foundations that support in the materials below the loess, (3) removal of the loess and replacement with compacted fill, and/or (4) in situ improvements of the loess soils. One or more of these approaches have been used in the design and construction of the foundations at nearby projects and will be used to design the foundations for the project.

Construction would likely require excavation approximately nine to ten feet deep and approximately 50 feet in diameter. Excavated material would be stockpiled for use as backfill adjacent to the turbine pad for approximately 14 to 28 days while the concrete cures. Silt fences or sediment moats would be installed on the downslope side of stockpiles. Sediment moats are ditches dug around the perimeter of the stockpile with the excavation sidecast to the outboard side of the ditch to form a temporary dike. The temporary dike provides a physical barrier that traps sediment “in the moat” and prevents its discharge. Once the concrete cures, the stockpiled materials would be used for backfilling. The contractor would be responsible for locating a disposal site, which may include placing and cultivating the excess material on upland agricultural lands within the lease boundary for excess materials if saturated soils are encountered and must be hauled away from the site, loads would be drained on-site until dripping is reduced to minimize spillage on roads. Disturbed areas resulting from foundation and crane pad construction would be seeded to establish crops or native species as appropriate.

BMPs used as part of turbine foundation construction would include phasing the work as practical to minimize disturbance at any given time, preserving existing vegetation, graveled access road, draining saturated soils on site, silt fences, sediment moats, and reestablishing permanent vegetation. If construction persisted in the wet season, additional BMPs such as covering the stockpiles and heavy mulching would be considered. Silt fences would be removed once the stockpile has been removed and the disturbed areas stabilized with vegetation.

Tower and Rotor Assembly

Turbine tower pieces, nacelle, hub, blades and appurtenances would be transported by trucks to each turbine location and erected using a construction crane. The base tower section would be bolted to the foundation pedestal, the middle section would then be bolted to the base section, and the top section would then be bolted to the middle section. The nacelle is then lifted to the top of the tower and bolted in place. The rotor (hub and three blades) is assembled on the ground and then the rotor assembly is hoisted and attached to the turbine nacelle.

No additional BMPs would be required for this phase of construction. BMPs previously installed as part of road construction and/or turbine foundation construction should provide adequate erosion and sedimentation control.

Mitigation Site

Portions of the mitigation site may be plowed in preparation of habitat mitigation. A 100-foot wide vegetated filter strip will be left on the downslope side of the mitigation site, to prevent exposed soils from eroding.

Stormwater Management

Stormwater management will be ongoing through the life of the project. The use of water for construction practices (*e.g.*, dust suppression, road compaction) is not anticipated to generate runoff. Wastewater would not be discharged into wetlands or other adjacent resources. The area receives approximately 12 inches of precipitation annually, most of which occurs between October 1 and March 31. Stormwater runoff resulting from precipitation is anticipated to be minimal and would infiltrate onsite.

Demobilization

Demobilization would include final road grading, site cleanup, and decommissioning the erosion and sedimentation BMPs among other activities. The Applicant will remove all silt fences and other BMPs as appropriate and would end 1200-C permit coverage once all soil disturbance activities have been completed and final stabilization of exposed soils has occurred. Table 1 lists construction equipment typically used during wind project construction.

Table 1.- Equipment Typically Used for Wind Facility Construction

Equipment	Use
Bulldozer	Road and pad construction
Grader	Road and pad construction
Water trucks	Compaction, erosion and dust control

Table 1.- Equipment Typically Used for Wind Facility Construction

Roller/compactor	Road and pad compaction
Backhoe/trenching machine	Digging trenches for underground utilities
Excavator	Foundation excavation
Heavy duty rock trencher	Underground trenching
Truck-mounted drilling rig	Drilling power pole holes
Concrete trucks/concrete pumps	Pouring tower and other structure foundations
Cranes	Tower/turbine erection
Dump trucks	Hauling road and pad material
Flatbed & Low-bed trucks	Hauling towers, turbines and components, and construction equipment
Pickup trucks	General use and hauling minor equipment
Small hydraulic cranes/forklifts	Loading and unloading equipment
Four-wheel-drive all-terrain vehicles	Rough grade access and underground cable installation
Rough-terrain cranes / forklifts	Lifting equipment and pre-erection assembly

Additional Information

A revegetation plan describing revegetation methods and seedmixes is attached. Erosion and Sediment Control (ESC) BMPs will be installed according to the guidance provided in NPDES Storm Water Regulations for Construction Projects, December 2002.

In addition to the NPDES guidance, practices that can be used to control erosion of loess soils include seeding early in the spring, stubble-mulch tillage, and construction of terraces, diversions, and grassed waterways. Leaving crop residue near the surface helps conserve moisture, maintain tilth, and control erosion.

9. *Describe the truck drippage precautions you will take to prevent discharge of water from trucks hauling wet soils or stone excavated from the site:*

Because of the climate and soil types in the area, excessively wet soils and/or stone excavation are not anticipated. Therefore, truck drippage is not expected to be an issue. In the unlikely event of hauling wet soils or stone, trucks would be allowed to drain on-site before entering public right-of-way (i.e., county road system). If draining on-site is determined to be inadequate, the ESC Lead would coordinate additional BMPs to minimize truck drippage.

10. Describe the procedures you will use to assure prompt maintenance and repair of graded surfaces and erosion and sediment control measures.

Response: A copy of the ESC Plan (Plan) and all inspection reports (described below) for the Project would be retained on-site and made available to the Department of Environmental Quality, its agent, or the local municipality upon request. The contractor would designate an ESC Lead who would be responsible for implementing the ESC Plan and following through on all maintenance requirements. The ESC Lead would be a person with knowledge and experience in construction stormwater controls and management practices. The ESC Lead's contact information, including an emergency contact number, would be provided as part of the ESC Plan.

All roads, pads, trenched areas, stockpiles and disturbed areas resulting from facility construction would be inspected regularly and maintained to minimize erosion and sedimentation. For active sites, inspections would occur daily during stormwater runoff or snowmelt runoff and at least once every seven calendar days and within 24 hours after any storm event greater than 0.5 inches of rain in a 24-hour period. For inactive periods greater than seven days, inspections would occur once every two weeks. If a site is inaccessible due to adverse weather conditions, inspections would not occur, but the adverse weather conditions would be noted on the inspection report.

The inspections would document the following:

- Inspection date, inspector's name, weather conditions, and rainfall amount in the last 24 hours.
- List observations of all BMPs.
- At representative discharge point(s), document the quality of discharge for any turbidity, color, sheen, or floating materials.
- Recommended corrective actions required, if any.

The applicant would implement the following maintenance activities and guidelines:

- Significant amounts of sediment that leave the site would be cleaned up within 24 hours and placed back on the site or disposed of in a legal manner.
- Under no circumstances would sediment be intentionally washed into storm sewers or drainages unless it was to be captured by a BMP (e.g., basin insert) before entering receiving waters.
- For silt fences, the trapped sediment would be removed before it reaches one third of the above ground height of the fence.
- All erosion and sedimentation control BMPs not directly in the path of work would be installed before any land disturbance.
- All disturbed areas that would be revegetated with native species would be reseeded at appropriate intervals until a performance standard of 70 percent cover is met.
- Fertilizers would not be used when seeding native species, and would only be used in such a way to minimize nutrient-laden runoff when seeding wheat.
- If construction activities cease for 45 days or more, all disturbed areas would be stabilized using vegetation, heavy mulch, or other appropriate BMPs as necessary.
- All temporary erosion and sediment control measures will be removed within 30 days after final stabilization of the site. Final stabilization is deemed to have occurred when the impacted areas demonstrate 70% cover and the risk of erosion has been minimized.
- Adequate stockpiles of silt fences, straw bales, spill kits, and other measures as appropriate will be maintained on site for emergency situations and to allow for the prompt response for repairs.

Attachment 2: Requests for Contested Case (*PLACEHOLDER)

***To be provided in Supplemental Staff Report during week of October 15, 2018**