2.0 Project Description and Alternatives

2.1 Introduction

As discussed in Section 1.1, the proposed project would consist of two wind farm sites located near each other (approximately 9 miles apart) within the Application Area (see **Figure 1-2**); however, not all of this land would be used for or disturbed by the project. In addition to the WTGs, the proposed project would require the construction of ancillary facilities as well as a haul road and transmission connection between the two sites. A general description of the project proposed by PCW can be summarized as follows:

- A 2,000 to 3,000-MW wind farm project consisting of up to 1,000 WTGs with a nameplate capacity ranging from 1.5- to 3-MW;
- Development of step-up transformers, underground and overhead electric collection and communication lines, electric substations, RDF, O&M facilities, and laydown areas;
- Haul road and transmission connection between the two sites;
- Construct new roads and upgrade existing roads; and
- Power from the wind farms would be transmitted via overhead electric transmission lines that would connect to a new substation in the Application Area.

Power generated by the project would be routed to transmission lines analyzed in detail in separate NEPA analyses, but have been considered in the CIA included in Chapter 5.0. At this time, BLM Wyoming is analyzing five applications for large scale overhead electric transmission projects, including the TransWest Express, Gateway West, Gateway South, Overland, and Zephyr transmission projects. A portion of the generation also could be connected to the existing PacifiCorp 230 kV transmission line on the northern edge of the project site. Because the wind farm project would not be possible without overhead transmission lines, any of the proposed projects could be considered a connected action.

Following construction, all disturbance areas would be reclaimed in accordance with the BLM-approved Reclamation Plan to facilitate eventual ecosystem reconstruction to maintain a safe and stable landscape and meet the desired outcomes of the land use plan. For analysis purposes, it is assumed that reclamation activities would be the same on public and private lands.

The BLM identified a range of alternatives based on issues and concerns raised from public comments, through interdisciplinary interaction between resource professionals, and in collaboration with the cooperating and interested agencies. The BLM has identified Alternative 1R with modifications as the Preferred Alternative. The modification is to specifically prohibit project development from areas of the Red Rim-Grizzly WHMA located within the Greater Sage-grouse Core Area (247 acres) applied through ACMs as well as overlap with the Alternative 1R boundary. This modification prohibits development on 1,037 acres (**Figure 1-5**) in the Sierra Madre portion of the project.

- Project Elements Common to All Action Alternatives (Section 2.2);
- No Action Alternative (Section 2.2.5);
- Alternative 1R: Applicant Proposed Alternative (Section 2.2.6);
- Alternative 2: Checkerboard Only (Section 2.2.7);
- Alternative 3: No Miller Hill or South Sierra Madre (Section 2.2.8);
- Alternative 4: Private Lands Only (Section 2.2.9); and

- Alternatives considered but eliminated from detailed analysis (Section 2.4).

Project-specific terminology is used in this EIS when discussing project geography, including the following:

- The **Application Area** refers to the area, encompassing 229,077 acres, specified in the applicant's Wind Site Testing and Monitoring Application filed with the BLM, Application Areas for ROWs of ancillary facilities, and the areas considered for haul road and transmission connection between the Chokecherry and Sierra Madre sites.
- Within the Application Area, the "**alternative boundary**" refers to a smaller boundary that was created specifically for each alternative based on constraints identified during the alternatives development process (these boundaries are discussed in Section 2.2.4 by alternative).
- Within each alternative boundary, the "**conceptual area of development**" is the area where development would most likely occur based on wind potential considerations (see **Figure 1-4**) as well as environmental constraints and ACMs (discussed in Section 2.2.1).

2.2 Project Elements Common to All Action Alternatives

This section describes project elements that would be part of all action alternatives considered in the analysis: Alternatives 1R, 2, 3, and 4 (discussed in Section 2.2.4). Details contained in the following sections are derived from the information provided by PCW in the revised draft POD dated January 2012 (PCW 2012a), which incorporates information from the Draft EIS and supersedes the March 2009 POD, the December 2009 *Power Company of Wyoming Response and Data on Bureau of Land Management Alternatives*, and the April 2010 *Applicant Proposed Alternative and Bureau of Land Management Response Letter* as well as modifications that occurred through ongoing discussions with the applicant. A detailed discussion of elements common to all alternatives and individual components associated with project construction is provided in **Appendix A**.

While the referenced documents serve as the basis for analysis in this document, micro-siting of turbine locations, roads, transmission lines, and support facilities has not been completed. The information provided for each Alternative assumes the greatest potential for disturbance, and, therefore, it is assumed that impacts identified at the time of micro-siting would not exceed those described in this document.

Upon completion of this project-wide level NEPA analysis, PCW would then submit up to four separate PODs for the internal haul road, transmission line between the two sites, Sierra Madre development, and Chokecherry development. The site-specific POD proposals would be tiered to the analysis and decision described in the ROD associated with this project-wide level EIS. ROW grants for these PODs must comply with the NEPA analysis and would include site-specific terms and conditions tiered back to the project-wide level EIS. Upon review of the individual PODs, additional NEPA analysis may be required prior to issuance of any ROW grants. The final turbine layout would adhere to the terms and conditions of the ROD and any ROW grants issued by the BLM. A NEPA tiering review procedure to guide subsequent site-specific NEPA approvals is provided as **Appendix B**.

<u>Background</u>

In January 2012, PCW submitted a revised draft POD to accompany the ROW applications for the CCSM Wind Energy Project (PCW 2012a), which incorporates and expands upon previous information included in the Draft EIS from the March 2009 POD. The POD includes descriptions of and guidelines for the design, construction, operation, reclamation, and maintenance of the wind farm, access roads, electric gathering lines, transmission lines, and electric substations that would be constructed as part of the project. The January 2012 revised draft POD provides a project description associated with a conceptual layout for the Applicant Proposed Alternative, included in the EIS as Alternative 1R, and is an

acceptable alternative to their original project concept, which was determined to be not in conformance with the 2008 Rawlins RMP (further discussed in Section 2.5).

Due to the technical nature of wind turbine layout siting, the BLM also requested that PCW provide technical data and develop a conceptual model of turbine layouts to show where turbines could potentially be sited for a set of BLM-provided alternatives and environmental constraints that the BLM may consider for further analysis. This information was originally presented to the BLM in December 2009 as the report entitled *Power Company of Wyoming Response and Data on Bureau of Land Management Alternatives* (PCW 2009b). However, information in the Final EIS for Alternatives 2-4 have been updated to include layout optimization similar to that proposed in the 2012 revised draft POD for the Alternative 1R conceptual design (PCW 2012) in effort to enable similar comparisons of initial and long-term disturbance estimates. These changes have included the following:

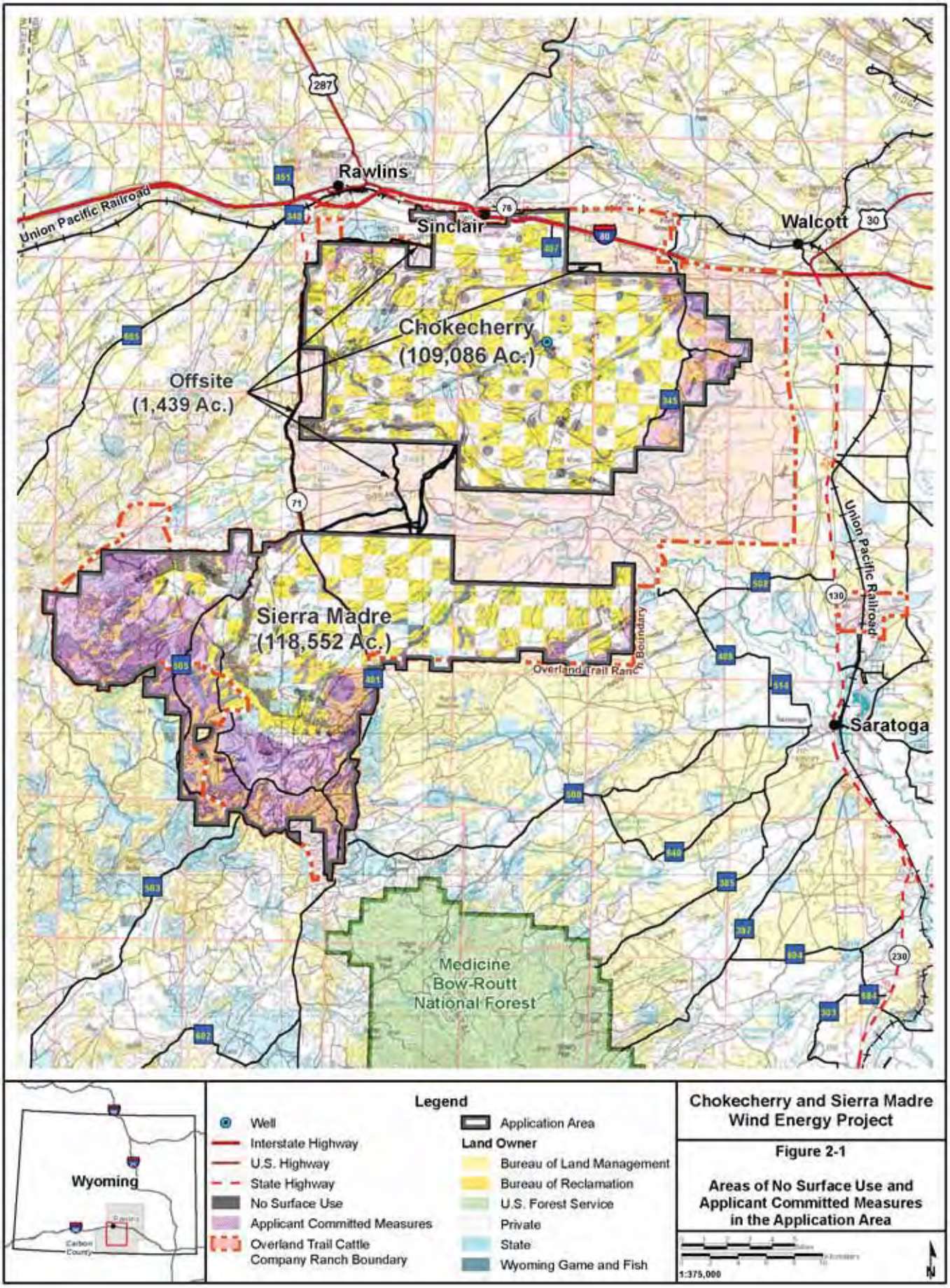
- Increased WTG pad initial disturbance and reduced long-term disturbance.
- Two tier road systems to allow for comparison between the new haul road alignment coming off Bolten Rim in Alternative 1R, the WY 71/CCR 401 haul road alignment in Alternative 2, and the Draft EIS haul road alignment in Alternatives 3 and 4.
- Increased number of electrical substations.
- Reduced underground 34.5kV network, but increased initial disturbance where multi-circuit segments are installed.

2.2.1 Environmental Constraints and Applicant Committed Measures

The Application Area is within a checkerboard landownership pattern, which is alternating sections of public, private, and state lands (**Table 1-2**). Use of the public lands for either development or access requires compliance with the stipulations and policy governing the public lands, including the 2008 Rawlins RMP and relevant federal laws, regulations, and policy. A summary of the BLM's environmental constraints is provided in **Appendix C**. **Figure 2-1** depicts the NSU constraints (see Chapter 8.0, Glossary) for the Application Area and **Figure 2-2** depicts the timing stipulations. With the exception of variations for greater sage-grouse noted in Alternative 2 (Section 2.2.7), the NSU constraints and timing stipulations would apply on public lands to all action alternatives (**Appendix C**, **Table C-1**). Under all action alternatives, PCW has committed to no development within the greater sage-grouse core breeding areas (Wyoming Governor's State EO 2011-5 Greater Sage-grouse Core Area Protection [2011]) (**Appendix C**, **Table C-2**), which also is consistent with recent BLM IMs WO-2012-043 and WY-2012-019, as discussed in Section 1.6.1.1.

The BLM does not have jurisdiction over development on private or state lands. However, the BLM has been coordinating with the state and county, both of which are cooperating agencies on this project, to incorporate recommendations and address concerns from these agencies into the EIS process for their consideration in subsequent permit decisions. Use of the State Land Board lands requires compliance with Board-approved restrictions, including the State of Wyoming greater sage-grouse stipulations under the authority of W.S. 36-2-101; other stipulations may be applied on a case-by-case basis through the Board. In addition, PCW has provided ACMs that would be applied to all private, state, and public lands. Summaries of the ACMs and applicant committed BMPs are provided in **Appendix C**. BMPs established through the *Record of Decision for Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments* (BLM 2005) for wind energy development activities on public lands also are considered applicable to this project. BMPs established in Appendix 15 of the 2008 Rawlins RMP for reducing surface disturbance and disruptive activities would apply to this project.

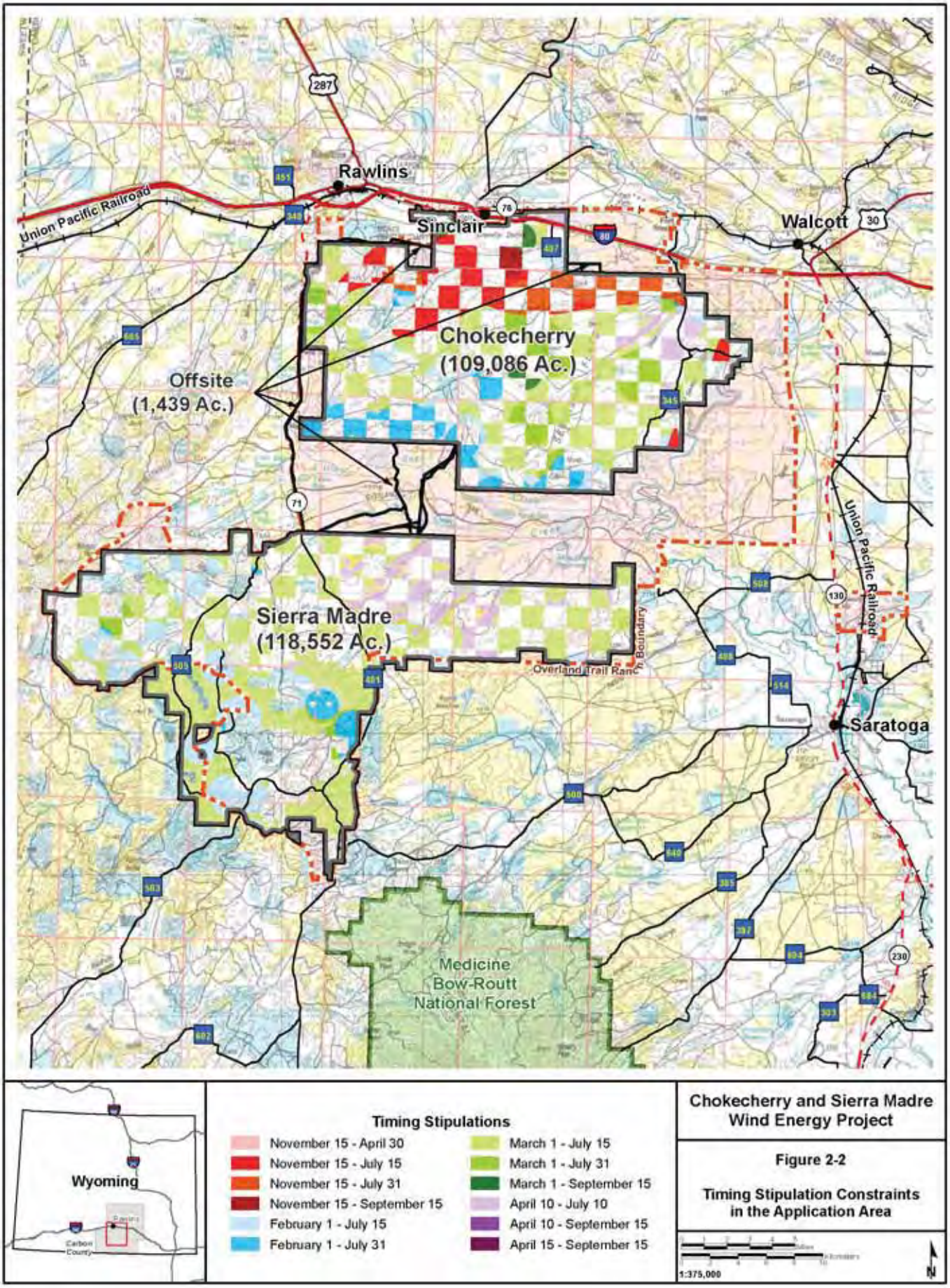
In addition to the BMPs, NSUs, and ACMs described in **Appendix C**, additional constraints may come through development of a reclamation and monitoring plan (**Appendix D**), Programmatic Agreement (PA) for cultural and Native American resources (**Appendix E**), an Avian Protection Plan (APP;



Chokecherry and Sierra Madre Wind Energy Project

Figure 2-1

Areas of No Surface Use and Applicant Committed Measures in the Application Area



Chokecherry and Sierra Madre Wind Energy Project

Figure 2-2

Timing Stipulation Constraints in the Application Area

Appendix J), and a Biological Opinion (BO [**Appendix L**]). These documents have not yet been completed, and consultation with other regulatory agencies including the USFWS and the Wyoming SHPO is ongoing. However, environmental constraints that may come through development of each of these documents would be incorporated into the selected alternative.

Additionally, mitigation as defined in 40 CFR 1508.20 may be identified through analysis conducted in Chapter 4.0 of this document (summarized in **Appendix C**, **Table C-4**). These measures would be identified as those that would avoid, minimize, rectify, reduce, eliminate, or compensate for potential environmental impacts to the extent possible. Constraints identified through the development of the APP, BO, PA, and mitigation measures would be incorporated by reference into any additional NEPA analysis required prior to issuance of any ROW grants for the project. These constraints would then in turn be considered as stipulations of approval in the ROW grants.

2.2.2 Visual Resource Management Considerations

As discussed in Section 1.6.1.1, no action alternatives could be developed that would be in conformance with the 2008 Rawlins RMP. Approval of any of the action alternatives would require an RMP Amendment to change the VRM classes in the Application Area. The VRM Plan Amendment for the CCSM project is being addressed in Volume I of this document. As part of the ROD, the BLM will decide whether to amend the 2008 Rawlins RMP as a prerequisite to approval of the CCSM project. The Proposed Plan identified in the VRM Plan Amendment in Volume I has been carried forward to inform the alternatives and the conceptual areas of development as well as the analysis in this Volume. All project alternatives conform to the 2008 Rawlins RMP and the Proposed Plan in the VRM-targeted Plan Amendment in Volume I.

2.2.3 Phased Construction Sequence (GEN-1)

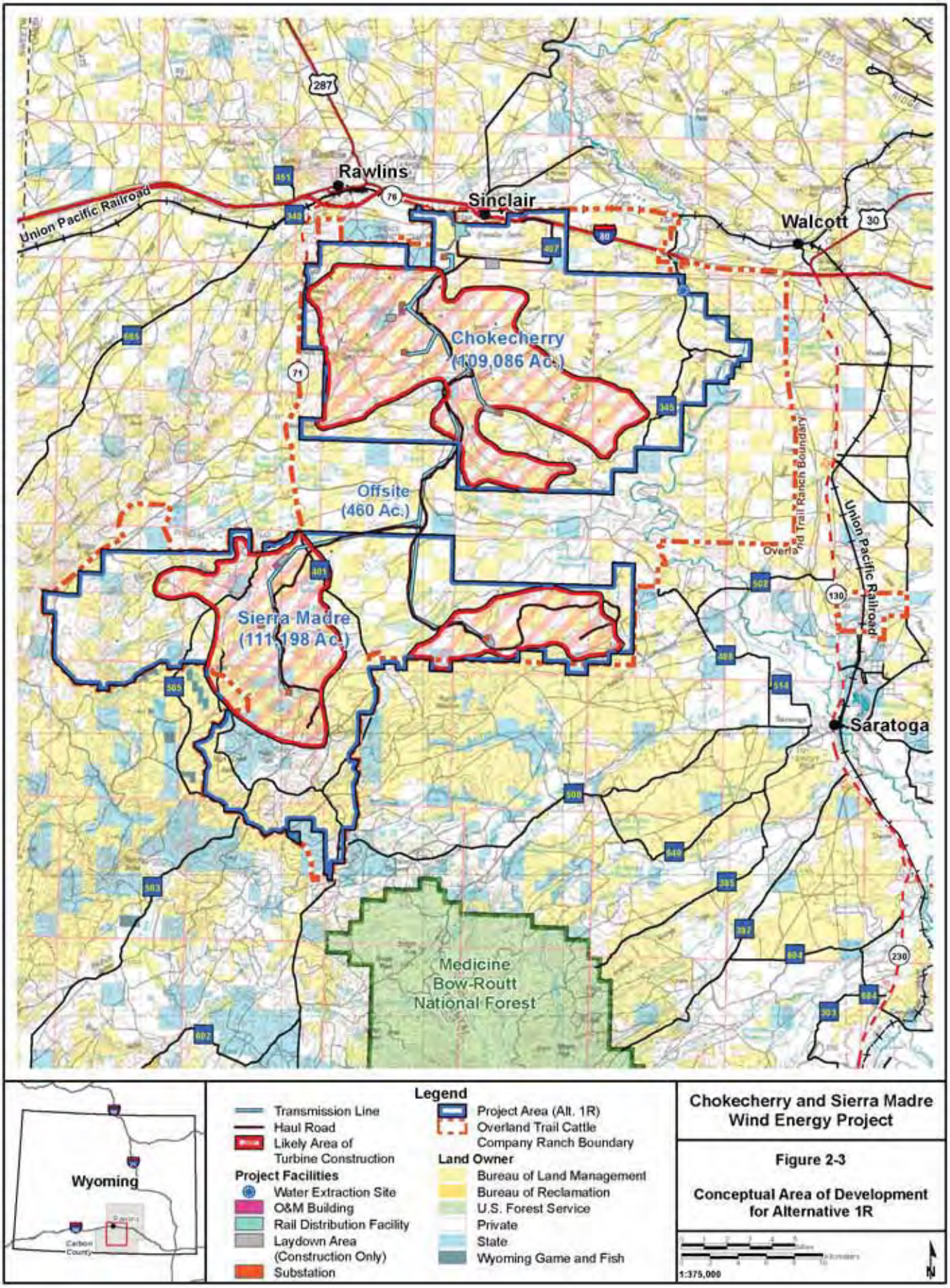
The applicant originally proposed to construct the project over a 3-year period. To mitigate potential socioeconomic effects caused by a large labor force, PCW agreed to a 4-year construction period with all internal access roads constructed in the first year, which was evaluated in the Draft EIS. However, this approach would result in surface disturbance throughout the Application Area in the first year, but most access roads would not be needed until subsequent construction years. This would ultimately delay reclamation of these areas. As a result, the BLM developed mitigation measure GEN-1 in the Draft EIS that would limit surface disturbance to areas where turbines would be constructed within 12 months with a goal to mitigate impacts from surface disturbance to wildlife, soils, water, and vegetation (e.g., weeds). PCW has modified their construction schedule and approach in the revised draft POD to reflect Draft EIS Mitigation Measure GEN-1 (PCW 2012). The GEN-1 Phased Construction Sequence has been incorporated into all alternatives in the Final EIS, rather than applied as a mitigation measure.

The GEN-1 Phased Construction Sequence would result in a minimum of four ROW grants issued for the project: 1) internal haul road, water extraction site, and RDF; 2) transmission line between the two sites; 3) Sierra Madre development; and 4) Chokecherry development. The GEN-1 Phased Construction Sequence is further detailed in Section A.3.1.1 of **Appendix A** and would apply to all alternatives.

2.2.4 Alternatives Considered in the EIS

While multiple alternatives and specific actions were considered, five alternatives are studied in detail in this EIS – the No Action and four action alternatives. These alternatives are described in the following sections. Each of the action alternatives discussed include the following:

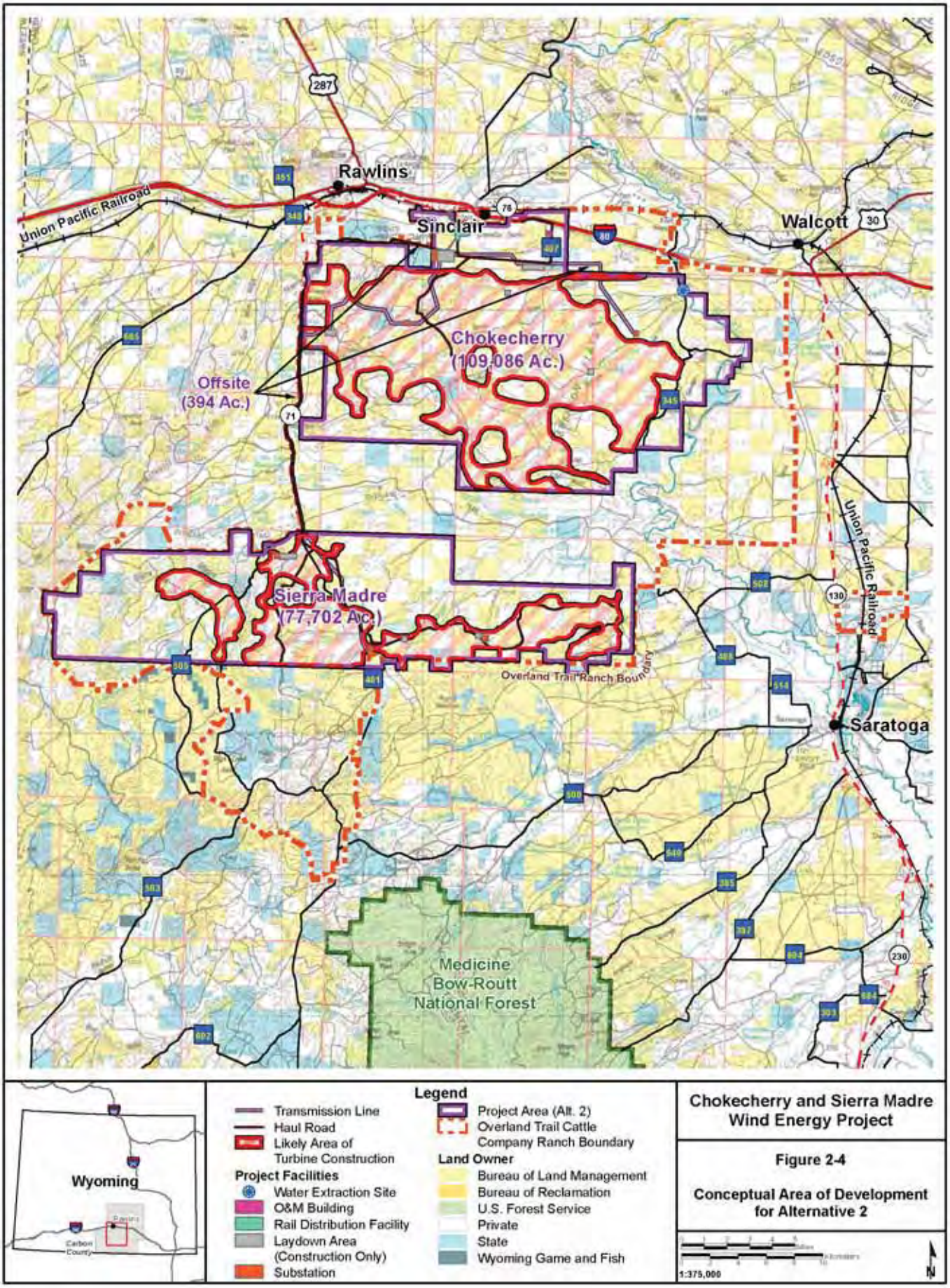
- Development under each action alternative would be constrained to the area of conceptual development identified within the alternative boundary (both terms are defined in Section 2.1 and shown on each of the alternative figures: **Figure 2-3**, **Figure 2-4**, **Figure 2-5**, and **Figure 2-6**).



Chokecherry and Sierra Madre Wind Energy Project

Figure 2-3

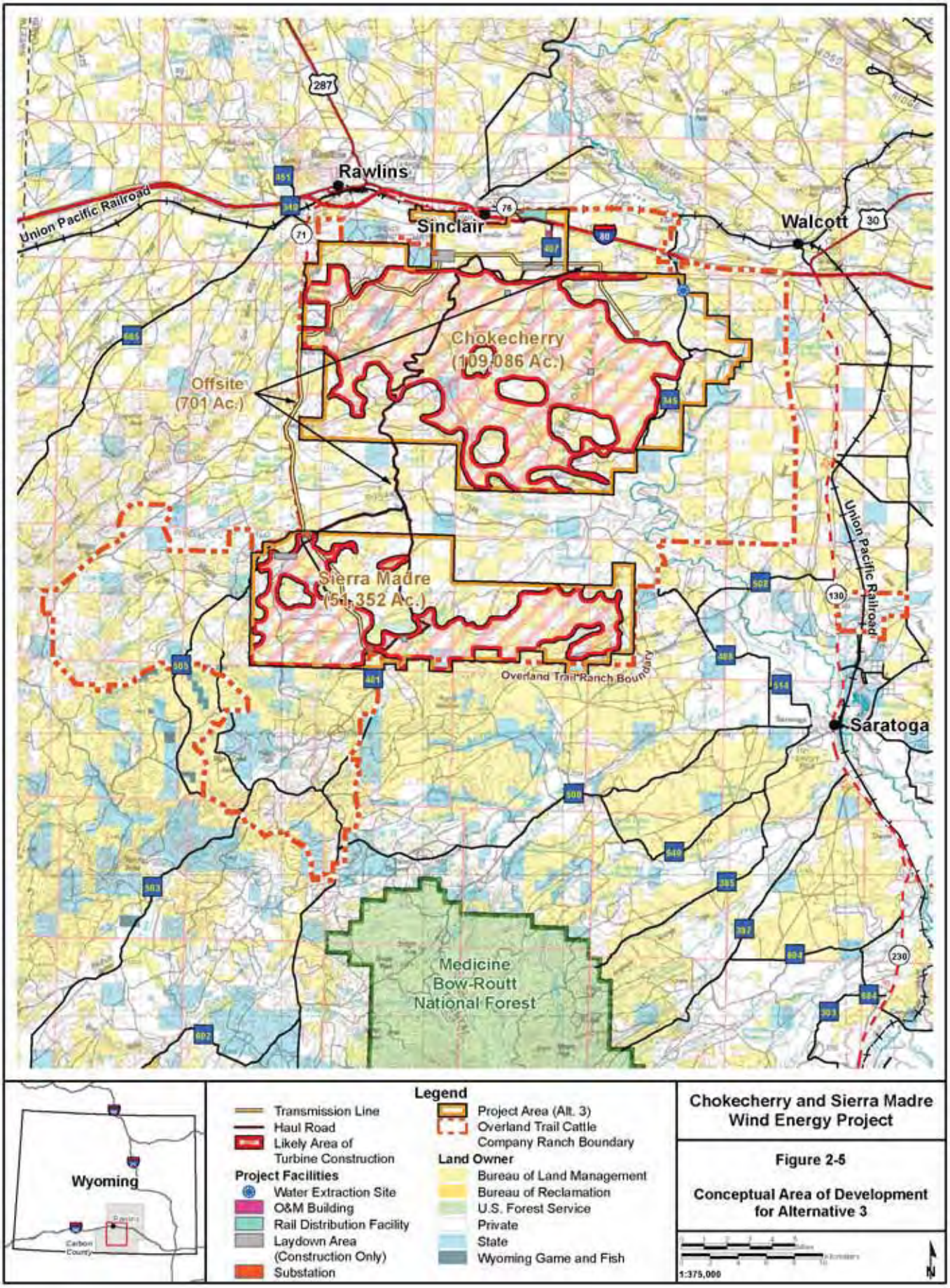
Conceptual Area of Development for Alternative 1R



Chokecherry and Sierra Madre Wind Energy Project

Figure 2-4

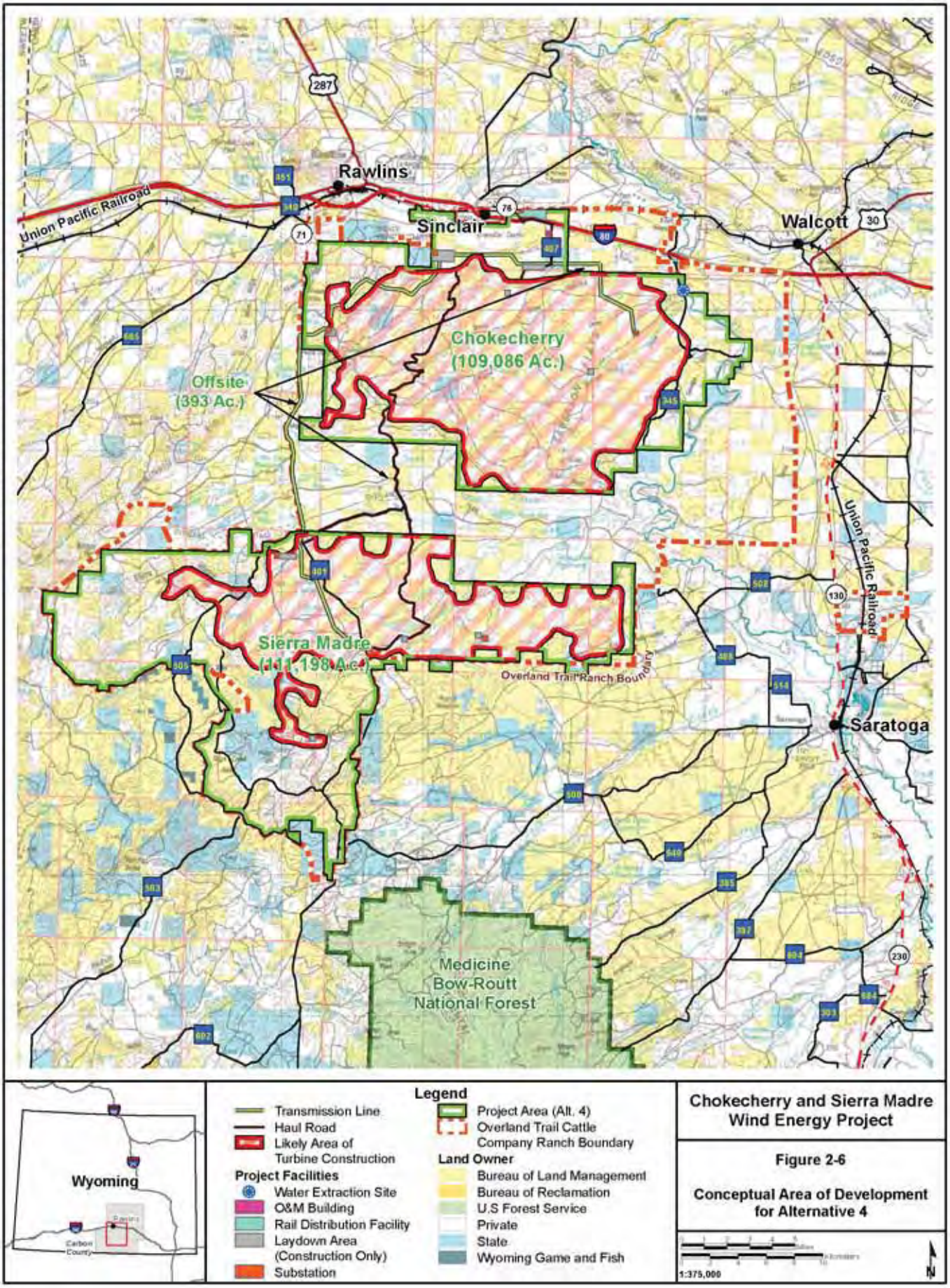
Conceptual Area of Development for Alternative 2



Chokecherry and Sierra Madre Wind Energy Project

Figure 2-5

Conceptual Area of Development for Alternative 3



Chokecherry and Sierra Madre Wind Energy Project

Figure 2-6

Conceptual Area of Development for Alternative 4

- No development would occur under any action alternative within NSU and ACM areas as identified in **Figure 2-1** and discussed in **Appendix C**.
- All action alternatives would adhere to the timing stipulations shown in **Figure 2-2** and discussed in **Appendix C** as well as additional constraints applied through the reclamation and monitoring plan, PA for cultural and Native American resources, APP, and BO.
- Project elements common to all action alternatives discussed in Section 2.2 and detailed in **Appendix A**, including the environmental constraints and ACMs (discussed in Section 2.2.1), the Proposed Plan identified in the VRM Plan Amendment in Volume I (discussed in Section 2.2.2), and the GEN-1 phased construction sequence (discussed in Section 2.2.3).

Within each alternative boundary, a conceptual area of development where turbines and associated roads would most likely be developed is presented for each action alternative. While micro-siting of turbines has not yet been completed, the areas presented for analysis in each of the alternatives is based upon the latest wind resource data and environmental constraints known at the time of analysis. The potential does remain that deviations from the conceptual areas depicted for each alternative could occur. For this reason, subsequent NEPA analysis, tiered to the analysis conducted in this document, would be required prior to issuance of any ROW grants (discussed further in **Appendix B**). The final turbine layout would adhere to the terms and conditions of the ROD and any ROW grants issued by the BLM.

2.2.5 No Action Alternative

NEPA regulations require that EIS alternative analyses “include the alternative of no action” (40 CFR 1502.14(d)). For this analysis, no action means that the BLM would reject PCW’s request to develop wind energy on public lands and deny any request to provide access to private lands for wind development within the Application Area. The area would continue to be used for livestock grazing and recreation. The BLM may consider ROW requests or similar applications for other projects, such as power transmission or mineral development, which may be proposed for this area in the future. This alternative does not meet the purpose and need of the project, which is to promote the development of wind energy on public lands.

2.2.6 Alternative 1R, Applicant Proposed Alternative

Alternative 1R, the Applicant’s Proposed Alternative, was submitted by PCW as an alternative to their original project concept. PCW developed this alternative after considering numerous environmental factors identified through the scoping process and optimized the conceptual layout with information from the Draft EIS. This alternative was developed after a comprehensive review of information pertaining to wildlife issues in the Application Area had been identified. The BLM evaluated this alternative and determined it to be a reasonable alternative that met the purpose and need and was, therefore, carried forward for detailed analysis.

Alternative 1R involves authorization of wind development in the 220,744-acre alternative footprint to accommodate development of a 2,000- to 3,000-MW project consisting of up to 1,000 turbines in the two sites, the 109,086-acre Chokecherry site and 111,198-acre Sierra Madre site, and off-site access on 460 acres. Jurisdiction for this alternative is presented in **Table 2-1**. The BLM does not have jurisdiction over development on private or state lands and would provide reasonable access to private in-holdings.

The conceptual area of development for Alternative 1R is displayed in **Figure 2-3**. This alternative includes a haul road location between the Chokecherry and Sierra Madre sites that avoids steep terrain and a RDF location south of I-80 to address concerns with access and construction traffic across I-80. A transmission line would parallel the internal haul road. Facilities associated with this alternative are identified in **Table 2-2**.

Table 2-1 Jurisdiction with the Alternative 1R Footprint

Jurisdiction	Alternative 1R[1] (acres)		Off-site[2]	Total[3]
	Chokecherry	Sierra Madre		
Public	49,872	53,216	155	**103,243**
State	1,937	7,663	0	**9,600**
Private	57,276	50,319	305	**107,900**
Total[3]	**109,086**	**111,198**	**460**	**220,744**

[1] The Chokecherry site boundary comprises all land within the Application Area that is north of the Overland Trail; the Sierra Madre site boundary comprises all land south of the Overland Trail.

[2] Off-site acreage encompasses all project components including transmission line, resource roads, and internal haul road that connect the Chokecherry and Sierra Madre sites.

[3] Discrepancies in totals due to rounding.

Table 2-2 Facilities Associated with Alternative 1R

Facility	Unit	Chokecherry	Sierra Madre	Off-site	Total
Support					
Laydown Areas[1]	Count	23	15	0	38
Substations	Count	4	3	0	7
Concrete Batch Plants	Count	3	2	0	5
O&M Facilities[2]	Count	8	7		15
RDF	Count	0	0	1	1
Water Extraction Site	Count	1	0	0	1
Transportation Network					
Haul Road	Miles	20	31	7	58
Internal Resource Roads and Access	Miles	213	163	3.5	380
Turnarounds	Each	46	54	0	100
Electrical System					
Overhead 230-kV Transmission	Miles	20	31	7	58
Underground 34.5kV Collection	Miles	164	131	0	295
Overhead 34.5-kV Collection	Miles	29	39	0	68
Overhead Collection Poles	Count	404	543	0	947
Overhead 230-kV Transmission Towers	Count	160	112	41	313

[1] Laydown areas include multiple smaller areas used for construction staging, crane erection/teardown areas, trailer complex/laydown, and laydown yards as described in the January 2012 revised POD (PCW 2012a). This alternative includes more laydown areas with smaller footprints.

[2] O&M facilities include the operations center, maintenance buildings, and permanent met towers as described in the January 2012 revised POD (PCW 2012a). This alternative includes more O&M with smaller footprints.

The conceptual area of development for Alternative 1R could accommodate a 2,000- to 3,000-MW project consisting of up to 1,000 turbines within the alternative footprint. As stated in Section 2.2.1, additional environmental constraints would come forth through development of an APP, BO, and PA. Likewise, micro-siting could result in the inability to locate all 1,000 turbines. For this reason, the information provided in **Table 2-3** represents the largest extent of disturbance that would occur under this alternative.

Disturbance estimates were generated by assuming an average amount of disturbance associated with each project component proposed by alternative. While these estimates may vary somewhat from Geographic Information System (GIS) estimates that used assumed component locations to generate resource-specific analyses (e.g., disturbance associated with a habitat or vegetation type), the difference is estimated to be less than 5 percent. Based on the average amount of disturbance for project components in this alternative, Alternative 1R would result in approximately 7,733 acres of initial disturbance (3.5 percent of the total Alternative Boundary). Estimated initial disturbance during the 5-year construction schedule is shown in **Table 2-3**. Total long term surface disturbance for Alternative 1R would be approximately 1,545 acres (0.7 percent of the total Alternative Boundary).

Table 2-3 Estimated Rate of Construction Surface Disturbance for Alternative 1R[1]

Construction Year	Estimated Initial Disturbance (acres)	Portion of Construction (%)
1	1,350	17
2	1,383	18
3	2,191	28
4	2,219	29
5	590	8
Total[2]	**7,733**	**100**

[1] Estimated disturbance based on average disturbance associated with each facility proposed under the alternative within the alternative boundary (includes all jurisdictions).

[2] Discrepancies in totals due to rounding.

2.2.7 Alternative 2, Checkerboard Only

Alternative 2 was developed in response to public and agency comments to restrict wind development within consolidated tracts of public lands for the sake of mitigating visual impacts in areas with high recreational values. The checkerboard land pattern produces numerous federal management complications, most notably through the restrictions of public access. The Application Area lying outside of the checkerboard land pattern is highly used by recreationists including hunters and travelers along the Continental Divide National Scenic Trail (CDNST). Additionally, this area is notable for wildlife habitat including greater sage-grouse, mule deer, elk, and raptors. The proximity of this area to National Forests increases viewer sensitivity.

While PCW has committed to not developing any wind energy facilities within greater sage-grouse core breeding areas, as defined in Wyoming Governor's State EO 2011-5, numerous greater sage-grouse leks, as well as nesting and brooding habitat, are located throughout the Application Area. This alternative incorporates an additional stipulation for greater sage-grouse protection of developments over 20 feet, being precluded within 1-mile or the visual horizon (whichever is closer) of a lek; for developments less than 20 feet, the standard buffer of 0.25-mile NSU in areas outside the greater sage-grouse core breeding area would apply.

Alternative 2 would authorize wind development on public lands within the 187,465-acre alternative footprint to accommodate development of a 2,000- to 3,000-MW project consisting of up to 1,000 turbines in the two sites, the109,086-acre Chokecherry site and the 77,702-acre Sierra Madre site north of T18N, and off-site access on 677 acres. The privately-owned lands and state lands in these same areas also were considered available for the development of wind energy facilities. Jurisdiction for this alternative is presented in **Table 2-4**.

Table 2-4 Jurisdiction with the Alternative 2 Footprint

Jurisdiction	Alternative 2[1] (acres)		Off-site[2]	Total[3]
	Chokecherry	Sierra Madre		
Public	49,872	33,707	287	83,866
State	1,937	3,030	85	5,052
Private	57,276	40,965	305	98,546
Total[3]	**109,086**	**77,702**	**677**	**187,465**

1 The Chokecherry site boundary comprises all land within the Application Area that is north of the Overland Trail; the Sierra Madre site boundary comprises all land south of the Overland Trail.

2 Off-site acreage encompasses all project components including transmission line, resource roads, and internal haul road that connect the Chokecherry and Sierra Madre sites.

3 Discrepancies in totals due to rounding.

This Alternative has been modified from the Draft EIS as a result of agency comments to include a haul road variation that parallels WY 71/CCR 401 because of concerns for impacts to big game habitat in the Sage Creek Basin. The haul road variation would connect to the preferred RDF location that is located south of I-80 but within the boundaries of the Chokecherry site. However, use of the haul road variation would require PCW to obtain necessary ROWs from other landowners, including: multiple other private landowners; lands owned by the City of Rawlins and used for its water treatment facility and associated reservoir; and lands owned by the Wyoming Department of Corrections State Penitentiary. While obtaining access across these lands may be a constraint, it is not entirely infeasible and the BLM has decided to include this option to allow decisionmakers to decide whether this type of variation would alleviate the concerns expressed in the agency comments received on the Draft EIS.

Figure 2-4 displays the conceptual area of development for Alternative 2. A transmission line would parallel the haul road adjacent to WY 71/CCR 401 and existing linear features (roads, pipelines) to collocate linear crossings of the historic Overland Trail. Facilities associated with this alternative are identified in **Table 2-5**.

Table 2-5 Facilities Associated with Alternative 2

Facility	Unit	Chokecherry	Sierra Madre	Off-site	Total
Support					
Laydown Areas[1]	Count	5	3	0	8
Substations	Count	4	3	0	7
Concrete Batch Plants	Count	3	2	0	5
O&M Facilities[2]	Count	0	0	1	1

Table 2-5 Facilities Associated with Alternative 2

Facility	Unit	Chokecherry	Sierra Madre	Off-site	Total
RDF	Count	0	0	1	1
Water Extraction Site	Count	1	0	0	1
Transportation Network					
Haul Road	Miles	19	29	15	63
Internal Resource Roads and Access	Miles	271	146	2.5	419.5
Turnarounds	Each	135	86	1	222
Electrical System					
Overhead 230-kV Transmission	Miles	19	29	15	63
Underground 34.5-kV Collection	Miles	198	119	0	317
Overhead 34.5-kV Collection	Miles	50	30	0	80
Overhead Collection Poles	Count	695	417	0	1,112
Overhead 230-kV Transmission Towers	Count	116	43	68	227

[1] Laydown areas include larger central areas used for construction staging, crane erection/teardown areas, trailer complex/laydown, and laydown yards.

[2] Operations and Maintenance facilities include a larger central operations and maintenance center.

The conceptual area of development for Alternative 2 could accommodate a 2,000 to 3,000-MW project consisting of up to 1,000 turbines within the alternative footprint. As with Alternative 1R, additional environmental constraints would come forth through development of an APP, BO, and PA. Likewise, micro-siting could result in the inability to locate all 1,000 turbines. For this reason, the information provided in **Table 2-6** represents the largest extent of disturbance that would occur under this alternative.

Table 2-6 Estimated Rate of Construction Surface Disturbance for Alternative 2[1]

Construction Year	Estimated Initial Disturbance (acres)	Portion of Construction (%)
1	1,496	17
2	1,532	18
3	2,428	28
4	2,459	29
5	653	8
Total[2]	**8,569**	**100**

[1] Estimated disturbance based on average disturbance associated with each facility proposed under the alternative within the alternative boundary (includes all jurisdictions).

[2] Discrepancies in totals due to rounding.

Disturbance estimates were generated using the same average amount of disturbance associated with each project component as Alternative 1R. Based on the average amount of disturbance for project components in this alternative, Alternative 2 would result in approximately 8,569 acres of initial

disturbance (4.6 percent of the total Alternative Boundary). Estimated initial disturbance during the 5-year construction schedule is shown in **Table 2-6**. Total long term surface disturbance for Alternative 2 would be approximately 1,629 acres (0.9 percent of the total Alternative Boundary).

2.2.8 Alternative 3, No Miller Hill or South Sierra Madre

This alternative was developed in response to public and agency comments to restrict wind development within consolidated tracts of public lands and exclude the Miller Hill portion of the Application Area in an attempt to protect existing VRM Class II areas and areas with high wildlife concerns. The issues raised in association with the Application Area outside of the checkerboard land pattern and described for Alternative 2 are addressed again in Alternative 3.

Miller Hill was identified as a highly sensitive area for wildlife, specifically greater sage-grouse, mule deer, elk, and raptors based on its proximity to the Grizzly WHMA. Furthermore, the headwaters of Muddy Creek, home to three BLM sensitive species, are located on Miller Hill. Mule deer and elk migration routes have been identified as terminating on Miller Hill as the area is used by both species as winter range. Under this alternative, WTGs would not be placed on Miller Hill or in the southern area defined as the Sierra Madre portion of the proposed project. WTGs would be placed east of the base of the slope to Miller Hill and into Sage Creek Basin.

While PCW has committed to not developing any wind energy facilities within greater sage-grouse core breeding areas, as defined in Wyoming Governor's State EO 2011-5, numerous greater sage-grouse leks, as well as nesting and brooding habitat, are located throughout the Application Area. Timing stipulations for greater sage-grouse protection would be the same as Alternative 1R.

Alternative 3 would authorize wind development on public lands within the 161,139-acre alternative footprint to accommodate development of a 2,000- to 3,000-MW project consisting of up to 1,000 turbines in the two sites, the 109,086-acre Chokecherry site and 51,352-acre Sierra Madre site located east of the eastern half of T18N, R88W, and off-site access on 701 acres. Privately owned and state lands located in these same areas also were considered available for the development of wind energy facilities. This would result in all lands (public, state, and private) below T18N or in the western half of T18N, R88W being considered as excluded from wind development. Jurisdiction for this alternative is presented in **Table 2-7**.

Table 2-7 Jurisdiction with the Alternative 3 Footprint

Jurisdiction	Alternative 3[1] (acres)		Off-site[2]	Total[3]
	Chokecherry	Sierra Madre		
Public	49,872	23,915	306	74,093
State	1,937	1,277	0	3,214
Private	57,276	26,160	395	83,831
Total[3]	**109,086**	**51,352**	**701**	**161,139**

1 The Chokecherry site boundary comprises all land within the Application Area that is north of the Overland Trail; the Sierra Madre site boundary comprises all land south of the Overland Trail.

2 Off-site acreage encompasses all project components including transmission line, resource roads, and internal haul road that connect the Chokecherry and Sierra Madre sites.

3 Discrepancies in totals due to rounding.

Figure 2-5 displays the conceptual area of development for Alternative 3. This alternative retains the original haul road location analyzed in the Draft EIS and alternate RDF location north of I-80 that was included in the Draft EIS. The transmission line would parallel the existing linear features (WY 71, roads,

pipelines) to collocate linear crossings of historic trails. Facilities associated with this alternative are shown in **Table 2-8**.

Table 2-8 Facilities Associated with Alternative 3

Facility	Unit	Chokecherry	Sierra Madre	Off-site	Total
Support					
Laydown Areas[1]	Count	5	2	0	7
Substations	Count	4	2	0	6
Concrete Batch Plants	Count	3	2	0	5
O&M Facilities[2]	Count	0	0	1	1
RDF	Count	0	0	1	1
Water Extraction Site	Count	1	0	0	1
Transportation Network					
Haul Road	Miles	21	10	9	40
Internal Resource Roads and Access	Miles	276	130	14	420
Turnarounds	Each	143	70	0	213
Electrical System					
Overhead 230-kV Transmission	Miles	21	10	9	40
Underground 34.5-kV Collection	Miles	202	96	0	298
Overhead 34.5-kV Collection	Miles	51	24	0	75
Overhead Collection Poles	Count	709	334	0	1,043
Overhead 230-kV Transmission Towers	Count	104	37	68	209

[1] Laydown areas include larger central areas used for construction staging, crane erection/teardown areas, trailer complex/laydown, and laydown yards.

[2] O&M facilities include a larger central operations and maintenance center.

The conceptual area of development for Alternative 3 could accommodate a 2,000 to 3,000-MW project consisting of up to 1,000 turbines within the alternative footprint. As with Alternative 1R, additional environmental constraints would come forth through development of an APP, BO, and PA. Likewise, micro-siting could result in the inability to locate all 1,000 turbines. For this reason, the information provided in **Table 2-9** represents the largest extent of disturbance that would occur under this alternative.

Disturbance estimates were generated using the same average amount of disturbance associated with each project component as Alternative 1R. Based on the average amount of disturbance for project components in this alternative, Alternative 3 would result in approximately 8,115 acres of initial disturbance (5 percent of the total Alternative Boundary). Estimated initial disturbance during the 5-year construction schedule is shown in **Table 2-9**. Total long term surface disturbance for Alternative 3 would be approximately 1,506 acres (0.9 percent of the total Alternative Boundary).

2.2.9 Alternative 4, Private Lands Only

Alternative 4 was developed in response to public and agency comments to limit the wind development to private lands only.

Table 2-9 Estimated Rate of Construction Surface Disturbance for Alternative 3[1]

Construction Year	Estimated Initial Disturbance (acres)	Portion of Construction (%)
1	1,417	17
2	1,451	18
3	2,299	28
4	2,329	29
5	619	8
Total[2]	**8,115**	**100**

[1] Estimated disturbance based on average disturbance associated with each facility proposed under the alternative within the alternative boundary (includes all jurisdictions).

[2] Discrepancies in totals due to rounding.

Alternative 4 considers no placement of WTGs on public lands or state lands within either the Chokecherry site or Sierra Madre site. This alternative, however, considers that the BLM would provide ROW grants to PCW across public lands, which would allow PCW to develop wind energy facilities on the privately-held lands. Development would occur on private lands within the 220,919-acre alternative footprint to accommodate development of a 2,000- to 3,000-MW project consisting of up to 1,000 turbines in the two sites, the 109,086-acre Chokecherry site and 111,198-acre Sierra Madre site, and off-site access on 635 acres. The BLM does not have jurisdiction over development on private or state lands and must provide reasonable access to private in-holdings. Application of stipulations is beyond the control of the BLM for development on private or state lands. The BLM would apply required NSU and timing stipulations to public lands for requested access points. Jurisdiction for this alternative is presented in **Table 2-10**.

The conceptual area of development for Alternative 4 resulted in a decrease in the number of turbines that could be sited to 846 within the alternative footprint. **Figure 2-6** displays the conceptual area of development for Alternative 4. This alternative meets PCW's minimum capacity requirements of developing a 2,000-MW project.

This alternative retains the original haul road location analyzed in the Draft EIS and alternate RDF location north of I-80 that was included in the Draft EIS. The transmission line would parallel the existing linear features (WY 71, roads, pipelines) to collocate linear crossings of the historic Overland Trail. Facilities associated with this alternative are shown in **Table 2-11**.

Disturbance estimates were generated by using the same average amount of disturbance associated with each project component as Alternative 1R. Based on the average amount of disturbance for project components in this alternative, Alternative 4 would result in approximately 8,195 acres of initial disturbance (3.7 percent of the total Alternative Boundary). The higher amount of surface disturbance in relation to fewer turbines is associated with the additional road network required across more area to access private lands. Estimated initial disturbance during the 5-year construction schedule is shown in **Table 2-12**. Total long term surface disturbance for Alternative 4 would be approximately 1,541 acres (0.7 percent of the total Alternative Boundary).

Table 2-10 Jurisdiction with the Alternative 4 Footprint

Jurisdiction	Alternative 4[1] (acres)		Off-site	Total[3]
	Chokecherry	Sierra Madre		
Public	49,872	53,216	277	103,365
State	1,937	7,663	0	9,600
Private	57,276	50,319	358	107,953
Total[3]	**109,086[2]**	**111,198**	**635**	**220,919**

[1] The Chokecherry site boundary comprises all land within the Application Area that is north of the Overland Trail; the Sierra Madre site boundary comprises all land south of the Overland Trail.

[2] Off-site acreage encompasses all project components including transmission line, resource roads, and internal haul road that connect the Chokecherry and Sierra Madre sites.

[3] Discrepancies in totals due to rounding.

Table 2-11 Facilities Associated with Alternative 4

Facility	Unit	Chokecherry	Sierra Madre	Off-site	Total
Support					
Laydown Areas[1]	Count	4	4	0	8
Substations	Count	4	3	0	7
Concrete Batch Plants	Count	3	2	0	5
O&M Facilities[2]	Count	0	0	1	1
RDF	Count	0	0	1	1
Water Extraction Site	Count	1	0	0	1
Transportation Network					
Haul Road	Miles	21	9	8	38
Internal Resource Roads and Access	Miles	265	174	11	450
Turnarounds	Each	94	74	5	173
Electrical System					
Overhead 230-kV Transmission	Miles	21	9	8	38
Underground 34.5kV Collection	Miles	150	96	0	246
Overhead 34.5kV Collection	Miles	38	24	0	62
Overhead Collection Poles	Count	529	334	0	863
Overhead 230 kV Transmission Towers	Count	49	31	141	221

[1] Laydown areas include larger central areas used for construction staging, crane erection/teardown areas, trailer complex/laydown, and laydown yards.

[2] O&M facilities include a larger central operations and maintenance center.

Table 2-12 Estimated Rate of Construction Surface Disturbance for Alternative 4[1]

Construction Year	Estimated Initial Disturbance (acres)	Portion of Construction (%)
1	1,431	17
2	1,466	18
3	2,322	28
4	2,352	29
5	625	8
Total[2]	**8,195**	**100**

[1] Estimated disturbance based on average disturbance associated with each facility proposed under the alternative within the alternative boundary (includes all jurisdictions).

[2] Discrepancies in totals due to rounding.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

The following alternatives and management options were considered but were eliminated from detailed analysis as either unreasonable or impractical because of technical, legal, or policy considerations. Some concepts were raised as independent alternatives, but were either considered to be required stipulations, mitigation, or incorporated as part of another alternative. These alternatives and concepts were developed through interdisciplinary team meetings, meetings with agencies, and input received during public scoping and comments received on the Draft EIS.

2.3.1 Proponent's Original Project Concept

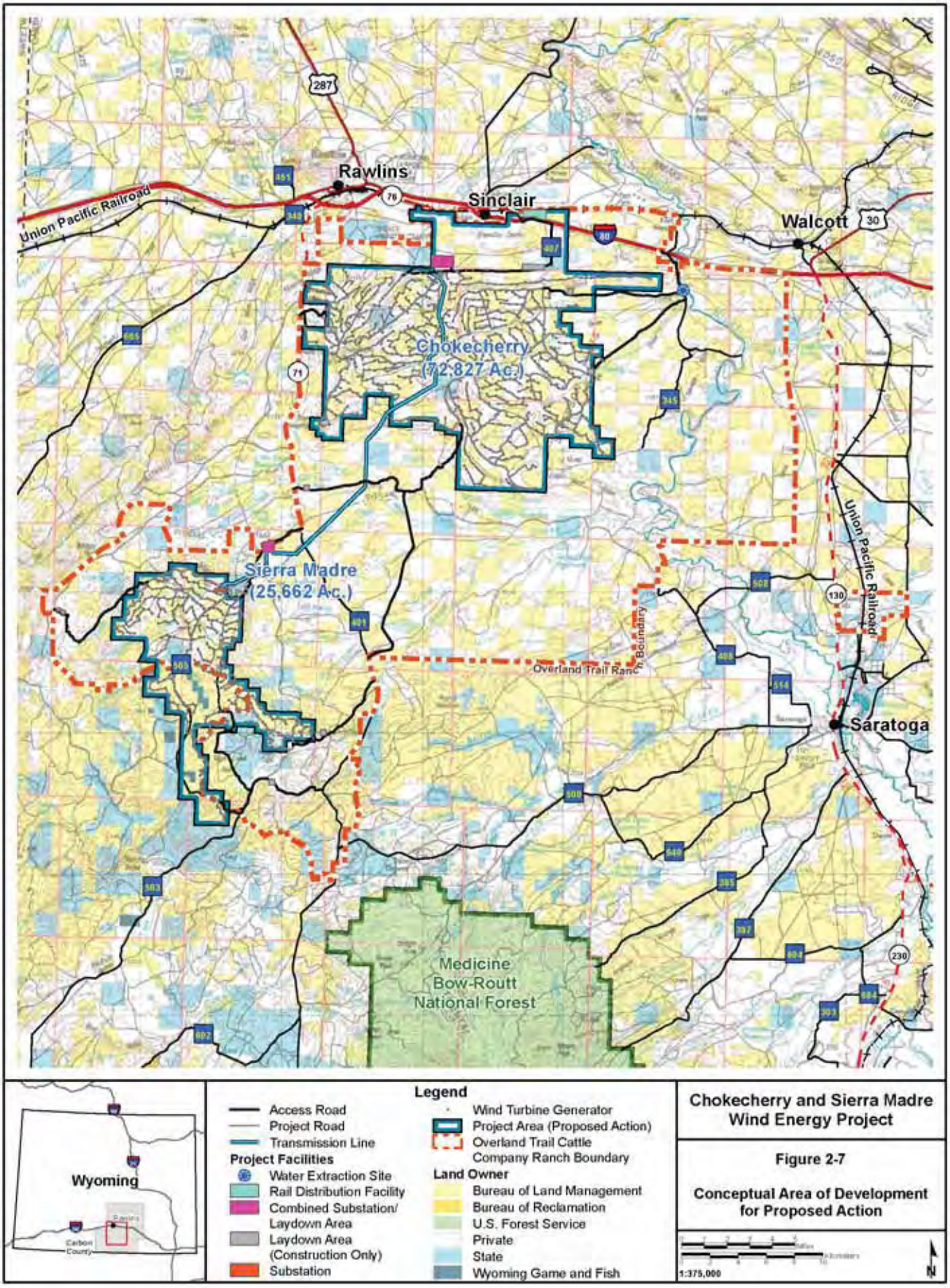
The original Proposed Action includes development of a 2,000 to 3,000-MW wind farm consisting of up to 1,000 WTGs on two wind farm sites – CCSM – within an approximately 98,477-acre area primarily within the 315,000-acre TOTCO ranch. Based on a conceptual area of development, approximately 675 turbines would be sited within the 72,835-acre Chokecherry site and approximately 325 turbines would be sited within the 25,642-acre Sierra Madre site. The installed project capacity would be between 2,000-3,000-MW. **Figure 2-7** illustrates PCW's original project concept.

Based on the average amount of disturbance for proposed project components, the original project concept would result in approximately 8,730 acres of initial disturbance (8.8 percent of the total Alternative Boundary) and approximately 1,811 acres of long-term disturbance (1.8 percent of the total Alternative Boundary). Construction would be planned to occur over a three-year period.

The original project concept does not consider application of BLM required stipulations on public lands. Therefore, the original project concept does not meet the BLM's purpose and need in that it does not conform to management policy set forth in the 2008 Rawlins RMP. For this reason, it was not carried forward.

2.3.2 Proponent's Original Project Concept with Constraints

This alternative considers the original project concept with additional BLM required environmental constraints applied to public lands as well as the application of ACMs. The Alternative Boundary, however, would remain the same as those submitted by PCW as its original project concept (98,477 acres). Based on a conceptual area of development, approximately 552 turbines would be sited within the 72,835-acre Chokecherry site and approximately 185 turbines would be sited within the 25,642-acre Sierra Madre site (totaling 737 WTG). The installed project capacity would be between 1,106 to 2,211-MW.



Chokecherry and Sierra Madre Wind Energy Project

Figure 2-7

Conceptual Area of Development for Proposed Action

Under this alternative, turbines displaced by stipulations on public lands may be relocated to private lands within the 98,477-acre Application Area. However, without expansion of the Alternative Boundary, the Original Project Concept with Environmental Constraints (e.g., RMP stipulations) does not meet PCW's objectives in that it does not allow for the development of 2,000 to 3,000-MW (1,000 turbine locations) and would not be economically viable. Therefore, the original project concept was replaced by Alternative 1 then by Alternative 1R, which was analyzed in detail.

2.3.3 Alternative 1: Application of RMP Stipulations and Expanded Application Area

Alternative 1R differs from Alternative 1 in that Alternative 1R provides a different area of conceptual development that incorporates the new greater sage-grouse Version 3 map that was not available when Alternative 1 was developed. Alternative 1 considers wind development on state, private, and public lands that are located within the Application Area and within the boundaries of TOTCO grazing allotments. This alternative also would apply the BLM-required environmental constraints to public lands as well as PCW's ACMs. The expanded Alternative Boundary was intended to accommodate displaced turbines to achieve development of a 2,000 to 3,000-MW project consisting of up to 1,000 WTG locations and maximize energy production. Based on a conceptual area of development, up to approximately 663 turbines would be sited within the 105,477-acre Chokecherry site and up to approximately 337 turbines would be sited within the 108,338-acre Sierra Madre site (totaling up to 1,000 WTG). The installed project capacity would be between 2,000 to 3,000-MW.

Alternative 1 was developed using the same criteria as PCW's applicant proposed alternative (Alternative 1R) in that both give PCW the option of designing a turbine layout that could use any portion of the area for which they have applied for site testing and monitoring while complying with BLM-required environmental constraints. For this reason, analysis of both alternatives would be redundant. As the original project concept would not be analyzed in detail, PCW's applicant proposed alternative (Alternative 1R) was carried forward for detailed analysis, essentially replacing and eliminating the need to analyze Alternative 1 in detail.

2.3.4 Alternative 5: Avoidance of Greater Sage-grouse Core Breeding Areas (Version 2 Map)

Alternative 5 considers wind development on private, state, and public lands located outside the greater sage-grouse core breeding areas, as designated by the Wyoming Governor's Greater Sage-Grouse Implementation Team and depicted on the greater sage-grouse core breeding areas Version 2 map (which was available at the time of the alternatives development), and within the Application Area. Based on a conceptual area of development, approximately 252 turbines would be sited within the 39,348-acre Chokecherry site and approximately 49 turbines would be sited within the 16,276-acre Sierra Madre site. The installed project capacity would be between 602 to 903-MW.

Alternative 5, no development in greater sage-grouse core breeding areas (based on the Version 2 Map), does not meet PCW's objectives in that it does not allow for the development of a 2,000 to 3,000-MW project consisting of up to 1,000 WTG locations. Additionally, since development of this alternative, the Wyoming Governor's Greater Sage-grouse Implementation Team issued the revised greater sage-grouse core breeding area boundaries (Version 3 Map) and associated recommendations (formalized in Wyoming Governor's State EO 2011-5, issued in 2011), which no longer includes a larger portion of the Application Area. PCW's ACMs would exclude development in the greater sage-grouse core breeding areas (as indicated on Version 3 Map) under all alternatives in accordance with Wyoming Governor's State EO 2011-5.

2.3.5 Alternative 6: Chokecherry Only/No Sierra Madre Development

Alternative 6 considers wind development on private, state, and public lands only in the Chokecherry site of the Application Area. As a result, no wind energy development would occur in the Sierra Madre site.

Based on a conceptual area of development, approximately 663 turbines would be sited within the 105,477-acre Chokecherry site. The installed project capacity would be between 1,326 and 1,989-MW.

Alternative 6, development of Chokecherry only, does not meet PCW's objectives in that it does not allow for the development of a 2,000 to 3,000-MW project consisting of up to 1,000 WTG locations and maximize energy production. Additionally, the BLM NEPA Handbook (H-1790-1) allows for various parts of separate alternatives that are analyzed to be "mixed and matched" to develop a complete preferred alternative as long as the reasons for doing so are explained. Since the impact analysis for all alternatives analyzes the CCSM sites separately, the analysis would already cover this option and it would be unnecessary to complete a separate analysis.

2.3.6 Wind Turbine Design and Siting Concepts

Multiple concepts were considered regarding variations to wind turbine design and siting. Concepts considered included: alternative wind turbine designs (types) and generating capacity, reduced/limits to turbine density, and higher capacity turbines. These concepts were considered as independent alternatives to potentially reduce surface disturbance and associated direct and indirect impacts from the project, including to soils, receiving waters, and avian species as well as visual resources. Some of these options have been included as part of all alternatives to the extent that it is technically feasible and, therefore, were not considered viable independent alternatives. For example, the project already considers using the most efficient turbines available (currently 2 to 3-MW) for the Application Area's wind resource and vertical wind shear factor, and also allows for the option of using International Electrotechnical Commission Classes 1 and 2 turbines with hub heights up to and including 328 feet. There are larger capacity turbine models (including 3.6 and 5-MW models), however, those turbines were developed for off-shore development or are prototype machines that are not commercially available and may not be appropriate for the site conditions. Other considerations in turbine model selection include the ability of manufacturers to produce and deliver turbines within the project timeframe, which is beyond the scope of the BLM's NEPA process. In addition, turbine density has inherent restrictions associated with wake effect and other engineering factors. Alternatives considered area restrictions associated with environmental constraints rather than arbitrarily placing density restrictions on the project, which is not considered a reasonable or practical alternative.

The BLM gave consideration to requiring a height restriction on WTGs, which may have the potential to reduce overall visibility of the project. Tower height is an important factor in WTG design since the wind blows faster at higher altitudes because of the drag of the surface and the viscosity of the air. Therefore, a height restriction would result in less energy output. According to an independent review of the project by the NREL (2011), commercially available WTGs that have more energy output also are taller structures. Placing a height restriction on WTGs would reduce the energy output produced by each WTG, requiring more WTGs to achieve the minimum energy output deemed economically necessary for the project viability by the applicant. A cursory review conducted by PCW indicated that up to 2,387 turbines could be sited in the Application Area, but the wind resource of these areas would vary considerably and some areas would not achieve near nameplate capacity. The extent of additional WTGs required to produce a desired output of 2,000 to 3,000-MW may not be achieved within the Application Area using smaller WTGs. More turbines would result in more surface disturbance across the Application Area. Smaller turbines also would have faster rotor speeds, increasing the potential for avian strikes.

The BLM also gave consideration to multiple smaller projects as opposed to one large wind project in two areas that share support facilities. According to an independent review of the project by NREL (2011), Alternative 1R considers 3 substations and a collector system of approximately 31 miles of transmission/collection lines. However, a system of 10 separate 200-MW projects would require 10 substations at a substantially increased cost and more surface disturbance since each project would require separate facilities. If the ten 200-MW projects were to be spread over a larger geographic area for other reasons (i.e., environmental impacts), then the more miles of electrical transmission/collection

lines would be needed, adding proportionately greater costs and surface disturbance to the project in addition to the 10 substations.

2.3.7 Transmission Concepts

Multiple concepts were considered regarding variations to the power transmission. Concepts considered included: transmission line routing relocation, alternative transmission line structure design, and transmission substation relocation. These concepts were considered as independent alternatives to address concerns related to greater sage-grouse, raptors, steep slopes, and visual resources that were identified during the public and agency scoping process.

Locating the main transmission line underground is not a viable concept due to transmission constraints, maintenance concerns, and prohibitive costs. Underground transmission lines are more difficult to site as a result of other considerations including underground waterways, varying soil and rock material, and varying thermal conditions as well as other infrastructure and ROWs. Underground circuits also are prone to heat build-up, which results in increased line resistance and lack circuit breaking capabilities that are available on overhead lines. Ultimately, design and installation as well as repairs of underground systems are more complex, time-consuming, and expensive. Therefore, the applicability of undergrounding secondary and high voltage transmission lines was eliminated from further consideration.

Viable concepts have been incorporated into the alternatives and these concepts were not considered as independent alternatives that required analysis. For example, single-pole transmission line structures were incorporated into all alternatives as they are less visible and require less disturbance than H-frame or lattice structures. These options were not considered viable independent alternatives. The most viable option was included in Alternatives 2 through 4, which incorporates the concept of the main transmission line paralleling existing linear features (WY 71, roads, pipelines) and avoiding sensitive resources through the BLM environmental constraints and ACMs.

2.3.8 Resource Protection Concepts

Multiple concepts were considered as independent alternatives to address concerns related to historic trails and other cultural resources, visual impacts to sensitive receptors, compliance with the BLM VRM classifications, avoid or reduce impacts to receiving waters, reduce impacts to avian and bat species, reduce electrocution and predation, and wildlife protection. Each of these concepts has been incorporated into either the EIS action alternatives or mitigation, as specified in the parentheses for each bullet below. In many cases these concepts are considered BLM-required environmental constraints or have been accepted as ACMs. In other cases, the concepts are considered mitigation and not reasonable or practical independent alternatives. Concepts considered include:

- Rerouting of transmission lines and roads to avoid cultural resources and crossing historic trails (addressed in Alternatives 2-4);
- Excluding wind development from existing VRM Class II areas (addressed in Alternative 3);
- Establish visual avoidance areas with ratings of high sensitivity based on viewer sensitivity, scenic quality, and distance zones to exclude wind development from critical key observation points (KOPS) and major travel routes in the analysis area (addressed with the No Action Alternative);
- Elimination of turbines and access roads upslope from the Rawlins public water supply and other receiving streams (all alternatives analyzed in detail);
- Discontinued operations during migration seasons to reduce avian and bat mortality (potential mitigation measures in the APP);

- Installation of overhead transmission structures with anti-perching devices and adequate conductor-to-conductor and conductor-to-ground space to prevent avian electrocution (potential mitigation measures in the APP); and
- Incorporation of protective measures including NSU and timing restrictions during breeding season (possibly beyond standard restrictions) and relocation of development to less sensitive areas which would apply to greater sage-grouse, raptors, and mountain plover (all alternatives analyzed in detail).

2.3.9 Renewable Energy Development Concepts

Thermal solar energy has gained considerable attention during recent years as a renewable resource for power generation. Designs include the use of parabolic mirror troughs, power tower designs, dish designs, and Fresnel lenses and reflectors. Parabolic mirror troughs have been in use for decades as a means to focus solar energy on a media to create heat to drive turbines and generators.

The 400 acre Nevada Solar One plant is one of the newer facilities in operation using parabolic mirror troughs to produce 64-MW. Pacific Gas and Electric Company has entered into power purchase agreements as part of BrightSource Energy with a planned capacity of 900-MW from a variety of generating configurations.

In general, a parabolic trough power plant uses about 5 to 10 acres land per MW of electric capacity depending on whether or not the solar field has been oversized to take advantage of thermal energy storage. Using Nevada Solar One as an example, 2,000-MW production (as proposed for the CCSM Wind Energy Project) would require development of a 12,500 acre solar facility. Such a facility would require a relatively level development site with multiple turbine/generator facilities that would be located within reasonable distances from the mirror trough solar array.

The application of solar power generation as an alternative to wind power generation has not been carried forward as a viable alternative because generating capacity is largely contingent upon daylight hours during summer months. It is anticipated that the proposed wind farm would deliver electricity at roughly half of the cost of concentrating solar. Furthermore, rough (hilly) terrain within the CCSM project sites makes it poorly suited for a solar power facility.

Biomass generator facilities have been developed using agricultural products and waste and human waste as fuels. Ethanol production has been increasing within the U.S. and elsewhere for use as an additive to gasoline on the premise that ethanol would replace (and therefore reduce) gasoline consumption. Biomass also has been used to produce methanol and similar gasses for power generation. Relatively small-scale methanol generating facilities have been developed using agricultural by-products and waste, animal waste, and human waste.

The potential use of ethanol or methanol as a fuel was not carried forward for further consideration. Ethanol production requires excessive amounts of water for production, energy output (when compared to gasoline) is low, and shipping of corn, sugar beans, and other commodities required to produce ethanol can be cost prohibitive due to transportation requirements. Furthermore, land required for commodities production for ethanol cannot be used for other purposes.

2.3.10 Alternate Project Site

The proposed CCSM Wind Energy Project is located in an area that is currently used for livestock production and recreation but also contains sensitive resources that would be adversely affected by the project. Development of the proposed Wind Energy Project at another location that contains less sensitive resources may reduce environmental impacts associated with the construction and generation of 2,000-MW. According to the applicant, the proposed project location contains the following characteristics atypical of other locations:

- Compatible land uses, current private ownership/management by the proponent, and availability for use as a wind farm;
- Availability of a developable wind resource with a wind power potential of “excellent”, “outstanding”, or “superb” as determined through modeling by AWS Truewind Solutions and validated by the NREL (2011) as an excellent wind resource;
- Existing or reasonably foreseeable long-distance transmission resources that would be available to interconnect the facility to the national or regional power grid;
- Availability of site access that could be used to transport turbines and ancillary equipment;
- Water availability for project development; and
- Adjacent land uses that are compatible with site development and/or project operations.

These key siting elements offer a unique opportunity for project development and operations proposed by the proponent, who has ownership of private lands within the Application Area and is currently using these lands and interspersed public and state lands for livestock grazing, a use compatible with the proposed project. While there may be suitable alternate locations with good wind resources and fewer resource constraints, consideration of siting the CCSM Wind Energy Project on an alternate project location would not meet the applicant’s objectives to construct the project within TOTCO ranch boundaries. While general concepts of alternate locations were raised during scoping, no specific alternate site feasible for the project was identified. Alternate project locations also may not possess some or all of the characteristics listed that are necessary for the proposed wind energy project. Additionally, alternate project locations also may be subject to conflicts identical or similar to those found at the proposed project location, including wildlife, visual resources, or socioeconomic concerns.

2.3.11 Staged Development Alternatives

Multiple concepts were considered regarding variations to staging development of the project with enough time during each stage to allow for monitoring of wildlife impacts from the project. Concepts considered included development of the Chokecherry site prior to the Sierra Madre site. These concepts were considered as independent alternatives; however, after further evaluation, project development should be dictated by seasonal stipulations and the applicant’s economic considerations and, therefore, the concepts were not considered reasonable or practical alternatives.

2.3.12 Turbine Transport Alternatives

Concerns were raised that hairpin turns and difficult terrain could inhibit the transport of turbine components and alternative transportation routes may be required. However, turbine transport should be dictated by engineering constraints and mitigation identified through the environmental analysis.

2.3.13 Use of State Highway 71/Carbon County Road 401 for Haul Road

Agency comments received on the Draft EIS suggested a haul road variation that either parallels or uses WY 71/CCR 401 because of concerns for impacts to big game habitat in the Sage Creek Basin. A haul road variation that parallels WY 71/CCR 401 has been incorporated in Alternative 2. However, use of WY 71/CCR 401 for a haul road is not a viable option due to safety concerns associated with conflicts between project traffic to interact with public traffic along the highway, which is used for residential, ranching, and recreational traffic. Use of WY 71/CCR 401 for the project would require permission and permits from Carbon County and possibly the state, possible upgrades to handle heavy truckloads, and extensive maintenance and repair from project use. As a result of these factors, this option was not considered feasible.

2.4 Comparison of Alternatives

This section includes a summary of impacts (**Tables 2-13** and **2-14**) to provide a side-by-side comparison of the alternatives.

Table 2-13 Surface Disturbance Comparison for CCSM Alternatives

New Facilities	Size (ROW width [feet] or acres/facility)	Initial Surface Disturbance by Alternative							
		Alternative 1R		Alternative 2		Alternative 3		Alternative 4	
		Multiplier (number or miles)	Disturbance (acres or % of alternative area)	Multiplier (number or miles)	Disturbance (acres or % of alternative area)	Multiplier (number or miles)	Disturbance (acres or % of alternative area)	Multiplier (number or miles)	Disturbance (acres or % of alternative area)
WTG	1.62 acres	1,000 each	1,620	1,000 each	1,620	1,000 each	1,620	846 each	1,371
Roads									
Haul road	120 feet	58 miles	836	63 miles	916	40 miles	579	38 miles	566
Off-site access, internal resource roads	79.6 feet	380 miles	3,665	419.5 miles	4,047	420 miles	4,044	450 miles	4,345
Turnaround roads	1 acre	100 each	100	222 each	222	213 each	213	173 each	173
WTG road networks subtotal[1]			4,601		5,185		4,836		5,083
Electrical System									
Overhead 230-kV Transmission	120 feet	28 miles	See Footnote 4	63 miles	See Footnote 4	40 miles	See Footnote 4	38 miles	See Footnote 4
Underground collections system (34.5kV)	4.2 feet	295 miles	150	317 miles	161	298 miles	152	246 miles	125
Overhead collections system (34.5kV)	0 feet	68 miles	0	180 miles	0	75 miles	0	62 miles	0
Overhead collection poles	0.08 acre	947 each	76	1,112 each	89	1,043 each	83	863 each	69
OH transmission line towers and construction loop roads	0.26 acre	313 each	81	227 each	59	209 each	54	221 each	57
Electrical System Subtotal[1]			**307**		**309**		**289**		**252**
Support Facilities									

Table 2-13 Surface Disturbance Comparison for CCSM Alternatives

New Facilities	Size (ROW width [feet] or acres/facility)	Initial Surface Disturbance by Alternative							
		Alternative 1R		Alternative 2		Alternative 3		Alternative 4	
		Multiplier (number or miles)	Disturbance (acres or % of alternative area)	Multiplier (number or miles)	Disturbance (acres or % of alternative area)	Multiplier (number or miles)	Disturbance (acres or % of alternative area)	Multiplier (number or miles)	Disturbance (acres or % of alternative area)
Laydown areas[2]	Variable acres	38 each	566	8 each	880	7 each	840	8 each	920
Substations	Variable acres	7 each	280	7 each	280	6 each	240	7 each	280
Concrete batch plants	0 acre	5 each	0	5 each	0	5 each	0	5 each	0
O&M facilities[3]	Variable acres	15 each	104	1 each	40	1 each	40	1 each	40
RDF	250 acres	1 each	250	1 each	250	1 each	245	1 each	245
Water extraction	5 acres	1 each	5	1 each	5	1 each	5	1 each	5
Support Facilities Subtotal[1]			**1,205**		**1,455**		**1,370**		**1,490**
Alternative surface disturbance (acre)			7,733		8,569		8,115		8,195
Alternative boundary area (acre)			220,744		187,465		161,139		220,919
Alternative disturbance (%)			3.5%		4.6%		5.0%		3.7%
Long-term Surface Disturbance by Alternative									
Long-term surface disturbance (acre)			1,545		1,629		1,506		1,541
Long-term surface distance as % of Alternative Area			0.7%		0.9%		0.9%		0.7%

[1] Subtotal amounts may not add up due to rounding.

[2] Laydown areas include construction staging, crane erection/teardown areas, trailer complex/laydown, and laydown yards.

[3] O&M facilities include the operations center, maintenance buildings, and permanent met towers.

[4] Disturbance associated with the overhead 230-kV transmission line would occur within the haul road disturbance footprint.

Table 2-14 Impact Comparison by Resource for All Alternatives

Resource	Alternative 1R	Alternative 2	Alternative 3	Alternative 4	Additional Discussion
Cultural Resources and Native American Traditional Values					
Visual impacts to the historic properties	Visual effects to historic properties, specifically the Overland Trail, by introducing visual elements that diminish the integrity of the property's setting.	Increased potential for visual effects to the Overland Trail from Alternative 1R relative to the WTGs; visual effects associated with the proposed transmission line would be less than Alternative 1R.	Decreased potential for visual effects to the Overland Trail from Alternative 1R relative to WTGs; visual effects associated with the proposed transmission line would be the same as Alternative 2.	Increased potential for visual effects to the Overland Trail from Alternative 1R relative to WTGs; visual effects associated with the proposed transmission line would be the same as Alternative 2.	Section 4.2
Geology and Minerals					
Aggregate consumption[1]	2,800,000 yd^3	19 percent greater than Alternative 1R	9 percent greater than Alternative 1R	16 percent greater than Alternative 1R	Section 4.3
Land slide constraints (acres of landslide deposits potentially affected)	Approximately 8	Approximately 5	Less than 1	Approximately 5	Section 4.3
Swelling soil constraints (acres of shrink-swell potential bedrock)	Approximately 396	Approximately 548	Approximately 729	Approximately 793	Section 4.3
Land Use/Recreation					
Impacts to the Red Rim-Grizzly WHMA	The area inside the Red Rim-Grizzly WHMA and inside the Application Area, but outside the greater sage-grouse core breeding area, could have WTGs and supporting facilities.	Would not build within the Red Rim-Grizzly WHMA.	Would not build within the Red Rim-Grizzly WHMA.	Would not build within the Red Rim-Grizzly WHMA.	Sections 4.4 and 4.14

Table 2-14 Impact Comparison by Resource for All Alternatives

Resource	Alternative 1R	Alternative 2	Alternative 3	Alternative 4	Additional Discussion
Impacts to the CDNST (Special Recreation Management Area (SRMA)	No facilities within the 0.25 mile SRMA corridor. Strong visual impacts in the CDNST viewshed.	No facilities within the 0.25 mile SRMA corridor. Strong visual impacts in the CDNST viewshed.	No facilities within the 0.25 mile SRMA corridor. Strong visual impacts in the CDNST viewshed.	No facilities within the 0.25 mile SRMA corridor. Strong visual impacts in the CDNST viewshed.	Sections 4.7 and 4.12.
Impacts to the Teton Reservoir Recreation Site	No direct impacts to recreation opportunities. Strong visual impacts in the natural setting of recreation activities from WTGs and transmission line in the Teton Reservoir viewshed.	Visual impacts from the haul road traffic in close proximity to Teton Reservoir are intrusive. Strong visual impacts from the transmission line along haul road.	No direct impacts to recreation opportunities. Strong visual impacts in the natural setting of recreation activities from WTGs, haul road, and transmission line in reservoir viewshed.	No direct impacts to recreation opportunities. Change to natural setting of recreation activities from WTGs and transmission line in reservoir viewshed.	Sections 4.7 and 4.12
Impacts to the North Platte River SRMA	No direct impacts to recreation opportunities. Moderate to strong visual impacts in the natural setting as seen from some segments of the river.	No direct impacts to recreation opportunities. Moderate to strong visual impacts in the natural setting as seen from some segments of the river.	No direct impacts to recreation opportunities. Moderate to strong visual impacts in the natural setting as seen from some segments of the river.	No direct impacts to recreation opportunities. Moderate to strong visual impacts in the natural setting as seen from some segments of the river.	Sections 4.7 and 4.12
Lands with wilderness characteristics	No inventory units meet lands with wilderness characteristic (LWC) criteria; therefore no impacts to LWCs.	No inventory units meet LWC criteria; therefore no impacts to LWCs.	No inventory units meet LWC criteria; therefore no impacts to LWCs.	No inventory units meet LWC criteria; therefore no impacts to LWCs.	Section 4.4
Paleontology					
Potential Fossil Yield Classification (PFYC) Classes 4 or 5 areas (acres) direct impact	6,533	7,502	7,545	7,258	Section 4.5

Table 2-14 Impact Comparison by Resource for All Alternatives

Resource	Alternative 1R	Alternative 2	Alternative 3	Alternative 4	Additional Discussion
Range Resources					
AUMs lost – direct	969	1,067	977	995	Section 4.6
AUMs lost – dust deposition	2,000	2,201	2,083	2,236	Section 4.6
Socioeconomics					
Temporary employment (number jobs): Seasonal peak during development • Direct • Indirect and induced • Total	1,154 586 1,740 (Years 3 and 4)	Comparable to, but possibly slightly higher than Alternative 1R due to higher labor requirements for road construction and, project development.	Comparable to, but possibly slightly higher than Alternative 1R due to higher labor requirements for road construction and, project development.	Comparable to Alternative 1R, with possibility for slightly higher labor requirements for road construction and, project development, with offsets due to 15 percent fewer WTGs.	Section 4.8
Long-term employment during Operations: (number of jobs – range)	205 to 284	Comparable to Alternative 1R.	Comparable to Alternative 1R.	Lower than Alternative 1R due to fewer WTGs.	Section 4.8
Temporary housing demand (peak)	1,231 units in years 3 and 4; demand for temporary housing exceeds local availability.	Comparable to Alternative 1R.	Comparable to Alternative 1R.	Peak comparable to Alternative 1R, but lower average demand during years 3 through 5.	Section 4.8
Public sector revenues – (millions of dollars): Federal ROW grant rentals	$2.1 to $3.2 per year at full development.	$2.1 to $3.2 per year at full development.	$2.1 to $3.2 per year at full development.	Unknown, but likely less than $100,000 per year at full development.	Section 4.8

Table 2-14 Impact Comparison by Resource for All Alternatives

Resource	Alternative 1R	Alternative 2	Alternative 3	Alternative 4	Additional Discussion
Local ad valorem/property tax at full development (including mandatory state levies)	$29.7 to $42.4 (Year 1) $21.7 to $31 (Year 10)	$29.7 to $42.4 (Year 1) $21.7 to $31 (Year 10)	$29.7 to $42.4 (Year 1) $21.7 to $31 (Year 10)	$25.5 to $36.1 (Year 1) $18.6 to $26.3 (Year 10)	Section 4.8
Sales and use tax	$216 to $336 (over 5 years). Continue, but much lower during operations.	$216 to $336 (over 5 years). Continue, but much lower during operations.	$216 to $336 (over 5 years). Continue, but much lower during operations.	More than $194 to $284 (over 5 years). Continue, but much lower during operations	Section 4.8
Wind energy production tax (at full production following 3-year exemption)	$6.1 to $9.2 per year	$6.1 to $9.2 per year	$6.1 to $9.2 per year	$5.2 to $7.8 per year	Section 4.8
Eligibility for Wyoming Impact Assistance	Yes Amount is contingent upon sales tax increment. Distribution subject to determination by the Council	Comparable to Alternative 1R	Comparable to Alternative 1R	Comparable to, but lower than Alternative 1R	Section 4.8
Soils					
Severely water erodible soils (acres)	2,086	1,936	1,900	1,697	Section 4.9
Severely wind erodible soils (acres)	100	45	74	53	Section 4.9
Poor topsoil ratings (acres)	3,001	3,702	3,840	3,790	Section 4.9

Table 2-14 Impact Comparison by Resource for All Alternatives

Resource	Alternative 1R	Alternative 2	Alternative 3	Alternative 4	Additional Discussion
Transportation and Access					
Delay and deterioration in Level of Service (LOS) at key intersections	High volumes of construction traffic on WY 76/CR 407 at I-80 Exit 221 during construction After RDF completed, most truck traffic and all WTGs delivered on private roads. Peak hour delays and lower LOS at Exit 221 during peak months with the Exit 221 workforce commuting option. Peak hour delays and lower LOS at WY 71/ Locust St. & S. Higley Blvd. intersection during peak month with the WY 71/CR 401 commuting option.	Similar to, but slightly higher than Alternative 1R due to additional road construction.	Traffic volumes similar to, but slightly higher than Alternative 1R due to additional road construction. Traffic from alternative RDF site results in significant peak hour delay and deterioration in LOS at I-80 Exit 221 during peak months (Exit 221 workforce commuting option) and at WY 71/ Locust St & S. Higley Blvd intersection (WY 71/CR 401 commuting option).	Reduced overall volumes of WTG construction traffic as compared to Alternative 1R, potentially offset by higher volumes of internal road construction. High volumes of peak month/peak hour traffic associated with alternative RDF still anticipated.	Section 4.10
WY 71 (crossing) Impacts: Percent of SM turbines west/east of WY 71/CR 401	62/38	54/46	40/60	41/59	Section 4.10
Visual Resources					
Percent of WTGs on BLM–VRM Class IV[2]	46	39	43	0	Section 4.12
State[2]	5	3	2	0	Section 4.12

Table 2-14 Impact Comparison by Resource for All Alternatives

Resource	Alternative 1R	Alternative 2	Alternative 3	Alternative 4	Additional Discussion
Private[2]	50	59	54	100	Section 4.12
Total[3]	100	100	100	100	Section 4.12
Impact to the CDNST	Closest WTGs would be 1.6 miles from trail in Chokecherry. Closest heavy truck traffic on haul road would be 3.8 miles from trail in Sierra Madre.	Closest WTGs would be 1.3 miles from trail in Chokecherry. Closest heavy truck traffic on haul road would be 0.3 miles from trail in off-site Sage Creek valley below Atlantic Rim.	Closest WTGs would be 1.3 miles from trail in Chokecherry. Closest heavy truck traffic on haul road would be 3.3 miles from trail in Sierra Madre.	Closest WTGs would be 1.9 miles from trail in Chokecherry. Closest heavy truck traffic on haul road would be 3.3 miles from trail in Sierra Madre.	Section 4.12
Water Resources					
Water consumption[4] (acre-feet/year)	553	604	577	602	Section 4.13
Waterbody crossings (number)	348	531	494	596	Section 4.13
Number or stream crossings – ephemeral	343	520	483	582	Section 4.13
Number or stream crossings - perennial	5	11	11	14	Section 4.13
Wildlife Resources					
Mule deer crucial winter (acres) direct habitat loss	232	280	200	191	Section 4.14
Mule deer permanent roads in seasonal range (miles)	436	483	456	488	Section 4.14
Pronghorn permanent roads in seasonal range (miles)	437	483	457	488	Section 4.14
Elk permanent roads in seasonal range (miles)	58	28	0	28	Section 4.14

Table 2-14 Impact Comparison by Resource for All Alternatives

Resource	Alternative 1R	Alternative 2	Alternative 3	Alternative 4	Additional Discussion
Annual bat collision mortality	6,300	6,300	6,300	5,380	Section 4.14
Estimated annual raptor collision mortality	150-210	150-210	150-210	128-179	Section 4.14
Estimated annual collision mortality for all birds	5,400	5,400	5,400	4,612	Section 4.14
Special Status Species					
Number of WTGs in greater sage-grouse core area	0	0	0	0	Section 4.15
Acres of greater sage-grouse core area within 4 miles of project facilities	127,465	114,340	89,498	126,376	Section 4.15
Noise					
Distance to nearest noise sensitive receptor	>0.5 mile from WTG >1 mile from substation	>1 mile from WTG and substation	>1 mile from WTG >5 mile from substation	>1 mile from WTG and substation	Section 4.16

[1] Aggregate would be used for roads, laydown areas, substations, transmission line access roads, and concrete.

[2] Percent of WTGs in VRM class areas are estimates based on alternative conceptual designs.

[3] Discrepancies in totals due to rounding.

[4] Water would be used for concrete mixing, road watering, and road compaction.