APPENDIX J

TRANSPORTATION ANALYSIS

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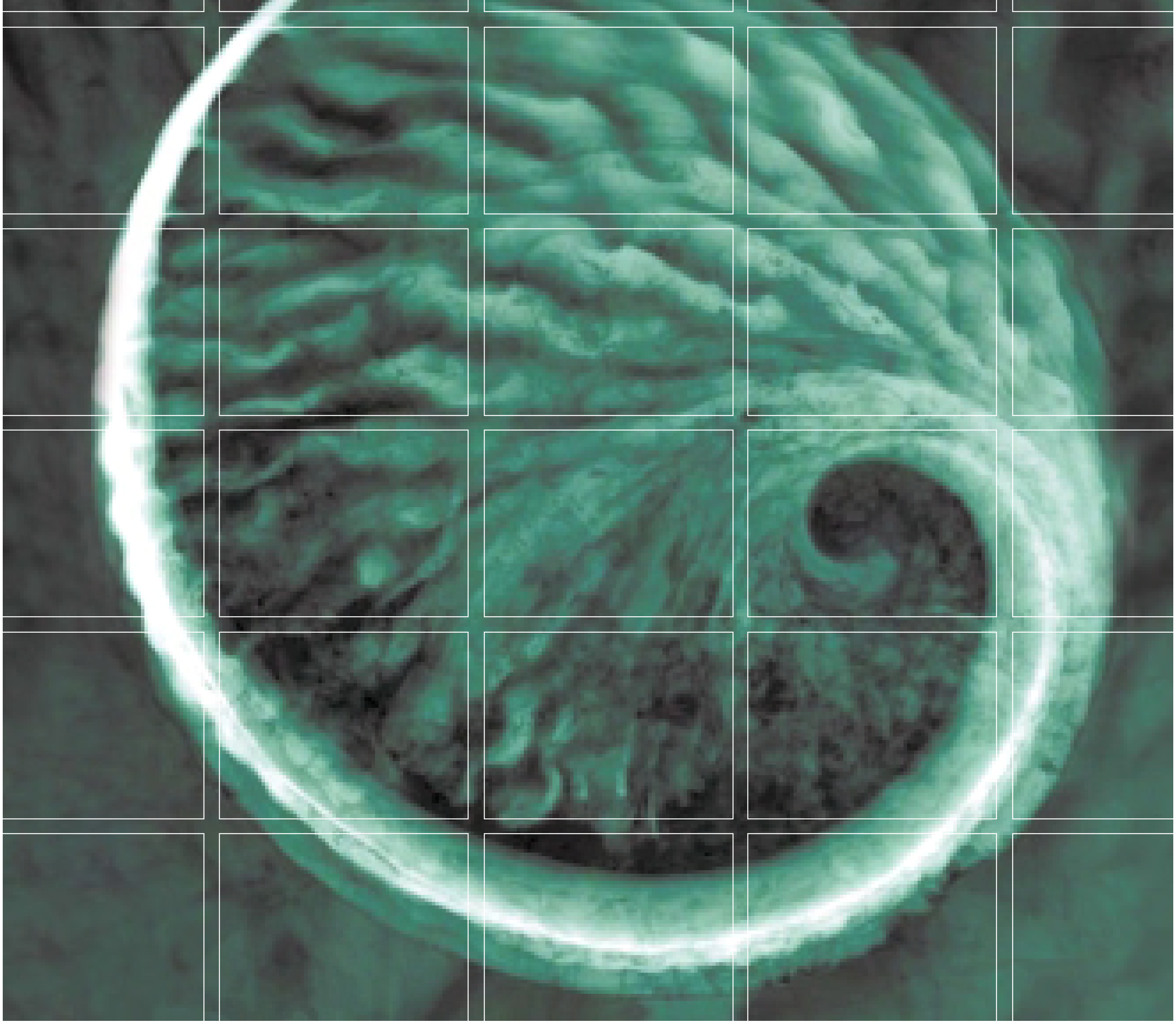

Transportation Analysis

Shell WindEnergy, Inc.
Hermosa West Wind Farm Project
Albany County, Wyoming

June 4, 2010

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Shell WindEnergy, Inc.

Transportation Analysis

June 4, 2010

Project No. 0115435
Hermosa West Wind Farm Project
Albany County, Wyoming

Alicia Smith, REM

Partner-in-Charge

Chris Zeisloft

Project Manager

Ben Sussman, AICP

Senior Transportation Planner

Environmental Resources Management Southwest, Inc.
15810 Park Ten Place, Suite 300
Houston, Texas 77084-5140
T: 281-600-1000
F: 281-600-1001

Texas Registered Engineering Firm F-2393

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ACRONYMS

AADT	Average Annual Daily Traffic
Applicant	Shell WindEnergy, Inc.
CDOT	Colorado Department of Transportation
CR	County Road
ERM	Environmental Resources Management, Inc.
FAA	Federal Aviation Administration
FY	Fiscal Year
HCS	Highway Capacity Software
I	Interstate
LOS	Level of Service
LRA	Laramie Regional Airport
MW	Megawatt
NTIA	U.S. Department of Commerce, National Telecommunications and Information Administration
O&M	Operations and Maintenance
Project	Hermosa Wind Farm Project
SR	State Road
STIP	Wyoming State Transportation Improvement Program
SWE	Shell WindEnergy, Inc.
SWPPP	Stormwater Pollution Prevention Plan
UPRR	Union Pacific Railroad
US	U.S. Highway
Western	Western Area Power Administration
WYDOT	Wyoming Department of Transportation
WYISD	Wyoming Industrial Siting Division

1.0 INTRODUCTION

Shell WindEnergy, Inc. (SWE or the Applicant) proposes to construct, operate, and maintain the Hermosa West Wind Farm Project (the Project) in southeast Albany County, Wyoming, near Tie Siding. The Project would consist of up to 200 wind turbines, with a total generating capacity of up to 300 megawatts (MW) of electricity. In addition to the wind energy collection system, the Project would include an on-site operation and maintenance (O&M) building, underground collector lines, transmission lines and substation, and associated access roads. Additional detail on the Project's components, construction, operation, and decommissioning can be found in the Project Description document.

At the request of the Applicant, Environmental Resources Management (ERM) has prepared this Transportation Analysis for the Project. This document is intended to provide the Western Area Power Administration (Western) with information on impacts that the Project is likely to have on transportation facilities in and around the Project site. The transportation information is provided in sufficient detail to support the preparation of an Environmental Impact Statement and a Wyoming Industrial Siting Division (WYISD) Section 109 Application.

1.1 REGULATORY FRAMEWORK

This document addresses two sets of criteria related to impacts on transportation facilities. These criteria are reprinted below.

Wyoming Industrial Siting Division, Section 109 Application Criteria, Rule I Section 7(i)(v)

An analysis of transportation facilities containing discussion of roads (surface, type) and railroads (if applicable). An analysis of effects on transportation facilities including effects on service levels of roads, haul routes for materials and supplies, increased rail traffic at grade crossings, and intersection of new access roads with existing roads.

Western Area Power Administration

A significant impact on transportation may result if any of the following were to occur from construction or operation of the proposed Project:

- *Increases in traffic that exceed a level of service established by the local or state transportation management agency.*
- *Creation of road dust and/or severe road damage at levels that create hazardous situations for motorists and pedestrians.*
- *Cause long term major traffic delays for a substantial number or motorists.*
- *Changes in traffic patterns that result in hazardous situations for motorists or pedestrians.*

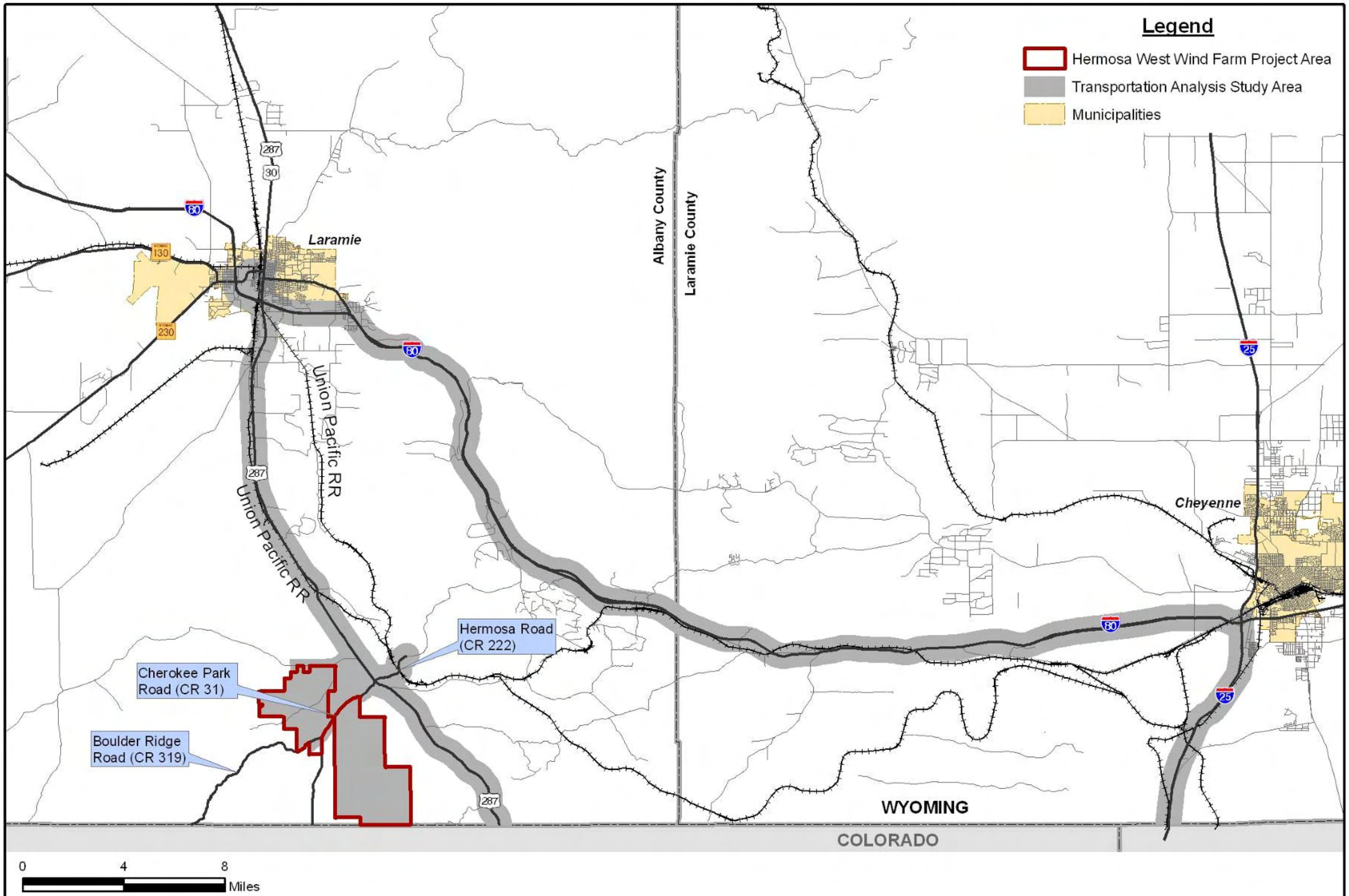
- *Change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.*

The WYISD criteria are included because the Applicant must complete a Section 109 application in order to construct the Project. The Western criteria are included because the electricity generated by the Project will flow to Western's transmission system.

1.2 STUDY AREA

Three distinct phases of Project activity will impact transportation infrastructure in the region: Construction, Operation, and Decommissioning. As described in Section 3, the Construction and Decommissioning phases (assumed to involve roughly the same amount of activity) will have the largest impact on transportation infrastructure. Thus, the Study Area for this Transportation Analysis (shown in Figure 1) is based on the area affected by Project construction activities.

Major Project components will be delivered to the site via truck, and will originate either in Colorado—arriving at the Project site via Interstate (I) 25 and I-80 (through Cheyenne)—or will be transferred to trucks from the Union Pacific Railroad (UPRR) system in or near Laramie. US 287 between Fort Collins and Laramie would be used only as an alternative route in the event of unexpected problems on I-25 or I-80. The Study Area for this project therefore includes the I-80 corridor from I-25 to State Route 130/230 (west of Laramie); the I-25 corridor from the Colorado State Line to I-80; the US 287 corridor from the Colorado State Line to I-80; portions of the City of Laramie in the vicinity of the UPRR yard; and the Project site and surrounding area.



Environmental Resources Management

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FIGURE 1
TRANSPORTATION ANALYSIS STUDY AREA
Hermosa West Wind Farm Project
Albany County, Wyoming

ERM

2.0 AFFECTED RESOURCES AND BASELINE CONDITIONS

This section describes the transportation facilities likely to be affected by Project activities, as well as existing conditions of those facilities. It includes qualitative descriptions of facility conditions, as well as quantitative analysis (where feasible) of traffic volumes.

2.1 ROAD FACILITIES

2.1.1 Affected Road Facilities

The major roads that are likely to be used by vehicles associated with the Project, especially vehicles delivering turbine and MET tower components, are described below. Table 1 summarizes the characteristics of these roads, and lists current traffic volumes. Figure 2 shows the affected roads and key intersections (discussed in more detail in Section 3.2.2).

TABLE 1: *Affected Roads in the Study Area*

Road, Location		Type	Lanes
I-80		Interstate	4 (divided)
I-25		Interstate	4 (divided)
US 287	I-80 to Laramie Southern Urban Limits	Arterial	4
	Laramie Southern Urban Limits to Tie Siding	Arterial	2
	Tie Siding to Pumpkin Vine Hill Rd	Arterial	4 (divided)
	Pumpkin Vine Hill Rd to Colorado State Line	Arterial	2
Snowy Range Rd (WY 230/130)		Arterial	2-4
Cherokee Park Rd (County Rd 31)		Local	Unpaved
Boulder Ridge Rd (County Rd 319)		Local	Unpaved
Hermosa Road (County Rd 222)		Local	Unpaved

Interstate Highways

I-80 and I-25 are the primary haul routes for turbine and MET tower components. Both Interstates are major components of the nation's interstate highway system. I-80 stretches from New Jersey to San Francisco via Cheyenne and Laramie, and is a major national freight route. "Semi-trucks comprise more than half the traffic volume" on I-80 in Wyoming.[1] I-25 stretches from New Mexico to Buffalo, Wyoming, via Denver and Cheyenne.

Turbine and MET tower components would travel on I-25 between the Colorado State Line and the I-80 interchange, and on I-80 between the I-25 interchange and the US 287 interchange at Exit 313. In addition, if turbine components are delivered to Laramie by rail, the portion of I-80 between Snowy Range Road (Exit 311) and US 287 would likely be used.

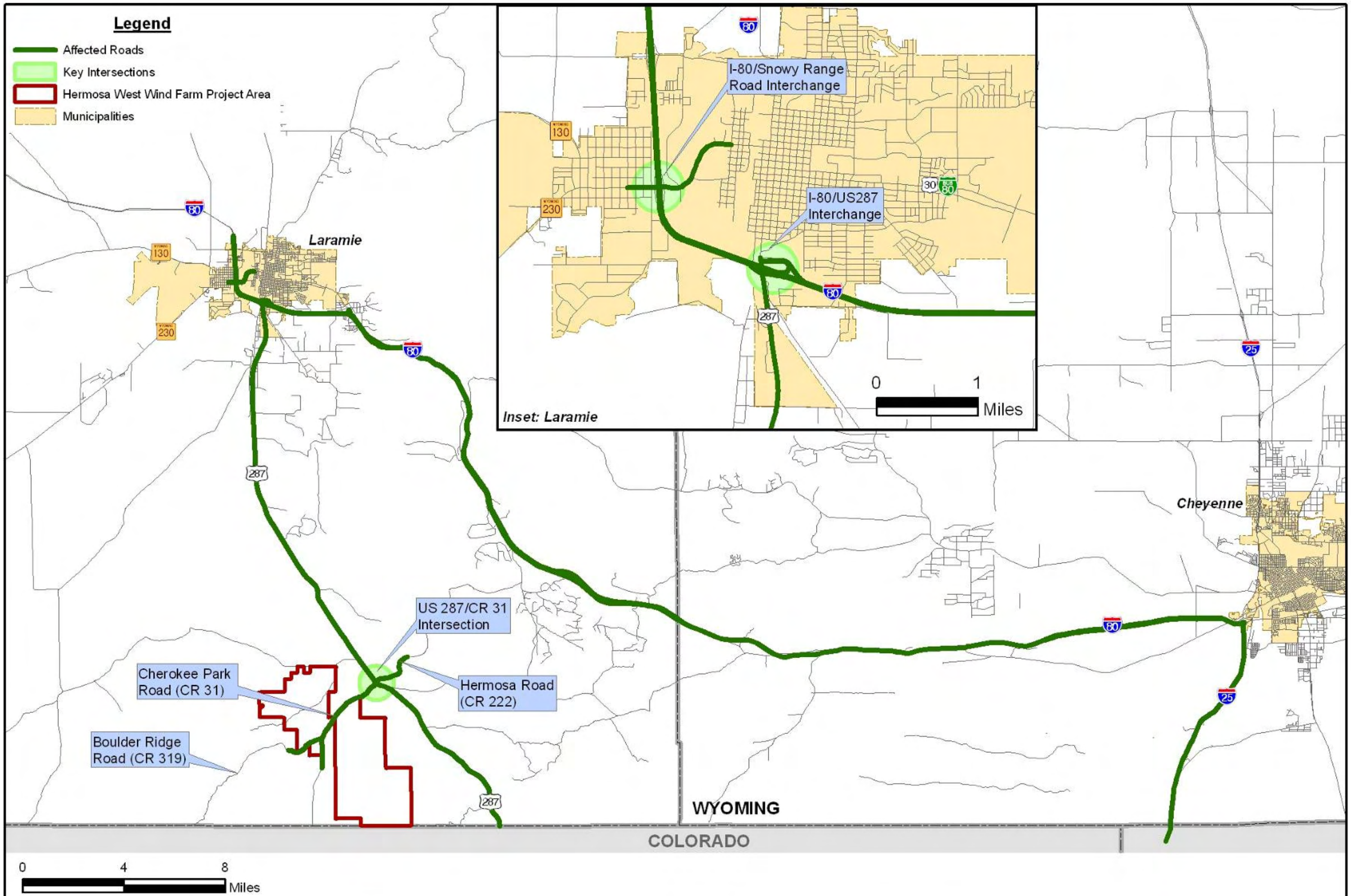

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FIGURE 2
AFFECTED ROADS AND KEY INTERSECTIONS
Hermosa West Wind Farm Project
Albany County, Wyoming

ERM

US 287

All access to the Project site will be from US 287, a significant arterial route that links Laramie to Fort Collins, Colorado. Although not heavily traveled compared to Interstate highways, US 287 is a significant truck route, and is one of the busiest roads in Albany County. The Wyoming Department of Transportation (WYDOT) classifies the condition of US 287 from Pumpkin Vine Road to Laramie as "Good," with other segments characterized as "Fair."

For most of its length between Fort Collins and Laramie, US 287 is a two-lane, undivided highway. Concerns about the safety of this configuration in both Colorado and Wyoming—especially in light of high truck volumes—are well-documented. WYDOT has recently upgraded the segment of US 287 in the vicinity of Tie Siding to a four-lane, divided highway, and has long-range plans to complete similar upgrades of the remainder of US 287 from the Colorado State Line to Laramie (see Section 2.1.3). The Colorado Department of Transportation (CDOT) is also evaluating safety upgrades for the portion of US 287 between Fort Collins and the Wyoming State Line.[2]

Roads on the Project Site

From US 287, most of the Project's turbines and other facilities (e.g., the O&M building) would be accessed via Cherokee Park Road (CR 31), which intersects with US 287, and a portion of Boulder Ridge Road (CR 319). Various parts of the Project site would also be accessed via smaller public roads.

These internal public roads provide access to privately-owned rangeland, a limited number of homes, and some state-owned land. They are unpaved, and carry extremely low traffic volumes.

Other Roads

The Applicant has not yet determined the rail-to-road transfer point for Project components. One logical location would be in or near the UPRR freight yard in Laramie. Project components unloaded in the UPRR yard would be transported to the Project site via Snowy Range Road (State Road 230/130) and its interchange with I-80 at Exit 311.[3] Snowy Ridge Road is a principal arterial, and is the primary entrance to Laramie from the west.

Other options for component transfer points would be along the UPRR lines to the south of I-80, much of which parallel US 287. In particular, the Applicant may wish to consider use of the Hermosa crossing, where the UPRR intersects Hermosa Road (CR 222). Like other county roads on the Project site, Hermosa Road is a low-volume, unpaved road. It forms the eastern leg of the intersection between US 287 and Cherokee Park Road. The Hermosa crossing is approximately one mile east of Tie Siding.

Bridges

There are no weight restrictions on any bridges on affected roadways in the Study Area. The I-80 bridges at the US 287 and Snowy Range Road interchanges have posted clearances of 18′ 5″ and 17′ 5″, respectively, which should be adequate to accommodate turbine components. The bridge over the UPRR approximately four miles north of Tie Siding is classified as "deficient" by the state's Long Range Transportation Plan.[4] This designation does not impose a weight restriction and does not indicate a structural deficiency.[5] Rather, WYDOT has identified a need to replace the bridge's decking (see Section 2.1.3).

2.1.2 Baseline Traffic Volumes

WYDOT records Annual Average Daily Traffic (AADT) on a regular basis at numerous points throughout the state. AADT count locations on affected roads (as listed in Section 2.1.1.) in the Study Area are shown on Figure 3, and 2008 AADT data (total and trucks only) are listed in Table 2.[6] AADT is not collected on county roads, and the traffic volumes on these roads are extremely light—perhaps only a few vehicles per day.

TABLE 2: *Baseline Traffic Volumes*

Road	Map Key	Location	2008 AADT		Share of Trucks
			Total	Trucks	
I-80 Eastbound	1a	Curtis Street	3,440	2,040	59.3%
	2a	Snowy Range Rd	8,570	3,190	37.2%
	3a	Third Street/US 287	6,670	2,820	42.3%
	4a	Grand Avenue/I-80 Business	6,810	2,920	42.9%
	5a	Albany/Laramie County Line	6,290	2,920	46.4%
	6a	Cheyenne Western Urban Limits	6,000	2,840	47.3%
I-80 Westbound	1b	Curtis Street	3,710	2,810	75.7%
	2b	Snowy Range Rd	8,530	3,270	38.3%
	3b	Third Street/US 287	6,800	2,870	42.2%
	4b	Grand Avenue/I-80 Business	6,880	2,960	43.0%
	5b	Albany/Laramie County Line	6,310	2,950	46.8%
	6b	Cheyenne Western Urban Limits	6,220	2,950	47.4%
I-25 Northbound	7a	Colorado State Line	8,590	1,790	20.8%
	8a	Cheyenne Southern Urban Limits	9,420	1,980	21.0%
I-25 Southbound	7b	Colorado State Line	8,600	1,800	20.9%
	8b	Cheyenne Southern Urban Limits	8,530	1,810	21.2%
US 287	9	I-80	7,700	1,150	14.9%
	10	Blackfoot Street	6,180	1,000	16.2%
	11	Laramie Southern Urban Limits	3,620	720	19.9%
	12	Red Buttes	3,580	710	19.8%
	13	UPRR Bridge	3,580	710	19.8%
	14	Tie Siding	3,400	710	20.9%
	15	6 Miles South of Tie Siding	3,400	710	20.9%
Snowy Range Road (SR 230/130)	16	Junction I-80	17,260	450	2.6%

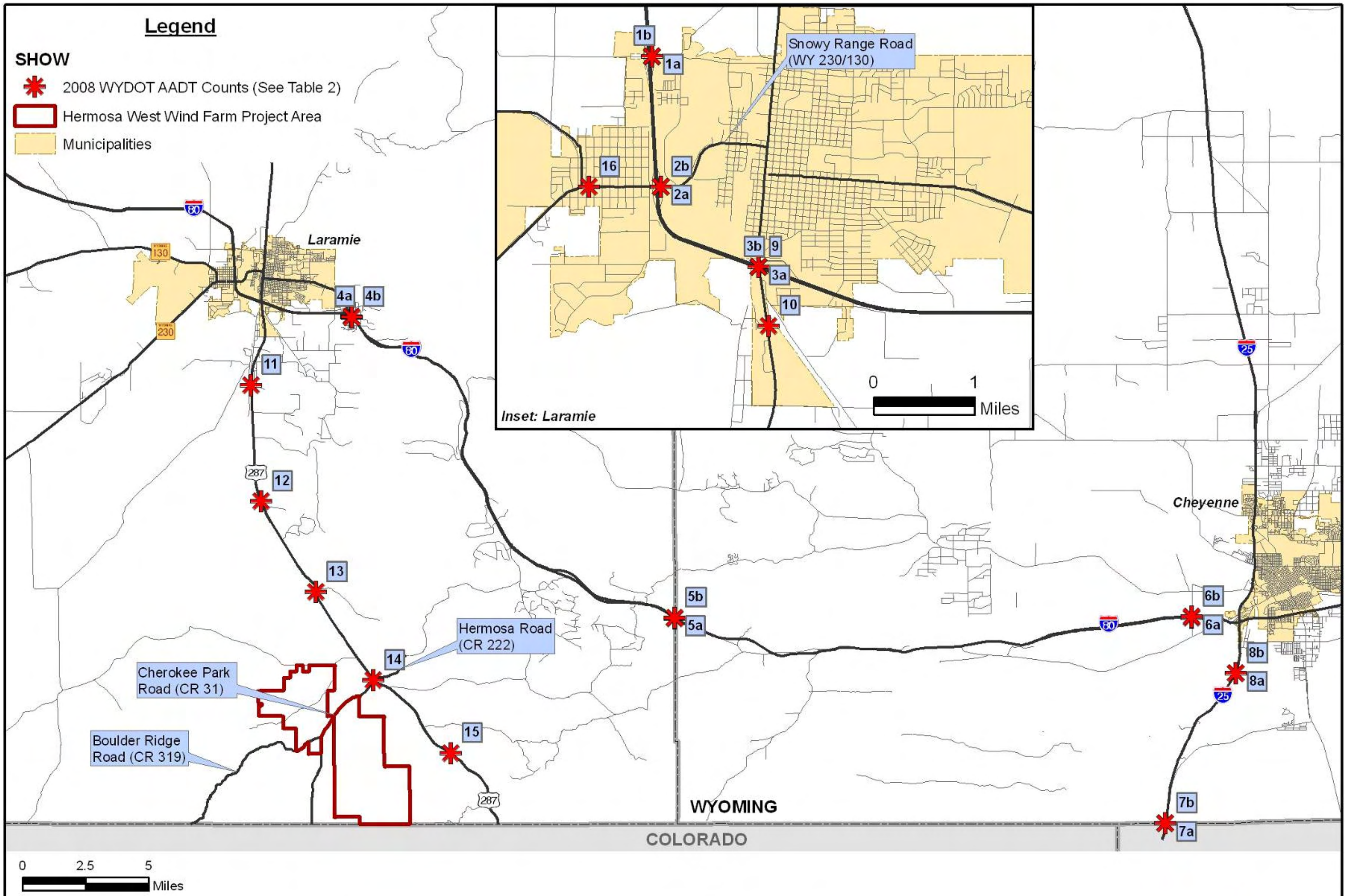

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FIGURE 3
WYDOT 2008 AADT COUNT LOCATIONS
Hermosa West Wind Farm Project
Albany County, Wyoming

The highest traffic volumes are generally on the arterials within the City of Laramie, followed by the Interstates. Truck traffic comprises nearly half of all traffic on I-80 in Laramie, and 15-20 percent of all traffic on US 287 in the vicinity of the Project.

2.1.3 Planned or Potential Road Upgrades

WYDOT's State Transportation Improvement Program (STIP) is an annual list of state-funded transportation projects for a six-year period. The 2010 STIP lists the following transportation projects with the potential to impact the Affected Road Facilities listed in Section 2.1.1:

- Reconstruction of US 287 from the Colorado State Line to the current southern extent of the four-lane divided section (south of Tie Siding), beginning in Fiscal Year (FY) 2014. This upgrade project would consist of construction of a new two-lane section of roadway alongside the existing portion of US 287, and is expected to involve minimal disruption of the existing roadway.[7]
- Rehabilitation of the Snowy Range Road bridge over the UPRR yard (FY 2012).
- New construction along the segment of Snowy Range Road in the vicinity of the UPRR bridge (FY 2013).
- Construction of a new interchange on I-25 at Speer Road, south of Cheyenne (FY 2010).

Reconstruction and widening is also planned for the segments of US 287 north of Tie Siding to Laramie. WYDOT is also planning to refurbish the decking on the US 287 bridge over the UPRR north of Tie Siding. No start date has been identified within the 2010 STIP's six-year timeframe for any of these projects.

Although WYDOT has identified funds for rehabilitation of the existing Clark Street bridge over the UPRR yard, the City of Laramie's 2007 Comprehensive Plan, and the 2010 Major Street Plan (prepared jointly by Laramie and Albany County) discuss plans to replace the existing Clark Street bridge with a new bridge at Haney Street, approximately ½ mile north. Any future bridge would offer a direct arterial connection to Snowy Range Road, and thus would not have a major impact on haul routes associated with the Project.

2.1.4 Level of Service Thresholds

Level of Service (LOS) is used throughout the United States to characterize the performance of roads, intersections, interchanges, and other transportation facilities. LOS ratings range from A (ideal conditions, with free-flowing traffic) to F (complete failure or gridlock).

Table 3 shows the LOS thresholds designated by WYDOT for various types of road. A proposed project that would cause the road to exceed these thresholds in its design year (e.g., the year of complete buildout) would need to provide capacity improvements—typically in the form of widening, geometric improvements, or other improvements.

TABLE 3: LOS Thresholds Warranting Capacity Improvements

Road Type	LOS Threshold		
	Overall	Urban Segments	Rural Segments
Interstate Highway Mainline	C	n/a	n/a
Interstate Highway Ramp	D	n/a	n/a
National Highway System Arterials (e.g., US Routes)	n/a	D	C
Other State Highways	n/a	D	C

2.1.5 *Existing Levels of Service*

Highway Capacity Software (HCS version 5.4) was used to determine the existing Level of Service for the roads in the Project vicinity, based on the AADT data shown in Table 2. Table 4 shows the results of the baseline LOS analysis. HCS reports are included in Appendix A.

In 2008, all of the affected roads in the study area performed at LOS A or B, indicating relatively low traffic volumes relative to the capacity of the roadway. Interstate LOS may be slightly worse than estimated in Table 4, due to truck volumes that exceed the parameters available in HCS.

TABLE 4: Baseline LOS

Road	Location	2008 LOS
I-80 Eastbound	Curtis Street	A
	Snowy Range Rd	A
	Third Street/US 287	A
	Grand Avenue/I-80 Business	A
	Albany/Laramie County Line	A
	Cheyenne Western Urban Limits	A
I-80 Westbound	Curtis Street	A
	Snowy Range Rd	A
	Third Street/US 287	A
	Grand Avenue/I-80 Business	A
	Albany/Laramie County Line	A
	Cheyenne Western Urban Limits	A
I-25 Northbound	Colorado State Line	A
	Cheyenne Southern Urban Limits	A
I-25 Southbound	Colorado State Line	A
	Cheyenne Southern Urban Limits	A
US 287	I-80	A
	Blackfoot Street	A
	Laramie Southern Urban Limits	B
	Red Buttes	B
	UPRR Bridge	B
	Tie Siding	A
	6 Miles South of Tie Siding	B
Snowy Range Road (SR 230/130)	Junction I-80	B

2.2 RAIL FACILITIES

Figure 4 shows the location of rail infrastructure in the Study Area. The UPRR's Central Corridor passes through Laramie and Hermosa (approximately one mile east of Tie Siding). The UPRR Central Corridor includes approximately 824 miles of track in Wyoming, and approximately 60 trains per day pass through Laramie.[8]

UPRR also operates a freight yard in Laramie. South of the UPRR yard, the UPRR mainline splits, with a single line running south, parallel to (and eventually under US 287), and two lines taking a parallel path further to the east. The three lines rejoin each other just north of Hermosa. There are no at-grade rail crossings along US 287 or any state road in the study area. Hermosa Road and other low-volume county or local roads cross the UPRR at grade.

2.3 OTHER TRANSPORTATION FACILITIES

2.3.1 Aviation Facilities

Laramie Regional Airport (LRA) is located approximately four miles west of central Laramie, and approximately 18 miles northwest of the Project site. LRA hosts private aircraft, as well as three daily commercial flights to Denver International Airport, serving approximately 10,000 passengers per year.[9] There are no other public airports in southern Albany County.

2.3.2 Non-Motorized Facilities

Wyoming's Draft Long-Range Transportation Plan designates Snowy Range Road as part of its "Cheyenne/Laramie/Snowy Range" long-distance bicycle touring route. While there are no designated bicycle lanes on Snowy Range Road, the street does have wide shoulders that can accommodate bicycle traffic. The Laramie Greenbelt Trail follows the Laramie River and crosses under Snowy Range Road approximately ½ mile from I-80.

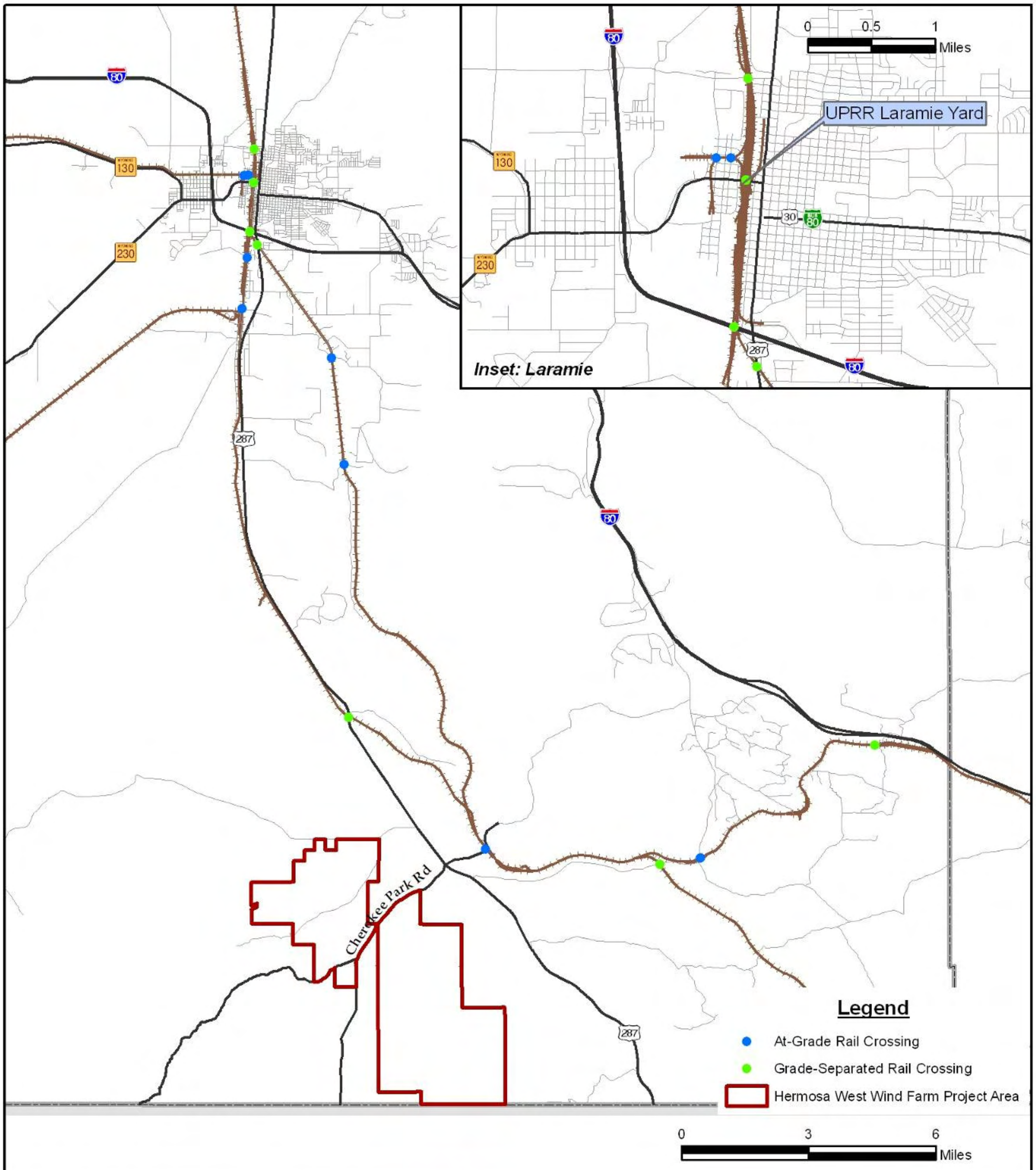

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FIGURE 4
RAILROAD FACILITIES
Hermosa West Wind Farm Project
Albany County, Wyoming

ERM

3.0 ANALYSIS OF IMPACTS

This section describes the potential impacts of the Project on the region's transportation system. Construction of the Project is expected to last from 2011 to 2013, and the Project is expected to have a 25-year lifespan. Impacts due to construction are evaluated based on projected conditions in 2012 (the height of construction), while impacts from decommissioning are evaluated based on projected conditions in 2037. Impacts from operations are also evaluated based on projected conditions in 2037 (e.g., just before decommissioning starts). This is a conservative estimate that captures the highest background traffic volumes.

3.1 FUTURE CONDITIONS

3.1.1 Construction and Decommissioning Phases

Construction of the Project would take place over approximately a one-year period, and would involve frequent trips by very large trucks carrying construction equipment, building materials, turbine components, and components of other Project facilities (such as the O&M building). The peak vehicular activity during the Project's construction phase would occur during months 5 and 6 (Table 5—reprinted from the Project Description—shows the approximate construction schedule), and would include "normal" heavy duty truck traffic, as well as deliveries of turbine components. Table 6 summarizes the assumed number of daily trips by vehicle type during peak Construction activity in 2012.

TABLE 5: ***Typical Construction Schedule of Wind Energy Projects***

Activity	Month of Construction Period
Mobilization	1
Access Roads and Laydown Areas Completed	2-6
Substation Construction	3-6
O&M Building Construction	3-6
Transmission Construction	3-6
Foundations	4-6
Wind Turbine Erection	5-11
Commissioning	2-4
Acceptance Testing	2-3

(Many of these activities will take place concurrently. Schedule would vary with the number of turbines to be installed)

TABLE 6: ***Estimated Daily Vehicle Traffic—Construction***

Vehicle Type	Origin/Destination	Average Daily Trips*
Construction Workers (250 workers @ 1.3 persons per vehicle)	Laramie	290
	Fort Collins	96
Turbine and MET Tower Components	Laramie (UPRR)	8
	Fort Collins	8
Normal Heavy Trucks (Concrete, Dump Trucks, Water Trucks)	Laramie	240

* Includes the average daily trips to and from the Project site (e.g., delivery of a turbine component on a single truck would count as two trips).

Normal heavy truck traffic includes concrete trucks, dump trucks, and water tankers. Concrete would likely be delivered from the Laramie area, and other trucks would deliver components, equipment, and materials to the site.

The number of truck deliveries per turbine would depend on the turbine technology selected for the Project. This document assumes that eight heavy truck deliveries would be required for each turbine (four tower segments, two blade trucks, a nacelle truck, and the rotor hub truck), with eight return trips by empty vehicles. Furthermore, given the construction schedule laid out in Table 5, this analysis assumes that an average of one complete turbine "package" would be delivered to the Project site each day.

Anticipated Haul Routes

It is anticipated that most ordinary heavy truck traffic would originate in Cheyenne, Laramie, or Fort Collins. The exact distribution of this traffic will depend on the preferred turbine technology and construction schedule. For purposes of analysis, this document makes the following assumptions about the distribution of construction traffic:

- Normal heavy trucks would be dispatched from a variety of locations in and around Laramie and Cheyenne. For modeling, half of normal heavy truck traffic was assigned to portions of I-80 east of US 287, while the other half were assigned to I-80 west of US 287. All normal heavy truck traffic would drive directly from Laramie to the Project site via US 287;[10]
- Half of all turbine components would be delivered from Colorado, traveling on I-25 and I-80 to reach the Project site;
- The remaining half of turbine components would be shipped via rail to UPRR's Laramie yard, transferred to trucks, and shipped to the Project site via Snowy Range Road (SR 230/130), I-80, and US 287;
- US 287 between Fort Collins and Laramie would only be used for turbine component deliveries if unusual traffic or travel circumstances arise on I-25 or I-80.

Alternative Scenario for Haul Routes

It is possible that rail would not be used at all for deliveries of turbine components. In such an alternative scenario, all deliveries of large turbine components (tower sections, nacelles, hubs and blades) would be via Interstate highways from Colorado or other areas outside of Wyoming. In such a scenario, the only traffic variable would be eight additional daily trips by oversize trucks carrying turbine components. Delivery of other materials would still be by tractor-trailer from either Fort Collins or Laramie. Other "ordinary heavy truck" and construction worker traffic would not change.

Anticipated Personnel Access Routes

Specific personnel forecasts have not been developed for Project construction. Based on data submitted for the 0.99 MW Campbell Hill Windpower project near Glenrock,[11] ERM estimates that during peak construction activities, as many as 250 workers may access the site per day during peak construction and decommissioning activities. The Campbell Hill data also assume average worker vehicle occupancy of 1.3 persons. Based on this assumption, the 250 workers for the Hermosa Project would arrive in 193 vehicles. This analysis assumes that 75 percent of those worker vehicles would be based out of Laramie, while the remaining 25 percent would commute from Fort Collins.

Internal Road Network

Project construction activities would include upgrades to existing public dirt roads (County and non-County roads) and the creation of other temporary roads to allow construction vehicle access to the turbine pads, laydown yards, O&M facilities, and other Project facilities. These roads would be developed to a standard sufficient to safely support the volume and type of construction vehicles anticipated for Project construction activities. Section 4.1 describes the road development standards that will be used by the Applicant.

Decommissioning

This analysis assumes that the peak amount of traffic generated by Decommissioning activities (the dismantling of the turbines and other Project facilities, and the restoration of the natural landscape) would be the same as for construction. These activities could occur as early as 2037.

3.1.2 Operations Phase

After the completion of construction, the Project would have a lifespan of approximately 25 years. During this Operations period, employee trips to the site would be limited to commuting by a few permanent employees and occasional visits by inspection or maintenance personnel. ERM estimates that during the Operations period, approximately 30 employees would work on the site during an average day, generating 60 vehicle trips per day. This analysis assumes that all such trips would originate in Laramie.

3.1.3 Future Year Traffic Volumes

Traffic data from WYDOT indicate that, since 1970, AADT along US 287 south of Laramie grew by approximately 1.5 percent per year,[12] while AADT on Interstates in the Study Area grew by approximately 4 percent per year. Overall traffic has leveled off in recent years, and actually decreased between 2000 and 2008 along US 287. However, to account for factors that might lead to increased future traffic volumes, this analysis assumes AADT growth of 2.0 percent per year on all affected roads in the Study Area, except for Snowy Range Road. For

Snowy Range Road, traffic growth was tied to population growth as projected by the 2007 Laramie Comprehensive Plan (approximately 1 percent annual growth).[13]

Table 7 shows estimated future AADT on affected roads in the Study Area. The future AADT includes "natural" traffic increases based on the growth rates described above, as well as Project-related trips from the Construction, Operations, and Decommissioning phases. Truck volumes were calculated by applying the current percentage of trucks in the current traffic stream to future "base" traffic volumes (projections without added Project-related traffic), and then adding Project-related trucks from Table 6.

TABLE 7: Future Traffic Volumes

Road	Location	2012 AADT		2037 AADT (Operations)		2037 AADT (Decommissioning)	
		Total	Trucks	Total	Trucks	Total	Trucks
I-80 Eastbound	Curtis Street	3,724	2,208	6,109	3,623	6,109	3,623
	Snowy Range Rd	9,549	3,726	15,219	5,665	15,492	5,938
	Third Street/US 287	7,766	3,598	11,845	5,008	12,391	5,554
	Grand Avenue/I-80 Business	7,644	3,434	12,094	5,185	12,367	5,458
	Albany/Laramie County Line	7,081	3,560	11,170	5,185	11,443	5,585
	Cheyenne West Urban Limits	6,768	3,476	10,655	5,043	10,928	5,446
I-80 Westbound	Curtis Street	4,016	3,042	6,588	4,990	6,588	4,990
	Snowy Range Rd	9,506	3,813	15,148	5,807	15,421	6,080
	Third Street/US 287	7,907	3,653	12,076	5,097	12,622	5,643
	Grand Avenue/I-80 Business	7,720	3,477	12,218	5,257	12,491	5,530
	Albany/Laramie County Line	7,103	3,594	11,206	5,239	11,479	5,639
	Cheyenne West Urban Limits	7,006	3,596	11,046	5,239	11,319	5,641
I-25 Northbound	Colorado State Line	9,571	2,267	15,255	3,179	15,528	3,509
	Cheyenne South Urban Limits	10,470	2,474	16,728	3,516	17,001	3,847
I-25 Southbound	Colorado State Line	9,582	2,279	15,272	3,197	15,545	3,527
	Cheyenne South Urban Limits	9,506	2,290	15,148	3,214	15,421	3,545
US 287	I-80	8,881	1,501	13,704	2,047	14,220	2,298
	Blackfoot Street	7,235	1,338	11,005	1,781	11,521	2,032
	Laramie South Urban Limits	4,464	1,035	6,459	1,285	6,986	1,535
	Red Buttes	4,421	1,025	6,388	1,267	6,904	1,517
	UPRR Bridge	4,421	1,025	6,388	1,267	6,904	1,517
	Tie Siding	4,322	1,025	6,068	1,267	6,680	1,517
	6 Miles South of Tie Siding	3,776	769	6,038	1,261	6,134	1,261
Snowy Range Road (SR 230/130)	Junction I-80	17,872	714	22,146	577	22,154	833

3.2 IMPACTS ON ROADS

This section discusses the potential impact that the Project would have on roadway safety and LOS.

3.2.1 *Future Roadway Levels of Service*

Table 8 shows the projected future LOS for affected roadways in the Study Area. LOS was calculated during Project construction (2012), operations (2037), and decommissioning (2037). The LOS analysis assumes that US 287 will be essentially in its current state in 2012, but will have been upgraded to a four-lane divided highway for its entire length by 2037.

TABLE 8: Future LOS

Road	Location	LOS		
		2012 (Construction)	2037 (Operations)	2037 (Decommissioning)
I-80 Eastbound	Curtis Street	A	A	A
	Snowy Range Rd	A	A	A
	Third Street/US 287	A	A	A
	Grand Avenue/I-80 Business	A	A	A
	Albany/Laramie County Line	A	A	A
	Cheyenne West Urban Limits	A	A	A
I-80 Westbound	Curtis Street	A	A	A
	Snowy Range Rd	A	A	A
	Third Street/US 287	A	A	A
	Grand Avenue/I-80 Business	A	A	A
	Albany/Laramie County Line	A	A	A
	Cheyenne West Urban Limits	A	A	A
I-25 Northbound	Colorado State Line	A	A	A
	Cheyenne South Urban Limits	A	A	A
I-25 Southbound	Colorado State Line	A	A	A
	Cheyenne South Urban Limits	A	A	A
US 287	I-80	A	B	B
	Blackfoot Street	A	A	A
	Laramie South Urban Limits	B	A	A
	Red Buttes	B	A	A
	UPRR Bridge	B	A	A
	Tie Siding	A	A	A
	6 Miles South of Tie Siding	B	A	A
Snowy Range Road (SR 230/130)	Junction I-80	B	C	C

Background traffic increases and Project-related activity would not cause any road segments to exceed the LOS thresholds established by WYDOT. Most affected roadways would operate at LOS A or B during all Project phases. Snowy Range Road would operate at LOS C in 2037, a reduced but acceptable LOS for an urban arterial.

Based on these analyses, traffic associated with the Project would not degrade LOS below state thresholds, and would not cause long-term major traffic delays for a substantial number of motorists.

3.2.2 *Intersections*

Level of Service Considerations

The straight-line LOS calculations described in Section 3.2.1 do not necessarily reflect the LOS of key intersections and interchanges. LOS analyses intersections require site-specific traffic turning movement data that were not available for this study. Instead, this section presents a qualitative analysis of the Project's potential impacts on LOS at key intersections in the Study Area.

Of particular interest are the I-80 interchanges at Snowy Range Road and US 287, and the Tie Siding intersection on US 287. These intersections will host most of the heavy truck traffic and commuter traffic associated with the Project, and will be the location of large numbers of turning movements (including those not related to the Project), which have more of an impact on intersection LOS than straight-line volumes.

Given available data, there is no indication that traffic associated with the Project would cause these intersections to operate at LOS C (US 287) or D (I-80) or worse. However, it is possible Project-related truck traffic—specifically oversize trucks carrying turbine components—could temporarily degrade LOS below these thresholds during peak hours (typically during the morning and evening commute).

To the degree that large truck traffic avoids these key intersections during peak-hours (see Section 4.2), traffic associated with the Project would not degrade LOS below state thresholds, and would not cause long-term major traffic delays for a substantial number of motorists.

Geometric Considerations

Geometric design of key intersections and interchanges should also be carefully considered. The I-80 interchanges already carry normal large truck traffic, and the newly-constructed US 287 intersection at Tie Siding appears to be designed to accommodate "normal heavy trucks," as described in Table 6. Some upgrades to the Tie Siding intersection may be necessary in order to ensure safe operation of vehicles carrying turbine components. Potential upgrades are described in Section 4.

3.2.3 *Road Safety*

WYDOT's Safety Index lists US 287 and I-80 has having a LOS D ("below average") for safety,[14] indicating the potential for improvements to reduce crash potential. Planned upgrades to US 287 (to extend the four-lane divided highway section recently implemented near Tie Siding) respond to this Safety Index rating.

However, until such upgrades are complete, the presence of Project-related trucks and especially oversize vehicles on affected roads could potentially reduce safety for other drivers. This potential impact is highest for the two-lane segments of US 287, and for peak travel hours.

3.2.4 Internal Road Network

Project-specific internal roads (including upgraded portions of existing public roads) would be constructed to a standard necessary to safely and efficiently move construction vehicles to and from turbine pad sites and other areas of the project. Accordingly, impacts of these roads on the regional transportation system would be minimal. The very small number of private vehicles that use these roads would experience delays during construction. However, given the lack of any significant nearby residential or commercial development (except for the businesses at the Tie Siding intersection), these impacts would be minimal.

3.2.5 Other Road Impacts

Increased Traffic for At-Grade Rail Crossings

As described in Section 3.1.1, haul routes for trucks associated with the Project and commuter routes for employees do not cross railroad tracks at-grade. This finding assumes that rail-borne turbine components will be offloaded in the Laramie yard.

As described in Section 3.1.1, the Applicant is considering options to use other sites for offloading of rail-borne turbine components, such as Hermosa Road and the Hermosa siding. If the Hermosa Road site is chosen, unloading would likely occur on the east side of the tracks, requiring as many as 32 rail crossings (half loaded, half empty) per day (assuming eight truckloads per turbine, all turbine components shipped via rail, and one turbine constructed per day). To implement this option, the Hermosa siding site would likely need to be built up to provide offloading equipment (e.g., cranes) and queuing space for multiple large trucks.

Such volumes would likely cause delays for the few travelers along Hermosa Road, and would need to be carefully coordinated with UPRR to avoid delays to or conflicts with freight rail traffic.

Road Dust and Road Damage

Because most of the affected public roads in the Study Area are paved, the potential for Project-related impacts due to road dust or severe road damage exists only along unpaved roads. These include Cherokee Park Road (and the Tie Siding intersection on US 287) and Boulder Ridge Road.

Most road maintenance would be performed on an as-needed basis, in accordance with Albany County requirements. Regular snow removal is likely during the winter months to maintain access to the turbines and substation when drifting occurs. It is expected that minor amounts of surface dragging, blading, or grading would be required after the spring thaw to remove vehicle ruts. Other similar surface work may be needed after periods of heavy rainfall, or periodically due to maintenance traffic. Any identified needs for repairs would be promptly addressed. Any culverts, drains, or other water management structures would need to be kept clear to allow effective drainage.

In order to manage dust on unpaved roads, the Applicant will develop a storm water pollution prevention plan (SWPPP), which includes erosion control measures. The SWPPP would be based on the U.S. Environmental Protection Agency (EPA) document entitled "Storm Water Management for Construction Activities—Developing Pollution Prevention Plans and Best Management Practices," as well as State permit requirements. Examples of best management practices that can be included in the SWPPP are the use of water or other dust control measures on unpaved roads or near heavily used public roads, holding traffic speeds to appropriate levels to minimize dust generation, using rock to cover disturbed soil, and re-vegetating or otherwise covering soils as soon as possible following soil disturbance.

Given these procedures, the Applicant's interest in avoiding damage to public roads (in order to maintain access to the turbines), and the extremely low volume of background traffic on county roads in and around the Project site, the Project would not create hazardous situations related to dust or road damage.

Trucks carrying Project materials offloaded at the UPRR Laramie yard would follow designated haul routes to reach I-80, avoiding damage to roads not intended for heavy cargo.

3.2.6 Alternative Scenario for Haul Routes

Under the alternative delivery scenario (see Section 3.1.1), the added traffic volume on US 287 would be minimal. I-25 and I-80 would host a total of 32 oversize vehicle trips rather than 16 assumed in the LOS modeling described in Section 3.2.1. This change in volume would not, in and of itself, affect Level of Service on road segments, and would not likely affect peak-hour LOS at key intersections. Safety considerations and procedures (see Section 4) would not change.

3.3 IMPACTS ON RAILROADS

As described above, the number of turbine components delivered by rail will depend on the specific turbine model selected for the Project. This analysis assumes that half of all Project turbines would be delivered via UPRR deliveries, equating to one or two full trains per week. This equates to less than one percent of existing UPRR rail traffic through Laramie (approximately 60 trains per day). While any rail delivery of Project components will need to be coordinated with

UPRR, Project-related rail deliveries to Laramie would not adversely impact railroad operations.

To enable potential offloading at the Hermosa siding, a new siding, offloading facilities, and vehicle queuing areas would likely need to be built. Construction would be challenging, given the topography of the area. To the degree that Project-related rail and truck deliveries would be carefully coordinated with UPRR, such a siding would not create significant adverse impacts on operations on the UPRR Central Corridor.

3.4 IMPACTS ON AIR TRAFFIC PATTERNS

The Federal Aviation Administration (FAA) has reviewed the Project Description as it relates to air travel, and has found no objection to the Project. The FAA letter to this effect is included in Appendix B.

As part of the FAA review, the US Department of Commerce, National Telecommunications and Information Administration (NTIA) also reviewed the Project Description for impacts related to weather radar signals—an important tool for maintaining safe air travel. NTIA has expressed concern over the potential for the Project to interfere with weather radar. The Applicant and NTIA are working together to address this concern. The NTIA letter to this effect is included in Appendix C.

4.0 MITIGATION

This section describes potential mitigation strategies to address the potential impacts described in Section 3.0. These strategies fall into two broad categories: Physical Improvements and Operational Procedures.

4.1 PHYSICAL IMPROVEMENTS

As described in the Project Description, the Applicant may need to improve certain public and private roads in order to accommodate oversize truck deliveries. This includes (but is not limited to) US 287 (specifically at the Tie Siding intersection), Cherokee Park Road and Boulder Ridge Road. Specific criteria for these improvements are listed in the Project Description, and reprinted here for reference.

In order to maintain safety during construction and maintenance activities, the following design criteria would need to be utilized:

- Maximum access road slope of 5 to 10 percent; depending on turbine requirements;
- Maximum road slope between turbines (turbine string road) between 5 and 10 percent;
- Maximum road width of access roads will likely be 25 ft and maximum width of turbine string roads will likely be 50 ft (required for crane movement on site);
- Minimum turn radius (inside radius of road way) of 115 ft (based on transporting three turbine blades at a time) wherever possible (varies by turbine type);
- Road surface will likely consist of an all weather gravel road; and
- Design speed limit of 15 miles per hour maximum on the turbine string roads, and 25 miles per hour on the site access roads.

The Applicant will also develop specific criteria related to humps, dips, road crown, and side slopes on Project site roads during the detailed design stage.

On-site Project traffic would use laydown yards as turnarounds where possible. The Applicant would construct additional turnouts and other turn-around areas as necessary.

Whenever possible, Project materials would be delivered directly to the construction pad for each turbine or other facility, and assembly of the turbine would commence shortly after delivery. As stated in the Project Description, the only exception may be if components must begin to arrive before the site is available for erection of the wind turbines (e.g., due to snow on the site, or sensitive species breeding periods). In such an instance, some components may be temporarily stored in a laydown area until turbine site access and crews are available to move and erect the turbine.

Assuming these criteria are met, no further physical improvements should be needed to ensure safe operations of Project-related vehicles. Similar criteria would be followed if the Applicant were to upgrade Hermosa Road for access to the UPRR line.

4.2 OPERATIONAL PROCEDURES

Safe operation of Project-related traffic depends not only on the condition and characteristics of affected roads, but also on procedures governing the time and frequency of deliveries of Project components and materials. To maximize safety and compatibility with background traffic flows, the following operational procedures are recommended for the Construction and Decommissioning phases of the Project.

4.2.1 Scheduling of Truck Movements

WYDOT data show that peak volume on affected roads Laramie typically occurs in the afternoon, generally from 4:00 p.m. to 6:00 p.m., with a less defined morning peak around 8:00 a.m. To minimize conflicts between Project traffic and background traffic, movements of normal heavy trucks (dump trucks, concrete trucks, standard size tractor-trailers or flatbeds, etc.) will be minimized (essential deliveries only), to the extent practicable, during the morning afternoon.

Movements of oversize trucks (deliveries of turbine components) will be prohibited during the afternoon peak and minimized in the morning peak, to the extent practicable. If possible and considering worker safety, such oversize deliveries will occur during other parts of the day, when background traffic tends to be lower, such as early morning and late afternoon. To the degree practicable, Project-related activities should be coordinated to avoid major traffic-generating events on the University of Wyoming campus. The Applicant will work with local law enforcement as appropriate to assist with deliveries.

4.2.2 Other Safety Measures

Road signs will be erected to warn travelers of oversize vehicle movements. The Applicant will also consider using chase vehicles (or police vehicles, if required by WYDOT) to give drivers additional warning.

4.2.3 Worker Transportation

Approximately 250 construction workers would travel to and from the site each day, generally during peak hours. While the traffic volumes associated with these worker trips could likely be accommodated without substantially degrading LOS, the Applicant may establish bus service to transport workers to and from Laramie or another common destination. This would reduce traffic along US 287, and could reduce the potential for traffic accidents involving workers.

5.0 ENDNOTES AND REFERENCES

[1] Source: WYDOT. 2010. Wyoming Connects; Draft Long Range Transportation Plan, Chapter 4.
[2] Ibid.
[3] Source: Cook, S. 2010. Personal Interview, May 13.
[4] Source: CDOT. 2010. FY08-13 STIP Amendment for Amendment Period 24.
[5] Source: Cook, S. 2010. Personal Interview, April 16.
[6] WYDOT has published 2008 AADT data for a large number of traffic count stations. The publicly available data for 2009 are far more limited, and do not, for example, include information on US 287 south of Laramie. Accordingly, 2008 is taken as the "Baseline" year for traffic counts and Level of Service Analyses.
[7] Ibid.
[8] Source: Wyoming DOT. 2010. Wyoming Connects; Draft Long Range Transportation Plan, Chapter 4.
[9] Albany County. 2008. Albany County Comprehensive Plan.
[10] The exact origin points of such vehicles are varied, and could stretch across a substantial portion of Wyoming and Colorado. While these trucks would add incremental traffic to major facilities such as I-80 and I-25, the most concentrated impact would be on the roads identified in Section 2.1.1.
[11] Duke Energy Corporation. 2009. Wyoming ISD Section 109 Permit Application; Campbell Hill Windpower Project.
[12] This is the compounded growth rate between 1970 and 2005. After 2005, there was a noticeable dropoff in traffic along US 287, possibly due to construction of the four-lane segment near Tie Siding.
[13] The Laramie Comprehensive Plan identifies a "targeted population" of 33,830 by 2025, equating to 0.9 percent annual growth (compounded) between 2000 and 2025.
[14] Source: Wyoming DOT. 2010. Wyoming Connects; Draft Long Range Transportation Plan, Chapter 4.

Highway Capacity Software Reports

Appendix A

June 4, 2010
Project No. 0115435

Environmental Resources Management Southwest, Inc.
15810 Park Ten Place, Suite 300
Houston, Texas 77084-5140
(281) 600-1000

Transportation Analysis

Shell WindEnergy, Inc.

Hermosa West Wind Farm Project

Albany County, Wyoming

APPENDIX

APPENDIX A: HIGHWAY CAPACITY SOFTWARE ANALYSES

Highway Capacity Software (HCS) was used to calculate LOS for straight-line segments of affected roadways, based on current (2008) and projected future (2012 and 2037) AADT, as described in Section 3.1. Worksheets documenting HCS inputs and outputs are included in this Appendix.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-25 NB
From/To:	Cheyenne Southern Urban Limits
Jurisdiction:	Laramie County
Analysis Year:	2008
Description:	Hermosa West Wind Farm

Flow Inputs and Adjustments

Annual average daily traffic, AADT	8590	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	425	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	260	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	260	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	3.7	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-25 NB
From/To:	Cheyenne Southern Urban Limits
Jurisdiction:	Laramie County
Analysis Year:	2012

Description: Hermosa West Wind Farm

Flow Inputs and Adjustments

Annual average daily traffic, AADT	10470	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	518	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	317	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	317	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	4.5	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

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___________________________Operational Planning Analysis___________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-25 NB
From/To:                 Cheyenne Southern Urban Limits
Jurisdiction:            Laramie County
Analysis Year:           2037 (Operations)
Description:  Hermosa West Wind Farm

___________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT         16728          veh/day
Peak-hour proportion of AADT, K            0.09
Peak-hour direction percent, D             55             %
Volume, DDHV                               828            veh/h
Peak-hour factor, PHF                      0.92
Trucks and buses                           25             %
Recreational vehicles                      0              %
Terrain type:                              Level
    Grade                                  0.00           %
    Segment length                         0.00           mi
Trucks and buses PCE, ET                   1.5
Recreational vehicles PCE, ER              1.2
Heavy Vehicle adjustment, fHV              0.889
Driver population factor, fp               1.00
Flow rate, vp                              506            pc/h/ln

___________________________Speed Inputs and Adjustments___________________________

Lane width                                 12.0           ft
Right-shoulder lateral clearance           6.0            ft
Interchange density                        0.50           interchange/mi
Number of lanes, N                         2
Free-flow speed:                           Measured
     FFS or BFFS                           70.0           mi/h
Lane width adjustment, fLW                 0.0            mi/h
Lateral clearance adjustment, fLC          0.0            mi/h
Interchange density adjustment, fID        0.0            mi/h
Number of lanes adjustment, fN             4.5            mi/h
Free-flow speed                            70.0           mi/h
                                           Urban Freeway

___________________________LOS and Performance Measures___________________________

Flow rate, vp                              506            pc/h/ln
Free-flow speed, FFS                       70.0           mi/h
Average passenger-car speed, S             70.0           mi/h
Number of lanes, N                         2
Density, D                                 7.2            pc/mi/ln
Level of Service, LOS                      A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-25 NB
From/To:	Cheyenne Southern Urban Limits
Jurisdiction:	Laramie County
Analysis Year:	2037 (Decommissioning)

Description: Hermosa West Wind Farm

Flow Inputs and Adjustments

Annual average daily traffic, AADT	17001	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	842	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	515	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	515	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	7.4	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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HCS+: Basic Freeway Segments Release 5.4



___________________________Operational Planning Analysis___________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-25 NB
From/To:                 Colorado-Wyoming State Line
Jurisdiction:            Laramie County
Analysis Year:           2008
Description:  Hermosa West Wind Farm

___________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          9420          veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55            %
Volume, DDHV                                466           veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25            %
Recreational vehicles                       0             %
Terrain type:                               Level
    Grade                                   0.00          %
    Segment length                          0.00          mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               285           pc/h/ln

___________________________Speed Inputs and Adjustments___________________________

Lane width                                  12.0          ft
Right-shoulder lateral clearance            6.0           ft
Interchange density                         0.50          interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0          mi/h
Lane width adjustment, fLW                  0.0           mi/h
Lateral clearance adjustment, fLC           0.0           mi/h
Interchange density adjustment, fID         0.0           mi/h
Number of lanes adjustment, fN              4.5           mi/h
Free-flow speed                             70.0          mi/h
                                            Urban Freeway

___________________________LOS and Performance Measures___________________________

Flow rate, vp                               285           pc/h/ln
Free-flow speed, FFS                        70.0          mi/h
Average passenger-car speed, S              70.0          mi/h
Number of lanes, N                          2
Density, D                                  4.1           pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
```

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-25 NB
From/To:	Colorado-Wyoming State Line
Jurisdiction:	Laramie County
Analysis Year:	2012

Description: Hermosa West Wind Farm

Flow Inputs and Adjustments

Annual average daily traffic, AADT	9571	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	474	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	290	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	290	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	4.1	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-25 NB
From/To:	Colorado-Wyoming State Line
Jurisdiction:	Laramie County
Analysis Year:	2037 (Operations)

Description: Hermosa West Wind Farm

Flow Inputs and Adjustments

Annual average daily traffic, AADT	15255	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	755	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	462	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	462	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	6.6	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

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___________________________Operational Planning Analysis___________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-25 NB
From/To:                 Colorado-Wyoming State Line
Jurisdiction:            Laramie County
Analysis Year:           2037 (Decommissioning)
Description:  Hermosa West Wind Farm

___________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT         15528          veh/day
Peak-hour proportion of AADT, K            0.09
Peak-hour direction percent, D             55             %
Volume, DDHV                               769            veh/h
Peak-hour factor, PHF                      0.92
Trucks and buses                           25             %
Recreational vehicles                      0              %
Terrain type:                              Level
    Grade                                  0.00           %
    Segment length                         0.00           mi
Trucks and buses PCE, ET                   1.5
Recreational vehicles PCE, ER              1.2
Heavy Vehicle adjustment, fHV              0.889
Driver population factor, fp               1.00
Flow rate, vp                              470            pc/h/ln

___________________________Speed Inputs and Adjustments___________________________

Lane width                                 12.0           ft
Right-shoulder lateral clearance           6.0            ft
Interchange density                        0.50           interchange/mi
Number of lanes, N                         2
Free-flow speed:                           Measured
     FFS or BFFS                           70.0           mi/h
Lane width adjustment, fLW                 0.0            mi/h
Lateral clearance adjustment, fLC          0.0            mi/h
Interchange density adjustment, fID        0.0            mi/h
Number of lanes adjustment, fN             4.5            mi/h
Free-flow speed                            70.0           mi/h
                                           Urban Freeway

___________________________LOS and Performance Measures___________________________

Flow rate, vp                              470            pc/h/ln
Free-flow speed, FFS                       70.0           mi/h
Average passenger-car speed, S             70.0           mi/h
Number of lanes, N                         2
Density, D                                 6.7            pc/mi/ln
Level of Service, LOS                      A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

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___________________________Operational Planning Analysis___________________________

Analyst:                  Sussman
Agency or Company:        ERM
Date Performed:           4/26/2010
Analysis Time Period:
Freeway/Direction:        I-25 SB
From/To:                  Cheyenne Southern Urban Limits
Jurisdiction:             Laramie County
Analysis Year:            2008
Description:  Hermosa West Wind Farm

___________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          8530          veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55            %
Volume, DDHV                                422           veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25            %
Recreational vehicles                       0             %
Terrain type:                               Level
    Grade                                   0.00          %
    Segment length                          0.00          mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               258           pc/h/ln

___________________________Speed Inputs and Adjustments___________________________

Lane width                                  12.0          ft
Right-shoulder lateral clearance            6.0           ft
Interchange density                         0.50          interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0          mi/h
Lane width adjustment, fLW                  0.0           mi/h
Lateral clearance adjustment, fLC           0.0           mi/h
Interchange density adjustment, fID         0.0           mi/h
Number of lanes adjustment, fN              4.5           mi/h
Free-flow speed                             70.0          mi/h
                                            Urban Freeway

___________________________LOS and Performance Measures___________________________

Flow rate, vp                               258           pc/h/ln
Free-flow speed, FFS                        70.0          mi/h
Average passenger-car speed, S              70.0          mi/h
Number of lanes, N                          2
Density, D                                  3.7           pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-25 SB
From/To:	Cheyenne Southern Urban Limits
Jurisdiction:	Laramie County
Analysis Year:	2012

Description: Hermosa West Wind Farm

Flow Inputs and Adjustments

Annual average daily traffic, AADT	9506	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	471	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	288	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	288	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	4.1	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-25 SB
From/To:	Cheyenne Southern Urban Limits
Jurisdiction:	Laramie County
Analysis Year:	2037 (Operations)

Description: Hermosa West Wind Farm

Flow Inputs and Adjustments

Annual average daily traffic, AADT	15148	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	750	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	459	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	459	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	6.6	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

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__________________________Operational Planning Analysis__________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-25 SB
From/To:                 Cheyenne Southern Urban Limits
Jurisdiction:            Laramie County
Analysis Year:           2037 (Decommissioning)
Description:  Hermosa West Wind Farm

__________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          15421          veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55             %
Volume, DDHV                                763            veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25             %
Recreational vehicles                       0              %
Terrain type:                               Level
    Grade                                   0.00           %
    Segment length                          0.00           mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               467            pc/h/ln

__________________________Speed Inputs and Adjustments___________________________

Lane width                                  12.0           ft
Right-shoulder lateral clearance            6.0            ft
Interchange density                         0.50           interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0           mi/h
Lane width adjustment, fLW                  0.0            mi/h
Lateral clearance adjustment, fLC           0.0            mi/h
Interchange density adjustment, fID         0.0            mi/h
Number of lanes adjustment, fN              4.5            mi/h
Free-flow speed                             70.0           mi/h
                                            Urban Freeway

__________________________LOS and Performance Measures___________________________

Flow rate, vp                               467            pc/h/ln
Free-flow speed, FFS                        70.0           mi/h
Average passenger-car speed, S              70.0           mi/h
Number of lanes, N                          2
Density, D                                  6.7            pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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                    HCS+: Basic Freeway Segments Release 5.4



_________________________Operational Planning Analysis_________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-25 SB
From/To:                 Colorado-Wyoming State Line
Jurisdiction:            Laramie County
Analysis Year:           2008
Description:  Hermosa West Wind Farm

_________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          8600           veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55             %
Volume, DDHV                                426            veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25             %
Recreational vehicles                       0              %
Terrain type:                               Level
    Grade                                   0.00           %
    Segment length                          0.00           mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               260            pc/h/ln

_________________________Speed Inputs and Adjustments__________________________

Lane width                                  12.0           ft
Right-shoulder lateral clearance            6.0            ft
Interchange density                         0.50           interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0           mi/h
Lane width adjustment, fLW                  0.0            mi/h
Lateral clearance adjustment, fLC           0.0            mi/h
Interchange density adjustment, fID         0.0            mi/h
Number of lanes adjustment, fN              4.5            mi/h
Free-flow speed                             70.0           mi/h
                                            Urban Freeway

_________________________LOS and Performance Measures__________________________

Flow rate, vp                               260            pc/h/ln
Free-flow speed, FFS                        70.0           mi/h
Average passenger-car speed, S              70.0           mi/h
Number of lanes, N                          2
Density, D                                  3.7            pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

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___________________________Operational Planning Analysis___________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-25 SB
From/To:                 Colorado-Wyoming State Line
Jurisdiction:            Laramie County
Analysis Year:           2012
Description:  Hermosa West Wind Farm

___________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT        9582          veh/day
Peak-hour proportion of AADT, K           0.09
Peak-hour direction percent, D            55            %
Volume, DDHV                              474           veh/h
Peak-hour factor, PHF                     0.92
Trucks and buses                          25            %
Recreational vehicles                     0             %
Terrain type:                             Level
    Grade                                 0.00          %
    Segment length                        0.00          mi
Trucks and buses PCE, ET                  1.5
Recreational vehicles PCE, ER             1.2
Heavy Vehicle adjustment, fHV             0.889
Driver population factor, fp              1.00
Flow rate, vp                             290           pc/h/ln

___________________________Speed Inputs and Adjustments___________________________

Lane width                                12.0          ft
Right-shoulder lateral clearance          6.0           ft
Interchange density                       0.50          interchange/mi
Number of lanes, N                        2
Free-flow speed:                          Measured
     FFS or BFFS                          70.0          mi/h
Lane width adjustment, fLW                0.0           mi/h
Lateral clearance adjustment, fLC         0.0           mi/h
Interchange density adjustment, fID       0.0           mi/h
Number of lanes adjustment, fN            4.5           mi/h
Free-flow speed                           70.0          mi/h
                                          Urban Freeway

___________________________LOS and Performance Measures___________________________

Flow rate, vp                             290           pc/h/ln
Free-flow speed, FFS                      70.0          mi/h
Average passenger-car speed, S            70.0          mi/h
Number of lanes, N                        2
Density, D                                4.1           pc/mi/ln
Level of Service, LOS                     A

  Overall results are not computed when free-flow speed is less than 55 mph.
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                    HCS+: Basic Freeway Segments Release 5.4



_________________________Operational Planning Analysis_________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-25 SB
From/To:                 Colorado-Wyoming State Line
Jurisdiction:            Laramie County
Analysis Year:           2037 (Operations)
Description:  Hermosa West Wind Farm

_________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT         15272          veh/day
Peak-hour proportion of AADT, K            0.09
Peak-hour direction percent, D             55             %
Volume, DDHV                               756            veh/h
Peak-hour factor, PHF                      0.92
Trucks and buses                           25             %
Recreational vehicles                      0              %
Terrain type:                              Level
    Grade                                  0.00           %
    Segment length                         0.00           mi
Trucks and buses PCE, ET                   1.5
Recreational vehicles PCE, ER              1.2
Heavy Vehicle adjustment, fHV              0.889
Driver population factor, fp               1.00
Flow rate, vp                              462            pc/h/ln

_________________________Speed Inputs and Adjustments__________________________

Lane width                                 12.0           ft
Right-shoulder lateral clearance           6.0            ft
Interchange density                        0.50           interchange/mi
Number of lanes, N                         2
Free-flow speed:                           Measured
     FFS or BFFS                           70.0           mi/h
Lane width adjustment, fLW                 0.0            mi/h
Lateral clearance adjustment, fLC          0.0            mi/h
Interchange density adjustment, fID        0.0            mi/h
Number of lanes adjustment, fN             4.5            mi/h
Free-flow speed                            70.0           mi/h
                                           Urban Freeway

_________________________LOS and Performance Measures__________________________

Flow rate, vp                              462            pc/h/ln
Free-flow speed, FFS                       70.0           mi/h
Average passenger-car speed, S             70.0           mi/h
Number of lanes, N                         2
Density, D                                 6.6            pc/mi/ln
Level of Service, LOS                      A

  Overall results are not computed when free-flow speed is less than 55 mph.
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                    HCS+: Basic Freeway Segments Release 5.4



_________________________Operational Planning Analysis_________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-25 SB
From/To:                 Colorado-Wyoming State Line
Jurisdiction:            Laramie County
Analysis Year:           2037 (Decommisisoning)
Description:  Hermosa West Wind Farm

_________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          15545          veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55             %
Volume, DDHV                                769            veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25             %
Recreational vehicles                       0              %
Terrain type:                               Level
    Grade                                   0.00           %
    Segment length                          0.00           mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               470            pc/h/ln

_________________________Speed Inputs and Adjustments__________________________

Lane width                                  12.0           ft
Right-shoulder lateral clearance            6.0            ft
Interchange density                         0.50           interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0           mi/h
Lane width adjustment, fLW                  0.0            mi/h
Lateral clearance adjustment, fLC           0.0            mi/h
Interchange density adjustment, fID         0.0            mi/h
Number of lanes adjustment, fN              4.5            mi/h
Free-flow speed                             70.0           mi/h
                                            Urban Freeway

_________________________LOS and Performance Measures__________________________

Flow rate, vp                               470            pc/h/ln
Free-flow speed, FFS                        70.0           mi/h
Average passenger-car speed, S              70.0           mi/h
Number of lanes, N                          2
Density, D                                  6.7            pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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                    HCS+: Basic Freeway Segments Release 5.4



_________________________Operational Planning Analysis_________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 EB
From/To:                 Cheyenne West Urban Limits
Jurisdiction:            Wyoming
Analysis Year:           2008
Description:  Hermosa West Project

_________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          6000           veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55             %
Volume, DDHV                                297            veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25             %
Recreational vehicles                       0              %
Terrain type:                               Level
    Grade                                   0.00           %
    Segment length                          0.00           mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               182            pc/h/ln

_________________________Speed Inputs and Adjustments__________________________

Lane width                                  12.0           ft
Right-shoulder lateral clearance            6.0            ft
Interchange density                         0.50           interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0           mi/h
Lane width adjustment, fLW                  0.0            mi/h
Lateral clearance adjustment, fLC           0.0            mi/h
Interchange density adjustment, fID         0.0            mi/h
Number of lanes adjustment, fN              4.5            mi/h
Free-flow speed                             70.0           mi/h
                                            Urban Freeway

_________________________LOS and Performance Measures__________________________

Flow rate, vp                               182            pc/h/ln
Free-flow speed, FFS                        70.0           mi/h
Average passenger-car speed, S              70.0           mi/h
Number of lanes, N                          2
Density, D                                  2.6            pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

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___________________________Operational Planning Analysis__________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 EB
From/To:                 Cheyenne West Urban Limits
Jurisdiction:            Wyoming
Analysis Year:           2012
Description:  Hermosa West Project

___________________________Flow Inputs and Adjustments____________________________

Annual average daily traffic, AADT         6768           veh/day
Peak-hour proportion of AADT, K            0.09
Peak-hour direction percent, D             55             %
Volume, DDHV                               335            veh/h
Peak-hour factor, PHF                      0.92
Trucks and buses                           25             %
Recreational vehicles                      0              %
Terrain type:                              Level
    Grade                                  0.00           %
    Segment length                         0.00           mi
Trucks and buses PCE, ET                   1.5
Recreational vehicles PCE, ER              1.2
Heavy Vehicle adjustment, fHV              0.889
Driver population factor, fp               1.00
Flow rate, vp                              205            pc/h/ln

___________________________Speed Inputs and Adjustments___________________________

Lane width                                 12.0           ft
Right-shoulder lateral clearance           6.0            ft
Interchange density                        0.50           interchange/mi
Number of lanes, N                         2
Free-flow speed:                           Measured
     FFS or BFFS                           70.0           mi/h
Lane width adjustment, fLW                 0.0            mi/h
Lateral clearance adjustment, fLC          0.0            mi/h
Interchange density adjustment, fID        0.0            mi/h
Number of lanes adjustment, fN             4.5            mi/h
Free-flow speed                            70.0           mi/h
                                           Urban Freeway

___________________________LOS and Performance Measures___________________________

Flow rate, vp                              205            pc/h/ln
Free-flow speed, FFS                       70.0           mi/h
Average passenger-car speed, S             70.0           mi/h
Number of lanes, N                         2
Density, D                                 2.9            pc/mi/ln
Level of Service, LOS                      A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

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__________________________Operational Planning Analysis__________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 EB
From/To:                 Cheyenne West Urban Limits
Jurisdiction:            Wyoming
Analysis Year:           2037 (Operations)
Description:  Hermosa West Project

__________________________Flow Inputs and Adjustments__________________________

Annual average daily traffic, AADT          10655          veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55             %
Volume, DDHV                                527            veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25             %
Recreational vehicles                       0              %
Terrain type:                               Level
    Grade                                   0.00           %
    Segment length                          0.00           mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               322            pc/h/ln

__________________________Speed Inputs and Adjustments__________________________

Lane width                                  12.0           ft
Right-shoulder lateral clearance            6.0            ft
Interchange density                         0.50           interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0           mi/h
Lane width adjustment, fLW                  0.0            mi/h
Lateral clearance adjustment, fLC           0.0            mi/h
Interchange density adjustment, fID         0.0            mi/h
Number of lanes adjustment, fN              4.5            mi/h
Free-flow speed                             70.0           mi/h
                                            Urban Freeway

__________________________LOS and Performance Measures__________________________

Flow rate, vp                               322            pc/h/ln
Free-flow speed, FFS                        70.0           mi/h
Average passenger-car speed, S              70.0           mi/h
Number of lanes, N                          2
Density, D                                  4.6            pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Cheyenne West Urban Limits
Jurisdiction:	Wyoming
Analysis Year:	2037 (Decommissioning)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	10928	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	541	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	331	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	331	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	4.7	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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                    HCS+: Basic Freeway Segments Release 5.4




_________________________Operational Planning Analysis__________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 EB
From/To:                 Albany/Laramie County Line
Jurisdiction:            Wyoming
Analysis Year:           2008
Description:  Hermosa West Project

_________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          6290           veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55             %
Volume, DDHV                                311            veh/h
Peak-hour factor, PHF                       0.88
Trucks and buses                            25             %
Recreational vehicles                       0              %
Terrain type:                               Mountainous
    Grade                                   0.00           %
    Segment length                          0.00           mi
Trucks and buses PCE, ET                    4.5
Recreational vehicles PCE, ER               4.0
Heavy Vehicle adjustment, fHV               0.533
Driver population factor, fp                1.00
Flow rate, vp                               331            pc/h/ln

_________________________Speed Inputs and Adjustments__________________________

Lane width                                  12.0           ft
Right-shoulder lateral clearance            6.0            ft
Interchange density                         0.50           interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0           mi/h
Lane width adjustment, fLW                  0.0            mi/h
Lateral clearance adjustment, fLC           0.0            mi/h
Interchange density adjustment, fID         0.0            mi/h
Number of lanes adjustment, fN              4.5            mi/h
Free-flow speed                             70.0           mi/h
                                            Urban Freeway

_________________________LOS and Performance Measures__________________________

Flow rate, vp                               331            pc/h/ln
Free-flow speed, FFS                        70.0           mi/h
Average passenger-car speed, S              70.0           mi/h
Number of lanes, N                          2
Density, D                                  4.7            pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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                    HCS+: Basic Freeway Segments Release 5.4



_________________________Operational Planning Analysis_________________________

Analyst:                Sussman
Agency or Company:      ERM
Date Performed:         4/26/2010
Analysis Time Period:
Freeway/Direction:      I-80 EB
From/To:                Albany/Laramie County Line
Jurisdiction:           Wyoming
Analysis Year:          2012
Description:  Hermosa West Project

_________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT        7081          veh/day
Peak-hour proportion of AADT, K           0.09
Peak-hour direction percent, D            55            %
Volume, DDHV                              351           veh/h
Peak-hour factor, PHF                     0.88
Trucks and buses                          25            %
Recreational vehicles                     0             %
Terrain type:                             Mountainous
    Grade                                 0.00          %
    Segment length                        0.00          mi
Trucks and buses PCE, ET                  4.5
Recreational vehicles PCE, ER             4.0
Heavy Vehicle adjustment, fHV             0.533
Driver population factor, fp              1.00
Flow rate, vp                             374           pc/h/ln

_________________________Speed Inputs and Adjustments__________________________

Lane width                                12.0          ft
Right-shoulder lateral clearance          6.0           ft
Interchange density                       0.50          interchange/mi
Number of lanes, N                        2
Free-flow speed:                          Measured
     FFS or BFFS                          70.0          mi/h
Lane width adjustment, fLW                0.0           mi/h
Lateral clearance adjustment, fLC         0.0           mi/h
Interchange density adjustment, fID       0.0           mi/h
Number of lanes adjustment, fN            4.5           mi/h
Free-flow speed                           70.0          mi/h
                                          Urban Freeway

_________________________LOS and Performance Measures__________________________

Flow rate, vp                             374           pc/h/ln
Free-flow speed, FFS                      70.0          mi/h
Average passenger-car speed, S            70.0          mi/h
Number of lanes, N                        2
Density, D                                5.3           pc/mi/ln
Level of Service, LOS                     A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Albany/Laramie County Line
Jurisdiction:	Wyoming
Analysis Year:	2037 (Operations)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	11170	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	553	veh/h
Peak-hour factor, PHF	0.88	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Mountainous	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	4.5	
Recreational vehicles PCE, ER	4.0	
Heavy Vehicle adjustment, fHV	0.533	
Driver population factor, fp	1.00	
Flow rate, vp	589	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	589	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.4	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Albany/Laramie County Line
Jurisdiction:	Wyoming
Analysis Year:	2037 (Decommissioning)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	11443	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	566	veh/h
Peak-hour factor, PHF	0.88	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Mountainous	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	4.5	
Recreational vehicles PCE, ER	4.0	
Heavy Vehicle adjustment, fHV	0.533	
Driver population factor, fp	1.00	
Flow rate, vp	603	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	603	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.6	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Curtis Street
Jurisdiction:	Laramie
Analysis Year:	2008
Description:	

Flow Inputs and Adjustments

Annual average daily traffic, AADT	3440	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	170	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	104	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	104	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	1.5	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Curtis Street
Jurisdiction:	Laramie
Analysis Year:	2012
Description:	

Flow Inputs and Adjustments

Annual average daily traffic, AADT	3724	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	184	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	112	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	112	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	1.6	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

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__________________________Operational Planning Analysis__________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 EB
From/To:                 Curtis Street
Jurisdiction:            Laramie
Analysis Year:
Description:

__________________________Flow Inputs and Adjustments__________________________

Annual average daily traffic, AADT         6109           veh/day
Peak-hour proportion of AADT, K            0.09
Peak-hour direction percent, D             55             %
Volume, DDHV                               302            veh/h
Peak-hour factor, PHF                      0.92
Trucks and buses                           25             %
Recreational vehicles                      0              %
Terrain type:                              Level
    Grade                                  0.00           %
    Segment length                         0.00           mi
Trucks and buses PCE, ET                   1.5
Recreational vehicles PCE, ER              1.2
Heavy Vehicle adjustment, fHV              0.889
Driver population factor, fp               1.00
Flow rate, vp                              185            pc/h/ln

__________________________Speed Inputs and Adjustments__________________________

Lane width                                 12.0           ft
Right-shoulder lateral clearance           6.0            ft
Interchange density                        0.50           interchange/mi
Number of lanes, N                         2
Free-flow speed:                           Measured
     FFS or BFFS                           70.0           mi/h
Lane width adjustment, fLW                 0.0            mi/h
Lateral clearance adjustment, fLC          0.0            mi/h
Interchange density adjustment, fID        0.0            mi/h
Number of lanes adjustment, fN             4.5            mi/h
Free-flow speed                            70.0           mi/h
                                           Urban Freeway

__________________________LOS and Performance Measures__________________________

Flow rate, vp                              185            pc/h/ln
Free-flow speed, FFS                       70.0           mi/h
Average passenger-car speed, S             70.0           mi/h
Number of lanes, N                         2
Density, D                                 2.6            pc/mi/ln
Level of Service, LOS                      A

  Overall results are not computed when free-flow speed is less than 55 mph.
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                HCS+: Basic Freeway Segments Release 5.4



_________________________Operational Planning Analysis_________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 EB
From/To:                 Grand Avenue
Jurisdiction:            Laramie
Analysis Year:           2008
Description:  Hermosa West Project

_________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          6810          veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55            %
Volume, DDHV                                337           veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25            %
Recreational vehicles                       0             %
Terrain type:                               Level
    Grade                                   0.00          %
    Segment length                          0.00          mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               206           pc/h/ln

_________________________Speed Inputs and Adjustments__________________________

Lane width                                  12.0          ft
Right-shoulder lateral clearance            6.0           ft
Interchange density                         0.50          interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0          mi/h
Lane width adjustment, fLW                  0.0           mi/h
Lateral clearance adjustment, fLC           0.0           mi/h
Interchange density adjustment, fID         0.0           mi/h
Number of lanes adjustment, fN              4.5           mi/h
Free-flow speed                             70.0          mi/h
                                            Urban Freeway

_________________________LOS and Performance Measures__________________________

Flow rate, vp                               206           pc/h/ln
Free-flow speed, FFS                        70.0          mi/h
Average passenger-car speed, S              70.0          mi/h
Number of lanes, N                          2
Density, D                                  2.9           pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Grand Avenue
Jurisdiction:	Laramie
Analysis Year:	2012

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	7644	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	378	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	231	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	231	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	3.3	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

______Operational Planning Analysis______

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Grand Avenue
Jurisdiction:	Laramie
Analysis Year:	

Description: Hermosa West Project

______Flow Inputs and Adjustments______

Annual average daily traffic, AADT	12094	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	599	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	366	pc/h/ln

______Speed Inputs and Adjustments______

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

______LOS and Performance Measures______

Flow rate, vp	366	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	5.2	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Grand Avenue
Jurisdiction:	Laramie
Analysis Year:	2037 (Decommissioning)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	12367	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	612	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	374	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	374	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	5.3	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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                    HCS+: Basic Freeway Segments Release 5.4



_________________________Operational Planning Analysis_________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 EB
From/To:                 Snowy Range Rd
Jurisdiction:            Laramie
Analysis Year:           2008
Description:  Hermosa West Project

_________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          8570           veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55             %
Volume, DDHV                                424            veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25             %
Recreational vehicles                       0              %
Terrain type:                               Level
    Grade                                   0.00           %
    Segment length                          0.00           mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               259            pc/h/ln

_________________________Speed Inputs and Adjustments__________________________

Lane width                                  12.0           ft
Right-shoulder lateral clearance            6.0            ft
Interchange density                         0.50           interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0           mi/h
Lane width adjustment, fLW                  0.0            mi/h
Lateral clearance adjustment, fLC           0.0            mi/h
Interchange density adjustment, fID         0.0            mi/h
Number of lanes adjustment, fN              4.5            mi/h
Free-flow speed                             70.0           mi/h
                                            Urban Freeway

_________________________LOS and Performance Measures__________________________

Flow rate, vp                               259            pc/h/ln
Free-flow speed, FFS                        70.0           mi/h
Average passenger-car speed, S              70.0           mi/h
Number of lanes, N                          2
Density, D                                  3.7            pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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                    HCS+: Basic Freeway Segments Release 5.4



_________________________Operational Planning Analysis_________________________

Analyst:                Sussman
Agency or Company:      ERM
Date Performed:         4/26/2010
Analysis Time Period:
Freeway/Direction:      I-80 EB
From/To:                Snowy Range Rd
Jurisdiction:           Laramie
Analysis Year:          2012
Description:  Hermosa West Project

_________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          9549           veh/day
Peak-hour proportion of AADT, K             0.11
Peak-hour direction percent, D              60             %
Volume, DDHV                                630            veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25             %
Recreational vehicles                       0              %
Terrain type:                               Level
    Grade                                   0.00           %
    Segment length                          0.00           mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               385            pc/h/ln

_________________________Speed Inputs and Adjustments__________________________

Lane width                                  12.0           ft
Right-shoulder lateral clearance            6.0            ft
Interchange density                         0.50           interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0           mi/h
Lane width adjustment, fLW                  0.0            mi/h
Lateral clearance adjustment, fLC           0.0            mi/h
Interchange density adjustment, fID         0.0            mi/h
Number of lanes adjustment, fN              4.5            mi/h
Free-flow speed                             70.0           mi/h
                                            Urban Freeway

_________________________LOS and Performance Measures__________________________

Flow rate, vp                               385            pc/h/ln
Free-flow speed, FFS                        70.0           mi/h
Average passenger-car speed, S              70.0           mi/h
Number of lanes, N                          2
Density, D                                  5.5            pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

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Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 EB
From/To:                 Snowy Range Rd
Jurisdiction:            Laramie
Analysis Year:           2037 (Operations)
Description:  Hermosa West Project
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Flow Inputs and Adjustments

Annual average daily traffic, AADT	15219	veh/day
Peak-hour proportion of AADT, K	0.10	
Peak-hour direction percent, D	60	%
Volume, DDHV	913	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	558	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	558	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.0	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Snowy Range Rd
Jurisdiction:	Laramie
Analysis Year:	2037 (Decommissioning)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	15492	veh/day
Peak-hour proportion of AADT, K	0.10	
Peak-hour direction percent, D	60	%
Volume, DDHV	930	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	569	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	569	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.1	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	US 287
Jurisdiction:	Laramie
Analysis Year:	2008

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	6670	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	330	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	202	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	202	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	2.9	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

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___________________________Operational Planning Analysis___________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 EB
From/To:                 US 287
Jurisdiction:            Laramie
Analysis Year:           2012
Description:  Hermosa West Project

___________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          7766            veh/day
Peak-hour proportion of AADT, K             0.12
Peak-hour direction percent, D              60              %
Volume, DDHV                                559             veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25              %
Recreational vehicles                       0               %
Terrain type:                               Level
    Grade                                   0.00            %
    Segment length                          0.00            mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               342             pc/h/ln

___________________________Speed Inputs and Adjustments___________________________

Lane width                                  12.0            ft
Right-shoulder lateral clearance            6.0             ft
Interchange density                         0.50            interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0            mi/h
Lane width adjustment, fLW                  0.0             mi/h
Lateral clearance adjustment, fLC           0.0             mi/h
Interchange density adjustment, fID         0.0             mi/h
Number of lanes adjustment, fN              4.5             mi/h
Free-flow speed                             70.0            mi/h
                                            Urban Freeway

___________________________LOS and Performance Measures___________________________

Flow rate, vp                               342             pc/h/ln
Free-flow speed, FFS                        70.0            mi/h
Average passenger-car speed, S              70.0            mi/h
Number of lanes, N                          2
Density, D                                  4.9             pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	US 287
Jurisdiction:	Laramie
Analysis Year:	2037 (Operations)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	11845	veh/day
Peak-hour proportion of AADT, K	0.10	
Peak-hour direction percent, D	60	%
Volume, DDHV	711	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	435	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	435	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	6.2	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

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___________________________Operational Planning Analysis___________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 EB
From/To:                 US 287
Jurisdiction:            Laramie
Analysis Year:           2037 (Decommissioning)
Description:  Hermosa West Project

___________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT          12391          veh/day
Peak-hour proportion of AADT, K             0.10
Peak-hour direction percent, D              60             %
Volume, DDHV                                743            veh/h
Peak-hour factor, PHF                       0.92
Trucks and buses                            25             %
Recreational vehicles                       0              %
Terrain type:                               Level
    Grade                                   0.00           %
    Segment length                          0.00           mi
Trucks and buses PCE, ET                    1.5
Recreational vehicles PCE, ER               1.2
Heavy Vehicle adjustment, fHV               0.889
Driver population factor, fp                1.00
Flow rate, vp                               454            pc/h/ln

___________________________Speed Inputs and Adjustments___________________________

Lane width                                  12.0           ft
Right-shoulder lateral clearance            6.0            ft
Interchange density                         0.50           interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            70.0           mi/h
Lane width adjustment, fLW                  0.0            mi/h
Lateral clearance adjustment, fLC           0.0            mi/h
Interchange density adjustment, fID         0.0            mi/h
Number of lanes adjustment, fN              4.5            mi/h
Free-flow speed                             70.0           mi/h
                                            Urban Freeway

___________________________LOS and Performance Measures___________________________

Flow rate, vp                               454            pc/h/ln
Free-flow speed, FFS                        70.0           mi/h
Average passenger-car speed, S              70.0           mi/h
Number of lanes, N                          2
Density, D                                  6.5            pc/mi/ln
Level of Service, LOS                       A

  Overall results are not computed when free-flow speed is less than 55 mph.
```

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/28/2010
Analysis Time Period:	
Freeway/Direction:	I-80WB
From/To:	Cheyenne Western Urban Limits
Jurisdiction:	Wyoming
Analysis Year:	2008

Description: Hermosa West Wind Farm

Flow Inputs and Adjustments

Annual average daily traffic, AADT	6220	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	308	veh/h
Peak-hour factor, PHF	0.88	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Mountainous	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	4.5*	
Recreational vehicles PCE, ER	4.0	
Heavy Vehicle adjustment, fHV	0.533	
Driver population factor, fp	1.00	
Flow rate, vp	328	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	328	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	5.0	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/28/2010
Analysis Time Period:	
Freeway/Direction:	I-80WB
From/To:	Cheyenne Western Urban Limits
Jurisdiction:	Wyoming
Analysis Year:	2012
Description:	

Flow Inputs and Adjustments

Annual average daily traffic, AADT	7006	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	347	veh/h
Peak-hour factor, PHF	0.88	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Mountainous	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	4.5*	
Recreational vehicles PCE, ER	4.0	
Heavy Vehicle adjustment, fHV	0.533	
Driver population factor, fp	1.00	
Flow rate, vp	370	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	370	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	5.7	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

```
Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/28/2010
Analysis Time Period:
Freeway/Direction:       I-80WB
From/To:                 Cheyenne Western Urban Limits
Jurisdiction:            Wyoming
Analysis Year:           2037 (Operations)
Description:  Hermosa West Wind Farm
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Flow Inputs and Adjustments

```
Annual average daily traffic, AADT          11046          veh/day
Peak-hour proportion of AADT, K             0.09
Peak-hour direction percent, D              55             %
Volume, DDHV                                547            veh/h
Peak-hour factor, PHF                       0.88
Trucks and buses                            25             %
Recreational vehicles                       0              %
Terrain type:                               Mountainous
    Grade                                   0.00           %
    Segment length                          0.00           mi
Trucks and buses PCE, ET                    4.5*
Recreational vehicles PCE, ER               4.0
Heavy Vehicle adjustment, fHV               0.533
Driver population factor, fp                1.00
Flow rate, vp                               583            pc/h/ln
```

Speed Inputs and Adjustments

```
Lane width                                  12.0           ft
Right-shoulder lateral clearance            6.0            ft
Interchange density                         0.50           interchange/mi
Number of lanes, N                          2
Free-flow speed:                            Measured
     FFS or BFFS                            65.0           mi/h
Lane width adjustment, fLW                  0.0            mi/h
Lateral clearance adjustment, fLC           0.0            mi/h
Interchange density adjustment, fID         0.0            mi/h
Number of lanes adjustment, fN              4.5            mi/h
Free-flow speed                             65.0           mi/h
                                            Urban Freeway
```

LOS and Performance Measures

```
Flow rate, vp                               583            pc/h/ln
Free-flow speed, FFS                        65.0           mi/h
Average passenger-car speed, S              65.0           mi/h
Number of lanes, N                          2
Density, D                                  9.0            pc/mi/ln
Level of Service, LOS                       A
```

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

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___________________________Operational Planning Analysis___________________________

Analyst:                  Sussman
Agency or Company:        ERM
Date Performed:           4/28/2010
Analysis Time Period:
Freeway/Direction:        I-80WB
From/To:                  Cheyenne Western Urban Limits
Jurisdiction:             Wyoming
Analysis Year:            2037 (Decommissioning)
Description:  Hermosa West Wind Farm

___________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT        11319          veh/day
Peak-hour proportion of AADT, K           0.09
Peak-hour direction percent, D            55             %
Volume, DDHV                              560            veh/h
Peak-hour factor, PHF                     0.88
Trucks and buses                          25             %
Recreational vehicles                     0              %
Terrain type:                             Mountainous
    Grade                                 0.00           %
    Segment length                        0.00           mi
Trucks and buses PCE, ET                  4.5*
Recreational vehicles PCE, ER             4.0
Heavy Vehicle adjustment, fHV             0.533
Driver population factor, fp              1.00
Flow rate, vp                             597            pc/h/ln

___________________________Speed Inputs and Adjustments___________________________

Lane width                                12.0           ft
Right-shoulder lateral clearance          6.0            ft
Interchange density                       0.50           interchange/mi
Number of lanes, N                        2
Free-flow speed:                          Measured
     FFS or BFFS                          65.0           mi/h
Lane width adjustment, fLW                0.0            mi/h
Lateral clearance adjustment, fLC         0.0            mi/h
Interchange density adjustment, fID       0.0            mi/h
Number of lanes adjustment, fN            4.5            mi/h
Free-flow speed                           65.0           mi/h
                                          Urban Freeway

___________________________LOS and Performance Measures___________________________

Flow rate, vp                             597            pc/h/ln
Free-flow speed, FFS                      65.0           mi/h
Average passenger-car speed, S            65.0           mi/h
Number of lanes, N                        2
Density, D                                9.2            pc/mi/ln
Level of Service, LOS                     A

  Overall results are not computed when free-flow speed is less than 55 mph.
```

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 WB
From/To:	Albany/Laramie County Line
Jurisdiction:	Wyoming
Analysis Year:	2008

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	6310	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	312	veh/h
Peak-hour factor, PHF	0.88	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Mountainous	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	4.5	
Recreational vehicles PCE, ER	4.0	
Heavy Vehicle adjustment, fHV	0.533	
Driver population factor, fp	1.00	
Flow rate, vp	332	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	332	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	4.7	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 WB
From/To:	Albany/Laramie County Line
Jurisdiction:	Wyoming
Analysis Year:	2012

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	7103	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	352	veh/h
Peak-hour factor, PHF	0.88	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Mountainous	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	4.5	
Recreational vehicles PCE, ER	4.0	
Heavy Vehicle adjustment, fHV	0.533	
Driver population factor, fp	1.00	
Flow rate, vp	375	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	375	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	5.4	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 WB
From/To:	Albany/Laramie County Line
Jurisdiction:	Wyoming
Analysis Year:	2037 (Operations)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	11206	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	555	veh/h
Peak-hour factor, PHF	0.88	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Mountainous	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	4.5	
Recreational vehicles PCE, ER	4.0	
Heavy Vehicle adjustment, fHV	0.533	
Driver population factor, fp	1.00	
Flow rate, vp	591	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	591	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.4	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 WB
From/To:	Albany/Laramie County Line
Jurisdiction:	Wyoming
Analysis Year:	2037 (Decommissioning)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	11479	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	568	veh/h
Peak-hour factor, PHF	0.88	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Mountainous	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	4.5	
Recreational vehicles PCE, ER	4.0	
Heavy Vehicle adjustment, fHV	0.533	
Driver population factor, fp	1.00	
Flow rate, vp	605	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	605	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.6	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 WB
From/To:	Curtis Street
Jurisdiction:	Laramie
Analysis Year:	2008
Description:	

Flow Inputs and Adjustments

Annual average daily traffic, AADT	3710	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	184	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	112	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	112	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	1.6	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 WB
From/To:	Curtis Street
Jurisdiction:	Laramie
Analysis Year:	2012
Description:	

Flow Inputs and Adjustments

Annual average daily traffic, AADT	4016	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	199	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	122	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	122	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	1.7	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 WB
From/To:	Curtis Street
Jurisdiction:	Laramie
Analysis Year:	2037
Description:	

Flow Inputs and Adjustments

Annual average daily traffic, AADT	6588	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	326	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	199	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	199	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	2.8	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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                    HCS+: Basic Freeway Segments Release 5.4



_________________________Operational Planning Analysis_________________________

Analyst:                 Sussman
Agency or Company:       ERM
Date Performed:          4/26/2010
Analysis Time Period:
Freeway/Direction:       I-80 WB
From/To:                 Grand Avenue
Jurisdiction:            Laramie
Analysis Year:           2008
Description:  Hermosa West Project

_________________________Flow Inputs and Adjustments___________________________

Annual average daily traffic, AADT         6880          veh/day
Peak-hour proportion of AADT, K            0.09
Peak-hour direction percent, D             55            %
Volume, DDHV                               341           veh/h
Peak-hour factor, PHF                      0.92
Trucks and buses                           25            %
Recreational vehicles                      0             %
Terrain type:                              Level
    Grade                                  0.00          %
    Segment length                         0.00          mi
Trucks and buses PCE, ET                   1.5
Recreational vehicles PCE, ER              1.2
Heavy Vehicle adjustment, fHV              0.889
Driver population factor, fp               1.00
Flow rate, vp                              208           pc/h/ln

_________________________Speed Inputs and Adjustments__________________________

Lane width                                 12.0          ft
Right-shoulder lateral clearance           6.0           ft
Interchange density                        0.50          interchange/mi
Number of lanes, N                         2
Free-flow speed:                           Measured
     FFS or BFFS                           70.0          mi/h
Lane width adjustment, fLW                 0.0           mi/h
Lateral clearance adjustment, fLC          0.0           mi/h
Interchange density adjustment, fID        0.0           mi/h
Number of lanes adjustment, fN             4.5           mi/h
Free-flow speed                            70.0          mi/h
                                           Urban Freeway

_________________________LOS and Performance Measures__________________________

Flow rate, vp                              208           pc/h/ln
Free-flow speed, FFS                       70.0          mi/h
Average passenger-car speed, S             70.0          mi/h
Number of lanes, N                         2
Density, D                                 3.0           pc/mi/ln
Level of Service, LOS                      A

  Overall results are not computed when free-flow speed is less than 55 mph.
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HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 WB
From/To:	Grand Avenue
Jurisdiction:	Laramie
Analysis Year:	2012

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	7720	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	382	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	234	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	234	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	3.3	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 WB
From/To:	Grand Avenue
Jurisdiction:	Laramie
Analysis Year:	2037 (Operations)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	12218	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	605	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	370	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	370	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	5.3	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 WB
From/To:	Grand Avenue
Jurisdiction:	Laramie
Analysis Year:	2037 (Decommissioning)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	12491	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	618	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	378	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	378	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	5.4	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Snowy Range Rd
Jurisdiction:	Laramie
Analysis Year:	2008

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	8530	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	422	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	258	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	258	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	3.7	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Snowy Range Rd
Jurisdiction:	Laramie
Analysis Year:	2012
Description:	Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	9506	veh/day
Peak-hour proportion of AADT, K	0.11	
Peak-hour direction percent, D	60	%
Volume, DDHV	627	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	383	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	383	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	5.5	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Snowy Range Rd
Jurisdiction:	Laramie
Analysis Year:	2037 (Operations)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	15148	veh/day
Peak-hour proportion of AADT, K	0.10	
Peak-hour direction percent, D	60	%
Volume, DDHV	909	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	556	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	556	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	7.9	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	Snowy Range Rd
Jurisdiction:	Laramie
Analysis Year:	2037 (Decommissioning)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT		veh/day
Peak-hour proportion of AADT, K	0.10	
Peak-hour direction percent, D	60	%
Volume, DDHV	941	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	575	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	575	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.2	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	US 287
Jurisdiction:	Laramie
Analysis Year:	2008

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	6800	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	337	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	206	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	206	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	2.9	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	US 287
Jurisdiction:	Laramie
Analysis Year:	2012

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	7907	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	55	%
Volume, DDHV	391	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	239	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	239	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	3.4	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	US 287
Jurisdiction:	Laramie
Analysis Year:	2037 (Operations)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT	12076	veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	60	%
Volume, DDHV	652	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	399	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	399	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	5.7	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Planning Analysis

Analyst:	Sussman
Agency or Company:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Freeway/Direction:	I-80 EB
From/To:	US 287
Jurisdiction:	Laramie
Analysis Year:	2037 (Decommissioning)

Description: Hermosa West Project

Flow Inputs and Adjustments

Annual average daily traffic, AADT		veh/day
Peak-hour proportion of AADT, K	0.09	
Peak-hour direction percent, D	60	%
Volume, DDHV	681	veh/h
Peak-hour factor, PHF	0.92	
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicles PCE, ER	1.2	
Heavy Vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	416	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	416	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	5.9	pc/mi/ln
Level of Service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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                        HCS+: Urban Streets Release 5.4



______________________________PLANNING ANALYSIS________________________________
Analyst:                Sussman
Agency/Co.:             ERM
Date Performed:         4/26/2010
Analysis Time Period:
Urban Street:           Snowy Range Road
Direction of Travel:
Jurisdiction:           Laramie
Analysis Year:          2008
Project ID:  Hermosa West Wind Farm

___________________________Traffic Characteristics_____________________________

Annual average daily traffic, AADT   17260     vpd
Planning analysis hour factor, K     0.100
Directional distribution factor, D   0.600
Peak-hour factor, PHF                0.920
Adjusted saturation flow rate        1800      pcphgpl
Percent turns from exclusive lanes   25        %
_________________________Roadway Characteristics________________________________

Number of through lanes one direction, N  1
Free flow speed, FFS                      35        mph
Urban class                               2
Section length                            1.00      miles
Median                                    No
Left-turn bays                            No
_________________________Signal Characteristics_________________________________

Signalized intersections             2
Arrival type, AT                     3
Signal type (k = 0.5 for planning)   Pretimed
Cycle length, C                      60.0      sec
Effective green ratio, g/C           0.750
________________________________Results_________________________________________

Annual average daily traffic, AADT   17260     vpd
Two-way hourly volume                1726      vph
Hourly directional volume            1035      vph
Through-volume 15-min. flow rate     843       v
Running time                         103.0     sec
v/c ratio                            0.78
Through capacity                     1079      vph
Progression factor, PF               1.000
Uniform delay                        4.5       sec
Filtering/metering factor, I         0.530
Incremental delay                    3.1       sec
Control delay                        7.6       sec/v
Total travel speed, Sa               30.5      mph
Total urban street LOS               B
```

HCS+: Urban Streets Release 5.4

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____________________________PLANNING ANALYSIS________________________________
Analyst:                 Sussman
Agency/Co.:              ERM
Date Performed:          4/26/2010
Analysis Time Period:
Urban Street:            Snowy Range Road
Direction of Travel:
Jurisdiction:            Laramie
Analysis Year:           2012
Project ID:  Hermosa West Wind Farm

___________________________Traffic Characteristics_____________________________

Annual average daily traffic, AADT   17872     vpd
Planning analysis hour factor, K     0.100
Directional distribution factor, D   0.600
Peak-hour factor, PHF                0.920
Adjusted saturation flow rate        1800      pcphgpl
Percent turns from exclusive lanes   25        %
_________________________Roadway Characteristics_______________________________

Number of through lanes one direction, N  1
Free flow speed, FFS                      35        mph
Urban class                               2
Section length                            1.00      miles
Median                                    No
Left-turn bays                            No
_________________________Signal Characteristics________________________________

Signalized intersections             2
Arrival type, AT                     3
Signal type (k = 0.5 for planning)   Pretimed
Cycle length, C                      60.0      sec
Effective green ratio, g/C           0.750
________________________________Results________________________________________

Annual average daily traffic, AADT   17872     vpd
Two-way hourly volume                1787      vph
Hourly directional volume            1072      vph
Through-volume 15-min. flow rate     873       v
Running time                         103.0     sec
v/c ratio                            0.81
Through capacity                     1079      vph
Progression factor, PF               1.000
Uniform delay                        4.8       sec
Filtering/metering factor, I         0.484
Incremental delay                    3.3       sec
Control delay                        8.1       sec/v
Total travel speed, Sa               30.2      mph
Total urban street LOS               B
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                       HCS+: Urban Streets Release 5.4



______________________________PLANNING ANALYSIS________________________________
Analyst:                 Sussman
Agency/Co.:              ERM
Date Performed:          4/26/2010
Analysis Time Period:
Urban Street:            Snowy Range Road
Direction of Travel:
Jurisdiction:            Laramie
Analysis Year:           2037 (Operations)
Project ID:  Hermosa West Wind Farm

___________________________Traffic Characteristics_____________________________

Annual average daily traffic, AADT   22146     vpd
Planning analysis hour factor, K     0.103
Directional distribution factor, D   0.600
Peak-hour factor, PHF                0.920
Adjusted saturation flow rate        1800      pcphgpl
Percent turns from exclusive lanes   25        %
_________________________Roadway Characteristics_______________________________

Number of through lanes one direction, N  1
Free flow speed, FFS                      35        mph
Urban class                               2
Section length                            1.00      miles
Median                                    No
Left-turn bays                            No
_________________________Signal Characteristics________________________________

Signalized intersections             2
Arrival type, AT                     3
Signal type (k = 0.5 for planning)   Pretimed
Cycle length, C                      75.0      sec
Effective green ratio, g/C           0.750
________________________________Results________________________________________

Annual average daily traffic, AADT   22146     vpd
Two-way hourly volume                2281      vph
Hourly directional volume            1368      vph
Through-volume 15-min. flow rate     1115      v
Running time                         103.0     sec
v/c ratio                            1.03
Through capacity                     1079      vph
Progression factor, PF               1.000
Uniform delay                        9.4       sec
Filtering/metering factor, I         0.090
Incremental delay                    18.7      sec
Control delay                        28.1      sec/v
Total travel speed, Sa               22.6      mph
Total urban street LOS               C
```

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst:	Sussman
Agency/Co.:	ERM
Date Performed:	4/26/2010
Analysis Time Period:	
Urban Street:	Snowy Range Road
Direction of Travel:	
Jurisdiction:	Laramie
Analysis Year:	2037 (Operations)

Project ID: Hermosa West Wind Farm

Traffic Characteristics

Annual average daily traffic, AADT	22154	vpd
Planning analysis hour factor, K	0.100	
Directional distribution factor, D	0.600	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	25	%

Roadway Characteristics

Number of through lanes one direction, N	1	
Free flow speed, FFS	35	mph
Urban class	2	
Section length	1.00	miles
Median	No	
Left-turn bays	No	

Signal Characteristics

Signalized intersections	2	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Pretimed	
Cycle length, C	60.0	sec
Effective green ratio, g/C	0.750	

Results

Annual average daily traffic, AADT	22154	vpd
Two-way hourly volume	2215	vph
Hourly directional volume	1329	vph
Through-volume 15-min. flow rate	1083	v
Running time	103.0	sec
v/c ratio	1.00	
Through capacity	1079	vph
Progression factor, PF	1.000	
Uniform delay	7.5	sec
Filtering/metering factor, I	0.090	
Incremental delay	9.1	sec
Control delay	16.6	sec/v
Total travel speed, Sa	26.4	mph
Total urban street LOS	C	

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Sussman
Agency/Co:	ERM
Date:	4/26/2010
Analysis Period:	
Highway:	US 287
From/To:	at I-80
Jurisdiction:	Albany County
Analysis Year:	2008
Project ID:	Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	7700	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	15	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 7700 x 0.60 x 0.10 = 462

Volume for :			LOS
4-lane highway = 462	vph/2 lanes = 231	vphpl	A
6-lane highway = 462	vph/3 lanes = 154	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Sussman
Agency/Co:	ERM
Date:	4/26/2010
Analysis Period:	
Highway:	US 287
From/To:	at I-80
Jurisdiction:	Albany County
Analysis Year:	2012
Project ID:	Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	8881	vpd
Proportion AADT during peak hour, K	0.11	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	17	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 8881   x 0.60 x 0.11 = 586

Volume for :                                              LOS
   4-lane highway = 586        vph/2 lanes = 293       vphpl  A
   6-lane highway = 586        vph/3 lanes = 195       vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Sussman
Agency/Co: ERM
Date: 4/26/2010
Analysis Period:
Highway: US 287
From/To: at I-80
Jurisdiction: Albany County
Analysis Year: 2037 (Operations)
Project ID: Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	13704	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	17	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 13704  x 0.60 x 0.10 = 822

Volume for :                                              LOS
   4-lane highway = 822       vph/2 lanes = 411       vphpl  B
   6-lane highway = 822       vph/3 lanes = 274       vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Sussman
Agency/Co:	ERM
Date:	4/26/2010
Analysis Period:	
Highway:	US 287
From/To:	at I-80
Jurisdiction:	Albany County
Analysis Year:	2037 (Decommissioning)
Project ID:	Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	14220	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	16	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 14220 x 0.60 x 0.10 = 853

Volume for :			LOS
4-lane highway = 853	vph/2 lanes = 426	vphpl	B
6-lane highway = 853	vph/3 lanes = 284	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Sussman
Agency/Co: ERM
Date: 4/26/2010
Analysis Period:
Highway: US 287
From/To: at Blackfoot Street
Jurisdiction: Albany County
Analysis Year: 2008
Project ID: Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	6180	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	16	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 6180 x 0.60 x 0.10 = 371

Volume for :			LOS
4-lane highway = 371	vph/2 lanes = 185	vphpl	A
6-lane highway = 371	vph/3 lanes = 123	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
	LOS	0	5	10	15	20	0	5	10	15	20
Terrain											
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Sussman
Agency/Co: ERM
Date: 4/26/2010
Analysis Period:
Highway: US 287
From/To: at Blackfoot Street
Jurisdiction: Albany County
Analysis Year: 2012
Project ID: Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	7227	vpd
Proportion AADT during peak hour, K	0.12	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	18	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 7227   x 0.60 x 0.12 = 520

Volume for :                                            LOS
   4-lane highway = 520       vph/2 lanes = 260      vphpl  A
   6-lane highway = 520       vph/3 lanes = 173      vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

```
Analyst:          Sussman
Agency/Co:        ERM
Date:             4/26/2010
Analysis Period:
Highway:          US 287
From/To:          at Blackfoot Street
Jurisdiction:     Albany County
Analysis Year:    2037 (Operations)
Project ID:       Hermosa West Wind Farm
```

INPUT DATA

Total AADT volume, AADT	11005	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	16	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 11005  x 0.60 x 0.10 = 660

Volume for :                                          LOS
   4-lane highway = 660        vph/2 lanes = 330      vphpl  A
   6-lane highway = 660        vph/3 lanes = 220      vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

```
Analyst:          Sussman
Agency/Co:        ERM
Date:             4/26/2010
Analysis Period:
Highway:          US 287
From/To:          at Blackfoot Street
Jurisdiction:     Albany County
Analysis Year:    2037 (Decommissioning)
Project ID:       Hermosa West Wind Farm
```

INPUT DATA

Total AADT volume, AADT	11521	vpd
Proportion AADT during peak hour, K	0.11	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	18	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 11521  x 0.60 x 0.11 = 760

Volume for :                                             LOS
   4-lane highway = 760       vph/2 lanes = 380      vphpl  A
   6-lane highway = 760       vph/3 lanes = 253      vphpl  A
```

LEVEL OF SERVICE

Terrain	LOS	FFS 60 mph, 0% Trucks	5	10	15	20	FFS 50 mph, 0% Trucks	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Free-Flow Speed = 60 mph / Free-Flow Speed = 50 mph; columns are Percent Trucks (0, 5, 10, 15, 20).

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

```
                        HCS+: Two-Lane Highways Release 5.4

___________________Two-Way Two-Lane Highway Segment Analysis__________________

Analyst                 Sussman
Agency/Co.              ERM
Date Performed          4/26/2010
Analysis Time Period
Highway                 US 287
From/To                 Laramie South Urban Limit
Jurisdiction            Laramie
Analysis Year           2008
Description

___________________________________Input Data_________________________________

Highway class  Class 1
Shoulder width       6.0     ft     Peak-hour factor, PHF       0.88
Lane width           12.0    ft     % Trucks and buses          20      %
Segment length       3.0     mi     % Recreational vehicles     0       %
Terrain type         Rolling        % No-passing zones          50      %
Grade:  Length               mi     Access points/mi            2       /mi
        Up/down              %

Two-way hourly volume, V    181     veh/h
Directional split       60  /   40  %

____________________________Average Travel Speed______________________________

Grade adjustment factor, fG                       0.71
PCE for trucks, ET                                2.5
PCE for RVs, ER                                   1.1
Heavy-vehicle adjustment factor,                  0.769
Two-way flow rate,(note-1) vp                     377     pc/h
Highest directional split proportion (note-2)     226     pc/h

Free-Flow Speed from Field Measurement:
Field measured speed, SFM                          -      mi/h
Observed volume, Vf                                -      veh/h
Estimated Free-Flow Speed:
Base free-flow speed, BFFS                        60.0    mi/h
Adj. for lane and shoulder width, fLS             0.0     mi/h
Adj. for access points, fA                        0.5     mi/h

Free-flow speed, FFS                              59.5    mi/h

Adjustment for no-passing zones, fnp              3.0     mi/h
Average travel speed, ATS                         53.6    mi/h


__________________________Percent Time-Spent-Following________________________

Grade adjustment factor, fG                                     0.77
PCE for trucks, ET                                              1.8
PCE for RVs, ER                                                 1.0
Heavy-vehicle adjustment factor, fHV                            0.862
Two-way flow rate,(note-1) vp                                   310    pc/h
Highest directional split proportion (note-2)                   186
Base percent time-spent-following, BPTSF                        23.9   %
Adj.for directional distribution and no-passing zones, fd/np 19.1
Percent time-spent-following, PTSF                              42.9   %

________________Level of Service and Other Performance Measures_______________

Level of service, LOS                                           B
Volume to capacity ratio, v/c                                   0.12
Peak 15-min vehicle-miles of travel, VMT15                      154     veh-mi
Peak-hour vehicle-miles of travel, VMT60                        543     veh-mi
Peak 15-min total travel time, TT15                             2.9     veh-h
______________________________________________________________________________

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate
   analysis-the LOS is F.
```

```
                       HCS+: Two-Lane Highways Release 5.4

___________________Two-Way Two-Lane Highway Segment Analysis__________________

Analyst                  Sussman
Agency/Co.               ERM
Date Performed           4/26/2010
Analysis Time Period
Highway                  US 287
From/To                  Laramie South Urban Limit
Jurisdiction             Laramie
Analysis Year            2012
Description

___________________________________Input Data__________________________________

Highway class  Class 1
Shoulder width      6.0     ft     Peak-hour factor, PHF       0.88
Lane width          12.0    ft     % Trucks and buses          23      %
Segment length      3.0     mi     % Recreational vehicles     0       %
Terrain type        Rolling        % No-passing zones          50      %
Grade:  Length              mi     Access points/mi            2       /mi
        Up/down             %

Two-way hourly volume, V    223     veh/h
Directional split      60  /   40  %

____________________________Average Travel Speed______________________________

Grade adjustment factor, fG                      0.71
PCE for trucks, ET                               2.5
PCE for RVs, ER                                  1.1
Heavy-vehicle adjustment factor,                 0.743
Two-way flow rate,(note-1) vp                    480     pc/h
Highest directional split proportion (note-2)    288     pc/h

Free-Flow Speed from Field Measurement:
Field measured speed, SFM                         -      mi/h
Observed volume, Vf                               -      veh/h
Estimated Free-Flow Speed:
Base free-flow speed, BFFS                       60.0    mi/h
Adj. for lane and shoulder width, fLS            0.0     mi/h
Adj. for access points, fA                       0.5     mi/h

Free-flow speed, FFS                             59.5    mi/h

Adjustment for no-passing zones, fnp             2.9     mi/h
Average travel speed, ATS                        52.8    mi/h

__________________________Percent Time-Spent-Following________________________

Grade adjustment factor, fG                                    0.77
PCE for trucks, ET                                             1.8
PCE for RVs, ER                                                1.0
Heavy-vehicle adjustment factor, fHV                           0.845
Two-way flow rate,(note-1) vp                                  390    pc/h
Highest directional split proportion (note-2)                  234
Base percent time-spent-following, BPTSF                       29.0   %
Adj.for directional distribution and no-passing zones, fd/np 18.5
Percent time-spent-following, PTSF                             47.5   %

________________Level of Service and Other Performance Measures________________

Level of service, LOS                                          B
Volume to capacity ratio, v/c                                  0.15
Peak 15-min vehicle-miles of travel, VMT15                     190      veh-mi
Peak-hour vehicle-miles of travel, VMT60                       669      veh-mi
Peak 15-min total travel time, TT15                            3.6      veh-h
_______________________________________________________________________________

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate
   analysis-the LOS is F.
```

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Sussman
Agency/Co:	ERM
Date:	4/26/2010
Analysis Period:	
Highway:	US 287
From/To:	Laramie S. Urban Limits
Jurisdiction:	Albany County
Analysis Year:	2037 (Operations)
Project ID:	Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	6459	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	20	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 6459   x 0.60 x 0.10 = 388

Volume for :                                                LOS
   4-lane highway = 388        vph/2 lanes = 194       vphpl  A
   6-lane highway = 388        vph/3 lanes = 129       vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Sussman
Agency/Co: ERM
Date: 4/26/2010
Analysis Period:
Highway: US 287
From/To: Laramie S. Urban Limits
Jurisdiction: Albany County
Analysis Year: 2037 (Decommissioning)
Project ID: Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	6975	vpd
Proportion AADT during peak hour, K	0.12	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	20	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 6975   x 0.60 x 0.12 = 502

Volume for :                                            LOS
   4-lane highway = 502        vph/2 lanes = 251       vphpl  A
   6-lane highway = 502        vph/3 lanes = 167       vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

```
                        HCS+: Two-Lane Highways Release 5.4

___________________Two-Way Two-Lane Highway Segment Analysis__________________

Analyst                  Sussman
Agency/Co.               ERM
Date Performed           4/26/2010
Analysis Time Period
Highway                  US 287
From/To                  Red Buttes
Jurisdiction             Laramie
Analysis Year            2008
Description

___________________________________Input Data__________________________________

Highway class  Class 1
Shoulder width       6.0     ft     Peak-hour factor, PHF       0.88
Lane width           12.0    ft     % Trucks and buses          20      %
Segment length       4.3     mi     % Recreational vehicles     0       %
Terrain type         Rolling        % No-passing zones          50      %
Grade:  Length               mi     Access points/mi            2       /mi
        Up/down              %

Two-way hourly volume, V    180     veh/h
Directional split       60  /   40  %

____________________________Average Travel Speed_______________________________

Grade adjustment factor, fG                      0.71
PCE for trucks, ET                               2.5
PCE for RVs, ER                                  1.1
Heavy-vehicle adjustment factor,                 0.769
Two-way flow rate,(note-1) vp                    375     pc/h
Highest directional split proportion (note-2)    225     pc/h

Free-Flow Speed from Field Measurement:
Field measured speed, SFM                         -      mi/h
Observed volume, Vf                               -      veh/h
Estimated Free-Flow Speed:
Base free-flow speed, BFFS                       60.0    mi/h
Adj. for lane and shoulder width, fLS            0.0     mi/h
Adj. for access points, fA                       0.5     mi/h

Free-flow speed, FFS                             59.5    mi/h

Adjustment for no-passing zones, fnp             3.0     mi/h
Average travel speed, ATS                        53.6    mi/h

__________________________Percent Time-Spent-Following_________________________

Grade adjustment factor, fG                                    0.77
PCE for trucks, ET                                             1.8
PCE for RVs, ER                                                1.0
Heavy-vehicle adjustment factor, fHV                           0.862
Two-way flow rate,(note-1) vp                                  308    pc/h
Highest directional split proportion (note-2)                  185
Base percent time-spent-following, BPTSF                       23.7   %
Adj.for directional distribution and no-passing zones, fd/np 19.1
Percent time-spent-following, PTSF                             42.8   %

________________Level of Service and Other Performance Measures________________

Level of service, LOS                                          B
Volume to capacity ratio, v/c                                  0.12
Peak 15-min vehicle-miles of travel, VMT15                     220     veh-mi
Peak-hour vehicle-miles of travel, VMT60                       774     veh-mi
Peak 15-min total travel time, TT15                            4.1     veh-h
_______________________________________________________________________________

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate
   analysis-the LOS is F.
```

```
                        HCS+: Two-Lane Highways Release 5.4

___________________Two-Way Two-Lane Highway Segment Analysis__________________

Analyst                 Sussman
Agency/Co.              ERM
Date Performed          4/26/2010
Analysis Time Period
Highway                 US 287
From/To                 Red Buttes
Jurisdiction            Albany County
Analysis Year           2012
Description

___________________________________Input Data_________________________________

Highway class  Class 1
Shoulder width       6.0     ft     Peak-hour factor, PHF       0.88
Lane width           12.0    ft     % Trucks and buses          23      %
Segment length       4.3     mi     % Recreational vehicles     0       %
Terrain type         Rolling        % No-passing zones          50      %
Grade:  Length               mi     Access points/mi            2       /mi
        Up/down              %

Two-way hourly volume, V    221     veh/h
Directional split       60  /   40  %

____________________________Average Travel Speed______________________________

Grade adjustment factor, fG                     0.71
PCE for trucks, ET                              2.5
PCE for RVs, ER                                 1.1
Heavy-vehicle adjustment factor,                0.743
Two-way flow rate,(note-1) vp                   476     pc/h
Highest directional split proportion (note-2)   286     pc/h

Free-Flow Speed from Field Measurement:
Field measured speed, SFM                        -      mi/h
Observed volume, Vf                              -      veh/h
Estimated Free-Flow Speed:
Base free-flow speed, BFFS                      60.0    mi/h
Adj. for lane and shoulder width, fLS           0.0     mi/h
Adj. for access points, fA                      0.5     mi/h

Free-flow speed, FFS                            59.5    mi/h

Adjustment for no-passing zones, fnp            2.9     mi/h
Average travel speed, ATS                       52.9    mi/h

__________________________Percent Time-Spent-Following________________________

Grade adjustment factor, fG                                   0.77
PCE for trucks, ET                                            1.8
PCE for RVs, ER                                               1.0
Heavy-vehicle adjustment factor, fHV                          0.845
Two-way flow rate,(note-1) vp                                 386    pc/h
Highest directional split proportion (note-2)                 232
Base percent time-spent-following, BPTSF                      28.8   %
Adj.for directional distribution and no-passing zones, fd/np  18.5
Percent time-spent-following, PTSF                            47.3   %

________________Level of Service and Other Performance Measures_______________

Level of service, LOS                                         B
Volume to capacity ratio, v/c                                 0.15
Peak 15-min vehicle-miles of travel, VMT15                    270      veh-mi
Peak-hour vehicle-miles of travel, VMT60                      950      veh-mi
Peak 15-min total travel time, TT15                           5.1      veh-h
______________________________________________________________________________

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate
   analysis-the LOS is F.
```

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Sussman
Agency/Co: ERM
Date: 4/26/2010
Analysis Period:
Highway: US 287
From/To: Red Buttes
Jurisdiction: Albany County
Analysis Year: 2037 (Operations)
Project ID: Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	6388	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	20	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 6388 x 0.60 x 0.10 = 383

Volume for :			LOS
4-lane highway = 383	vph/2 lanes = 191	vphpl	A
6-lane highway = 383	vph/3 lanes = 127	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Sussman
Agency/Co: ERM
Date: 4/26/2010
Analysis Period:
Highway: US 287
From/To: Red Buttes
Jurisdiction: Albany County
Analysis Year: 2037 (Decommissioning)
Project ID: Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	6904	vpd
Proportion AADT during peak hour, K	0.12	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	20	%
Terrain type	Rolling	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 6904 x 0.60 x 0.12 = 497

Volume for :			LOS
4-lane highway = 497	vph/2 lanes = 248	vphpl	A
6-lane highway = 497	vph/3 lanes = 165	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

```
                        HCS+: Two-Lane Highways Release 5.4

___________________Two-Way Two-Lane Highway Segment Analysis__________________

Analyst                   Sussman
Agency/Co.                ERM
Date Performed            4/26/2010
Analysis Time Period
Highway                   US 287
From/To                   UPRR Bridge
Jurisdiction              Albany County
Analysis Year             2008
Description

___________________________________Input Data__________________________________

Highway class  Class 1
Shoulder width       6.0     ft     Peak-hour factor, PHF       0.88
Lane width           12.0    ft     % Trucks and buses          20      %
Segment length       4.7     mi     % Recreational vehicles     0       %
Terrain type         Rolling        % No-passing zones          50      %
Grade:  Length              mi     Access points/mi            2       /mi
        Up/down             %

Two-way hourly volume, V    180     veh/h
Directional split       60  /   40  %

____________________________Average Travel Speed_______________________________

Grade adjustment factor, fG                       0.71
PCE for trucks, ET                                2.5
PCE for RVs, ER                                   1.1
Heavy-vehicle adjustment factor,                  0.769
Two-way flow rate,(note-1) vp                     375     pc/h
Highest directional split proportion (note-2)     225     pc/h

Free-Flow Speed from Field Measurement:
Field measured speed, SFM                          -      mi/h
Observed volume, Vf                                -      veh/h
Estimated Free-Flow Speed:
Base free-flow speed, BFFS                        60.0    mi/h
Adj. for lane and shoulder width, fLS             0.0     mi/h
Adj. for access points, fA                        0.5     mi/h

Free-flow speed, FFS                              59.5    mi/h

Adjustment for no-passing zones, fnp              3.0     mi/h
Average travel speed, ATS                         53.6    mi/h

__________________________Percent Time-Spent-Following_________________________

Grade adjustment factor, fG                                    0.77
PCE for trucks, ET                                             1.8
PCE for RVs, ER                                                1.0
Heavy-vehicle adjustment factor, fHV                           0.862
Two-way flow rate,(note-1) vp                                  308    pc/h
Highest directional split proportion (note-2)                  185
Base percent time-spent-following, BPTSF                       23.7   %
Adj.for directional distribution and no-passing zones, fd/np 19.1
Percent time-spent-following, PTSF                             42.8   %

________________Level of Service and Other Performance Measures________________

Level of service, LOS                                          B
Volume to capacity ratio, v/c                                  0.12
Peak 15-min vehicle-miles of travel, VMT15                     240     veh-mi
Peak-hour vehicle-miles of travel, VMT60                       846     veh-mi
Peak 15-min total travel time, TT15                            4.5     veh-h
_______________________________________________________________________________

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate
   analysis-the LOS is F.
```

```
                         HCS+: Two-Lane Highways Release 5.4

___________________Two-Way Two-Lane Highway Segment Analysis__________________

Analyst                 Sussman
Agency/Co.              ERM
Date Performed          4/26/2010
Analysis Time Period
Highway                 US 287
From/To                 UPRR Bridge
Jurisdiction            Albany County
Analysis Year           2012
Description

___________________________________Input Data___________________________________

Highway class  Class 1
Shoulder width       6.0     ft     Peak-hour factor, PHF       0.88
Lane width           12.0    ft     % Trucks and buses          23      %
Segment length       4.7     mi     % Recreational vehicles     0       %
Terrain type         Rolling        % No-passing zones          50      %
Grade:  Length               mi     Access points/mi            2       /mi
        Up/down              %

Two-way hourly volume, V    221     veh/h
Directional split       60  /   40  %

____________________________Average Travel Speed________________________________

Grade adjustment factor, fG                     0.71
PCE for trucks, ET                              2.5
PCE for RVs, ER                                 1.1
Heavy-vehicle adjustment factor,                0.743
Two-way flow rate,(note-1) vp                   476     pc/h
Highest directional split proportion (note-2)   286     pc/h

Free-Flow Speed from Field Measurement:
Field measured speed, SFM                        -      mi/h
Observed volume, Vf                              -      veh/h
Estimated Free-Flow Speed:
Base free-flow speed, BFFS                      60.0    mi/h
Adj. for lane and shoulder width, fLS           0.0     mi/h
Adj. for access points, fA                      0.5     mi/h

Free-flow speed, FFS                            59.5    mi/h

Adjustment for no-passing zones, fnp            2.9     mi/h
Average travel speed, ATS                       52.9    mi/h

__________________________Percent Time-Spent-Following________________________

Grade adjustment factor, fG                                   0.77
PCE for trucks, ET                                            1.8
PCE for RVs, ER                                               1.0
Heavy-vehicle adjustment factor, fHV                          0.845
Two-way flow rate,(note-1) vp                                 386    pc/h
Highest directional split proportion (note-2)                 232
Base percent time-spent-following, BPTSF                      28.8   %
Adj.for directional distribution and no-passing zones, fd/np 18.5
Percent time-spent-following, PTSF                            47.3   %

________________Level of Service and Other Performance Measures________________

Level of service, LOS                                         B
Volume to capacity ratio, v/c                                 0.15
Peak 15-min vehicle-miles of travel, VMT15                    295      veh-mi
Peak-hour vehicle-miles of travel, VMT60                      1039     veh-mi
Peak 15-min total travel time, TT15                           5.6      veh-h
_______________________________________________________________________________

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate
   analysis-the LOS is F.
```

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

```
Analyst:         Sussman
Agency/Co:       ERM
Date:            4/26/2010
Analysis Period:
Highway:         US 287
From/To:         UPRR Bridge
Jurisdiction:    Albany County
Analysis Year:   2037 (Operations)
Project ID:      Hermosa West Wind Farm
```

INPUT DATA

```
Total AADT volume, AADT                                    6388        vpd
Proportion AADT during peak hour, K                        0.10
Percent peak-hour traffic in heaviest direction, D         60          %
Trucks                                                     20          %
Terrain type                                               Rolling
Base free-flow speed, BFFS                                 60.0        mph
```

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 6388   x 0.60 x 0.10 = 383

Volume for :                                               LOS
   4-lane highway = 383        vph/2 lanes = 191       vphpl  A
   6-lane highway = 383        vph/3 lanes = 127       vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

```
Assumptions:  highway with 60 mi/h FFS has 8 access points/mi; highway with
              50 mi/h FFS has 25 access points/mi; lane width = 12 ft;
              shoulder width > 6 ft; divided highway; PHF = 0.88;
              all heavy vehicles are trucks and regular commuters
```

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Sussman
Agency/Co:	ERM
Date:	4/26/2010
Analysis Period:	
Highway:	US 287
From/To:	UPRR
Jurisdiction:	Albany County
Analysis Year:	2037 (Decommissioning)
Project ID:	Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	6904	vpd
Proportion AADT during peak hour, K	0.12	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	20	%
Terrain type	Rolling	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 6904 x 0.60 x 0.12 = 497

Volume for :				LOS
4-lane highway = 497	vph/2 lanes = 248	vphpl		A
6-lane highway = 497	vph/3 lanes = 165	vphpl		A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Sussman
Agency/Co: ERM
Date: 4/26/2010
Analysis Period:
Highway: US 287
From/To: Tie Siding Segment
Jurisdiction: Albany County
Analysis Year: 2008
Project ID: Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	3400	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	20	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 3400 x 0.60 x 0.10 = 204

Volume for :			LOS
4-lane highway = 204	vph/2 lanes = 102	vphpl	A
6-lane highway = 204	vph/3 lanes = 68	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

```
Analyst:          Sussman
Agency/Co:        ERM
Date:             4/26/2010
Analysis Period:
Highway:          US 287
From/To:          Tie Siding Segment
Jurisdiction:     Albany County
Analysis Year:    2012
Project ID:       Hermosa West Wind Farm
```

INPUT DATA

```
Total AADT volume, AADT                                  4322        vpd
Proportion AADT during peak hour, K                      0.16
Percent peak-hour traffic in heaviest direction, D       60          %
Trucks                                                   20          %
Terrain type                                             Rolling
Base free-flow speed, BFFS                               60.0        mph
```

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 4322   x 0.60 x 0.16 = 415

Volume for :                                                LOS
   4-lane highway = 415        vph/2 lanes = 207       vphpl  A
   6-lane highway = 415        vph/3 lanes = 138       vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Sussman
Agency/Co:	ERM
Date:	4/26/2010
Analysis Period:	
Highway:	US 287
From/To:	Tie Siding Segment
Jurisdiction:	Albany County
Analysis Year:	2037 (Operations)
Project ID:	Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	6068	vpd
Proportion AADT during peak hour, K	0.14	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	20	%
Terrain type	Rolling	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 6068   x 0.60 x 0.14 = 510

Volume for :                                              LOS
   4-lane highway = 510        vph/2 lanes = 255       vphpl  A
   6-lane highway = 510        vph/3 lanes = 170       vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

```
Analyst:          Sussman
Agency/Co:        ERM
Date:             4/26/2010
Analysis Period:
Highway:          US 287
From/To:          Tie Siding
Jurisdiction:     Albany County
Analysis Year:    2037 (Decommissioning)
Project ID:       Hermosa West Wind Farm
```

INPUT DATA

Total AADT volume, AADT	6680	vpd
Proportion AADT during peak hour, K	0.13	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	20	%
Terrain type	Rolling	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 6680   x 0.60 x 0.13 = 521

Volume for :                                             LOS
   4-lane highway = 521        vph/2 lanes = 260       vphpl  A
   6-lane highway = 521        vph/3 lanes = 173       vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

```
                        HCS+: Two-Lane Highways Release 5.4

___________________Two-Way Two-Lane Highway Segment Analysis__________________

Analyst                 Sussman
Agency/Co.              ERM
Date Performed          4/26/2010
Analysis Time Period
Highway                 US 287
From/To                 State Line to 4-lane Section
Jurisdiction            Albany County
Analysis Year           2008
Description

___________________________________Input Data___________________________________

Highway class  Class 1
Shoulder width       6.0     ft     Peak-hour factor, PHF       0.88
Lane width           12.0    ft     % Trucks and buses          20      %
Segment length       4.7     mi     % Recreational vehicles     0       %
Terrain type         Rolling        % No-passing zones          50      %
Grade:  Length               mi     Access points/mi            2       /mi
        Up/down              %

Two-way hourly volume, V    170     veh/h
Directional split       60  /   40  %

____________________________Average Travel Speed________________________________

Grade adjustment factor, fG                    0.71
PCE for trucks, ET                             2.5
PCE for RVs, ER                                1.1
Heavy-vehicle adjustment factor,               0.769
Two-way flow rate,(note-1) vp                  354     pc/h
Highest directional split proportion (note-2)  212     pc/h

Free-Flow Speed from Field Measurement:
Field measured speed, SFM                       -      mi/h
Observed volume, Vf                             -      veh/h
Estimated Free-Flow Speed:
Base free-flow speed, BFFS                     60.0    mi/h
Adj. for lane and shoulder width, fLS          0.0     mi/h
Adj. for access points, fA                     0.5     mi/h

Free-flow speed, FFS                           59.5    mi/h

Adjustment for no-passing zones, fnp           2.8     mi/h
Average travel speed, ATS                      53.9    mi/h

__________________________Percent Time-Spent-Following__________________________

Grade adjustment factor, fG                                  0.77
PCE for trucks, ET                                           1.8
PCE for RVs, ER                                              1.0
Heavy-vehicle adjustment factor, fHV                         0.862
Two-way flow rate,(note-1) vp                                291    pc/h
Highest directional split proportion (note-2)                175
Base percent time-spent-following, BPTSF                     22.6   %
Adj.for directional distribution and no-passing zones, fd/np 19.2
Percent time-spent-following, PTSF                           41.8   %

________________Level of Service and Other Performance Measures_________________

Level of service, LOS                                        B
Volume to capacity ratio, v/c                                0.11
Peak 15-min vehicle-miles of travel, VMT15                   227     veh-mi
Peak-hour vehicle-miles of travel, VMT60                     799     veh-mi
Peak 15-min total travel time, TT15                          4.2     veh-h
________________________________________________________________________________

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate
   analysis-the LOS is F.
```

```
                        HCS+: Two-Lane Highways Release 5.4

___________________Two-Way Two-Lane Highway Segment Analysis__________________

Analyst                 Sussman
Agency/Co.              ERM
Date Performed          4/26/2010
Analysis Time Period
Highway                 US 287
From/To                 State Line to 4-lane Section
Jurisdiction            Albany County
Analysis Year           2012
Description

___________________________________Input Data_________________________________

Highway class  Class 1
Shoulder width       6.0     ft     Peak-hour factor, PHF       0.88
Lane width           12.0    ft     % Trucks and buses          19      %
Segment length       4.7     mi     % Recreational vehicles     0       %
Terrain type         Rolling        % No-passing zones          50      %
Grade:  Length               mi     Access points/mi            2       /mi
        Up/down              %

Two-way hourly volume, V    189     veh/h
Directional split       60  /   40  %

____________________________Average Travel Speed______________________________

Grade adjustment factor, fG                       0.71
PCE for trucks, ET                                2.5
PCE for RVs, ER                                   1.1
Heavy-vehicle adjustment factor,                  0.778
Two-way flow rate,(note-1) vp                     389      pc/h
Highest directional split proportion (note-2)     233      pc/h

Free-Flow Speed from Field Measurement:
Field measured speed, SFM                          -       mi/h
Observed volume, Vf                                -       veh/h
Estimated Free-Flow Speed:
Base free-flow speed, BFFS                        60.0     mi/h
Adj. for lane and shoulder width, fLS             0.0      mi/h
Adj. for access points, fA                        0.5      mi/h

Free-flow speed, FFS                              59.5     mi/h

Adjustment for no-passing zones, fnp              3.0      mi/h
Average travel speed, ATS                         53.4     mi/h

__________________________Percent Time-Spent-Following________________________

Grade adjustment factor, fG                                     0.77
PCE for trucks, ET                                              1.8
PCE for RVs, ER                                                 1.0
Heavy-vehicle adjustment factor, fHV                            0.868
Two-way flow rate,(note-1) vp                                   321     pc/h
Highest directional split proportion (note-2)                   193
Base percent time-spent-following, BPTSF                        24.6    %
Adj.for directional distribution and no-passing zones, fd/np 19.0
Percent time-spent-following, PTSF                              43.6    %

________________Level of Service and Other Performance Measures_______________

Level of service, LOS                                           B
Volume to capacity ratio, v/c                                   0.12
Peak 15-min vehicle-miles of travel, VMT15                      252      veh-mi
Peak-hour vehicle-miles of travel, VMT60                        888      veh-mi
Peak 15-min total travel time, TT15                             4.7      veh-h
______________________________________________________________________________

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate
   analysis-the LOS is F.
```

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Sussman
Agency/Co:	ERM
Date:	4/26/2010
Analysis Period:	
Highway:	US 287
From/To:	WY/CO State Line
Jurisdiction:	Albany County
Analysis Year:	2037 (Operations)
Project ID:	Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	6038	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	20	%
Terrain type	Rolling	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

```
DDHV = AADT   x D    x K
DDHV = 6038   x 0.60 x 0.10 = 362

Volume for :                                         LOS
   4-lane highway = 362        vph/2 lanes = 181       vphpl  A
   6-lane highway = 362        vph/3 lanes = 120       vphpl  A
```

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst:	Sussman
Agency/Co:	ERM
Date:	4/26/2010
Analysis Period:	
Highway:	US 287
From/To:	WY/CO State Line
Jurisdiction:	Albany County
Analysis Year:	2037 (Decommissioning)
Project ID:	Hermosa West Wind Farm

INPUT DATA

Total AADT volume, AADT	6134	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	60	%
Trucks	20	%
Terrain type	Rolling	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 6134 x 0.60 x 0.10 = 368

Volume for :			LOS
4-lane highway = 368	vph/2 lanes = 184	vphpl	A
6-lane highway = 368	vph/3 lanes = 122	vphpl	A

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

Federal Aviation Administration Letter

Appendix B

June 4, 2010
Project No. 0115435

Environmental Resources Management Southwest, Inc.
15810 Park Ten Place, Suite 300
Houston, Texas 77084-5140
(281) 600-1000

U.S. Department
of Transportation
Federal Aviation Administration

Northwest Mountain Region
Office of the Regional Administrator

1601 Lind Avenue S.W.
Renton, WA 98057-3356

FEB 9 2010

Mark Wieringa, NEPA Document Manager
U. S. Department of Energy, Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228-8213

Dear Mr. Wieringa:

This letter is to acknowledge your notice regarding public scoping meetings for the Hermosa West Wind Energy Project.

Because the area involved is 15 to 20 miles from the nearest public airport, the Federal Aviation Administration (FAA) has no interest in this project. However, if proposed structures are more than 200' above ground level, in keeping with Title 14, Code of Federal Regulations, Part 77.13, their proponent is required to file an FAA form 7460-1 (Notice of Proposed Construction or Alteration) thru the www.oeaaa.faa.gov website. You may file forms electronically via this website's New User Registration, or you may file forms 7460-1 and 7460-2 via U.S. mail to:

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Service, AJR-322
2601 Meacham Boulevard
Fort Worth, TX 76193

If you need more information or have additional questions about this specific project, please contact the FAA's regional air traffic wind turbine contacts for Wyoming, technician Chris Cody or specialist Earl Newalu, at (404) 305-7082 or (404) 305-7083.

Sincerely,

Kathryn M. Vernon
Regional Administrator
Northwest Mountain Region

Western AREA POWER ADMINISTRATION
P.O. Box 281213
Lakewood, CO 80228-8213

Please fold this comment form letter-style and tape here (

UNITED STATES POSTAGE PITNEY BOWES
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MAILED FROM ZIP CODE 80228

Western Area Power Administration
Corporate Services Office
Attn: Mark Wieringa A7400
P.O. Box 281213
Lakewood, CO 80228-8213

Please submit your comments by:

- regular mail
- email: HermosaWestEIS@wapa.gov
- phone: 1-800-336-7288

The comment period deadline is March 1, 2010

Let me know when you Need on Easement On my land in that area

Please tell us how we can reach you:

Name: Richard Menkin

Address: P.O. Box 243

City: Cheyenne Wy State: Wyo Zip: 82003

Your personal information may become part of the project record.
Please mail this form with your personal information facing in.

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National Telecommunications and Information Administration Letter

Appendix C

June 4, 2010
Project No. 0115435

Environmental Resources Management Southwest, Inc.
15810 Park Ten Place, Suite 300
Houston, Texas 77084-5140
(281) 600-1000

JAN 12 2009

Mr. Kurt Oliver
COMSEARCH
Director, Field Services
19700 Janelia Farms Blvd.
Ashburn, VA 20147

Re: Hermosa Wind Energy Project, in Albany County, WY

Dear Mr. Oliver:

In response to your request on November 24, 2008, the National Telecommunications and Information Administration provided to the federal agencies represented in the Interdepartment Radio Advisory Committee (IRAC) the plans for the Hermosa Wind Energy Project, in Albany County, Wyoming.

After a 45 day period of review, only the Department of Commerce (DOC) and the Department of Energy (DOE) identified any concerns regarding blockage of their radio frequency transmissions.

DOC stated the following:

> The proposed Hermosa Wind Project in Albany County, WY will be located between approximately 25 and 39 nm southwest through west of the Cheyenne, WY Weather Surveillance Radar-1988 Doppler (WSR-88D). DOC estimates the proposed wind farm (towers and turbines) will be in the radar line of sight of the Cheyenne WSR-88D. The Cheyenne WSR-88D will see the wind farm on a daily basis. The towers and turbine blades will cause interference consisting of reflectivity clutter and anomalous Doppler returns at and downstream from the facility, possibly causing some beam blockage/attenuation and shadow effects. The wind farm will likely have large meteorological and hydrological impacts on the Cheyenne WSR-88D due to the returns from the rotating blades that the WSR-88D clutter filter will not be able to eliminate. WSR-88D weather radar data that is contaminated by wind turbine clutter (WTC) can cause impacts to all users including government, emergency managers, television broadcasters, private industry, researchers, and the public. Impacts to the key government agencies, the Departments of Commerce, Transportation, and Defense, could be particularly detrimental because they have the potential to impair the agencies' capability and efficiency in their respective public service/public safety roles. For example, the wind farm could have an impact on the Cheyenne Weather Forecast Office severe weather warning operations near and potentially downrange of the wind farm.
>
> We would be willing to assist the developer in exploring siting options that would reduce the impact on the Cheyenne, WY WSR-88D and weather radar data users.
>
> Please forward the attached report to the developer along with the NTIA's response.
>
> POC:
> Dominic Bosco
> 1325 East West Hwy
> Building: SSMC2
> Silver Spring, MD 20910-3283
> Phone: 301-713-1841 x123

DOE stated the following:

> Analysis reveals potentially harmful interference to DOE's Western Area Power Administration's (Western), communications assets from the planned Hermosa Wind Project in Albany County, Wyoming. There are microwave links that cross through the specified boundary. These links are used for supervisory control and protection of Western's power transmission system. DOE/Western is willing to assist the developer in exploring siting options to mitigate any potential adverse effects. To ensure uninterrupted protection of the power transmission system, Western's Spectrum Program Manager requires the turbine locations. Western may elect as an alternative, to provide beam paths with associated worst case Fresnel zones to assist the developer in turbine placement.
>
> DOE requests the developer coordinate directly with Western's point of contact:
>
> Scott E. Johnson
> Spectrum Program Manager
> Western Area Power Administration
> Phone: 720-962-7380
> Fax: 720-962-7400
> sjohnson@wapa.gov

I am also enclosing the report referenced in the DOC comments.

While the other IRAC agencies did not identify any concerns regarding radio frequency blockage, this does not eliminate the need for the wind energy facilities to meet any other requirements specified by law related to these agencies. For example, this review by the IRAC does not eliminate any need that may exist to coordinate with the Federal Aviation Administration concerning flight obstruction.

Thank you for the opportunity to review these proposals.

Sincerely,

Edward M. Davison
Deputy Associate Administrator
Office of Spectrum Management

Enclosure

Hermosa Wind Project Operational Impacts

Cheyenne WSR-88D Impacts Overview

The Hermosa Wind Project will likely have large meteorological and hydrological impacts for the Cheyenne WSR-88D in the azimuths impacted by the wind farm. Most of the potential turbine locations will protrude into the main beam (radar line of sight) and possibly cause blockage (attenuation) and shadow effects downrange particularly during inversions and periods of Anomalous Propagation (AP) (ducting situations). The majority of the wind farm area will be visible on the Cheyenne radar on a daily basis and almost all the wind farm area will likely be visible during AP (25-50% of the time) and possibly have an impact on warning effectiveness for the wind farm region and potentially downrange. Under the current proposal, the Hermosa Wind Project will impact the Cheyenne radar from approximately 245°-274° (southwest through west). Radar data users may benefit from the Dodge City WFO experience with the Spearville Wind Farm and the Buffalo WFO experience with the Maple Ridge Wind Farm.

Most potential turbine locations will be in the main beam of the Cheyenne WSR-88D and will cause interference. In addition, the turbines' spinning blades will seriously diminish the effectiveness of clutter filtering capabilities near the wind farm. The clutter contamination from this wind farm will cause the Precipitation Processing Subsystem to generate false rainfall estimates. It is likely that the irregular Doppler velocity data in the area of the wind farm will degrade the performance of the Velocity Dealiasing Algorithm and may cause the Tornado Detection Algorithm and/or Mesocyclone Detection Algorithm to miss detections or generate false alarms. It is likely that wind turbine clutter will contaminate the Doppler velocity data in the area of the wind farm and possibly downrange, making it difficult for forecasters to identify severe weather and tornadic signatures in those areas, or may create false signatures. In addition, Composite Reflectivity products will be contaminated and the Storm Cell Identification and Tracking algorithm may falsely identify storms near the radar or provide incorrect track forecasts. Operators and other radar data users should be made aware of the possible impact on algorithm and product performance, in addition to impacts on base data.

Government Agency Potential Operational Impacts

WSR-88D weather radar data that is contaminated by wind turbine clutter (WTC) can cause impacts to all users including government, emergency managers, television broadcasters, private industry, researchers, and the public. Impacts to the key government agencies, the Departments of Commerce, Transportation, and Defense, could be particularly detrimental because they have the potential to impair the agencies' capability and efficiency in their respective public service/public safety roles.

National Weather Service (NWS) Impacts. WSR-88D weather data is used to issue tornado/severe weather/flashflood warnings, weather forecasts, and hydrological forecasts. The data is also used as input to some forecast models. The proposed wind farm area is in the NWS Cheyenne Weather Forecast Office's forecast region/County Warning Area. This area of the country experiences thunderstorms in the summer and freezing precipitation in the winter. The radar is used to provide advance warning on these threatening weather conditions and clutter from a wind farm can look like a thunderstorm or winter precipitation event on radar. In addition, if an actual thunderstorm or winter precipitation event were to move over that clutter, the characteristics of the storm could be masked or misinterpreted. Therefore there may be an impact to warning effectiveness, particularly for the wind farm region and potentially downrange. More serious impacts to warning effectiveness could potentially occur downrange due to blockage (attenuation) and shadow effects from the wind farm particularly during inversions and periods of

AP (ducting situations). In addition, the radar may give false estimates of precipitation/icing accumulation (including snowfall accumulation) due to clutter contamination from the wind farm. This could also have an impact on warning effectiveness.

Federal Aviation Administration (FAA) Impacts. The FAA uses the WSR-88D weather radar in daily operations to enhance air traffic efficiency and safety. Data from the WSR-88Ds are displayed on the operational screens of FAA air traffic controllers. Weather radar data is a key input into the Weather and Radar Processor (WARP), the Integrated Terminal Weather System (ITWS), and the Corridor Integrated Weather System (CIWS) used by the agency for national air traffic management. WTC contaminated radar data can degrade reflectivity and velocity products in the ITWS used to advise pilots of potential weather events that could impact safety of flight. Also, WTC contaminated radar data can cause errors in high resolution vertically integrated liquid (HRVIL) and echo top (ET) products used for weather forecasting algorithms in CIWS. This can lead to erroneous placement of current and forecast weather conditions impacting air traffic routes resulting in unnecessary and expensive aircraft re-routing and excess fuel consumption.

Department of Defense (DOD) Impacts. The DOD uses the WSR-88D weather radar in forecasting operations for resource protection and mission planning/execution. DOD weather forecasters use the WSR-88D data for the issuance of tornado/severe weather/flashflood warnings, weather forecasts, and flight planning. WTC contaminated radar data causes similar impacts as described above under the NWS section and can result in unnecessary/expensive mission changes, unnecessary resource protection actions, and aircraft re-routing, delays, or cancellations. DOD forecasters face unique challenges because they are often geographically separated from their mission forecast, watch/warning areas. Additionally, DOD forecasters must forecast, watch, and warn for ground and flight level areas that vary significantly in size from less than one square mile to areas covering multiple states. This makes the unpredictable appearance of WTC under varying AP conditions and geographically diverse locations particularly challenging.

Hermosa Wind Project Statistics

There is a proposal to build a wind farm located between approximately 25 and 39 nm southwest through west of the Cheyenne WSR-88D (Figure 1). The turbines are expected to be 410 feet in height with blades that are 295 feet in diameter. It is unknown at this time the number of turbines that will be built, however, the project area is approximately 136,400 acres.

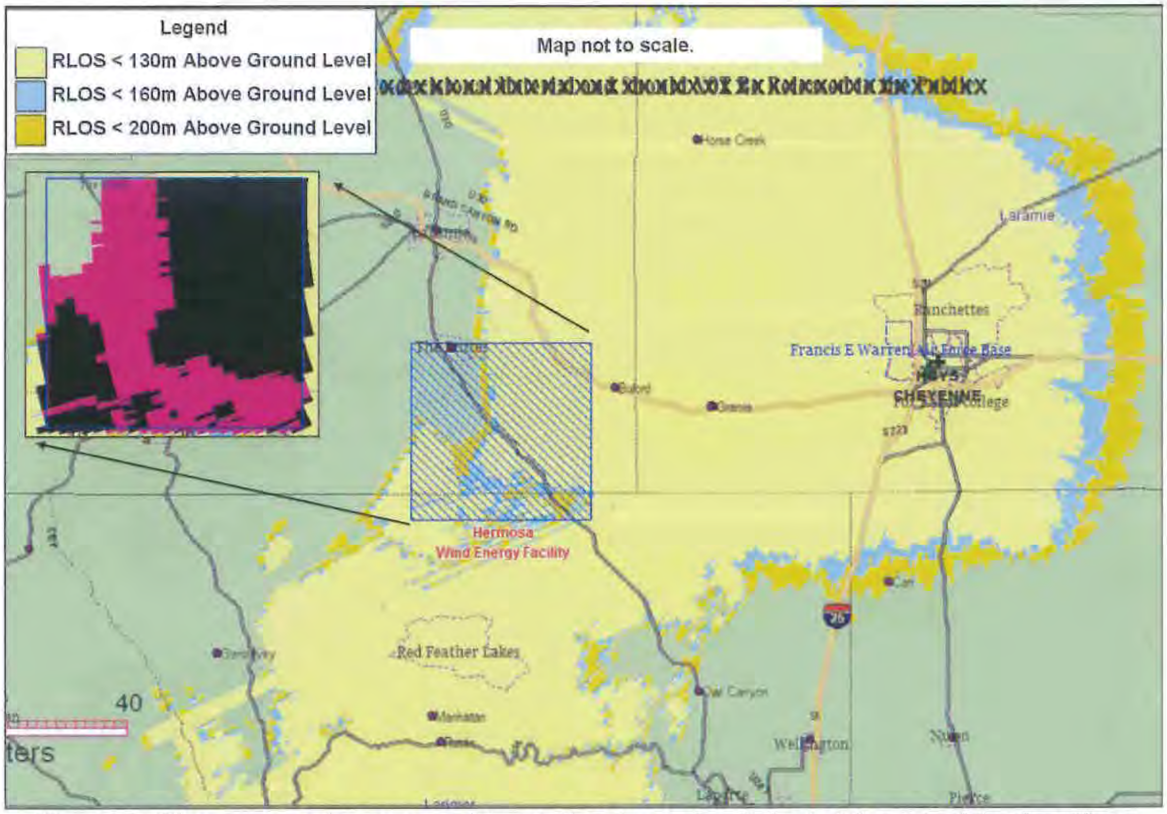

Figure 1: Cheyenne radar map and inset showing potential wind farm turbine locations (black) in RLOS and potential wind farm turbine locations (purple) within 700 feet of the RLOS.

Comparison with Spearville Wind Farm near Dodge City

There is currently a large wind farm, Spearville, located near Dodge City, Kansas, which affects the WSR-88D radar. The turbines are approximately between 10 and 16 nm northeast of the Dodge City radar, and the wind farm has 72 turbines on approximately 5,100 acres. The turbines are about 389 feet in height, with a rotor diameter of about 253 feet. The main beam of the Dodge City radar is 73 feet below the top of the closest turbines in the Spearville wind farm. Since this wind farm is in the RLOS, it is almost always visible on the Dodge City radar. It is highly visible in the reflectivity data with reflectivity values up to 40 dBz and the velocity data is contaminated in the vicinity of and downstream of the wind farm (Figure 2).

The proposed Hermosa Wind Project is significantly larger in size (area) and the turbines themselves are larger. Most potential turbine locations will protrude further into the RLOS but the proposed wind farm is further from the Cheyenne radar than Spearville is from the Dodge City radar. The clutter pattern will be much larger. At the 0.5° elevation cut, approximately 60% of the potential turbine locations (Figure 1) in the proposal will protrude into the main beam (RLOS). Also, at the 0.5° elevation cut, nearly all of the remaining potential turbine locations are within 700 feet of the radar main beam (RLOS). Any turbines constructed in the RLOS may cause blockage (attenuation) and shadow effects downrange and, in addition, any turbines constructed within 700 feet of the RLOS will likely be visible during inversions and periods of AP (25-50% of the time). At the 0.5° elevation cut, the main beam of the Cheyenne radar is, on average, 384 feet below the top of the potential turbine locations; therefore, the majority of the wind farm area will be visible on the Cheyenne radar on a daily basis and almost all the wind farm area will likely be visible during AP (25-50% of the time). For comparison, note that the

Spearville Wind Farm impacts the Dodge City radar from approximately 50°-65° (to the northeast) whereas the Hermosa Wind Project can potentially impact the Cheyenne radar significantly from approximately 245°-274° (southwest through west).

Overall, the Hermosa Wind Project will likely have a larger impact on the Cheyenne WSR-88D than the Spearville wind farm has on the Dodge City WSR-88D due to its larger size (area), larger azimuthal spread, and further protrusion into the RLOS.

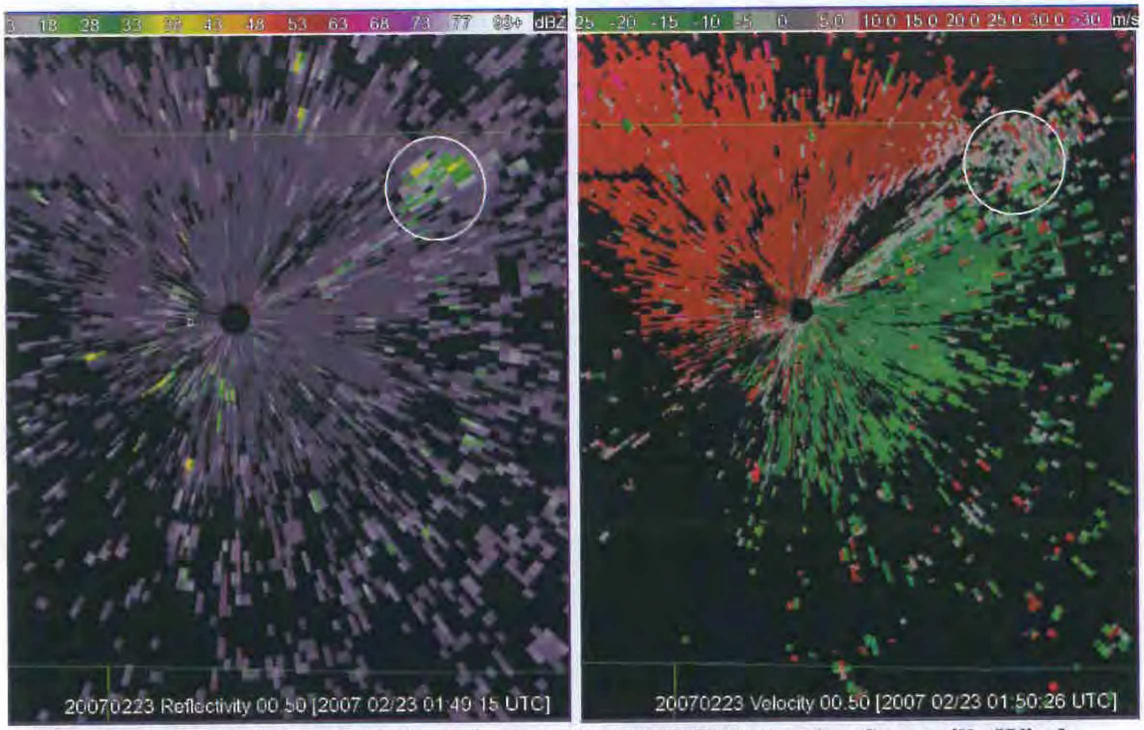

Figure 2: Reflectivity (on left) from Dodge City WSR-88D showing Spearville Wind Farm (circled). Mean Radial Velocity (on right) matches reflectivity data on left. The velocity data (on right) downrange from the wind towers/turbines are spurious and caused by the wind farm. Red colors indicate outbound velocities (going away from radar), green colors indicate inbound velocities. Red and green colors in close proximity can be indicators of tornadoes, mesocyclones, convergence, or divergence, all of which can be indicators of severe weather.

Comparison with Maple Ridge Wind Farm near Fort Drum

There is currently a large wind farm, Maple Ridge, located near the Fort Drum, NY WSR-88D, which affects the radar. The turbines are approximately between 2 and 8 nm north through southeast of the Fort Drum radar, and the wind farm has 195 turbines on 12,000 acres. The turbines are about 389 feet in height, with a rotor diameter of about 253 feet. The main beam of the Fort Drum radar averages 154 feet below the top of the turbines in the Maple Ridge wind farm. Since this wind farm is in the RLOS, it is almost always visible on the Fort Drum radar. It is highly visible in the reflectivity data with reflectivity values up to 50 dBz (Figure 3) and the velocity data is contaminated in the vicinity of and downstream of the wind farm (Figure 4). Due to the close proximity to the radar, spurious multi-path false echoes appear downrange from the wind farm.

The proposed Hermosa Wind Project is larger in size (area) and the turbines themselves are larger. Most potential turbine locations will protrude further into the RLOS but the proposed wind farm is further in distance from the Cheyenne radar than Maple Ridge is from the Fort

Drum radar. The clutter pattern will likely be larger. For comparison, note that the Maple Ridge Wind Farm impacts the Fort Drum radar significantly from approximately 001°-117° (north through east) whereas the Hermosa Wind Project could potentially impact the Cheyenne radar significantly from approximately 245°-274° (southwest through west).

Overall, the Hermosa Wind Project will likely have a similar impact on the Cheyenne WSR-88D that the Maple Ridge wind farm has on the Fort Drum WSR-88D due to its larger size (area) and similar protrusion into the RLOS but further distance from the radar and smaller azimuthal spread.

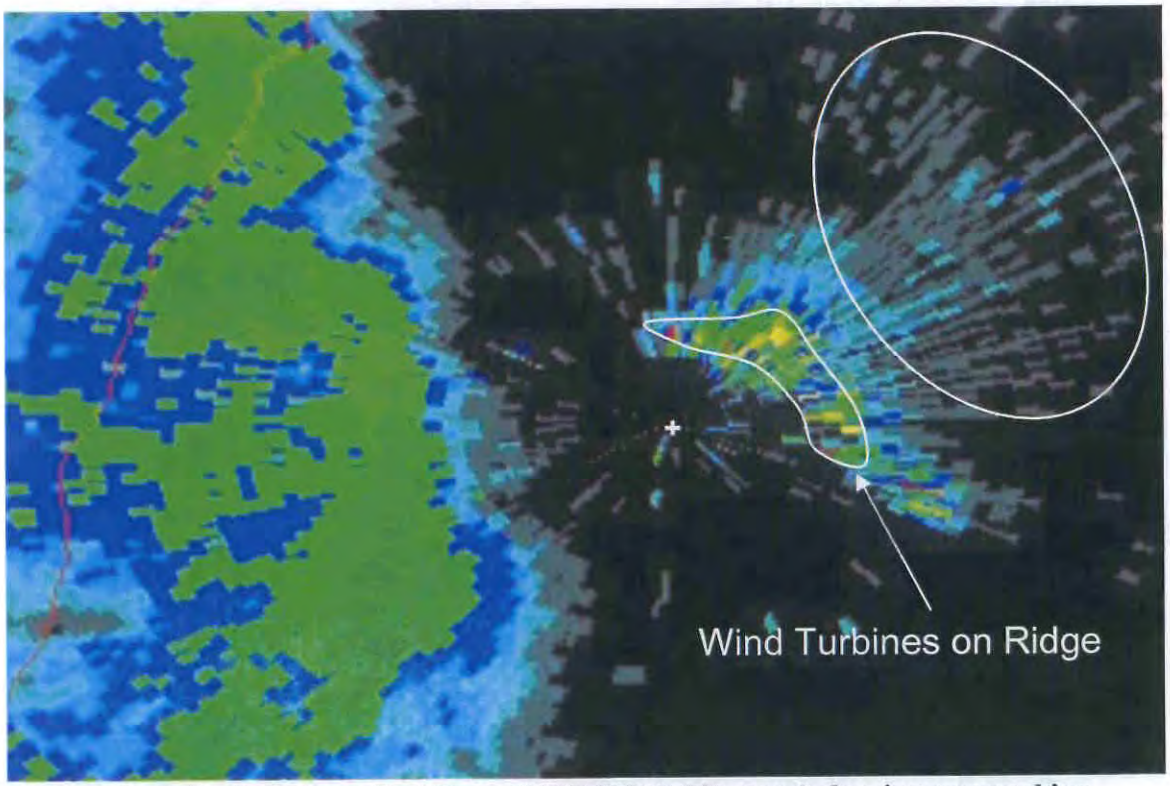

Figure 3: Reflectivity from Fort Drum WSR-88D (white cross) showing approaching weather from West and Maple Ridge Wind Farm North through Southeast. Spurious multi-path false echoes downrange of the wind farm (circled) are due to the rotating turbine blades.

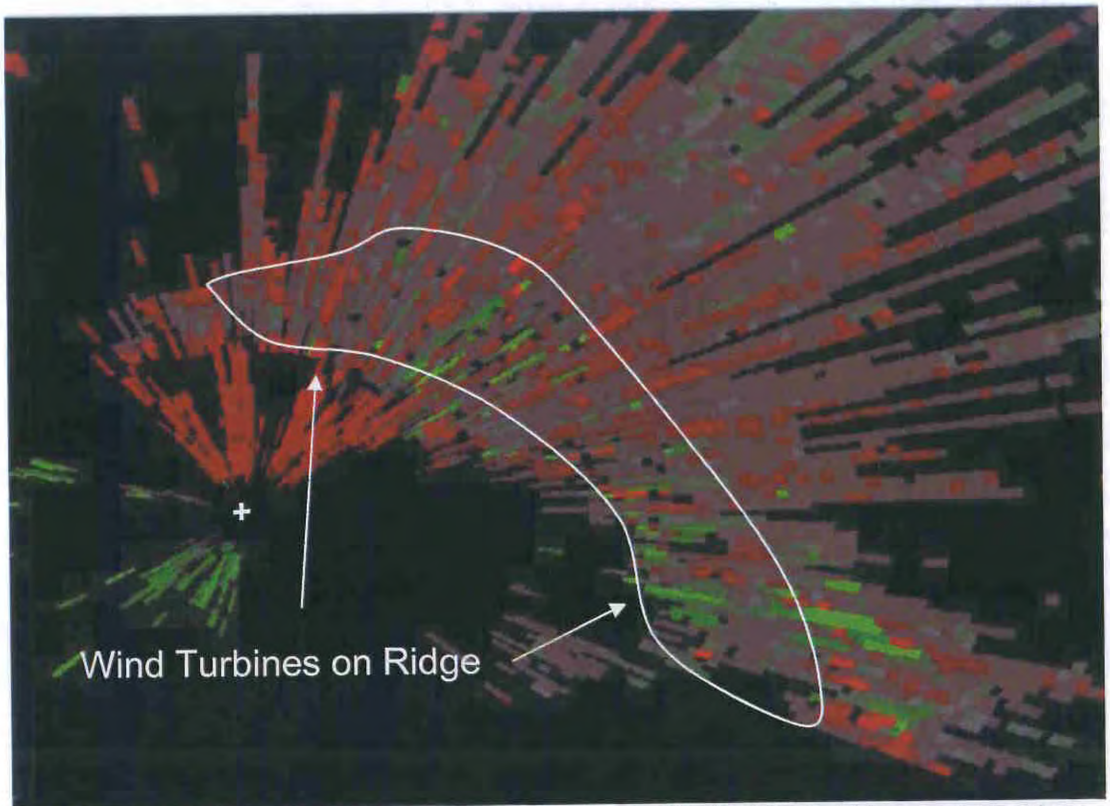

Figure 4: Zoomed Velocity Image from Fort Drum WSR-88D (white cross) showing contaminated velocity data in the vicinity of and downrange of the wind farm. Spurious multi-path false echoes north through southeast downrange of the wind farm are due to the rotating turbine blades.

Report date: 22 December 2008

APPENDIX K

RECREATION AND LAND USE ASSESSMENT

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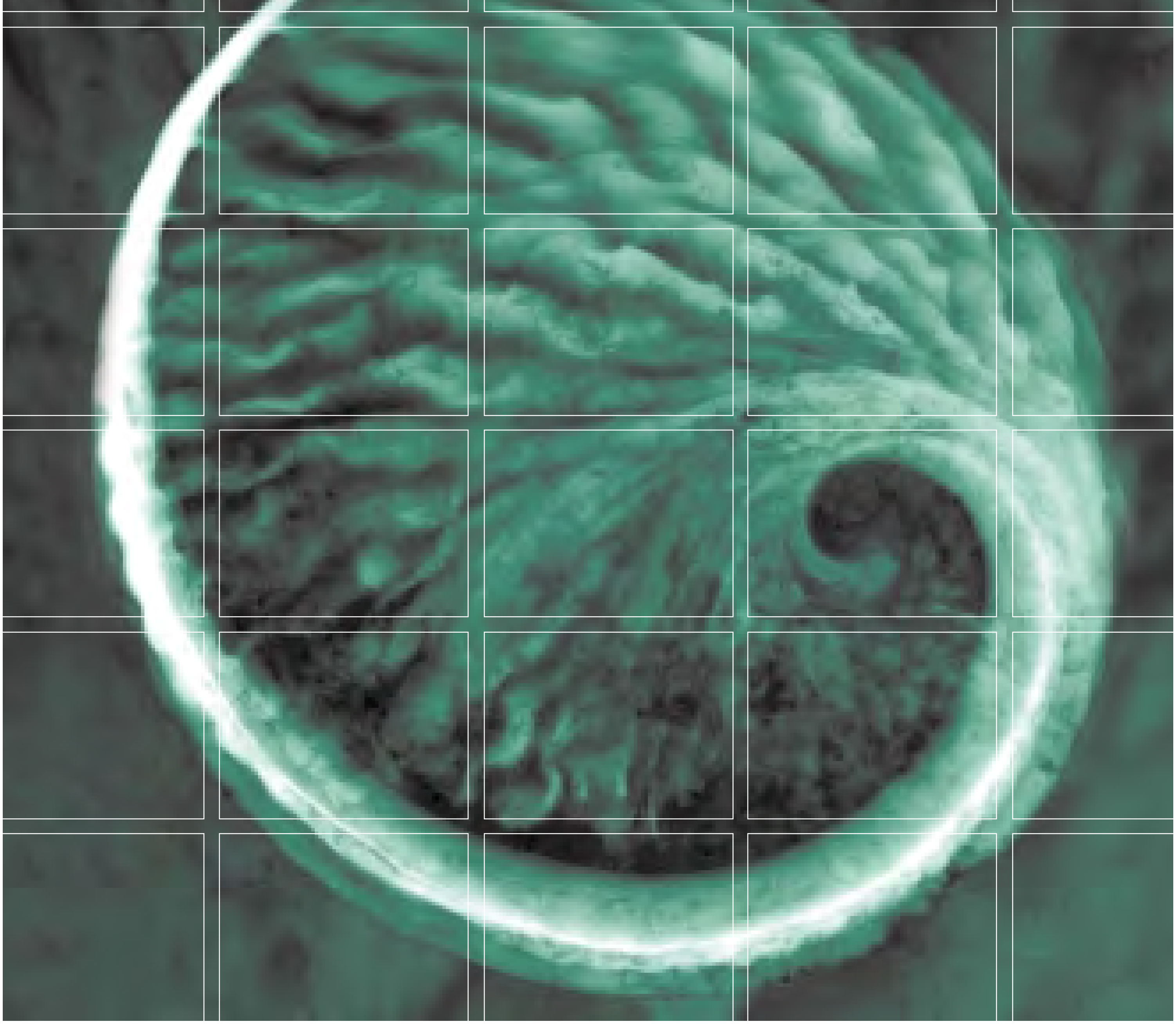

Recreation and Land Use Assessment

Shell WindEnergy, Inc.
Hermosa West Wind Farm Project
Albany County, Wyoming

June 23, 2010

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Shell WindEnergy, Inc.

Recreation and Land Use Assessment

June 23, 2010

Project No. 0116974
Hermosa West Wind Farm Project
Albany County, Wyoming

Alicia C. Smith, R.E.M.
Partner-in-Charge

Chris Zeisloft
Project Manager

Environmental Resources Management Southwest, Inc.
15810 Park Ten Place, Suite 300
Houston, Texas 77084-5140
T: 281-600-1000
F: 281-600-1001

Texas Registered Engineering Firm F-2393

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EXECUTIVE SUMMARY

Environmental Resources Management was commissioned by Shell WindEnergy Inc. to prepare a Recreational and Land Use Assessment for development of the Hermosa West Wind Farm Project (Project) in southeast Albany County, Wyoming near Tie Siding.

Within the immediate Project area, there are limited recreational activities, primarily small amounts of hunting on state and private land. The Overland Trail, which passes between the eastern boundary of the Project area and Tie Siding, is listed on the National Register of Historic Places in its entirety. However, there are no sites or portions of the trail individually listed in Albany County.

Outside of the Project area there are a variety of recreational activities including hunting, fishing, motorsports, winter sports, biking, hiking, and camping. Many of these activities take place on private lands as well as state and federal parks and forests. In addition to outdoor-based recreational activities, there are also numerous museums, historic sites, galleries, and shops in Albany County.

Since the Project area does not have any direct recreational activities with the exception of hunting, few negative impacts are expected during construction and operation of the Project. Construction will bring more workers and transient tenants to the Project area and surrounding towns, which may result in an increase in recreational demand at local attractions and resources. This additional demand may displace local use of these activities, particularly on weekends, during the construction phase of the Project, but will also result in additional revenues through visitor use fees. The Project will provide long-term permanent employment for approximately 20 to 40 people (approximately one person per 5 to 10 turbines).

1.0 INTRODUCTION

Environmental Resources Management Southwest, Inc. (ERM) was commissioned by Shell WindEnergy, Inc. (SWE) to prepare a Recreational and Land Use Assessment for development of the Hermosa West Wind Farm Project (the Project) in southeast Albany County, Wyoming near Tie Siding. Within the area of potential effect described below, the following types of recreational activities were assessed:

- Hunting,
- Fishing,
- State and federal parks and forests,
- Museums, and
- Other attractions for recreation.

For purposes of this report, "high season" typically denotes the summer months.

1.1 PROJECT OVERVIEW

The Project proposed by SWE falls primarily under the jurisdiction of the Western Area Power Administration (Western) and the State of Wyoming; multiple assessments and evaluations of existing conditions and potential impacts of the Project are required for the permitting process. This Recreational and Land Use Assessment has been conducted to support requirements under the National Environmental Policy Act (NEPA) and Wyoming Industrial Information and Siting Act. The purpose of this assessment is to determine if the following two conditions may occur from the construction or operation of the proposed Project:

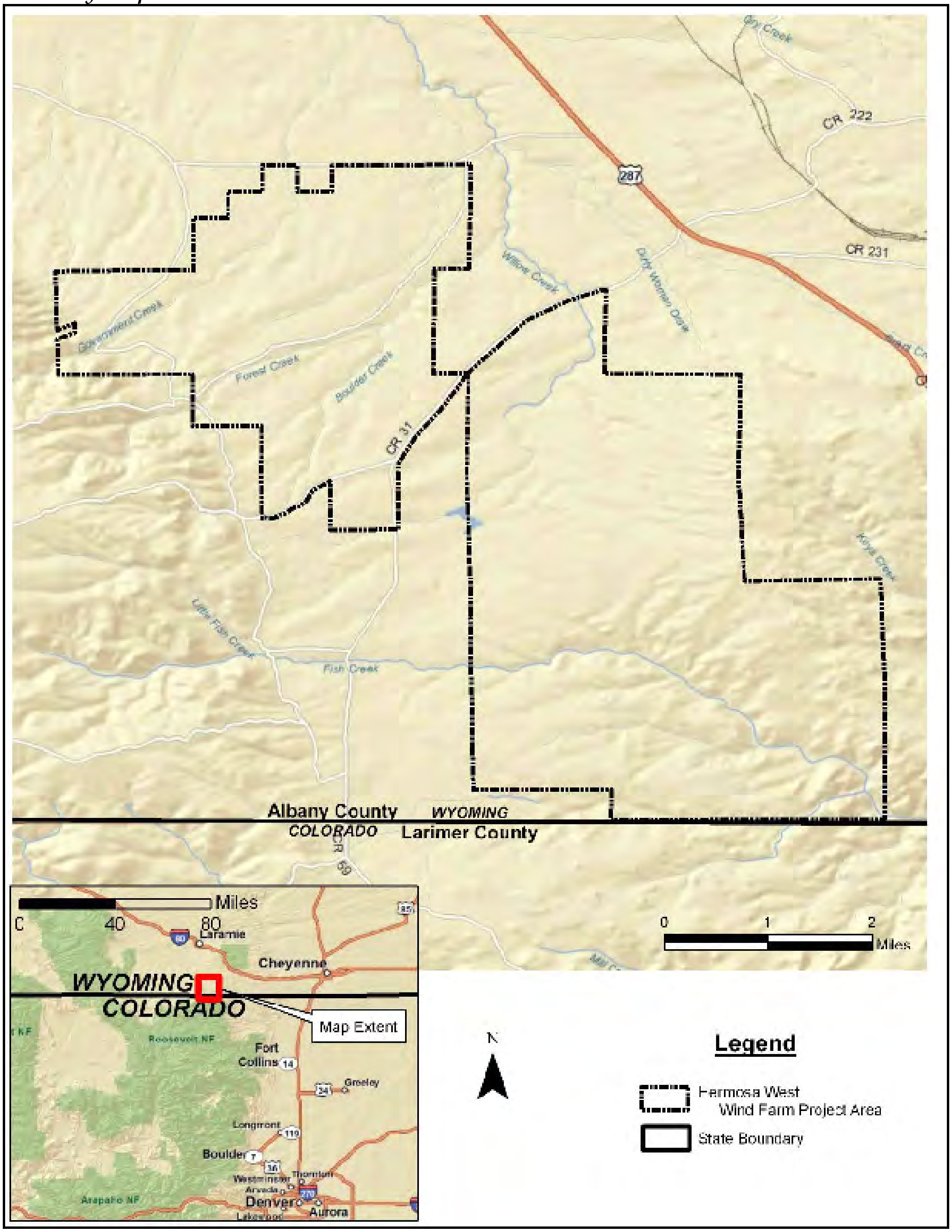
- Will potential population influx (to support construction and operation of the proposed Project) result in a long term substantial increased demand for recreation activities and exceed the capacity for these facilities in a given area; and
- Will the Project result in long term substantial conflicts with established recreational areas.

1.2 PROJECT LOCALITY

The Project will be located in southeast Albany County, Wyoming near Tie Siding (Figure 1-1, Site Vicinity Map). The Project will consist of a maximum of 200 wind turbines with a total generating capacity of up to 300 megawatts (MW) of electricity. The Project will also include a wind energy collection system, on-site operation and maintenance (O&M) building, underground collector lines, an interconnecting transmission line and substation, associated access roads, and off-site upgrades to facilities owned by Western.

Given the Project location in southeast Albany County, this report covers recreational activities in an area of potential effect extending through both Albany and Laramie Counties in Wyoming and Larimer County in north-central Colorado.

FIGURE 1-1: Vicinity Map



1.3 PROJECT ACTIVITIES

Rule I Section 7 (xiii)(B) – Preliminary evaluations of or plans and proposals for alleviation social, economic, or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans, and approvals shall cover recreational resources.

This report addresses recreational impacts from both construction and operation of the Project. During construction, public access to the site may be limited in order to promote public and worker safety. Construction activities include wind turbine erection, foundation excavation, electrical collection system trenching, and substation construction and interconnection. In order to facilitate construction activities, access roads may need to be constructed to each turbine site and the Project substation. During construction, deliveries, fencing, surveying, sampling, grading, excavation, and trenching are among some of the activities that may be expected during the roughly 11 month schedule. When the wind turbines are erected, steel placement, cable placement, grounding, and electrical systems installation will be conducted during this phase of construction. Construction will create approximately 350 jobs over a 12 to 16 month period; 20 to 40% of these jobs are expected to be filled using local workers.

During operation of the Project, maintenance activities are expected including both routine inspections and unscheduled needs. Maintenance at both the Project substation and individual wind turbines are expected. Some general road and building maintenance may be required throughout the life of the Project as well. Operation of the Project will create approximately 20 to 40 full-time operations and maintenance jobs (approximately one person per five to ten turbines).

1.4 LAND USE

Rule I Section 7(i)(i) – Land Use. Land use designation of the site location, including whether the use of the land by the industrial facility is consistent with state, intrastate, regional, county, and local land use plans, if any. The analysis shall include the area of land required and ultimate use of land by the industrial facility and reclamation plans for all lands affected by the industrial facility or its dependent components.

1.4.1 Albany County Requirements

The land uses in the Project area is currently mapped as agricultural and exempt (State of Wyoming lands) by the Albany County. The Albany County Comprehensive Plan discusses the need for farming and agriculture to be preserved in the county. One of the objectives of this plan is to promote the development of properly sited and designed wind farms, solar energy projects, and transmission infrastructure, in conjunction with good planning practices (Albany County, 2008). The Project design continues to allow agribusiness with an enhanced revenue stream for the landowner.

The Project will be located on a combination of privately owned fee and State of Wyoming lands. Therefore, a Commercial Wind Energy Conversion System (WECS) Permit, Conditional Use Permit (CUP), and a Zoning Certification (for the O&M and office buildings) will be required to construct and operate the Project from Albany County. SWE has met with the Albany County Planning and Zoning Commission to discuss the permitting process and to introduce the Project.

Albany County has developed wind energy siting regulations (Section 8) that outline setbacks and additional requirements for wind development within the county. These regulations have been adopted for the following purposes:

a. To assure that any development and production of wind generated electricity in Albany County is safe, effective, and that it will minimize impacts to wildlife;

b. To acknowledge that these facilities are clearly visible and cannot be hidden from view, however, design consideration should include minimizing the degradation of the visual character of the area;

c. To facilitate economic opportunities for local residents;

d. To promote the supply of wind energy in support of Wyoming's goal of increasing energy production from renewable energy sources;

e. To be consistent with the Albany County Comprehensive Plan.

SWE has worked with Albany County to incorporate these regulations into the preliminary design of the Project.

1.4.2 *State of Wyoming Land Requirements*

The Wyoming State Land Trust consists of three assets: State Trust Land, State Trust Minerals, and the State Permanent Land Fund. All three assets derive revenue from those lands granted by the federal government to the state of Wyoming at the time of statehood under various acts of the U.S. Congress and accepted and governed under Article 18 of the Wyoming Constitution.

The revenues generated by trust lands and minerals are reserved for the exclusive benefit of the beneficiaries designated in the congressional acts. The beneficiaries are the common (public) schools and certain other designated public institutions in Wyoming such as the Wyoming State Hospital. The Wyoming State Constitution and the Wyoming State Legislature direct the Board of Land Commissioners, consisting of the state’s five elected officials, to manage trust assets for two key purposes consistent with traditional trust principles: (1) long-term growth in value and (2) optimum, sustainable revenue production.

A Special Use Lease will be required for Project development on State of Wyoming lands. Special Use Leases are authorized under Chapter 5, Special Use Leasing of the Board of Land Commissioners Rules and Regulations. Special use means any use of state land other than for grazing, agriculture, the extraction of minerals, or uses authorized under easements granted pursuant to Chapter 5 of the Rules and Regulations, or hunting, fishing, and general recreational uses pursuant to Chapter 13 of the Rules and Regulations. Pursuant to this, SWE has obtained a Special Use Lease for the Project.

There are two Special Use Leases dedicated to recreational use of mention near the Project area. One lease is for cabins and is located approximately 30 miles due west of the Project area, and another lease dedicated to wildlife habitat conservation located approximately 30 miles northwest of the Project area.

1.5 REPORT PROCESS AND LIMITATIONS

Research and preparation of this report has been conducted primarily as a desktop exercise. Interviews were conducted with Mr. Terry Creekmore and Mr. Mike Snigg of the Wyoming Game and Fish Department (WGFD) to assess current hunting and fishing activities in the Project area. Additionally, requests were made to managers of various local, state, and federal recreational attractions within Albany County to assess current interest and popularity.

2.0 RECREATIONAL BASELINE

2.1 INTRODUCTION

The current recreational activities in the region in which the Project is proposed have been considered at the county level. ERM based its research on information available for recreational activities in Albany County, nearby state parks, and Laramie, Wyoming.

2.2 HUNTING

While the Project area encompasses a few existing hunting areas, there are a variety of hunting options within the greater vicinity. Mr. Terry Creekmore, WGFD Wildlife Management Coordinator for the Laramie region, confirmed that within the proposed Project area, three private landowners currently allow hunting on their properties. Access is limited and very little information on the numbers of hunters using the land is exchanged between the landowners and the WGFD; no tallies of hunters using the Project area are available for this reason. Furthermore, hunting permits granted by the WGFD are not site-specific; therefore SWE is unlikely to know how many permits are used to access the area.

Within the Project area there is also public hunting access on Wyoming State lands located along Cherokee Park Road, also referred to as Colorado Road 31. This area encompasses approximately 3,070 acres as indicated in Figure 2-1. Mr. Creekmore advised that pronghorn and elk hunting are possible; however, the landscape cover here is sparse and the game will most likely scatter at any disturbance. For this reason hunting along these road sections is minimal.

Because the amount of hunting is limited in the immediate Project area, WGFD has voiced concern, in a letter dated March 1, 2010, over the potential loss of hunting access and that these are important areas to maintain access as "this is a desired condition for Wyoming's public." Outside of the Project area there are multiple places to hunt within a close radius. The Spiegelberg and Monolith Ranches are private lands designated Hunter Management Areas (HMA) located eight and two miles south of Laramie, respectively. Permission slips to hunt on these lands must be obtained from the WGFD prior to use (WGFD, 2010).

Within 100 miles of the Project area there is an even greater number of hunting options. In addition to multiple walk-in areas and HMAs, Curt Gowdy State Park, Vedauwoo, Medicine Bow National Forest, and Roosevelt National Forest in Colorado all provide hunting access. If available, the numbers of annual visitors to each of these attractions are found in Table 2-2.

2.3 FISHING

According to Mr. Mike Snigg, Regional Fish Supervisor at the WGFD, despite the presence of five named waterbodies are located within the Project area, there are no significant fishing resources in or near the Project area. The WGFD developed a stream classification system for use by anglers and the general public for the purpose of showing where the most productive streams are located throughout the state. The ranking system is based solely on sport fish (trout) density (pounds per mile) (Table 2-1). The WGFD has determined by percentage the amount stream miles in Wyoming that should be classified as Ribbon streams. The WGFD has not developed a map of these streams to date.

TABLE 2-1: WGFD Stream Classification Ranking Criteria

Category	Percent of Streams	Pounds of Sport Fish Per Mile
Blue Ribbon	3	Greater than 600
Red Ribbon	6	Greater than 300 and Less than 600
Yellow Ribbon	28	Greater than 50 and Less than 300
Green Ribbon	63	Greater than one and Less than 50
Orange Ribbon	Unknown	Any Cool/Warm Water Game Fish Present

According to WGFD Correspondence dated March 1, 2010, of the five named waterbodies within the Project area, Fish Creek and Willow Creek are Yellow and Green Ribbon designated streams, respectively, hosting brook trout, creek chub, and longnose dace. Although streams in the Project area have been documented to have game fish, the populations are expected to be relatively low due to limited surface water as indicated in Table 2-2.

TABLE 2-2: Drainage Areas within the Project Area

Stream Name	Approximate Drainage Area (square miles)	Drainage Area (acres)
Government Creek	2.3	1,472
Forest Creek	1.7	1,088
Boulder Creek	4.6	2,944
Willow Creek	8.1	5,180
Fish Creek	17.1	10,944

Game fish populations are expected to be more robust and popular for fishing higher upstream on private lands. Specifically, both Fish Creek and Willow Creek may have greater fish populations upstream directly west of the Project area at higher elevation. The only public access areas nearby for fishing include Leazenby Lake, Meeboer Lake, and the Laramie River at Monolith, none of which lie in the Project area (WGFD, 2008). Table 2-3 depicts the lengths of Fish and Willow Creeks both within the Project area and within Albany County. This table also provides the lengths of public access to these Creeks. Approximately 4.7 miles north of the Project area Willow Creek is impounded to form Willow Creek Reservoir. This approximately 60 acre reservoir abuts Wyoming State lands and offers approximately .75 mile of public access shoreline.

TABLE 2-3: *Lengths of Classified Streams in the Project Area and Albany County*

Stream Name	Length within County	Length within Project Area	Public Access Length within County	Public Access Length within Project Area
Fish Creek	9.4	4.1	0.5	0.3
Willow Creek*	17	3.1	3.1	2.7

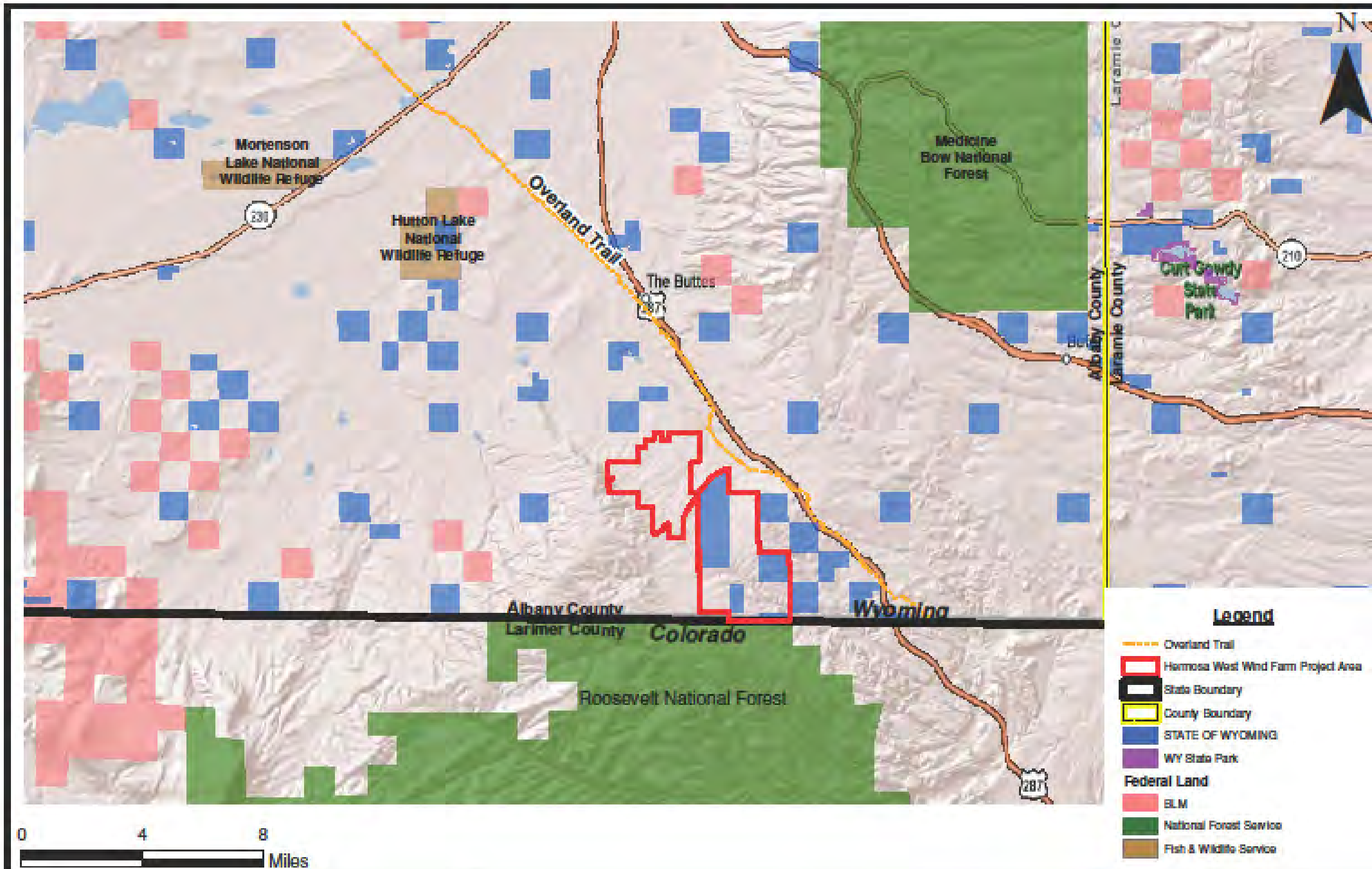
** Willow Creek is impounded approximately 4.7 miles north of the Project area; the 0.9 mile linear flowline through this impounded area is included in these calculations.*

Similar to options for hunting, within 100 miles of the Project area there is a greater variety of fishing options. Curt Gowdy State Park features two reservoirs with fishing opportunities; Granite reservoir features rainbow trout and kokanee salmon fishing while Crystal Reservoir has brown trout as well. Within nearby Medicine Bow National Forest, there are 14 lakes and one stream featuring a variety of species for fishing. Most common is the brook trout, occurring in 12 of the lakes and Libby Creek. Other species include rainbow trout, golden trout, cutthroat trout, brown trout, and splake (a hybrid of brook and lake trout).

2.4 STATE AND FEDERAL PARKS AND FORESTS

Within the Project area there are no county, State, or Federal parks, however the Project area encompasses approximately 3,070 acres of State of Wyoming land as indicated (in blue) in the below figure. Approximately 16 miles northeast of the Project area in Laramie County lays Curt Gowdy State Park (Figure 2-1). This park features low daily and annual passes and features various activities ranging from hunting and fishing to the Lodge Amphitheatre and playgrounds. Over 100,000 visitors come to the park to enjoy its recreational activities on an annual basis. A summary of recreation activities at State and Federal parks and forests in the vicinity of the Project area may be found in Table 2-4 (Wyoming State Tourism, 2010).

FIGURE 2-1: State and Federal Parks and Forests in the Vicinity of the Project Area



Environmental Resources Management

DESIGN: K Wanka	DRAWN: S King	CHKD.: A Smith
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FIGURE 2-1
STATE AND FEDERAL LANDS
Hermosa West Wind Farm Project
Albany County, Wyoming

ERM

TABLE 2-4: Recreation Activities at State and Federal Parks and Forests in the Vicinity of the Project Area

Name	Location	Annual Visitors	Distance to Project Area (Miles)	Distance to Project Area (Minutes)	Number of Campsites	Season	Fees	Attractions
Curt Gowdy State Park	Cheyenne, Wyoming	107,000	50	99	20	Year-round, but limited	Daily: $2-17 Annual: $33 - 53	Amphitheatre (Hynds Lodge), archery range, boat ramp/dock, campsites, corrals, fishing pier and three reservoirs, group picnic shelter, picnic areas, playground, viewing areas, Volksmarch Trail
Roosevelt National Forest	North Central Colorado	N/A	92	291	53	Year-round, but limited	None, although some permits may be required for activities such as camping	Camping, fishing, rock climbing, heritage resources, hunting & target shooting, off-roading, hiking, and biking
Medicine Bow National Forest	Southeast Wyoming	1,400,000	78	142	85	Year-round, but limited	None, although some permits may be required for activities such as camping	Snowmobiling, hunting, biking, skiing, Vedauwoo
Hutton Lake National Wildlife Refuge	Laramie, Wyoming	N/A	13	84	0	Year-round	None	Wildlife observation and photography
Mortenson Lake National Wildlife Refuge	Laramie, Wyoming	0	20	85	0	Closed to the public	NA	Closed to the public

At the federal level, two national forests provide local recreation options for residents and tourists near the Project area: Medicine Bow National Forest located in Southeast Wyoming and Roosevelt National Forest in North Central Colorado (Figure 2-1). Portions of Medicine Bow National Forest are located within 45 miles of the Project area and provide important recreational outlets for the local community. Medicine Bow National Forest encompasses the Snowy Range Mountains and sees approximately 1.4 million visitors annually.

Vedauwoo is a recreational area located within the Medicine Bow National Forest just west of Curt Gowdy State Park and northeast of the Project area. This area is popular with rock climbers, and provides recreation for hikers, bikers, anglers, and cross-country skiers.

Within 30 miles of the Project area there are two wildlife refuges: Hutton Lake National Wildlife Refuge and Mortenson Lake National Wildlife Refuge (Figure 2-1). The Mortenson Lake National Wildlife Refuge is closed to the public because it supports the last known breeding population of the endangered Wyoming toad. This refuge focuses on recovery of the toad and maintaining ideal habitat along shorelines.

The Hutton Lake National Wildlife Refuge offers grazing and water manipulation for the benefit of migrating birds and one of its five lakes for a captive breeding and release site for Wyoming toads. This refuge is open to the public and involved in environmental education with local schools, churches, and conservation groups and provides ideal scenery for spring waterfowl flights featuring redhead and canvasback ducks, shorebirds, raptors, and white-tailed prairie dogs.

2.5 MUSEUMS

Although no museums or historic sites are located within the Project area, there are multiple attractions within an hour of the Project site (Table 2-5, Figure 2-2)).

TABLE 2-5: Museums and Historical Sites Located within One Hour of the Project Area

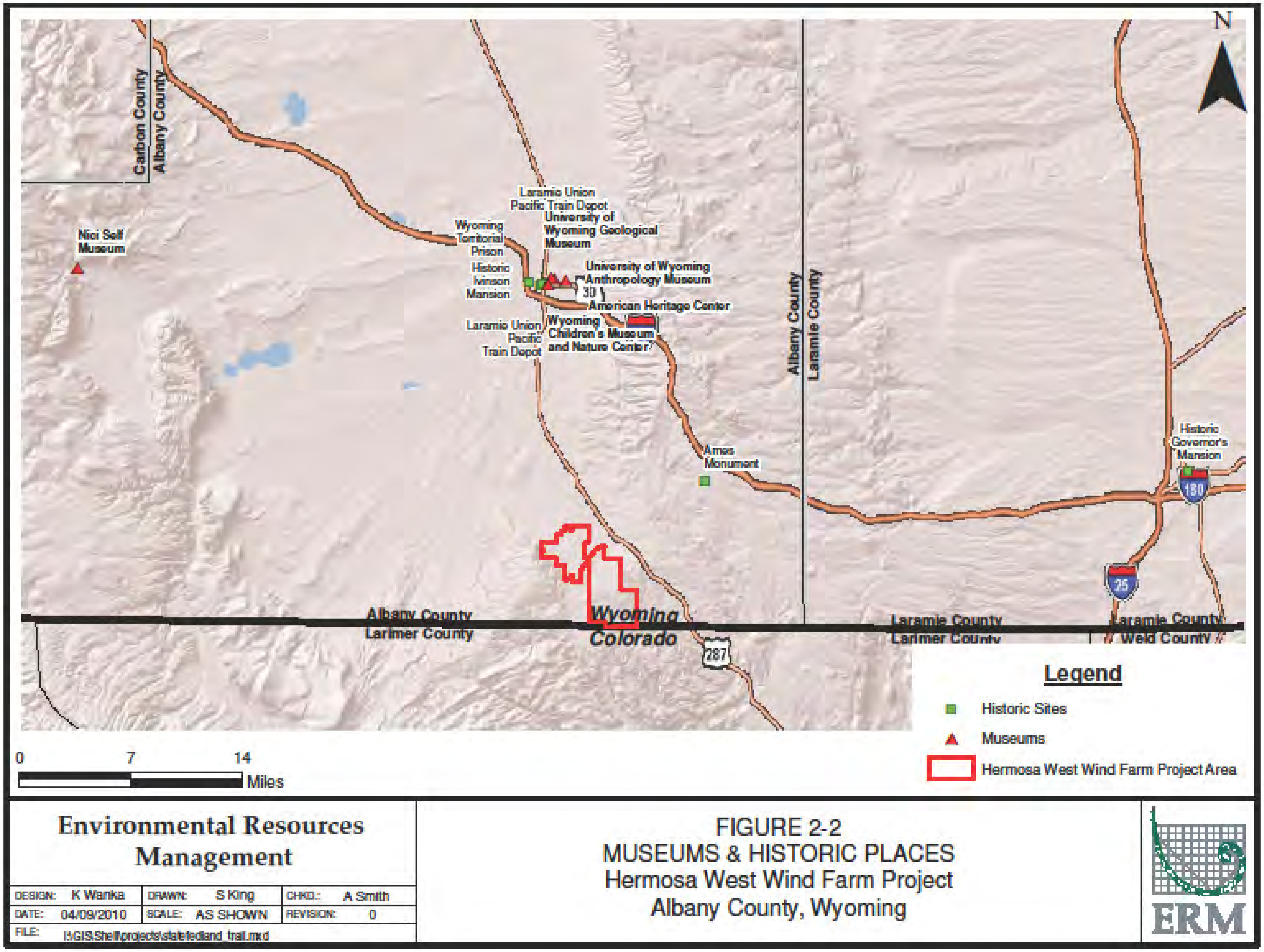
Attraction	Location	Annual Visitors	Distance (Miles)	Distance (Minutes)	Season	Fees
Ames Monument	Buford	NA	7	20	Year-round	None
American Heritage Center	Laramie	NA	26	62	Year-round	NA
Historic Ivinson Mansion	Laramie	6500	26	62	Year-round	$5-10
Laramie Union Pacific Train Depot	Laramie	8000	26	62	Year-round	Free, available to rent
University of Wyoming Museums	Laramie	1300+	26	62	Year-round, some only the academic year	None ($3 for planetarium)
Wyoming Children's Museum and Nature Center	Laramie	4500	26	62	NA	NA

Attraction	Location	Annual Visitors	Distance (Miles)	Distance (Minutes)	Season	Fees
Wyoming Women's History House	Laramie	NA	26	62	Summer	NA
Wyoming Territorial Prison	Laramie	NA	27	64	Grounds open year round, facility open May-September	$5
NICI Self Museum	Centennial	NA	55	106	Summer	Free
Historic Governors' Mansion	Cheyenne	6000	75	103	Year-round	None

Each of these sites offers specific attractions and amenities.

- *American Heritage Center:* Repository of archives, rare books, and manuscripts at the University of Wyoming.
- *Ames Monument:* Memorial to the Ames brothers of Massachusetts who were integral factors in construction of the first east to west coast North American railroad.
- *Historic Governors' Mansion:* Served as home to Wyoming Governors and families for 71 years until 1976 and featured modern central plumbing, hot water heat, and gas and electric features.
- *Historic Ivinson Mansion:* Restored 1892 home that keeps artifacts of the Laramie Plains Museum.
- *Laramie Union Pacific Train Depot:* Served as a train depot until 1997, and now as a museum preserving Albany County's railroad heritage. Added to the National Register of Historic Places in 1988.
- *NICI Self Museum*: Consists of a historic depot building, artifacts and photographs from the centennial Valley, history of the Laramie, Hahns Peak & Pacific railroad, lumbering tools and exhibits of ranch life.
- *University of Wyoming Museums:* Includes anthropology, art, and geology museums as well as an insect gallery and planetarium.
- *Wyoming Children's Museum and Nature Center:* Provides children and families the opportunity for alternative education to learn about Wyoming through interactive exhibits and programs.
- *Wyoming Territorial Prison:* Listed on the National Register, this museum held outlaws such as Butch Cassidy and features displays, tours, scavenger hunts, and historic structures such as a broom factory, homestead cabins, and a boxcar and warden's house.
- *Wyoming Women's History House:* Features influential and significant women in Wyoming's history including Louisa Swain, a 70 year old Quaker and the first woman to cast a ballot.

FIGURE 2-2: Museums and Historical Sites Located within One Hour of the Project Area



2.6 OTHER ATTRACTIONS FOR RECREATION

Multiple other recreational activities exist throughout regions close to the Project area, although none are specific to the Project area. Private ranches offering activities to the public such as fishing, 4x4 and all terrain vehicle (ATV) off roading, and horseback riding are located throughout southeast Wyoming. There are no recreational trails for ATV or snowmobile use currently within the Project area.

In addition to the historic sites previously mentioned, the Overland Trail also passes just east of the Project area, although no formally recognized historic sites are located in the Project area (Figure 2-1). The Overland Trail carried nearly 20,000 pioneers west between 1862 and 1868 due to Indian uprising conflicts along the Oregon Trail. The Overland Trail today is marked by various historic stage stations, the closest existing one to the Project area is Virginia Dale Station, which is located approximately 21 miles southeast in Colorado. A site of debris just southwest of Tie Siding and eight miles from the Project marks the location of the Willow Springs Stage Station, the first stop along the trail in Wyoming (Larson, 2000). Portions of the trail within the Project area are not for recreational use; the Overland Trail is a historic trail through which wagon trains passed.

The portion of the Overland Trail located near the Project area roughly runs parallel to US 287. An Environmental Assessment (EA) completed for the expansion of US 287, states that the trail is recommended as eligible for listing on the National Registry of Historic Places as a nationally significant stage and freight road. The Wyoming Department of Transportation (WYDOT) determined that the segment of the trail paralleling the road has been recommended as non-contributing to the Overland Trail's overall significance.

In addition to historic and physical recreational activities, many towns around the Project area, particularly Laramie, host a variety of antique stores, shops, and art galleries.

3.0 ASSESSMENT OF RECREATIONAL IMPACTS

3.1 INTRODUCTION

The potential recreational impacts of the Project must be considered at both the Project level, and throughout greater Albany County.

Impacts on recreational resources are considered significant if they occur in high-density developed recreational areas or if the facilities generate significant noise, dust, or air quality, or visual impacts can be expected during either construction or operation of the Project.

Areas of potential recreational impact have been grouped under sub-headings, and a summary is provided for each. This assessment is based on the construction and operation of the Project.

3.2 HUNTING

Since the majority of hunting that occurs in the Project area is on private land, minimal impacts to hunting on the Project area are expected. If private landowners in the Project area allow hunting that is not monitored by the state, some hunting may be reduced during construction of the Project given that necessary equipment and activities may disturb local wildlife. Continued hunting during operation of the Project will be dictated by private landowners and their lease agreements. Hunting may be restricted at the time of construction and maintenance to ensure the safety of workers.

Public access hunting in the Project area, which is already very limited, may decrease as well during construction, but only due to habitat disturbance due to construction activities. Hunting maybe restricted at time of construction and maintenance to ensure the safety of workers. SWE's lease agreement with the State of Wyoming prohibits SWE from restricting access to public lands, so hunting will be allowed to resume to preconstruction levels.

During operation and particularly construction of the Project, a minimal increase in hunting at other public and private access areas throughout Albany County may be expected.

3.3 FISHING

While Fish Creek and Willow Creek run through the Project area, stream habitats here do not provide optimal recreational fishing due to a lack of surface water resources. In order to minimize potential impacts to fishing and water resources in the Project area, SWE will develop a Stormwater Pollution Prevention Plan (SWPPP) and a Spill Prevention Control and Countermeasures (SPCC) Plan. These plans will utilize industry best management practices (BMPs), such as temporary sediment basins, silt fencing, and wing ditches to further reduce potential impacts to surface waters within the Project area and adjacent

adjacent watersheds. Because fishing is not a typical recreational activity in the Project area and SWE will be implementing BMPs, no impacts are expected.

3.4 LOCAL PARKS

No local parks or national resources exist in the Project area; therefore no negative impacts are expected during either construction or operation of the Project. Some parks and campsites near the Project area may experience a slight increase in use from workers, particularly during construction which will result in a larger increase in employment than during operation. There are approximately 158 campsites distributed among local parks to the Project area. Construction of the Project may result in a population influx of approximately 270 to 280 workers during the construction phase. If these workers engage in recreational camping at local parks, they could potentially displace existing recreational users. The majority of campsites are administered and managed by the Laramie Ranger District of Medicine Bow National Forest.

One privately owned campsite, the Laramie KOA, has 144 sites open year-round offering recreational vehicle and tent sites as well as one and two-room cabins. This site features 70 feet maximum length pull-through, 30-50 amp service, and cable television in addition to services such as meeting rooms, modem dataports, wireless internet, and a snack bar (BSR Social and Economic Report May 2010). During construction, approximately seven percent of nonlocal workers (15 nonlocal workers) are expected to have accommodations in recreational vehicles in Albany County. Given the estimated vacancy rate of five percent for recreational vehicle sites and campsites, the demand for recreational vehicle sites may exceed the availability. Evidence from existing wind farm projects in the US demonstrates that the majority of non-local workers for construction of the Project are either single or unaccompanied by their families.

The Project is not anticipated to have visual impacts on local parks, with the exception of the Ames Monument. Due to the topography and location the Project, it may be visible at the Ames Monument on clear days. It is anticipated the Project will be most visible when looking west from Ames Monument.

3.5 MUSEUMS

During construction, some increase in the use of museums and local historic sites may increase, particularly on weekends, as more transient workers seek recreational activities local to the Project area. This increase in traffic to local sites may displace some local users, although the impact is expected to be minimal. Because the permanent workforce required for the operational phase of the Project is limited (approximately 20-40 individuals), no long-standing impacts to use of museums and historical sites is expected. The increases in use would be beneficial where entrance fees are used to support these sites.

3.6 OTHER ATTRACTIONS FOR RECREATION

During construction, reasonable increases in recreational activities such as use of ATVs/4x4s as well as local ranching activities like horseback riding are to be expected as transient workers and some families relocate near the Project area. These effects are not expected to be long-term. A similar increase in activity for local shops and galleries, particularly in and around Laramie, is expected during construction. The increases in use would be beneficial where entrance fees are used to support these sites. Nonlocal workers are expected to contribute over $5.6 million on commercial activities, some of which will be spent locally on recreation and entertainment (BSR, 2010).

Portions of the historic Overland Trail are located east of the Project area (parallel to US 287). Cultural resource surveys through the planned development portions of the Project did not find any visible wheel ruts, which is all that is left of this trail in many places. The EA for the US 287 expansion recommended that the segment of the trail paralleling the road be recommended as non-contributing to the Overland Trail's overall significance, and a FONSI was issued for the expansion project.

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APPENDIX L

SOCIAL AND ECONOMIC IMPACTS OF THE PROPOSED HERMOSA WEST WIND ENERGY PROJECT

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BSR

Social and Economic Impacts of the Proposed Hermosa West Wind Energy Project

Report prepared for Shell WindEnergy Inc.

May 2010

Introduction

Shell WindEnergy Inc. (SWE) is considering the construction of a wind farm (Hermosa West) in a largely rural area of Albany County, Wyoming. Evidence from operating wind farms suggests that they can have large economic, social, and environmental impacts. SWE asked BSR to conduct a study to identify and summarize the key non-technical issues and risks. We have done this through both engagement with stakeholders and analysis of social and economic data and trends related to the likely impacts of the proposed project. By addressing both challenges and opportunities, BSR’s work supports SWE’s efforts to ensure that its social investments are integrated with and targeted toward addressing social and environmental impacts of the wind farms during both construction and operation.

The following report addresses the social and economic impacts of the project.

Executive Summary

- Wyoming's economy has historically been driven by the exploitation of its natural resources, the most important being its agricultural land, subsurface minerals and oil & gas, and world-class scenic beauty. These resources have provided many Wyoming residents with a high standard of living, access to affordable education, and low taxes.
- Albany County, wherein both of the proposed wind farms will be located, has few natural resources at its disposal and as such has not benefited as much as other counties from the financial largess created by the periodic booms in oil & gas and coal production. On the flip side, however, it has not suffered during the lean years when commodity prices have ravaged the extractives industries.
- Although bereft of natural resources, Albany County does have considerable wealth embodied in the intellectual capital associated with the University of Wyoming. The university, state and local governments, Ivinson Memorial Hospital, and Wal-Mart are its largest employers. It has one of the highest education profiles in the United States, with over 50 percent of its residents possessing a college degree and a large percentage having graduate degrees.
- The population of Albany County just tops 30,000 and is mostly located in the largest municipality, Laramie. Similar to the rest of the state, it is ethnically homogenous, with over 90 percent of the population classified as white. Municipal services are of high quality, but they are largely concentrated in Laramie, and as a result emergency fire protection, medical services, and law enforcement are challenged to provide adequate services to the outlying areas. It has a good vehicle and railroad transportation infrastructure.
- The building and operation of the wind farm would result in increased tax revenues for various levels of government and the creation of construction jobs and full-time operational positions. It would also create employment opportunities through the indirect and induced effects of purchases of goods and services in the local community.
- The Hermosa West wind project is located south of Laramie near the Colorado border and straddling U.S. 287 on both the east and west sides.
- From an economic perspective it appears likely that the benefits of Hermosa West would outweigh any potential costs associated with its construction and operation. Large tax revenues would flow to the state and local government entities over the life of the wind farm, and a substantial number of jobs would be created both directly and indirectly. The local construction labor market would, assuming a normal level of slack, be able to handle the large demand for workers (50-60), but it might have the effect of tightening the supply-demand equation. Given the large number of workers that would be in the area for an extended period, there would also be a generous effect on local commercial conditions as a result of spending on goods and services.
- With respect to potential negative impacts, the most salient concerns converge on transportation, medical and fire emergencies, and housing.

Background

Shell WindEnergy Inc. (SWE) is considering the construction of a wind farm (Hermosa West) in a largely rural area of Albany County, Wyoming. The Hermosa West wind project, which is scaleable to 300MW, is located south of Laramie near the Colorado border and straddling U.S. 287. Currently Hermosa West consists of 11,125 acres of privately owned and state property.

Southern Wyoming contains enormous wind resources. *Western Renewable Energy Zones – Phase 1 Report* by the Western Governors Association and the National Renewable Energy Laboratory (NREL) found that "more than 50% of the best class 5 – 7 winds in the Western U.S. occur in southern Wyoming." NREL data estimates that Wyoming has over 500,000 MW's of developable Class 3 through 7 wind of which 100,000 MWs is Class 5 through 7, and over two-thirds of Class 7 wind in the Western U.S. is located in Wyoming.

Albany County is very large, spanning 4,300 square miles, and with a population of roughly 32,000 has a low ratio of residents per square mile. Around 60 percent of the county is made up of agricultural lands, and in recent years there has been a marked conversion of such holdings to smaller parcels, such as the 35-acre ranchettes. The public sector owns approximately 34 percent of the county's land and this is spread among the Forest Service, the Bureau of Land Management, the Fish and Wildlife Service, the State of Wyoming, and the City of Laramie. There are two municipalities, Laramie and Rock River, and several areas that are unincorporated but contain concentrations of residents, including Centennial and Woods Landing.

An indication of the "open spaces" that exist in Albany County is provided by the fact that residential and commercial development together account for less than 5 percent of the county's land area.

In order to maximize the benefits to these local communities and to minimize the problems associated with its proposed wind farm project, SWE seeks to more clearly understand both the perceptions and attitude of stakeholders towards these proposed projects and the current socioeconomic situation of Albany County.

Social and Economic Analysis

Depending on their size, location, and land ownership, proposed wind farm projects in Wyoming can be required to apply for a variety of permits that involve analysis of their environmental, cultural, social, and economic impact. Based on our review of the permit applications of other wind farms, the detail necessary to satisfy regulatory demands varies depending on the particular permitting process. For example, the requirements of the Industrial Development Information and Siting Act (ISA) are quite extensive, while those contained in the Albany County Wind Energy Siting Regulations are not. The following analysis provides a broad overview of the potential social and economic impact of the proposed wind farm project at Hermosa West and identifies steps that SWE can take to assure that its projects maximize their socioeconomic performance.

Introduction

Albany County encompasses the City of Laramie (hereafter Laramie) which in turn contains the University of Wyoming, the only four year institution of higher learning within the State, the town of Rock River, the town of Centennial, and smaller unincorporated communities and mountain resorts. It is one of the poorest counties in Wyoming, ranking near the bottom in terms of income level and tax revenue. The economy was historically based on agriculture (farming and ranching), but in recent years has become more oriented toward the service sector and government. The largest employer is the University of Wyoming; however, this institution does not contribute to the tax base of the County as it is tax exempt. Overall, the county is experiencing a slightly declining population in part due to lack of opportunity for high-paying jobs.

Larimer County, Colorado has a population of roughly 270,000 and covers an area of 2,634 square miles. It is among the most populous counties in the state and its two main population centers are the incorporated cities of Fort Collins (137,000 pop.) and Loveland (62,200 pop.). There county includes 7 incorporate cities or towns and 21 unincorporated communities. The county's largest employer is Colorado State University (Fort Collins) and its economy is driven by the university and a diversified mixture of agricultural and industrial activities. Over the past decade, the population grew significantly owing to a strong business climate and its attraction as a place of retirement.

Baseline Conditions

The following section provides background information on the social and economic conditions prevalent in Albany County against which the impacts from the wind farm projects will be assessed. Since both projects will be located entirely within the county, it is reasonable to assume that most of the impacts will occur there and thus it will be the focus of this report. There clearly will be impacts on other counties and, most likely, in Colorado as well given the proximity of the proposed Hermosa project, but we believe these will be minimal compared to those in Albany County.

Nevertheless, it is reasonable to assume that some of the workers will choose to stay in the Fort Collins area in Larimer County, Colorado. We believe this will be a minority of the workforce, however, as it is more convenient to locate in Laramie, especially given that it is closer and the road is less dangerous. Our assumption is that of the estimated 300 workers that will not be from the local area, 240 will reside in Laramie and 60 (20 percent) in Larimer County. Given the relatively small number predicted to live in Colorado, we do not provide a full socioeconomic analysis of Larimer County and Fort Collins – we will, however, estimate the impact of the additional workers on those socioeconomic characteristics where it is potentially meaningful.

POPULATION PROFILE

Key characteristics of the populations of Albany County and Laramie are described below, including a breakdown by age, gender, and race.

The location and characteristics of the population within the project area are important indicators of the size and availability of the potential workforce. Albany County represents approximately 6 percent of Wyoming's total population, and this percentage has changed little over the past century (see Table 1 below). Unlike other counties, Albany has not been subjected to the wide swings in population owing to the booms and busts of the oil & gas and coal industries as there are no large energy-bearing deposits in the Southeastern part of the state. A critical force stabilizing the population has been the University of Wyoming, which is located in Laramie; although numerous stakeholders noted that the University's non-taxable status has negatively impacted the county's finances, it is also true that it is the major employer in the county and has undoubtedly made Laramie an attractive place to live and for business.

Laramie is by far the largest city in Albany County and accounts for nearly 85 percent of the county's population, a figure that has changed little over the past 30 years. The next largest incorporated area is Rock River Town, but it makes up less than 1 percent of the county's inhabitance; the remainder is mostly spread across the county in small pockets in unincorporated areas. Although shifts in the location of a population within any defined geographic area are always occurring, the distribution of population within Albany County has stayed very consistent over the last decades of the twentieth century and into the 21st.

Age Distribution. The age distribution of Albany County has shown a relatively consistent trend since 1980, with younger age groups (19 and below and 20-34) declining from 71.1 percent in 1980 to 60.7 percent in 2008. This reflects both an absolute decline in the number of people in those age groups, as well as an increase in the population of those in the higher age brackets. In comparison with the rest of the state, Albany County has a higher population in the 20-34 age bracket owing to the large number of students attending the University of Wyoming in Laramie. The number of adults in the prime working age category of 20 – 54 rose from 16,282 in 1980 to 18,067 in 2008, but as a proportion of the county's total population it fell from 59.5 to 55.4 percent over the same period.

Table 1
Albany County
Population and Demographic Profile

	1980	**1990**	**2000**	**2007/8**
Wyoming	469,557	453,588	493,782	532,668
Albany	29,082	30,797	32,014	32,553
19 and Below	30.9	29.6	26.4	26.9
20 - 34	40.2	35.1	34.5	33.8
35 - 54	15.7	21.8	24.0	21.6
55 - 64	6.1	5.6	6.7	9.2
65 and Above	6.9	7.6	8.2	8.2
% Female	48	48	48	47
Laramie	24,410	26,687	27,204	27,664
Rock River		190	235	213

Migration. From 1980 to 2008, the population of Albany County rose just under 12 percent, but much of this growth occurred in the 1980s and 1990s; since 2000, the population has only marginally increased (1.6%). What is noteworthy about this population trend is that all of the increase is attributable to birth rates being higher than death rates; net migration or people entering and leaving Albany County has been negative in aggregate since the early 1990s, and from 2000 to 2008 totaled 1,048. Although it's not possible to draw concrete conclusions, negative net migration could be attributable, at least in part, to a lack of job opportunities.

Race, Ethnicity, and Gender. Racial and ethnic minorities comprise a small proportion of the total population of both Wyoming and Albany County (see Table 2 below). In the latest year for which information is available (2006-2008), residence classified as white made up 92.4 percent of the population (including 7.8 percent represented by Hispanics), with Asian (2.7%), African American (1.4%), and American Indian/Alaska Native (1.7%) accounting for the largest minority segments. This racial and ethnic breakdown is relatively consistent with that for the entire state and that of Laramie, although there are some differences when looking at smaller population centers such as Rock River. With respect to gender, males account for just over 52 percent of the population in Albany County.

Table 2
Albany County
Race, Ethnicity and Gender Profile

	1980	1990	2000	2008
Total Population	29,082	30,797	32,014	32,758
		Percent		
White	90.7	87.2	87.5	86.6
Hispanic	6.4	6.5	7.5	7.9
Asian	1.2	2.1	2.1	1.8
African-America	1.0	0.9	1.4	1.6
Native American	0.5	0.7	1.9	1.1
Female	48	48	48	47

Population Projection. Based on data from the Wyoming Department of Administration and Information, Economic Analysis Division, the populations of Albany County and the city of Laramie are projected to decline slightly over the next decade. Given the uncertainty inherent in such predictions, however, it is also possible that the populations of both will remain largely unchanged or increase marginally. In either case, the expectation should be that neither Albany County nor Laramie will experience major population shifts.

ECONOMIC CONDITIONS

The following section will highlight the major economic conditions in Albany County and Laramie that are directly related to the potential social and economic impacts of the wind farm projects. These conditions include employment trends, labor force characteristics, income and earnings, and government finances.

In part because of the stability provided by the University of Wyoming and the lack of dependence on the financial services industry to drive growth, Albany County and Laramie did not experience large economic disruptions as a result of the global economic downturn. Output and employment have declined, but on a scale far less significant than that of many other areas of the country. From the Q2 2008 to Q2 2009, unemployment rose from 2.5 to 3.3 percent and retail sales fell 11.45 percent in Albany County. New home construction declined over this period as did auto registrations, but the evidence suggests that overall the economy of Albany County has held up well.

Employment. From 2000 to 2008, the number of employed workers in Albany County rose from 17,688 to 18,255, or 3.3 percent, while the labor force grew from 18,300 to 18,728, or 2.3 percent. Closely mirroring the county, employment in Laramie from 2000 to 2007 rose from 14,936 to 15,442, or 3.3 percent, while the labor force increased from 15,446 to 15,826, or 2.4 percent. During this same period, employment in Wyoming increased over 10 percent, and thus Albany County and Laramie lagged behind the state in terms of job creation.

The above data for Albany County and Laramie suggest that unemployment rates fell over the periods in question, and in fact they declined from 3.3 to 2.5 percent in Albany County and 3.3 to 2.4 percent in Laramie. These declines were accompanied by absolute falls in the number of unemployed workers; in Albany County from 612 to 474 and in Laramie from 510 to 384. These results compare favorably with many other counties in Wyoming and with the state overall, where unemployment has remained above 3 percent over this period.

As noted earlier, however, the number of residents out of work and the unemployment rate have risen at both the county and state levels during 2009 as a result of the economic downturn. As of October 2009, the unemployed rate in Albany County measured 4.3 percent,[1] and will most likely end the year at this level. This is still well below the statewide unemployment rate of 7.4 percent in October 2009, but nonetheless represents a doubling of the Albany County jobless rate from 2.2 percent in October 2008.

Composition of Employment. The broadest classification of employment divides the workforce between the private and public sectors, and in Albany County in 2007 (the latest year available) approximately 36 percent of the employed labor force worked for the government, 58 percent in the private sector, and 6 percent were self-employed. In terms of type of employer, the state government accounts for roughly 25 percent, retail trade 11 percent, local government 9 percent, health care and social assistance 7 percent, construction 5.5 percent, and manufacturing 3.2 percent (see Table 3 below). Most noteworthy when comparing Albany County to other counties and Wyoming overall is the very high percentage of employment accounted for by the state government; this is attributable to the fact that the University of Wyoming is located in Laramie. For example, state government only makes up 3.9 percent of total employment for the state.

Table 3
Albany County
Employment and Industry Distribution

	1990	2000	2008
TOTAL EMPLOYMENT	14,927	17,168	18,698
Education, Health Care, Social Services	5,533	6,361	7,073
Arts, Entertainment, Accommodation, Hospitality	n.a.	1,899	2,034
Professional, Scientific and Management	n.a.	1,150	1,666
Retail Trade	2,998	1,706	2,238
Construction	625	961	976
Manufacturing	827	713	710
Transportation	550	559	629
Agriculture, Forestry	501	598	699

Construction Industry. With respect to conditions in the market for construction workers in Albany County, the number of jobs rose from 827 in 2000 to an average of 948 during the fourth quarter of 2008. Employment in the construction industry has declined along with the contraction in activity related to the economic downturn, however, and stood at 816 in March 2009. This fall was mostly accounted for by the decline in employment of specialty trade contractors as that in the construction of buildings and heavy and civil engineering projects remained relatively even. Although detailed data for 2009 is not yet available for Albany County with respect to unemployment by sector, it is very likely that, given the trends at the state level, the number of jobs

[1] Wyoming Labor Force Trends, Wyoming Department of Employment, October 2009.

in construction has continued to decline. Statewide employment in construction has declined by nearly 17 percent, or approximately 5,000 jobs, from October 2008 to October 2009.

The average weekly wage for construction workers measured $666 at the end of the first quarter of 2009, a fall from $711 at year end 2008.

Number and Type of Establishments and Minority Businesses. Table 4 provides a snapshot of the major employers in Albany County and the size of their workforces. This reinforces the fact that employment is heavily dependent on government resources, whether directly to finance the provision of city and state services, or indirectly to support educational institutions. There are relatively few private sector companies with large payrolls, and there is very little in the way of traditional manufacturing employment.

Table 4
Largest Employers in Albany County

Organization	# of Employees	Organization	# of Employees
University of Wyoming	5,237	Albany County	247
Albany County Schools	513	ARK Regional Svcs.	200
Ivinson Memorial Hospital	490	Trihydro Corporation	172
Wal-Mart	400	Mountain Cement	121
City of Laramie	304	Altitude Brewery	100
Petro Stopping Center	300	Brown & Gold	100
WyoTech	250	New Albertson's	100

In 2007, there were a total of 1,052 private nonfarm establishments located in Albany County, with the overwhelming majority being relatively small: 55 percent, 1-4 employees; 21 percent, 5-9 employees; 13 percent, 10-19 employees; and, 7 percent, 20-49 employees. The largest number of companies were reported in the retail trade sector (171), followed by construction (136), health care and social assistance (112), and hotel and food service (107).

Minority-Owned Firms. Data on the percentage of minority-owned firms is not available at the county level, but it is compiled at the state level and for the latest year available (2002) measured 4.7 percent. Given that Laramie is one of the most diverse in Wyoming, it is reasonable to assume that the percentage of minority-owned firms in Albany County is at least as high as that in Wyoming overall. Using 5 percent as the baseline, we estimate that there are approximately 50-55 minority-owned firms in Albany County.

Female-owned firms are far greater in number than minority-owned ones, and in 2002 totaled 350 (or 33% of all establishments) in Albany County.

Earnings and Income. Table 5 below shows the evolution over the period 2000 to 2006-2007 (latest years for which data is available) of total personal income and per capita income in Albany County. Total personal income rose from $742.8 to $937.8 million, or 26.2 percent in all and 3.7 percent annually. As would be expected, per capita income increased at a similar rate (23%), rising from $23,275 to $28,858. With respect to both income measures, the rates of increase in Albany County were less than that which occurred for the entire state; for example, per capita personal income in Wyoming rose 53 percent ($28,469 to $43,360) over the same period. Thus, Albany County has not only experienced less rapid income growth than other parts of the state, but it is also the case that its overall income level (and perhaps standard of living) significantly lags that of Wyoming as a whole.

Table 5 Earnings Distribution in Albany County		
Earnings	**Number of Households**	**% of Total Households**
Less than $10,000	1,405	10.1
$10,000 - 24,999	2,905	20.9
$25,000 - 34,999	1,709	12.3
$35,000 - 49,999	2,007	14.4
$50,000 - 74,999	2,415	17.4
$75,000 – 99,999	1,493	10.7
Above $100,000	1,956	14.1

When earnings are broken down by industry, state government (32%) is by far the largest generator, followed by local governments (12%), health care and social assistance (8%), retail trade (6.5%), construction (5.6%), manufacturing, and leisure/hospitality and food services (3.3%). Although an industry's share of total employment and share of total earnings do not exactly match, there is a fair degree of correspondence. Mining and agriculture, which dominate the economies of many other counties in Wyoming, are not significant generators of income (or employment, as noted earlier) in Albany County.

The picture is different, however, when considering average annual earnings per worker by industry. In 2007, mining had the highest at $72,644, followed by finance and insurance ($54,873), agriculture ($53,326), the federal government ($52,143), the state government ($45,097), transportation and warehousing ($41,652), and information technology ($36,907).

Poverty and Income Distribution. According to the U.S. Census Bureau, in 2006-2008 approximately 8 percent of all families and 17 percent of all individuals in Albany County were living below the official poverty line. This figure has no doubt increased in the past year, and the county, as does the city of Laramie, continues to have one of the highest poverty rates in Wyoming. Given the high levels of poverty in both Albany County and Laramie, it would not be unusual to find that the distribution of income is highly unequal. Although inequality exists, with 43 percent of households earning less than $35,000 per year, it is also true that over 40 percent of households earn more than $50,000 annually.

Community/Work Location Dynamics. When considering the social impact of a project on a community (in this case Albany County), it is important to first understand whether or not the community in question is home to a relatively equal number of workers and job opportunities, or has significantly more of one than the other. Related to this is the balance a community has with respect to the earnings of residence working outside the community and non-residence working in the community. If workers employed outside of their community earn more than those employed in their community but living outside of it, then the community has a net positive earnings balance and is considered a "bedroom community"; if the net earnings are negative, then a community is considered to be a "work center" community.

Thus, there are two ways to conceptualize the relationship between work location and living location; one is based on the flow of workers and the other on the flow of money. The most common way of identifying a community as being a bedroom or work center is based on financial flows, but it is also possible to consider the flow of people as well.

Table 6 below provides data on the pattern of worker flows into Albany County. The balance between workers residing in the county and the number of jobs there is almost equal, with a slightly higher number of jobs than workers. Roughly 86 percent of those that work in the county are also residents there, and this is attributable in part to the fact that the University of Wyoming is such a large employer. Inflows of workers to Albany County mostly originate in Laramie and Natrona Counties, and there is a fairly large number that commute from the Colorado counties of Larimer and Weld.

Table 6 Workers in Albany County - 2006	
Residence	**Number**
Albany County	13,073
Laramie County	1,008
Natrona County	280
Freemont County	79
Platte County	79
Colorado	**157**
Larimer County, CO	114
Weld County, CO	43

Over the past two decades, Albany County has had a net positive balance on earnings which means that its residents working outside of the county have earned more than those working in the community but residing outside of it. Because of this positive balance of earnings flows, Albany County is considered a bedroom community.

Government Finances. The main sources of revenue for Albany County are taxes (property, sales, use, and lodging) and transfers from the Federal government and the state of Wyoming. Taxes make up the vast majority of revenue for Albany County, of which those on real property are the largest component. Total *ad valorem* taxes levied in 2008 amounted to $22.1 million, with residential (60%) and commercial (21%) land, and utilities, railroads, and airlines (12%) accounting for over 90 percent of the total. Key services supported by property taxes include education, highways, police and fire protection, correctional facilities, hospitals, parks and recreation, and welfare.

The other main source of revenue for the county is excise taxes (sales, use, and lodging), a portion of which it keeps and the remainder distributed to the state. Table 7 below shows an increase for all three taxes early in the decade, and then decline since 2006. Since Albany does not rely on mineral taxes as much as other counties or the state in general, the recent drop in energy prices has had less of a negative impact on government finances

Table 7
Albany County Tax Receipts

	Sales and Use	Optional 1% Levy	Lodging	Total
2002	4,867,951	4,115,503	311,765	9,295,219
2003	4,958,375	4,312,313	369,136	9,639,824
2004	5,157,815	4,444,802	386,169	9,988,786
2005	5,495,356	4,706,688	446,992	10,649,036
2006	6,581,004	5,642,938	550,661	12,774,603
2007	5,746,422	4,989,926	607,223	11,343,571
2008	5,618,146	4,884,509	679,376	11,182,031

The following descriptions provide background on other types of taxes that are applicable in Albany County.

Use Tax. A use tax is imposed on purchases made outside a taxing jurisdiction for first time use, storage, or other consumption within that jurisdiction. Wyoming's use tax rate is 4 percent. Receipts are shared between state government and the county of origin on the same distribution basis as sales tax.

Lodging Tax. Cities, towns, and counties may impose an excise tax of up to 4 percent on all sleeping accommodations for guests staying less than 30 days. All tax collections, less state administrative costs, are distributed to the taxing jurisdiction and at least 90 percent of the taxes collected must be used to promote travel and tourism. Albany County levies a lodging tax of 4 percent.

Industrial Siting Impact Assistance Funds. Under the Industrial development and Siting Statutes a county or town can be awarded industrial impact assistance tax payments. These payments are distributed to the county treasurer, and the county treasurer distributes to the county and to the cities and towns within the county based on a ratio established by the industrial siting council during a public hearing. The industrial siting council reviews the distribution ratio for construction projects on a regular basis and makes appropriate adjustments.

Impact assistance payments allow cities, towns, or counties to mitigate the negative impacts major industrial projects may have on community resources. The level of assistance is determined by the increase in tax revenue caused by the industrial project and matches that increase with additional monies from the state General Fund to help communities respond to project-related impacts. This tax distribution is transferred from the state General Fund, via the office of the State Treasurer, directly to County Treasurers' offices.

HOUSING

Any large scale construction project will likely require the use, at least in part, of workers that don't reside in the area where the project is being developed. In order to understand the potential impact of wind farm construction on the housing market in a particular community, it is first necessary to have a clear picture of the current supply, type, value, and needs with respect to housing in the impacted area.

Albany County's housing market is dominated by Laramie. Over the past decade, the county experienced a booming housing sector, and from 1997 to 2008, the average price of single family homes rose 8.5 percent annually. Although the past year has seen a decline in prices and construction, and an increase in vacancy rates, it is expected that the housing market will recover relatively quickly given the stable economic foundation provided by the University of Wyoming.

Current Housing Stock. In 2006-2008, the number of housing units in Albany County totaled 17,150, with roughly 54 percent being single-family units, 36 percent multi-family dwellings, and 9 percent mobile homes (see Table 8). The majority of these are in the southern third of the county, including Laramie, and the remainder are spread among Rock River (60 units) and the county's unincorporated areas. Data from the Albany County Comprehensive Plan suggest that approximately 15 percent (or 2,400 units) of the total housing stock are located in unincorporated areas. With respect to occupancy rates, just below 20 percent of the total housing stock in Albany County is vacant, and results from the 2000 census suggest that a significant percentage of these are attributable to seasonal, recreational, or occasional use.

Owner-occupied units accounted for 56 percent of the total, and renter-occupied 44 percent. Compared to other counties and to all of the state of Wyoming, the percentage of renter-occupied housing is high, and this is in part a reflection of the large number of rental units that serve the student population at the University of Wyoming. Vacancy rates for rental units (almost all of which are in Laramie) has remained below 5 percent for most of this decade, but in the second quarter of 2008 it rose sharply (to 4.3%) and has continued to do so into 2009 as the vacancy rate is now in excess of 10 percent.

A significant proportion of the housing stock (21%) has been constructed since 1990 and over 50 percent of all housing units were constructed after 1970. Thus, the housing stock is relatively new and this in part accounts for the fact that just 1 percent of housing units are considered substandard – i.e., lacking complete plumbing and/or kitchen facilities. Over 70 percent of the housing units contain from two to four bedrooms.

Table 8 Housing Baseline for Albany County	
Type of Unit	**Number of Units**
Single Family Units	10,161
2 Units	1,507
3 or 4 Units	1,572
5 to 9 Units	1,063
10 to 19 Units	600
20 or More	656
Mobile Homes	1,591
Total	17,150

Construction Activity. The amount of residential construction in any given year is closely related to the overall state of the economy, and from 2001 to 2007 Albany County experienced strong growth in the number of permits issued for residential construction. As seen in the table below, permitting was strong not only in Laramie but also outside of the city limits, and peeked in 2004-2005. The decline since then has been dramatic as new housing unit construction fell from 589 in 2005 to 167 in 2008. This decline has continued in 2009, with permits for construction of new single-family homes falling by 24 percent in the second quarter as compared to 2008, but at least some of the slack has been taken up by a sharp increase in remodeling activity and the continuation of new apartment construction.

Table 9
Number of Building Permits Issued
Albany County

	Single-Family	Duplex	Multiplex	Multi-Family	Total
2000	105	2	0	0	107
2001	135	0	4	144	283
2002	153	2	8	0	163
2003	193	2	28	48	271
2004	210	2	16	182	410
2005	192	0	110	292	594
2006	156	6	92	75	329
2007	192	0	24	48	264
2008	142	0	18	12	172

Commercial construction has faired less well, however, as only one commercial permit was issued from January through June – the average value per month of commercial construction was $149,800, compared with $2,800,000 per month in 2008.

Price Trends in Housing. The average price for residential property in Albany County showed relatively modest growth in the 1980s, but beginning in the 1990s and accelerating this decade, prices grew at a staggering pace – from 2000 to 2008, the average price of a residence increased 82%, from $112,000 to $222,000 (see Table). Given that the population of the county remained essentially flat during this period, it's not possible to attribute the increase to an inflow of new residents overwhelming the available supply of housing. Undoubtedly there are numerous causes of the spike in housing prices, and undoubtedly these include increasing wealth and market speculation.

As shown in Table 10, the cost of rental units (houses and apartments) has increased as well since 2000, but the growth rate was considerably less than for that for buying a home. The cost of renting a house rose nearly 43 percent and that for an apartment 29 percent from 2000 to 2008, but over the past two years rental prices have slowed owing to a declining economy and, in the case of apartment units, to the large increase of supply of units caused by the building boom of the past few years. Rental prices for both houses and apartments in Albany County exceeded the statewide average for most of the past decade, but the difference narrowed and was eliminated in 2007.

Rental prices for mobile homes on lots in Albany County have tracked those of apartments for most of this decade, and by the fourth quarter of 2008 they were equal ($599 and $597, respectively).

Table 10
Rental Housing Monthly Costs
Albany County

4th Quarter	Apartments	Houses	Mobile Homes	Mobil Home Lots
2000	460	609	462	198
2001	488	718	486	205
2002	498	694	518	221
2003	533	809	578	229
2004	594	849	541	229
2005	603	805	549	245
2006	602	834	550	252
2007	568	837	523	258
2008	597	870	599	261

Vacancy Rates. From 2001 through 2008, the vacancy rate for housing units in Albany County only occasionally exceeded 5 percent and for most of the period fluctuated between 2 and 4 percent. It began rising in 2008, however, and by the second quarter of 2009 had reached 10.5 percent – this is the highest vacancy rate recorded over the past decade and, for the most part, is concentrated in Laramie.

Future Demand. In 2008, the Wyoming Housing Database Partnership (WHDP) projected future demand for home ownership and rental units for the entire state and individual counties. Based on the moderate growth scenario, the demand for home ownership will increase to roughly 8,300 units by 2015 and 9,000 by 2020, which represent increases of 5.7 and 15.6 percent, respectively. Demand for rental units will rise to 6,561 and 6,821 over the same period, or 6.7 and 10.9 percent increases.

Temporary Accommodations. In recent years a number of hotels and motels have been built in Laramie mainly in response to demand created by tourism and visitors to the University of Wyoming. As a result, the city and Albany County have a large number of establishments and rooms to accommodate visitors and workers. Table 11 below lists the establishments and the number of rooms available.

Occupancy rates are closely tied to the tourism industry and specific events at the University of Wyoming, but generally speaking the summer months have the highest levels of occupancy (around 80 percent) and this drops to between 50 and 60 percent from November through April. In terms of prices, the average daily room rate across the sector rose from $55 in 2002 to $70 in 2008, with higher rates of around $80 applying during the high season.

Recreational Vehicle Sites. Albany County has one official site for recreational vehicles and that is at the Laramie, which has 115 sites for vehicles – although no information is available in terms of average levels of vacancy, we assume 5% is typical during the tourist season and higher during the off-season.

Table 11 Hotels and Motels in Albany County			
Name	**# of Rooms**	**Name**	**# of Rooms**
Albany Lodge	15	Holiday Inn	100
America's Best Value Inn	33	Howard Johnson Inn	112
Americinn Laramie	32	Motel 6	99
Baymont Inn and Suites	72	Motel 8	141
Best Western Inn	62	Quality Inn and Suites	55
Comfort Inn	55	Ramada Center Hotel	100
Days Inn	53	Ranger Motel	31
Econolodge	52	Sunset Inn	51
Fairfield Inn and Suites	82	Super 8	42
First Gold Inn	79	Thunderbird Lodge	21
Gas Lite Motel	30	Travel Inn Motel	28
Hampton Inn	84	Travelodge	30
Hilton Garden Inn	134		

Larimer County Housing Profile. Given that the population of the county approaches 300,000 and the central city (Fort Collins) is home to a major university (24,000 students), it is no surprise that the housing stock in Larimer County is large and diversified. There was a construction boom mid-decade that added considerably to the housing stock, but this has tapered off and new construction has been virtually at a standstill. The total number of housing units in the county is approximately 130,000; 96,000 are single family residences, 9,000 units are in duplexes or triplexes, 19,000 units are in apartment buildings, and 5,900 units are in mobile homes. Reflecting the strong population growth in the county over the past two decades, the housing stock is relatively young; 40% of the housing units have been built since 1990.

Rental units make up approximately 32% of all housing in the county, and a considerable portion of this owes to the student population at Colorado State University; in Fort Collins, rental units account for 40% of the housing market. The level of vacancies fluctuates with the economy, and it rose in early 2009 but has since fallen and now stands at 5.1% for multi-unit properties Larimer County.

With respect to temporary accommodations, there are over 70 hotels and motels in the county of varying size and quality. Conservatively estimating an average size of 30 rooms per establishment, the total number of hotel and motel rooms in the county exceeds 2,000. The final category of potential housing is recreational vehicles, and in Fort Collins and Poudre Valley there are 250 slots.

EDUCATION

Given the economic and social impact of the University of Wyoming and Laramie County Community College in Laramie and the surrounding areas, it is fair to say that educational institutions are in many respects the foundation of Albany County. With respect to K-12 education, there is one school district in Albany County and it is composed of 18 schools; 3 high schools, 2 middle schools, and 13 elementary schools. The most schools and the largest are in Laramie, but Rock River has an elementary, middle, and high school.

Enrollment trends for each type of school are shown in Table 12. Enrollment peaked in the mid-1990s for elementary and middle schools and in 1999 for high school, and all three have declined from their levels in 2000. But enrollment stopped falling around 2006-07 and, in fact, there was an increase in elementary school enrollment in 2008, which might portend a stabilization of enrollment for the entire system. The dropout rate for 12th grade is 6.4 percent.

Table 12 Public School Education Enrollment in Albany County					
	Elementary	Jr. High School	High School	LCCC	UofW
2000	1,950	848	933	623	8,200
2001	1,930	924	898	628	8,400
2002	1,917	911	899	619	8,545
2003	1,925	875	850	704	8,612
2004	1,933	884	818	759	8,611
2005	1,845	828	803	800	8,416
2006	1,831	835	808	974	8,429
2007	1,834	827	810	1,012	8,419
2008	1,891	827	794	1,054	7,891

There are 316 total teachers for the district, which equates to a student/teacher ratio of 11/1 – this is lower than for the state overall (12.4/1) and that of the U.S. (15.5/1). Tax dollars spent per student is approximately $12,000, and this is derived from transfers from the state (70%) and local and county sources (30%). Over 70 percent of expenditures go directly to teachers and instructional support.

Not surprisingly given the population composition of Albany County, the overwhelming majority of students are white (80%) and Hispanic (14%); African-American (2.6%), Asian (3.2%), and American Indian (1.1%) make up the remainder.

Larimer County Education Profile. There are three school districts, with the two largest being Poudre and Thompson, and together they have 51 elementary schools, 16 middle schools, and 9 high schools. Total K-12 enrollment exceeds 42,000 students and only marginally increased over the period 2000-2009. The number of teachers in all three districts is approximately 2,490, and the student/teacher ratio in both Poudre and Thompson is around 17.3.

PUBLIC SERVICES

Government financed services include fire, police, and medical emergency. Albany County has a total of 7 fire departments and 10 fire stations; five of the departments are located in the community of Laramie, and one each in Rock River and Centennial. Details of the departments are provided in Table 13. Except for the Laramie Fire Department, which has 39 full-time employees, all of the fire stations are staffed by a total of 121 volunteers. Emergency medical services are only provided out of the Laramie Fire Department, and 27 of its 39 full-time employees are certified as advanced emergency medical technicians.

Table 13 Fire Departments in Albany County					
Name	Community	Stations	Paid	Volunteer	EMS
Albany County Volunteer Fire Dept	Laramie	1	0	30	No
Big Laramie Valley Volunteer Fire Dept.	Laramie	2	0	30	No
Centennial Valley Volunteer Fire Dept	Centennial	2	0	12	No
Laramie Fire Dept.	Laramie	2	39	0	Yes
Little Laramie Fire Dept.	Laramie	1	0	20	No
Rock River Volunteer Fire Dept.	Rock River	1	0	14	No
Vedauwoo Volunteer Fire Dept.	Laramie	1	0	15	No

The Rock River Volunteer Fire Department depends on fourteen volunteers, two of which are certified as basic emergency medical technicians; the Centennial Valley Volunteer Fire Department has two stations and relies on twelve volunteers, 6 of whom are certified as basic emergency medical technicians.

Fire and medical emergency services needed for the Hermosa West project would more than likely be responded to by the Laramie Fire Department; a call for assistance from the Hermosa West project, depending on the severity of the situation, could also be handled by one or more of the stations in Laramie.

With respect to police services, there are three different types of law enforcement officials; sheriffs, police officers, and highway patrol. Sheriff departments are funded by counties, police departments by municipalities, and the highway patrol by the state. All three law enforcement branches have offices in Laramie out of which their officers are dispatched and such officers could, in theory, be involved in incidents at the projects themselves or away from them but involving equipment and/or personnel.

The Albany County covers an area of approximately 4,500 square miles, and the Sheriff's Office has 15 full-time officers and is the primary law enforcement entity within the unincorporated areas of the county. All officers are currently stationed in Laramie, but in the past one sheriff was stationed in Rock River and residents in the northern section of the county have expressed a desire to reinstitute that staffing arrangement.

Laramie has a municipal police force of approximately 35 members, including staff and patrol officers, and the University of Wyoming has a force of about 15 members. There are approximately 2.8 law enforcement officers per 1,000 residents in Albany County. The Sheriff of Albany County still retains the responsibility for law enforcement and disaster coordination within Laramie and the University of Wyoming.

Crime in Albany County has not increased substantially over the past decade, and the vast majority of incidents involve property and not violence against people. In 2000, there were a total of 1,045 crimes, with 951 (91%) against property and 94 (9%) against people; in 2007, there were 1,056 crimes, with 1,033 (97%) against property and 23 (3%) against people. Much of the crime occurs in and around Laramie as this is the major population center of the county. In addition, drug and alcohol related offenses account for a large proportion of total crime in Albany County – in 2007, drug and alcohol were cases were responsible for 62 percent of total reported crimes.

Larimer County Public Services Profile. Fire fighting for the major portion of the county is provided by the Poudre Fire Authority (PFA), which is responsible for a territory of 235 square miles and covers 170,000 residents. The PFA has 166 full time employees, 13 fire stations (three of which are manned by 30 volunteer fire fighters), ten engine and two truck companies, and an office dedicated to fire prevention and public education.

With respect to law enforcement, Larimer County is similar to Albany County in that police services are provided for incorporated areas (cities and towns) by local police departments and for unincorporated areas by the county sheriff's office. In Fort Collins, police services are provided by 178 full time patrol and investigative staff supported by over 80 civilian personnel. The Sheriff's office is composed of 72 commissioned patrol officers and 12 investigators. There is approximately 1 law enforcement officer for every 1,000 residents in the county.

Crime in the county has fallen significant over the past decade, from a total of 5,972 crimes against property and people in 2000 to 4,989 in 2009. In 2009, there were approximately 18 crimes per 1,000 residents, which is a lower ratio than in Albany County, Wyoming.

HEALTH CARE

The availability of medical care and treatment is an important aspect of community well-being, and thus the extent to which health care services are sufficient to handle any additional demand resulting from a major construction project is a significant barometer of that project's potential impact.

Ivinson Memorial Hospital, located in Laramie, is the major medical care institution in Albany County and is a designated acute care facility. It is considered a full-service hospital with 99 beds and approximately 50 full-time physicians – it performs inpatient and outpatient surgeries and handles approximately 40,000 outpatient visits and over 4,000 emergency room visits annually.

In terms of emergency medical care, Ivinson is a state-certified Area Trauma Hospital, and all registered nurses in the emergency department are nationally certified in trauma, pediatric trauma, advanced cardiac life support, and pediatric advanced life support. It does not have a Medevac unit on-site, but it does have the facilities to accept patients brought to it by air ambulance. When it needs to call in an air ambulance, it uses the Medevac unit located in Greeley, Colorado at the North Colorado Medical Center.

More generally for Albany County, emergency services are provided to the entire area by the City of Laramie Fire Department. This service is partly supported by Ivinson Hospital, which pays the salaries of some of the fire fighters. In all, there are approximately 125 certified emergency service providers, 51 certified ambulance attendants, and 6 ambulances in the county. Most of these medical personnel and equipment are located in the Laramie area, however, and thus providing service to distant areas of the county can be a challenge. There have been efforts to establish mutual aid arrangements with other county's emergency services, which may in fact be closer to the scene of an accident or incident, but these have not successful to date.

In 2006, there were 18.8 physicians per 10,000 residents in Albany County, a ratio almost identical to that for the entire state, suggesting that medical care in the county is of a high quality. With respect to registered nurses, there were nearly 100 per 10,000 residents in 2006, a level of service ratio that is below that for the state overall.

Larimer County Health Care Profile. The major health care needs of the county are primarily provided by the Poudre Valley Health System (PVHS), based in Fort Collins. It provides a regional network of health care services and includes two major hospitals, Poudre Valley Hospital in Fort Collins and Medical Center of the Rockies in Loveland. The Poudre Valley Hospital is full service and has 226 beds; the Medical Center of the Rockies has 136 beds. The northern part of the county is also served by the Health District of Northern Larimer County, which was created in 1960 and is a special tax district—like a school, fire or sanitation district—that was created by voters to serve the health needs of the community and is governed by a publicly elected five-member board.

Emergency medical care is provided by PVHS ambulance service for almost the entire county. It has at least three emergency vehicles and paramedics and EMS crews in service at all times.

MUNICIPAL SERVICES

The major municipal services in Albany County are briefly described below.

Wastewater Treatment. There are five wastewater facilities in the county, with the two largest being in Laramie and Rock River. Given the projected size of the workforces for both projects, there is no issue with respect to capacity within either system.

Water. There are numerous water systems sprinkled throughout the county to serve those outside of Laramie. The Laramie system is, of course, the largest and most sophisticated. Rock River's system relies on surface water, while that in Centennial draws on groundwater.

Long-term access to adequate supplies of water is a key issue for the county and although there don't appear to be any major constraints at the present time, this may not be the case in the future. Wind energy production does not require significant amounts of water other during the construction phase (preparation of the concrete used in constructing the turbine foundations and suppression during the construction of access roads, clearing of vegetation, road grading, and road traffic) and this lack of need to draw heavily upon the county's water resources is a very positive aspect of wind energy.

TRANSPORTATION INFRASTRUCTURE

Similar to development of any large industrial facility, the site preparation, foundation construction, and turbine erection phases of constructing a wind farm place significant demands on the surrounding transportation system. Albany County has relatively good transportation assets – the major road systems are U.S. Highways 287 and 30, Wyoming 13, and Interstate 80.

I-80 is a four-lane, divided roadway that is a major thoroughfare not only for Wyoming residents but also for those going to points further west and east. It is heavily used by trucks, which comprise roughly 50 percent of vehicles that use it. Similar to any major interstate highway that gets heavy use, I80 is in a constant state of repair and upgrading, and there will likely be such projects ongoing during the wind farms' construction. There are no projects currently planned at the various intersections that might be impacted during the Hermosa West project. Nearly half of its volume is semi-trucks, so the road is maintained to accommodate heavy vehicular loads.

U.S. 287 is a two-lane roadway classified as a Minor Arterial Road by WYDOT, and it carried well over 3,000 vehicles per day in 2008 (WYDOT) and has a posted speed limit of 65 miles per hour. Trucks make up around 15 percent of its traffic.

The State of Wyoming monitors usage on these roads and the information for each is shown below in Table 14. For the Hermosa West project, U.S. 287 is a heavily used road for travel to Colorado by both passenger vehicles and trucks, and this should help to ease the absorption of the additional traffic associated with the project. Moreover, a recent upgrade to U.S. 287 added a turning lane at the Cherokee Park Road intersection, and this will improve traffic flow and safety in general, and will reduce any negative impact resulting from additional traffic related to the construction phase of Hermosa West.

There are no major limitations with respect to the central arterial roadways that will serve the project during preparation, construction, and operation. With respect to the secondary roads, however, there are challenges in terms of assuring that they are able to handle the anticipated loads and managing the deterioration caused by the construction process. In order to address these concerns, a clear plan should be developed with input from WYDOT and local officials that will assure the integrity of the roads and all contractor personnel will be informed of and required to abide by relevant federal, state, and local laws and regulations intended to protect the public and the environment.

Table 14
Road Usage – Average Number of Vehicles Per Day in 2008

	Hermosa West Project	
	U.S. 287 Laramie South	**U.S. 287 Tie Siding**
All Vehicles	3,620	3,400
Trucks	720	710
% Trucks	21	21

Impact Analysis

The following analysis estimates the potential impact of the proposed wind farm on the social and economic fabric of the local community near to the project and Albany and Larimer Counties. The focus will be on those issues for which baseline data is provided in the previous section, including employment, housing, education, medical care, municipal services, and transportation infrastructure.

SUMMARY OF RESULTS

Table 15 provides a summary of these potential impacts – such impacts can be conceptualized as the marginal effect of a particular impact (employment, number of trucks, etc.) on an existing baseline condition. If the marginal effect is small – for instance, if the aggregate number of workers on a project during the construction phase is less than one percent of an area's total labor force – then this suggests that the project's effect on the local labor market will be limited. From the data in the tables below it is evident that the intensity of the impacts from the Hermosa West project will vary.

It is important to note that with respect to the following discussion of the economic impacts of the wind farm, we do not take into account the payments made to the owners of private land that host turbines. There is no statistically relevant public information on such payments, but anecdotal evidence suggests that they are significant and in the case of a large wind farm could have a meaningful effect on a wind farm's marginal economic impact. In addition, we do not expect that the influx of workers from outside the area will have a demonstrable impact on the educational systems in either county – evidence from other wind farm projects shows that most non-local workers are single or are not accompanied by their families.

Hermosa West. Table 15 details Hermosa West's potential positive and negative economic and social impacts, and it is clear from an economic perspective that the benefits would outweigh any potential costs associated with its construction and operation. Large tax revenues would flow to the state and local government entities over the life of the wind farm, and a substantial number of jobs would be created both directly and indirectly. The local construction labor market would, assuming a normal level of slack, be able to handle the large demand for workers (50-60), but it might have the effect of tightening the supply-demand equation. Given the large number of workers that would be in the area for an extended period, there would also be a generous effect on local commercial conditions as a result of spending on goods and services.

With respect to potential negative impacts, the most salient concerns converge on transportation, medical and fire emergencies, and housing. U.S. 287 would be able to handle the peak construction traffic load without much difficulty, especially given the recent installation of a turning lane at Cherokee Park road, but there will be a significant impact on Cherokee Park and other secondary access routes – these roads are not accustomed to a high volume of construction vehicles and this could require roadway modification and traffic pattern adjustments.

The response time for fire or medical emergencies could be problematic given the distances involved. One way to overcome this challenge would be to consider investing in facilities, equipment, and training for developing a professional volunteer fire and medical emergency service at Tie Siding or another nearby site. This would not only meet the criteria for a meaningful social performance investment, but also would be considered a very positive act by local residents.

The supply of housing units could be significantly impacted by the influx of large numbers of nonlocal workers during the construction phase, in particular hotel/motel rooms and slots for parking mobile homes. Given the large number of apartments and homes for rent, it is unlikely that these segments of the housing market would be impacted by an additional 250 to 300 workers in the area over a 12 month timeframe. Support for the establishment of a mobile home facility near the project site would be an excellent way to enhance the overall social performance of the project – it would remove pressure on law enforcement in Laramie, and it would reduce traffic flows and possibly the number of roadway accidents.

Table 15 **Summary of Social and Economic Impacts** ***Hermosa West Wind Farm***	
	ECONOMIC
Employment	✓ Creation of approximately 350 construction jobs over a 12-16 month period, around 15% (or 50 workers) of which will be filled by local workers – this represents approximately 6-8% of the total local construction workforce ✓ Peak employment during construction will be 250 workers ✓ Creation of approximately 14-16 full-time operations and maintenance jobs ✓ Creation of 100-125 temporary jobs through indirect and induced effects ✓ Support development of high wage/skill local workforce
Government Revenue	✓ Increase state, county, and federal tax revenues which may total: ▪ $24.4 million in property tax payments over ten years ▪ $19.9 million in state sales tax on wind farm components ▪ $6.4 million in production excise taxes over ten years [redacted] ▪ $456,000 in sales tax on goods and services
Commercial Activity	✓ Support local business activity through direct, indirect, and induced effects flowing from purchases of products and services for project itself and by workers ✓ Total expenditures by nonlocal workers on lodging, food, gasoline, and entertainment is estimated to surpass $5.6 million
	SOCIAL
Housing	✓ The project will have an impact on the housing market, most notably by increasing demand for hotel/motel rooms and recreational vehicle lots – but the effect in aggregate will not be significant.
Transportation	✓ Peak construction period traffic will increase traffic load on U.S. 287, but new turn lane at Cherokee Park road will reduce the overall impact on traffic flow ✓ Significant increase in number and type of vehicles on secondary access roads leading to wind farm – analysis should be undertaken to determine most appropriate way to assure that there is not a serious reduction in the level of service for users and in the condition of roads
Emergency Medical	✓ EMS will be provided by the Laramie Fire Department, which could pose challenges given the remoteness of the wind farm – Medevac service is provided out of Colorado, and Ivinson Hospital (Laramie) can handle Medevac deliveries ✓ Increased traffic on U.S. 287 and on secondary access roads increases likelihood of vehicle accidents, especially during peak construction period
Medical Care	✓ Potential slight impact on the provision of basic medical care as population of Laramie would increase by nearly 1% - not significant enough to warrant action given Laramie's excellent medical facility and relatively large number of doctors
Law Enforcement	✓ Large influx of nonlocal construction workers will lead to an increase in the level of crime – the projected number of crimes that will be committed warrants consideration of measures to alleviate burden on local law enforcement services
Fire Protection	✓ Potentially significant problem given distance between service provider and wind farm and remoteness of location
Education	✓ No impact as most nonlocal workers will not be accompanied by family/children

EMPLOYMENT

One of the most significant impacts that the wind farms will have on the social and economic conditions in local communities and Albany County is through the creation of jobs. By using local workers and construction-related services and bringing in non-local workers (defined as those that do not live in the immediate project area), the wind farm will have an impact on the local economy and on the provision of public services.

Table 16 below provides estimates of the number and types of workers that the project will likely require over the course of its construction. These estimates have been made using Industrial Siting Applications and studies from the University of Wyoming (see Appendix A, *Impact of Wind Development on Local Economies – Preliminary Wage Findings).*

Table 16 Construction Workforce Estimates: Hermosa West	
Type of Worker	**Number**
Surveying	8
Road Construction	60
Foundation Construction	70
Electrical Construction	90
Turbine Erection	60
O & M Building	12
General Laborers	9
Security	4
Turbine Supplier Support	20
Field Office Supervision	12
Total	***345***

Each category of worker will be engaged at different times on the project and have varying tenures. For instance, road construction occurs during the first stage of the project, and electrical construction and tower erection takes place in the latter half. Assuming a 10-16 month construction timeframe, the first 3 to 4 months will see a gradual increase in the number of workers on site, followed by a period of 5 to 6 months when the workforce will peak. We anticipate that at its peak, the workforce will number 250 workers.

The other category of workers that needs to be considered is that which will operate and maintain the wind farm. Estimates vary as to as the precise number required given the size of a wind farm, but a general rule is around 10 workers for a 100MW facility and 14-16 workers for 200MW. Given this, we estimate that the Hermosa West facility will employ at least 14-16 full-time workers. Operational efficiencies could keep this estimate low as conventional wind farms continue to be improved through operational excellence initiatives.

Local vs Non-Local Workers. One factor that will determine the overall economic impact of the wind farms, including their affect on the labor market, is the extent to which the workers hired in the construction phase are drawn from the local area. (It is assumed that the majority of workers that manage and maintain the wind farm will be drawn from the local area.) A higher proportion of the workforce sourced from the local area would mean, under certain assumptions, the project would provide a stronger boost to the local economy than if a higher proportion were to come from outside the area.

Data on the extent to which wind farms source local labor is not definitive, but based on past experience it can be assumed that a proportionately smaller percentage of the construction workforce will come from the local area. There are a number of potential reasons for this, including a shortage of the right kinds of specialized skills and the use of contractors from out of the area that bring a substantial number of workers with them. One recent study (*Impact of Wind Development on Local Economies – Preliminary Wage Findings*) estimated that only three types of jobs have had 40 percent or more of local workers; surveying, construction of the operations and maintenance facility, and security. Another estimate, this one contained in a submission under the Industrial Development and Information Siting Act, noted that the company anticipated that total constructions held by local workers would be in the range of 18 to 24 percent.

This has numerous implications with respect to the potential impact of the project on the local and county economies, and on the provision of public services.

HOUSING

A proportionally greater number of workers from outside of the project area mean a larger impact on the local housing market. Because the major construction phases of wind farm projects tend to last for a relatively short period, usually over a span of 6 to 8 months, the impact is short term. In order to analyze the potential impact on local housing resources, we have made a number of assumptions concerning the proportion of workers that will come from outside the area.

For Hermosa West, the total workforce that will be used to construct the wind farm is estimated at 345, of which we assume 85 percent are not local, or roughly 300; of this 300, we assume that 80%, or 240 workers, will live in Albany County and that 20%, or 60 workers, will live in Larimer County, Colorado. Other assumptions are that: the peak workforce will number 250 workers, with 210 living in Albany County and 40 living in Larimer County; the nonlocal workers will be single or will not be accompanied by their families; and, the nonlocal workers will rent accommodations during the project.

Two final assumptions are 1) 25 percent of the nonlocal workers will share accommodations, and that the remaining 75 percent will seek out individual living situations; and 2) workers will select types of housing proportionally similar to that observed in other wind farm developments. With respect to the latter assumption, it is anticipated that roughly 75 percent of workers will opt for living in hotel/motel rooms; 14 percent in single-family homes; 7 percent in recreational vehicles; and, 5 percent in apartments or mobile homes.

Based on the above assumptions, the peak demand for housing from the construction of Hermosa West will be 210 units in Albany County and 40 units in Larimer County. Table 17 below shows how this demand will be distributed across the different types of housing. Since the size of the workforce will vary over the life of the project, the actual demand for housing at any particular time will also vary, but it’s likely that during the peak months of operation the workforce, and thus the related demand for housing, will approach the figures provided below.

Table 17
Hermosa West:
Demand for Different Accommodations

Accommodation	Albany	Larimer
Hotel/Motel Rooms	157	30
Single-Family Homes	29	6
Recreational Vehicles	15	3
Apartments/Mobile Homes	9	1
Total Demand	210	40

Table 18 below shows the affective supply of different types of housing units in the city of Laramie. In all cases other than for recreational vehicles, there is an excess of supply over the potential demand for housing of the projected workforces for Hermosa West. The market for apartments and single family homes will be little impacted as the supply far outstrips that of projected demand.

Table 18
Supply of Housing Units in Laramie

Accommodation	Number	Vacancy Rate	Available Units
Hotel/Motel Rooms	1,545	15.0%	231
Single-Family Homes	6,150	9.7%	590
Recreational Vehicles	115	5.0%	6
Apartments/Mobile Homes	5,325	4.0%	213

Hotel/motel rooms will also be sufficient in number, although the potential demand of 157 units would considerably tighten the market. Potentially problematic is the supply-demand dynamic for recreational vehicle spaces; given the small number of spaces and the low estimated vacancy rate, there may be insufficient supply to accommodate the demand from the Hermosa West project.

Larimer County Housing Impact Assessment. Given the above assumptions, the total demand for housing in Larimer County arising from construction of the Hermosa West project would be 53 units, with a peak demand of 40. The vast majority of these at the peak period would be for temporary accommodations in hotels/motels; as shown earlier, there are more than 70 hotels and motels in Larimer County with a conservatively estimated total bed count in excess of 2,000. Even assuming an extremely low vacancy rate of 5%, the number of temporary accommodations available is highly likely to far exceed the demand flowing from the Hermosa West project.

In terms of the projected increase in demand for single family homes, recreational vehicle slots, and apartments, the very small number in each category will have no impact on the available supply in Larimer County or the Fort Collins area. For example, a demand for an additional 3 apartment rental units is immaterial in a market with around 19,000 total units.

We believe that the number of workers that will live in Larimer County during construction of Hermosa West will have not have a significant impact on the housing market.

Impact on Property Values. Assessing the potential impact of a wind farm on property values in surrounding areas has to be based on the variables and influences uncovered in research on other wind farms. Although such impacts have been the subject of research in the United States, until recently there had been no comprehensive studies across different wind farms and geographies that provided reasonably conclusive evidence. This research deficit has been rectified, however, by the issuing of a report in December 2009 by the Ernest Orlando Lawrence Berkeley National Laboratory entitled, “The Impact of Wind Power Projects on Residential Property Values in the United States: A multi-Site Hedonic Analysis.”

The research focused on the sale prices of 7,500 single-family homes within 10 miles of 24 wind farms in nine states. In none of the cases analyzed was there a significant impact on the sales price from being either able to view the wind farm or in relatively close proximity to it. The study does not rule out the possibility of property values being negatively impacted by wind farms, but it concluded that “if these impacts do exist, they are either too small and/or too infrequent to result in any widespread, statistically observable impact.” (see pg. iii.)

The results of this study do not provide absolute assurance that the property values of homes in proximity to the turbines of the proposed Hermosa West wind farm will not decline. As in any transactions involving significant assets, the factors affecting price are complex and will vary depending on the details of each transaction. It is not possible, given the current state of economic modeling with respect to wind farms, to forecast the potential impact on property values of proximity to the turbines/wind farm. The Lawrence Berkeley labs study does suggest, however, that the frequently heard argument that wind farms negatively impact property values may not, in fact, be true and, at the very least, is not supported by the available empirical evidence.

PUBLIC SAFETY

Police Services. Law enforcement within the project areas would fall to the Albany County Sheriff department and to the police departments in Laramie. Assuming that approximately 300 nonlocal workers are employed on the Hermosa West project and that many, if not most, live in and around Laramie, then this could increase the number of crimes committed by 10, or an increase of around 1 percent above current levels. At the current time, there are roughly 1.9 police officers per one thousand residents in Laramie (Level of Service measurement, or LOS), which is below the national average and that of many other cities in Wyoming. It could be argued that the increased number of residents resulting from the Hermosa West project could warrant some supplement to law enforcement staffing in Laramie.

Fire Protection. The number of nonlocal workers that would be added to the area for the Hermosa West project will not have a material impact on the provision of fire services. Based on the LOS ratio of 2.6 in Albany County and the assumption that many of the workers will reside in Laramie, the addition of up to 300 nonlocal workers will not require an upgrading the fire service.

Fire protection for the Hermosa West project area would be provided by the Laramie Fire Department and, potentially, the Vedauwoo Volunteer Fire Department. The Vedauwoo volunteer fire department does not provide emergency medical services (although Medicine Bow's does), and thus these would have to be provided out of Laramie.

Emergency Medical Service (EMS). There are a variety of circumstances when EMSs could be needed, including incidents on the project site and vehicle accidents involving workers commuting to and from the work areas. The Laramie Fire Department is responsible for providing EMS to all of Albany County, and thus it would be the principal responder to the Hermosa West project site. Emergency medical evacuation (Medevac) receiving facilities are available through Ivinson Memorial Hospital in Laramie, but it does not have a Medevac unit on site. It instead relies on the unit based at the North Colorado Medical Center in Greeley, Colorado.

Given the distances and time involved in getting ground-based EMSs to the proposed project site, there is a need for consultation with the Laramie Fire Department as well as the local volunteer fire departments at Tie Siding in order to better understand the issues and challenges of providing EMSs. Consideration should be given to creating EMS capabilities (training and equipment) within the Tie Siding volunteer fire department in order to shorten the response time to emergency situations.

Larimer County Public Services Impact Assessment. Assuming that 50-60 nonlocal workers decide to live in Larimer County, their impact on the provision of law enforcement, fire protection, and medical services will not be significant. Fort Collins has well developed police and fire protection services that appear to be adequately staffed and resourced, and the addition of a small number of residents to a population base in the hundreds of thousands does not portend major issues arising. Likewise with respect to medical facilities, Larimer County is home to two major hospitals with and a network of outpatient facilities and clinics that would be unlikely to feel the addition of 60 people to the area.

MUNICIPAL SERVICES

Even assuming that the Hermosa West project were constructed at the same time as potentially others in the county, and thus between 300 and 400 additional residents were added to Albany and Larimer Counties for a period of 6 to 16 months, the impact on municipal services in either county would not be significant.

TRANSPORTATION

A detailed study of future traffic patterns based on the likely impact of project implementation and any proposed road construction and upgrading projects needs to be completed in order to provide a definitive perspective on transportation impacts. This will require detailed information on the project's size, exact workforce, and road usage. At this point in time, however, we can draw some general conclusions based on current information and the results of traffic analyses done for other wind farm projects.

The majority of the traffic generated by the project will be construction vehicles delivering materials and workers, and specialized hauling vehicles bringing the various pieces of the turbines to the site. In terms of the intensity of traffic flow, the construction phase will present the greatest demands on the transportation infrastructure and thus the following analysis focuses on this phase for the proposed project.

Construction will involve the following elements:

- Construction of and improvements to the project access roads off of the main highways
- Stripping and stockpiling of top soil
- Excavation and construction of turbine foundations
- Excavation and construction of the substations and other buildings
- Erection of the wind turbines
- Excavation and installation of electrical cabling

In terms of the traffic going to the project site during the construction phase, this will include three principal types of vehicles: cars/trucks bring workers to and from the site; transporter vehicles for the various components of the turbines (tower sections, nacelles, blades, etc.); and general heavy haulage construction vehicles (cement and gravel trucks, dump trucks, etc.). The number and type of vehicles accessing the site will depend on the construction phase, with the heaviest period being the months when there is an overlap between the completion of the turbine foundations and the beginning of the turbine erections. This period will involve the largest number of workers on site at any point during the project, combined with a still high number of heavy haulage trucks and the turbine transporter vehicles.

The principal arterial roadway for the Hermosa West project will be U.S. 287 south from Laramie to Tie Siding. This is a multiple lane highway that handles a significant level of traffic owing to the fact that it is one of the main roads south into Colorado and the Fort Collins area. County Road 31 (or Cherokee Park Road) will be the main access road off of U.S. 287 – it is primarily used by residents in the area and as a connection to County Road 319 and the residential developments further west along the border with Colorado. It is not a heavily used road and the state does not collect detailed traffic data on its usage.

Although U.S. 287 is considered an extremely dangerous road as it approaches Fort Collins, there have been relatively few fatal accidents in the stretch between the Laramie and the state border. That is not to say that some stretches of U.S. 287 south of Laramie are not dangerous, particularly in bad weather, but rather to make the point that the main roadway that would handle much of the traffic for the Hermosa West project does not have a significantly greater number of serious or fatal accidents than other major roadways in Wyoming.

Table 19 provides estimates of the number of construction and personal vehicles that will be accessing the project site and using the roads during the peak period of construction. It is assumed that the wind farm will take approximately 16 months to build and that the 8th through the 13th months will have the most vehicle traffic. As is the case with Sand Hills, vehicles transporting workers account for a large proportion of the traffic. Underlying our analysis are the assumptions that 250 workers will be on site during the peak construction period and that some of these workers will commute together (1.2 per vehicle) – therefore, on a peak day 208 vehicles will be commuting to the project carrying 250 workers. Additional assumptions are that all major road construction and improvements will be completed in the first 4 months of the project, and that there will be a cement batch plant established on or near to the site, and thus cement trucks will not be traveling on the major roadways to and from the construction site.

The number of vehicles accessing the construction site during its peak month of activity is estimated to be just under 6,600, or a daily average of approximately 253 one-way and 500 two-way trips (assuming 26 working days per month). This amounts to an increase of 10-15 percent of the daily traffic volume on U.S. 30/287 as measured at Laramie South and at Tie Siding. If one assumes that approximately 15 percent of the daily traffic volume on U.S. 287 occurs during rush

Table 19 Number of Vehicles Traveling to Project Site – Hermosa West			
Activity	**Project Total**	**Peak Month**	**Peak Day**
Workers	--	5,408	208.0
Road Access	4,000	60	2.3
Water	1,600	250	9.6
Turbine Foundation	1,400	400	15.4
Turbine Electrical	200	80	3.0
Turbine Erection	1,400	400	15.4
Total	**--**	**6,598**	**253.2**

hour and that an even higher percentage of the project-related traffic occurs at this time, then it is very likely that the impact of the project-related traffic will be even greater in terms of percentage of traffic volume.

It is important to consider the volume of traffic that a particular road can handle without a severe deterioration in service. U.S. 287 is considered a Class A roadway, and although the increase in traffic related to the peak period of activity for the Hermosa West project would unquestionable lower this ranking, in our opinion it will not reduce it below an acceptable level of service. In addition, the recent addition of a turn lane at the County Road 31 exit will significantly reduce the level of congestion associated with vehicles exiting U.S. 287 for the project. Because of this, we do not believe that investment will be needed to upgrade U.S. 287.

With respect to County Road 31, detailed traffic data is not available but it is nonetheless clear that the construction of the wind farm will cause a significant increase in the number of vehicles on what is, primarily, a road used by local residents. Although this will be for a relatively short period of time, it nevertheless will have a noticeable impact on the normal pattern of traffic and present a change for those users accustomed to the normal vehicle load. It will thus be necessary to conduct a more detailed study of the potential need to modify the road to accommodate the increase in number and type of vehicles that will be using it – among the possibilities include changing the road's surface and/or widening it.

TAXES

Wyoming has a long history of receiving significant tax revenues from oil & gas and coal operations and to this day the state relies heavily on these industries to fund its operations. Many of the stakeholders interviewed during BSR's visit to the area in September 2010 expressed the opinion that although the other energy industries have significant environmental impacts, the benefits that they provide in the way of tax revenues and community relations programs serve to offset the negative environmental effects.

There are a variety of streams of local, state, and federal government revenue that are generated by wind farms, including: property taxes; sales, use, and lodging taxes; excise tax on wind production; and state trust land fees.

The land for the Hermosa West project is owned privately and by the State of Wyoming through its Office of State Lands and Investments. For purposes of the following analysis, the cost of the project is estimated to be $475 million, which equates to $1.6 million for each megawatt of power produced and $2.3 million for the installation of each of the 200 wind turbines. This estimate is likely to be conservatively low for revenue projection estimating purposes.

Property Tax. The first step is to establish the fair market value of the project by discounting it using a market to book-value ratio of 80 percent – this yields a fair market value of $380 million. Next, the fair market value of the property is discounted by the state of Wyoming's assessment ratio for industrial properties of 11.5 percent – this leaves an assessed valuation of $43.7 million.

The assessed valuation is the base upon which the property tax is calculated. Albany County's tax levy is 66.718 mills, and applying this rate to the assessed valuation of the project of $43.7 million yields a first year property tax on the Hermosa project of $2.91 million. Depreciating the wind farm by 4 percent per year while holding steady the mills rate yields total property tax revenues of $13.4 million over the initial 5 years of the project and $24.4 million over 10 years. Even though property tax revenues will decline owing to depreciation, the tenth year of the project would still result in a tax charge of $2.01 million.

Sales Tax. Assuming that the state sales tax will apply to this project, there will be a 6 percent levy (4 percent at the state level and an additional 2 percent levied at the local level) on the purchase of various components of the wind farm. Based on the estimate that 70% of the project's cost would be subject to the 6 percent tax, the total sales tax revenue generated for the state and local governments would be $19.9 million.

State and local governments will also benefit from taxes generated by the purchase of goods and services, such as food, lodging, and entertainment, by non-local workers. The state-wide sales tax is 4 percent, and counties are allowed to levy three additional taxes: general purpose optional (1%); specific purpose optional (1%); and, lodging (4%).

In order to calculate the potential sales tax revenues generated by the construction of the Hermosa West wind farm, we have made a number of assumptions, including:

- Construction will last for 15 months
- 345 workers will be employed on the project
- 300 workers will be nonlocal – 240 in Albany County and 60 in Larimer County, Colorado
- 75 percent of the nonlocal workers will live in hotels/motels
- Daily taxable expenditures will total $132 and cover four categories:
    1. Lodging - $70
    2. Meals - $25
    3. Entertainment/Recreation - $25
    4. Gasoline - $12

Table 20 sets forth the taxes that will be generated by the purchases of nonlocal workers, and estimates that they will come to approximately $400,000. It should be noted that the estimate for the lodging tax revenues is subject to revision given that there is no tax imposed on visitors that stay for more than 30 days in the same lodging.

Table 20
Total Excise Tax Revenues Generated by Nonlocal Workers: Hermosa West Wind Farm

Type of Tax	Revenue ($)
Sales Tax	195,624
Optional Tax (General)	48,900
Optional Tax (Specific)	48,900
Lodging Tax	103,700
Total	***397,124***

Excise Production Tax. The Wyoming legislature recently passed a new tax on wind energy production equivalent to $1 per megawatt of electricity produced. There is a 3 year grace period that begins at the moment a wind farm starts production. Given that the Hermosa project is 300 megawatts, the total potential tax revenue is $2,628,000. But wind turbines do not operate at full capacity, and in this study we use a 35% utilization factor. Adjusted using this factor, the excise production tax on the Hermosa West wind farm will generate approximately $920,000 of revenue each year that will divided among the county ($552,000) and state ($368,000).

Assuming that the tax rate does not change, the tax revenues that will flow to the county and state over the life of the project are shown below. (Please note that the calculation in years 1-10 takes into account the 3 year grace period.) If the project operates for 40 years, the total tax revenues will be $20.4 million for the county and $13.5 million for the state.

- Years 1–10
    - Total: $6,440,000
    - County: $3,864,000
    - State: $2,576,000
- Years 10 – 40
    - Total: $27,600,000
    - County: $16,560,000
    - State: $11,040,000

State Lease Revenue. The Hermosa West wind farm will mostly be developed on private property, but there will be some turbines located on state trust land – the assumption underlying our analysis is that 65 of the 200 turbines will be located on state-owned land. There are a number of different taxes associated with renting state trust land, and each is set forth below.

1. An acreage fee is assessed from the point at which the agreement is signed and until the start of construction. This amounts to [redacted] per acre leased for the first four years and [redacted] per acre for years 5-8. We assume that construction will begin in year 5, and thus the fee will total [redacted].
2. A construction tax is levied equal to [redacted] per megawatt of installed capacity. Assuming that 65 turbines are placed on state trust land and that each has a capacity of 1.5MW, then the total installed capacity will be 97.5MW. This one-time tax will thus be [redacted].
3. Once operational, the wind turbines located on state land will be subject to a royalty fee that is equivalent to 4% of their gross annual revenues for the initial 20 years of operation, and 5% for the next 30 years. Gross annual revenues can be estimated based on the price of electricity, the amount of power produced, and the capacity of the turbine. Assuming that each 1.5 MW turbine operates at 35 percent of capacity, then the average number of hours of operation in a year will be 3,066 and the average number of megawatts produced annually will be 4,600. The market price for electricity varies considerably over time, location, and end-user, but we will assume a price of [redacted] per megawatt of electricity produced. Based on the above assumptions, each turbine will produce [redacted] of revenue per year.

   Therefore, total gross revenues for all of the turbines will be [redacted], and for years 1-20 the royalty payment will be equal to [redacted] and for years 21-40 it will equal [redacted]. The projected royalty payments are shown below.

   - Yrs 1–20: Annual payment per turbine, [redacted]; wind farm, [redacted]
   - Yrs 21-40: Annual payment per turbine, [redacted]; wind farm, [redacted]

   Given the above assumptions, the Hermosa wind farm will make royalty payments to the state on the order [redacted] over the first twenty years of production and [redacted] over the second 20 years of operation.

Tax Revenue Implications of Hermosa West. Wind farms have been criticized in Wyoming for their alleged lack of potential to generate significant tax revenue for the state and local governments. As the above analysis shows, however, the proposed Hermosa West wind farm would in fact provide a considerable revenue stream for the various levels of government.

Table 21 below shows all of the taxes that would be paid to the federal, state and local governments extending out over a period of 10 years. With respect to Hermosa West, the initial 2-3 years of construction and operation would result in tax payments exceeding $25 million, and thereafter total tax payments would be in the range of $3 million annually.

Balance Between County and State Benefits. The most significant benefits flowing to both the county and state from the Hermosa West project will be the various streams of tax revenues. There are other benefits, of course, including support for business development and community-based programs, but the revenue enhancement that the project will bring outweigh these considerations.

Assuming that the wind farm operates for 40 years and achieves an average capacity utilization of between 30 and 40 percent, the total taxes generated for the state by the end of this period will be $59.5 million. The vast majority of this revenue will flow from three sources: 1) the sales tax on purchased components of the wind farm; 2) the royalty fee assessed for turbines placed on land leased from the state; 3) and the newly enacted excise production tax.

Under the same assumptions concerning the productive life of the wind farm, Albany County will be the beneficiary of $85.8 million in tax revenue as a result of the construction and operation of Hermosa West. The two principal sources of revenue will be the property tax levied annually on the operating assets of the wind farm and the excise production tax.

Table 21
Potential Tax Revenues

Hermosa West	
Property Tax	Year 1 - $2.9 million (annual, declining) Year 10 – $2.0 million 5 Yrs. – $13.4 million 10 Yrs. – $24.4 million
Excise Production Tax	Years 1-10 Total: $6,440,000 County: $3,864,000 State: $2,576,000
Sales Tax (Project Components)	$19.9 million
Sales and Optional Taxes (Goods and Services)	$397,000 (during construction)
State Land Trust	Acreage Tax - [redacted] Construction Tax - [redacted] Royalty Tax – Annual Payment ➢ [redacted] (years 1-20) ➢ [redacted] (years 21-40)

Appendix A

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APPENDIX M

SHELL WIND ENERGY HERMOSA LEASE AREA: POTENTIAL FOR DEVELOPMENT OF ECONOMIC RESOURCES

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DAUB & ASSOCIATES, INC.

1985 ½ SOUTH BROADWAY
GRAND JUNCTION, CO 81507-9649
(970) 254-1224
FAX (970) 242-8438
Email: gjdaub@daubandassociates.com
www.daubandassociates.com

Shell Wind Energy

Hermosa Lease Area

Potential for Development of Economic Resources

Prepared for:

Shell Wind Energy, Inc.

Hermosa Wind Farm Project

Albany County, Wyoming

Prepared by:

Daub & Associates, Inc.

Grand Junction, Colorado

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Introduction

Shell Wind Energy is researching the feasibility of establishing wind energy farms on two leases in Wyoming, located immediately north of the Colorado-Wyoming border. These leases, known as the Hermosa West Lease and Hermosa East Lease, are located in parts of T12N R73W, T12N R72W, T13N R73W, T13N R72W, T13N R71W, and T14N R72W, in Albany County, Wyoming (Plate 1). The location of the wind energy farms on these leases is dependent in part upon the potential for the development of economic resources both at the surface and in the subsurface, as well as the topography and the presence of pre-existing structures on the leases. Additionally, surface and subsurface mineral ownership within the lease area is a factor. Those areas with a higher potential for economic development may not be suitable for wind turbines. This report is the product of an exhaustive review of the geology, topography, and surface and subsurface mineral ownership as found on and below the leases. A list of the references used in the compilation of the maps and text is included in Appendix 1. All plates referred to in the text can be found in the pocket at the end of this report.

Geology

A geologic map for the vicinity of the leases is shown on Plate 2. Precambrian basement igneous and metamorphic rocks, consisting largely of granite and gneiss, underlie the vast majority of both leases. Paleozoic sedimentary rocks are almost entirely restricted to the northwestern section of the Hermosa West Lease. Quaternary alluvial, alluvial fan, and terrace deposits are also more commonly found in the northwestern portion of the Hermosa West Lease. Rare Devonian kimberlite diatremes are found locally within the Hermosa East Lease, with one occurrence noted within the southeastern portion of the Hermosa West Lease (as shown on Plate 3). Structurally, a number of thrust and reverse faults are present in the lease areas. These faults, between 70 and 40 million years old, are a product of the Cretaceous-Tertiary Laramide Orogeny. Quaternary and recent alluvial deposits overlie the faults in a number of areas, which suggests they have long been inactive.

The Precambrian basement igneous and metamorphic rocks include the Sherman Granite (Ys), Sherman Granite inner cap rock phase (Ysi), Virginia Dale ring structure diorite (Ydi), and Laramie and Medicine Bow Mountain metasedimentary and metavolcanic rocks (Xsv) (Plate 2). Although uranium mineral occurrences have been noted in the area in association with these rocks (Plate 4), there are no active uranium mines within the

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lease areas. Aside from quarrying for rip-rap or decorative stone, there is no other known economic value for these rocks.

The Paleozoic sedimentary rocks include the Fountain and Casper Formations (PPcf). As noted on the geologic map, the Casper Formation is a well-cemented sandstone with interbedded limestone and dolomite deposits. Closer to Laramie, Wyoming the Casper Formation is locally quarried for cement or gravel from the carbonaceous interbeds, and it serves as the primary aquifer for the Laramie area. Additionally, the Casper Formation has been found to be a reservoir for heavy oil at the Little Laramie and Herrick Fields in Townships 16/17N and Ranges 75/76W, located approximately 30 miles from the Hermosa project area. The Fountain Formation underlies the Casper Formation and consists of a well-cemented arkosic conglomerate. The Fountain Formation is not believed to have much economic value except possibly as an aquifer.

Quaternary units present include unconsolidated fine to coarse alluvial sediments (Qa), older alluvial fans (Qof) and older terrace (Qot) deposits. Unconsolidated alluvial sediments are the youngest materials on the leases, and are between 0 and 50 feet thick. These sediments might be utilized as sources of aggregate. The older alluvial fan and terrace deposits are the oldest of the Quaternary deposits, and are between 0 and 10 feet thick. These units might be sources of aggregate, but are not as thick, are more consolidated, and are less continuous than the Qa deposits. With the exception of one small (10 acre) sand and gravel operation located in Section 22 of T13N R72W (Plate 4), there are no existing aggregate, sand, or gravel operations within the Hermosa lease area.

The Devonian kimberlite diatremes have a potential for economic development, as they may contain diamonds and include semi-precious indicator minerals. There are no currently operating kimberlite mines in the area, and no known kimberlite mines have ever been active on the leases. The kimberlite outcrops are rare and localized. The only known diamond-producing kimberlite mine was in northern Colorado, and closed due to poor economic conditions.

The following is a discussion of the geology found on each of the respective leases.

Hermosa West Lease Geology

The Hermosa West Lease can be subdivided into two areas, a northwest portion and a southern portion. Most of the northwest portion of the Hermosa West Lease is underlain by the Casper and Fountain Formations and northeast to southwest trending deposits of unconsolidated alluvium and older alluvial fan deposits. Petroleum reserves have been found in the Casper Formation in other areas of Wyoming. However, due to the surface expression or shallow subsurface presence of the Casper Formation in the northwest section of the Hermosa West Lease, it is likely that any oil deposits that may have been present are now gone. Potential use as an aquifer and/or as a source for gravel and cement materials remains a possible utilization of the Casper Formation. The extensive alluvial deposits in the northwest portion of the Hermosa West Lease represent a potential for aggregate development in nearly all sections of the lease area, with the exception of Section 35 of T13N R73W and Sections 2 and 3 of T12N R73W (Plate 2).

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These deposits are as much as 3,000 feet wide, between 0 and 50 feet thick, and are laterally continuous through much of their occurrence on the lease. Due to the presence of alluvial formations in this portion of the Hermosa West Lease, nearly all of this area represents a potential for subsequent aggregate development, although economic viability is unknown. To economically develop an aggregate, a deposit requires a substantial amount of work along with an end user fairly close to the deposit. It was also noted that a single kimberlitic indicator mineral was identified in the SW ¼ SW ¼ of Section 28, T13N R73W (Plate 3).

The southern portion of the Hermosa West Lease is underlain predominantly by Sherman Granite. Sherman Granite has complete surface expression in Sections 7, 8, and 18 of T12N R72W and Section 13 of T12N R73W. Substantial older alluvial fan deposits are found in the northern part of this lease area, specifically in Section 36 of T13N R73W and Section 31 of T13N R72W (Plate 2). The Casper and Fountain Formations are exposed in the western half of Sections 25 and 36 of T13N R73W. Minor unconsolidated alluvial deposits (Qa) are restricted to Sections 17 and 20 of T12N R73W. Metasedimentary and metavolcanic rocks (Xsv) are found in Sections 25 and 36 of T13N R73W and Section 31 of T13N R72W. The southern portion of the Hermosa West Lease also includes three occurrences where 6 to 10 kimberlitic indicator minerals were identified, two of which occur in the NW ¼ NE ¼ of Section 8, T12N R72W in association with the Aultman 1 Kimberlite (Plate 4), and one which occurs in the NE ¼ of Section 19, T12N R72W (Plate 3). These are all part of the State Line Kimberlite complex. Due to the predominance of Precambrian rocks in the southern portion of the Hermosa West Lease, it is unlikely that economic development of surficial materials will occur in the near future. A possible exception might include the potential for aggregate development from the older alluvial fan deposits and unconsolidated alluvial deposits in the areas described above.

Hermosa East Lease Geology

The Hermosa East Lease similarly can be subdivided into two areas, a small northwest portion and a larger eastern portion. Sherman Granite underlies nearly all of the northwest portion, with the exception of minor outcrops of Casper Formation in the northeast and northwestern corners (SW ¼ of Section 18, T13N R72W and SE ¼ of Section 13, T13N R73W) (Plate 2). This being the case, it is improbable that future economic development will take place on these lands.

The eastern portion of the Hermosa East Lease is predominantly underlain by Sherman Granite, and it underlies all of Sections 22, 26, 27, 34, and 35 of T13N R72W, and Sections 3 and 11 of T12N R72W (Plate 2). It does not appear that any of these sections would be economically developed for aggregate or minerals. A small outcrop of Quaternary terrace deposits, Casper Formation and metasedimentary and metavolcanic rocks occurs only in Sections 28 and 33 of T13N R72W (Plate 2). It is also highly improbable that economic mineral development would occur in these sections. Unconsolidated, laterally continuous alluvial deposits (Qa) as much as 1,000 feet wide and 0 to 50 feet thick are prevalent in Sections 1, 12, 13, 24, and 25 of T13N R72W in association with Pump Creek and Dale Creek, and Sections 9, 15, 16, and 22 of T12N

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R72W in association with an unnamed creek. The extent of these deposits may make them attractive to develop, but if located in a creek bed they are unlikely candidates for development.

Two kimberlite diatremes are present in Section 9 of T12N R72W, one in the SW ¼ of the NE ¼, and the other in the NE ¼ of the NW ¼ (Plates 2 and 4). These are known as the Ferris 1 and Ferris 2 Kimberlites. Additionally, single occurrences of one kimberlitic indicator mineral have been indentified in the NE ¼ NE ¼ and SE ¼ SW ¼ of Section 23, T13N R72W, as well as in the SE ¼ NE ¼ of Section 4, T12N R72W (Plate 3). Four occurrences of 6 to 10 kimberlitic indicator minerals have been identified in this portion of the lease, two in the NW ¼ of Section 9, T12N R72W, and two in the NW ¼ of Section 16, T12N R72W (Plate 3). These occurrences with 6 to 10 kimberlitic indicator minerals are part of the State Line Kimberlite Complex. The kimberlites present in Sections 16 and 21 of T12N R72W are more specifically known as the Schaffer Kimberlite Complex (Plate 4). Though no kimberlite/diamond mines are active at these areas, there is a slight potential that these could be exploited at some future time.

General Geological Conclusions

Table 1 displays the potential economic resources that may have development potential from the two leases. Aggregate is considered to be the most probable resource for subsequent development, due to prevalent alluvial deposits found in areas on both leases. The unconsolidated nature, thickness, exposure at the surface, and continuity of the Qa deposits make them more likely for development than the older alluvial fan and terrace deposits (Plate 2). An inactive gravel pit is noted on the topographic map (Plate 1) in the NE ¼ of Section 24, T13N R72W. Future development of aggregate on the leases is considered a possibility for the areas on which the alluvial sediments occur. However, with the exception of one small sand and gravel operation located in Section 22 of T13N R72W (Plate 4), there are no active or inactive sand, gravel, or aggregate operations within the lease boundaries at the time of this report. The development of an aggregate operation requires extensive exploration drilling, permitting, and a relatively close end user to be profitable. None of these attributes are known to exist within the Hermosa Lease area.

Diamond and indicator mineral-producing kimberlites are considered the second most likely to be developed, though development would likely be localized to the known areas of kimberlite occurrence on the lease area as described above and seen on Plates 2, 3, and 4. It is not anticipated that new kimberlites will be discovered in the future on the leases. Future development of kimberlites on the leases is unlikely but remains a possibility. The one attempt to develop a similar kimberlite occurrence in Colorado proved to be uneconomical.

Carbonate source rock for cement is considered to be the third most likely resource for development. This potential is restricted to the limestones and dolomites of the Casper Formation, which are found mainly in the northwestern portion of the Hermosa West Lease. There are no other known occurrences of surface or subsurface carbonate rocks

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Table 1. Primary Potential Economic Resources in the Shell Wind Energy Hermosa Lease

Resource	Likelihood for Development	Formations	Comments
Aggregate	Likely	Quaternary alluvial sand and gravel and terraces	Substantial deposits located in T13N, R73W; minor deposits in T13N, R72W. Unconsolidated alluvial sediments are thicker (as much as 50 ft) and more continuous than older alluvial fan and terrace deposits, and have the greatest potential for development. A single 10 acre aggregate mine is currently operating on lease land in the NW 1/4 SW 1/4 S 22 T13N R72W.
Diamonds/Kimberlite Indicator Minerals	Not Likely/Possible	Precambrian and Devonian kimberlites	State Line Kimberlite District and most of the known kimberlite pipes are located within the prospective development area. Currently inactive and not economically viable to exploit. Possible by-products of gold and related diamond indicator mineral gemstone associations. Potential for future development, though no current diamond/kimberlite indicator mineral mining operations currently exist on lease lands.
Cement	Not Likely/Possible	Pennsylvanian Casper Formation	Carbonate interbeds of the Casper Formation are locally quarried for cement and gravel in the Laramie area. Quarrying of the Forelle Limestone (present in the area but not on the leases) is more likely. No cement mining operations currently exist on or around lease lands.
Uranium	Not Likely/Possible	Precambrian igneous and metamorphic basement of Laramie Mountains	Known mineral occurrences on lease land in pegmatite (S 3, T12N R72W) and inactive placer mine adjacent to lease land (S 2, T12N, R72W). Very localized occurrences, and likely not present in enough quantity to be profitable. No current uranium mining operations exist on lease lands.
Oil	Not Likely	Pennsylvanian Casper Formation	Closest known resource of heavy oil found to the northwest in the Little Laramie and Herrick Fields (T16/17N, R75/76W), located approximately 30 miles away from the Hermosa Lease. Casper Formation is found at the surface in much of T13N, R73W, and some of T12N, R73W and T13N, 72W. Any oil deposits that may have been present are likely gone.
Natural Gas	Not Present	na	Closest known resource is to the northwest at the Big Hollow Field (T15N, R75W) in the Cretaceous Muddy Sandstone, located approximately 25 miles away from the Hermosa Lease. No Cretaceous units are present in either the surface or subsurface of the prospective area, and gas in not expected to be found in the Chugwater or Casper Formations.
Coal, Coalbed Methane, and Carbon Dioxide	Not Present	na	Closest known resources are in the Rock Creek Coal Field, located approximately 50 miles to the northwest (T20N, R76W) of the Hermosa Lease. Subbituminous and high-volatile bituminous coal is found in the Cretaceous/Paleocene Ferris and Hanna Formations, with an unknown coalbed methane potential. These units are not present in either the surface or subsurface of the prospective area.
Gypsum	Not Present	Triassic Chugwater Formation	Mountain Cement has a gypsum quarry from Chugwater Formation south of Laramie. A small outcrop of Chugwater is found in the northwest corner of T13N, R73W, but this is over 3 miles from the leases, and the Chugwater Formation is not present within the lease boundaries.

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on the Hermosa Lease. While notable carbonate beds exist in the Casper Formation, it is more likely that cement source rock would preferentially be taken from a nearby outcrop of the Permian Forelle Limestone. Future development of cement source rock on the leases is considered a remote possibility.

Uranium occurrences have been noted both on and adjacent to the lease lands. Though uranium is not currently mined in the area, there remains a possibility of future discoveries in areas underlain by the Sherman Granite or in placers similar to the inactive Barvara 1 & 2 claim (Plate 4). Future development of uranium on the leases is considered possible, but not likely.

The Casper Formation retains the potential for petroleum resources. The closest known resource of heavy oil was noted approximately 30 miles to the northwest of the leases in the Little Laramie and Herrick Fields (T16/17N, R75/76W). As stated previously, because of the surface exposure of the Casper Formation in the lease area, any oil deposits which may have existed are believed to have been eroded away or migrated. Future development of oil on the leases is considered very unlikely.

Other economic resources, including gypsum, natural gas, coal, coalbed methane, and carbon dioxide, have no potential for being economically produced from the formations that are present at the surface and in the subsurface in the areas of the two leases.

From a geologic perspective, the southern portion of the Hermosa West Lease, and most of the Hermosa East Lease, has the least amount of potential for economic mineral resource development. The northwest portion of the Hermosa West Lease (all or part of Sections 22, 23, 26, 27, 28, 34, and 35 of T13N R73W and parts of Sections 2 and 3 of T12N R73W) has some remote potential for mineral resource development, when compared to the Hermosa East Lease, due to the presence of the Casper Formation and alluvial sediments.

In addition, faults are more common in the northwestern and southern areas of the lease. Though the faults are currently inactive, future rejuvenation remains a possibility, though unlikely. USGS shaking hazard maps designate the lease area with a low shaking potential. Historical earthquakes in or around the area are infrequent. A magnitude 3.8 earthquake occurred on August 29, 2004 with an epicenter 11 miles NNW of Douglas, Wyoming, approximately 125 miles due north of the Hermosa property. A magnitude 6.6 earthquake occurred on November 8, 1882 with an epicenter in western Colorado or southern Wyoming (neic.usgs.gov). The presence of faults within the lease boundaries should not be considered a major hazard or obstacle to wind turbine installation.

Active and Inactive Mining Activity

A list of active mines in Albany County, Wyoming can be found in Appendix 2. A single active sand and gravel aggregate mine is located on lease lands and operated by Connell

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Resources, Inc. on Bath owned land, and is highlighted in yellow in Appendix 2. The mine is located in the SW ¼ NW ¼ SW ¼ of Section 22, T13N R72W (Plate 4).

No inactive mines are known to exist on lease lands, according to state and county mine databases. One known inactive mine is located adjacent to lease lands in the SW ¼ of Section 2, T12N R72W (Plate 4 and Appendix 3). The mine is known as the Barvara 1 & 2, and was a uranium placer mine.

A "prospect" area is noted in the SW ¼ of Section 26, T13N R72W on the topographic map (Plate 1). It is unknown what mineral was identified at the prospect. Additionally, a mine and mineshaft are identified in the NE ¼ NW ¼ of Section 36, T13N R72W. The mine and mineshaft are inactive at the time of this report, and little is known about them as they are not noted in any federal, state or county mine database. The area of the prospect, mine, and mineshaft is underlain by Precambrian Sherman Granite. Mineral occurrences of uranium and copper were noted nearby (Plate 4), it is therefore likely that these operations were geared toward uranium and/or copper exploration.

An inactive mine is also noted in the SW ¼ of Section 4, T12N R72W of the Metallic and Industrial Minerals Map of Wyoming (Harris, et al., 1985). This mine is not found in state or county mine databases, but is noted on the map as an inactive surface mine for potassium feldspar from pegmatite.

A number of mineral occurrences or prospects on lease lands are noted on the Metallic and Industrial Minerals Map of Wyoming (Harris, et al., 1985). Due to the scale of the map (1:500,000), the exact locations of these mineral occurrences should be considered as approximate. Copper is noted in Fountain Formation red beds and Precambrian pegmatites in Section 29, T13N R72W. Uranium is noted to occur in granitic pegmatites to the east of the inactive mine noted above in Section 3, T12N R72W. Although these occurrences represent potential sites for future mineral development, the economic viability of such deposits is likely very low. Future development of these resources is not anticipated.

Surface Land and Mineral Ownership

The current surface land ownership for the leases is presented on Plate 5. The entire northwest portion of the Hermosa West Lease is owned by a single owner with two parcels: Reyes. The southern portion of the Hermosa West Lease contains three owners: Craig, Kilpatrick, and the State. The State owns and has grazing leases on three full sections and four partial sections (Plate 5). Craig owns three full sections and three partial sections, and Kilpatrick owns two full sections in the area. The entire northwest portion of the Hermosa East Lease is owned by a single owner with two parcels: Parker. The eastern portion of the Hermosa East Lease contains eight owners: Bath Family LP, Bath Sisters LLC, Fischer, Magrath Trust, Menkin, Parker, the State, and Union Pacific Railroad (UPRR). Bath Family LP owns seven full sections and six partial sections. Bath Sisters LLC owns one partial section. Fischer owns three full sections and seven partial sections. Magrath Trust owns one partial section. Menkin owns one partial section. Parker owns one full section and two partial sections. The State owns and has

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grazing leases on three full sections and four partial sections. UPRR owns two partial sections.

The current surface and subsurface mineral ownership for the leases is seen on Plate 6. At the time of this report, much of the mineral ownership on both leases is unknown. The mineral ownership of the entire northwest portion of the Hermosa West Lease is unknown except for part of Section 34, T13N R73W, which is owned by Cox and Lindstrom. In the southern portion of the Hermosa West Lease, there are at least three separate owners: Kilpatrick, Merritt, and the State. Kilpatrick owns one partial section, Merritt owns two full sections, and the State owns three full sections and two partial sections. The State's leases are for diamonds, jades, precious stones, and metals. The mineral ownership for three full sections and two partial sections are currently unknown for this area. The northwest portion of the Hermosa East Lease has two mineral owners: the Federal Government and Merritt. Both of these owners own partial sections. A small partial section has unknown mineral ownership. The eastern portion of the Hermosa East Lease has at least two mineral owners: the Federal Government and the State. The Federal Government owns seven partial sections; the State owns three full sections and four partial sections (Plate 6). Ten full sections and 12 partial sections have currently unknown mineral ownership. The State's mineral ownership in T12N R72W includes leases for diamonds, jade, precious stones and metals. Bensing and Associates have leased Section 36, T13N R72W from the State for all metal and non-metal resources.

Until further information can be obtained regarding mineral ownership in the lease areas, it is unknown whether future development on the leases will be likely or not, as much of that likelihood is dependent upon the owner, environmental laws, regulations, demand, and economic viability. Mineral ownerships depicted on Plate 6 have been compiled from the Wyoming Albany County Assessor's Office and Office of State Lands and Investments electronic databases. These databases contain information from 1997 to the present. A detailed book and page title search is required to determine specific mineral ownerships for all properties designated as "unknown" on the map that pre-date the information contained in the databases. However, it is likely that a more exhaustive title search of historical records would not be cost effective at this time, as the potential for future development on any of the lease land has been determined by this exercise to be limited.

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Appendix 1. References Used in the Compilation of the Maps and Spreadsheets

Albany County (WY) Assessor's Office (site visit, 307-721-2511)
BLM Geocommunicator.com specialized map website (updated 4/27/2010)
EPA Reference Notebook (online)-*State AML Inventories*
Geology.com (Wyoming Maps).
Harris, Ray E., Hausel, W. Dan, and Meyer, John E., 1985, *Metallic and Industrial Minerals Map of Wyoming,* Wyoming State Geological Survey Map Series 14
Hausel, W. Dan, 1996, *Overview of the Sloan 1 & 2 Diamondiferous Kimberlites, Colorado-Wyoming State Line District*, Wyoming State Geological Survey 1996 Industrial Minerals Forum Field Trip, Miscellaneous Report 96-04
Hausel, W. Dan, and Sutherland, Wayne M., 2000, *Gemstones and Other Unique Minerals and Rocks of Wyoming*, Wyoming State Geological Survey Bulletin 71
National Earthquake Information Center (NEIC) (neic.usgs.gov)
USGS Mineral Resources Program (Online Spatial Data, tin.er.usgs.gov)
Wyoming Department of Environmental Quality-Active Mine Permits (Ramona Christensen, Records Manager, 307-777-7053)
Wyoming Oil & Gas Conservation Commission (wogcc.state.us, 307-234-7147)
Wyoming Secretary of State Office (soswy.state.us)
Wyoming State Board of Land Commissioners Office (Cheyenne, Wyoming)
Wyoming State Geological Survey references (site visit, 307-766-2286, wsgs.uwyo.edu)
Wyoming State Inspector of Mines (307-362-5222, mailed State Annual Inspection Report-all active mines in WY 2009)
Wyoming State Office of Land & Investment (onsite visit, website db, Diana @ 307-777-6625)

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Appendix 2. Active mines in Albany County; Department of Environmental Quality Database

Permit #	Mine Name	Ftype	Acres	Mineral Name	Twnship	Range	Section	Qtr	Issued	Status	Annual Date	Surface	NonFed	LOM Affect
PT0665	ADVENTURE STONE LLC,	SUR	163.25	Quartzite	12N	71W	6		10/15/1997	A	10/15	0	163.25	0
PT0297	MOUNTAIN CEMENT CO, RED MOUNTAIN	SUR	120	Gypsum	12N	76W	9		3/26/1975	A	3/26			
PT0317	UNION PACIFIC RAILROAD CO,	SUR	163.68	Sand and Gravel	13N	71W	10		4/29/1975	A	4/29			138.8
ET1463	CONNELL RESOURCES INC, BATH	SUR	10	Sand and Gravel	13N	72W	22	SWNWSW	3/17/2009	A	3/17		10	10
PT0696	ALBANY, COUNTY OF,	SUR	10	Sand and Gravel	13N	74W	7		2/25/2003	A	2/25		10	
PT0605	MOUNTAIN CEMENT CO, RED BUTTES	SUR	162.7	Gypsum	14N	73W	21		8/11/1987	A	8/11		162.7	52.15
PT0658	MOUNTAIN CEMENT CO, WEAVER	SUR	1372	Limestone	14N	73W	34		2/29/1996	A	2/28		1372	
PT0648	MOUNTAIN CEMENT CO, BATH SHALE	SUR	735.1	Shale	14N	74W	4		9/28/1993	A	9/28	7	728.1	278.1
PT0604	MOUNTAIN CEMENT CO, HUTTON LAKE SHALE	SUR	185	Shale	14N	74W	21		7/6/1987	A	7/6			
PT0300	MOUNTAIN CEMENT CO, MONOLITH	SUR	226.78	Shale	14N	75W	12		3/26/1975	A	3/26		226.78	173.48
ET0922	DREAM PROPERTIES LLC,	SUR	10	Sand and Gravel	14N	78W	11		7/8/1994	A	7/8			10
PT0298	MOUNTAIN CEMENT CO, PIPER/ETCHEPARE	SUR	3413.31	Limestone	15N	73W	13		3/26/1975	A	3/26		3413.31	677.25
ET1135	GRIFFIN, MARION M,	SUR	10	Dirt	15N	73W	16		5/1/2000	A	5/1		10	10
PT0299	MOUNTAIN CEMENT CO, TUFFA	SUR	408	Sand and Gravel	15N	74W	5		3/26/1975	A	3/26			88
PT0752	LAFARGE WEST INC, TALBOTT PIT	SUR	244	Sand and Gravel	15N	75W	25		10/23/2007	A	10/23		244	165
PT0466	FOUR SQUARE MINING INC,	SUR	1	Gold	15N	78W	8		9/20/1982	A	12/19			
PT0645	SIMON CONTRACTORS,	SUR	40	Sand and Gravel	16N	73W	23		8/12/1993	A	8/12			
ET1343	HAMAKER EXCAVATION INC, CARROLL TRUST	SUR	10	Dirt	16N	74W	25		2/15/2006	A	2/15		10	10
ET0413	SANDERS, WILLIAM A, SANDERS	SUR	3	Sand and Gravel	16N	78W	27		8/23/1982	A	8/23		3	3
ET1460	BUXTON PROPERTIES LLC, BUXTON	SUR	10	Sand and Gravel	17N	73W	36		2/13/2009	A	2/13		10	10
ET1326	TRONSTAD, BRYAN, TRONSTAD	SUR	1.62	Sand and Gravel	17N	76W	29		9/13/2005	A	9-13		1.62	1.62
PT0662	LAFARGE WEST INC, NUNN	SUR	271	Sand and Gravel	18N	74W	35		9/30/1996	A	9/27		271	
ET0936	WYOMEX LLC, IRON MTN	SUR	9	Sand and Gravel	19N	71W	23		11/2/1994	A	11/2		9	9
PT0722	MCMURRY READY MIX CO, PLUMBAGO CREEK	SUR	34.9	Limestone	20N	70W	36		5/13/2005	A	5/13		34.9	30
ET1057	V A RESOURCES LLC, PLUMBAGO CREEK	SUR	10	Limestone	20N	73W	36		10/28/1997	A	10/28		10	10
PT0694	MOBILE CONCRETE INC, BURNETT QUARRY	SUR	56	Granite	28N	76W	7		9/18/2002	A	9-18		56	35

Appendix 3. BLM Mining Claims Database, Albany County

Claim Name	Record date	Location Date	Closed Date	Serial #	Group	Case Type	Case Description	Commodity	PID	Case ID
BARVARA 1&2	10/6/1988	9/12/1988	*	WMC237406	Mining claims(38)	PLACER CLAIM(384201)	Closed(C)	URANIUM AND OTHER MINLC(651)	B41D9BDD-76D1-4825-8941-9E48C530D81D	5369035

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