

Foote Creek Remote Transportation Permit Study

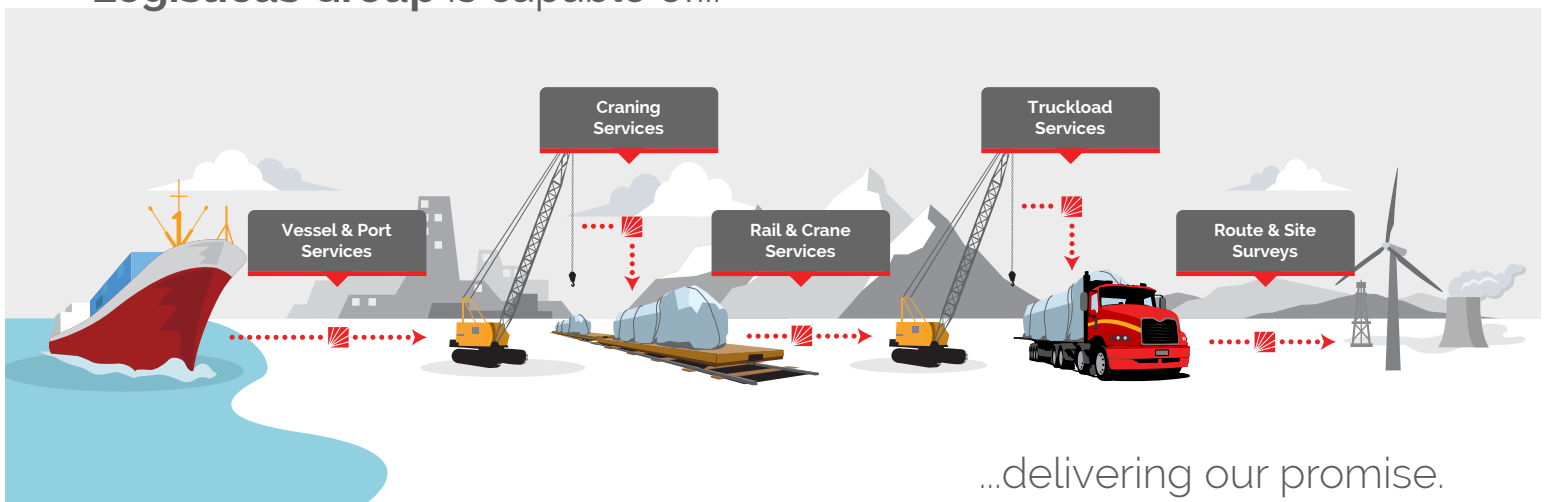
Sept 17, 2018 by:

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DISCLAIMER: This document is for reference purposes only. All conditions stated within this survey will need to be reverified by transport company before execution of shipment along route described herein. Any road, bridge and/or failure along route that creates damage or delay cost are the responsibility of the shipper. All conditions sited herein are subject to change by controlling agent.

This document is not meant to replace the trucking companies route survey in any way. A secondary audit should be completed 30 days before actual transport to identify any new risk.

Logisticus Group is capable of..



...delivering our promise.

Project Overview

Foote Creek

Remote Assessment: September 17, 2018

Purpose:

Enercon has hired Logisticus Group to perform a remote transportation permit study for a wind repower project in Carbon County, Wyoming. This study is intended to provide transportation information for the Carbon County permit requirements. This document is provided as a reference document only.

Project Name: Foote Creek Repower

Customer Name: Enercon

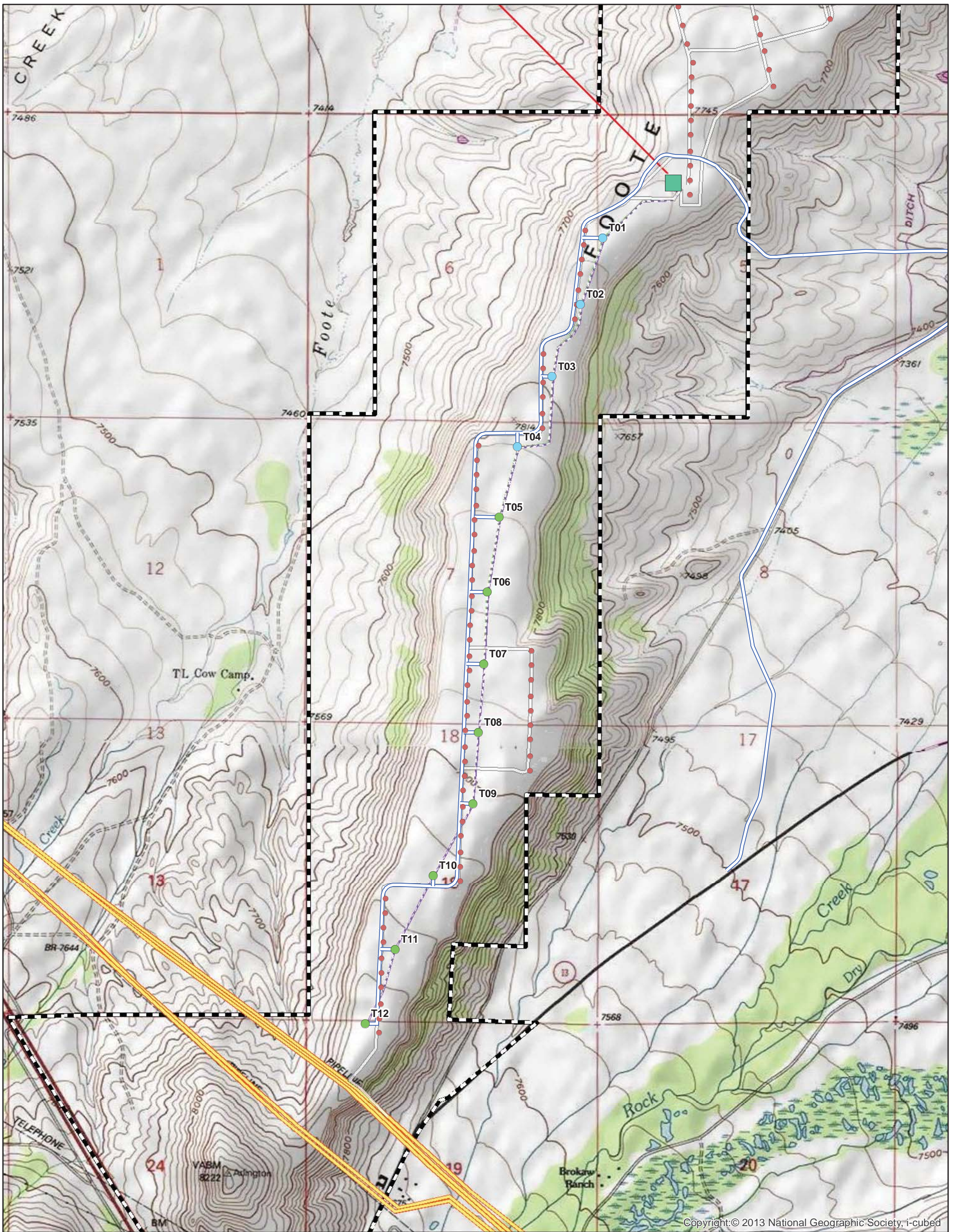
Project Start Date: 2019

Origin Location: Unknown as of this

Component Type: tbd

Turbine Quantity: 4.2 MW – Eight

2.0 MW – Four



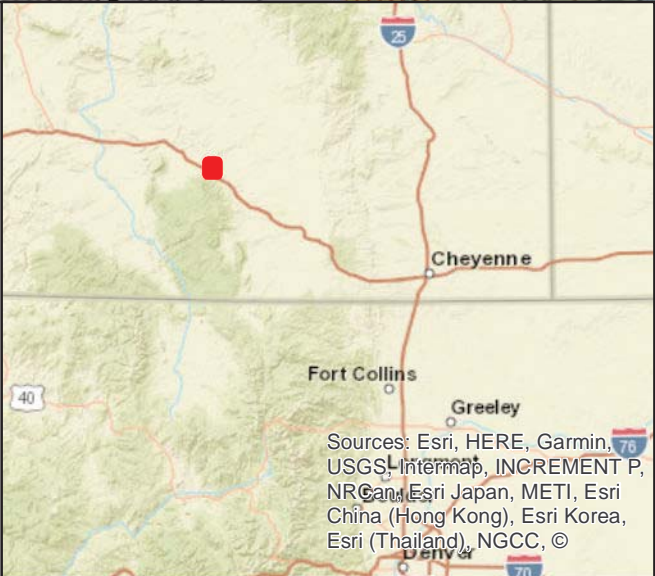
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Foote Creek I Turbines

- 2.0 MW
- 4.2 MW
- Existing Turbines
- Substation

Collector Circuits

- 1
- 2
- Access Roads
- Existing Access Roads
- Gas Pipelines
- Transmission Line
- Project Boundary



Foote Creek Repower Study

Proposed Turbine Layout

PacifiCorp

03 August 2018

N 0 0.3 0.6 Miles
NAD 1983 UTM Zone 13N

Trailer Configurations

TRAILER DIMENSIONS AND CONFIGURATIONS:

As well as legal loads, there will be a number of oversize deliveries for the project in this study. Often wind components are hauled on specially-designed trailers specifically manufactured for their transport. Below is a table with the type and *estimated number of loads* broken down by turbine type. Estimated number of truckloads for decommissioned turbines are also included. Details are provided on the estimated dimensions and weights of the loaded specialized equipment (based on the largest component dimensions). Truck configurations can and will be changed due to market demand and will be set by the OEM.

Estimated Total Number of Truckloads by Turbine Type		
Turbine Type	MPT	Wind Components
2 MW	1	36
4.2 MW		80
Old Turbines	N/A	612

Estimated Additional Truckloads Generated		
Construction Equipment and Supplies	Main Crane	Assist Cranes
74	30	15

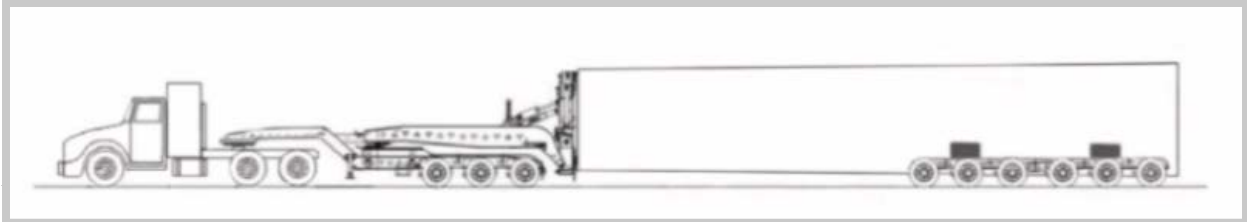
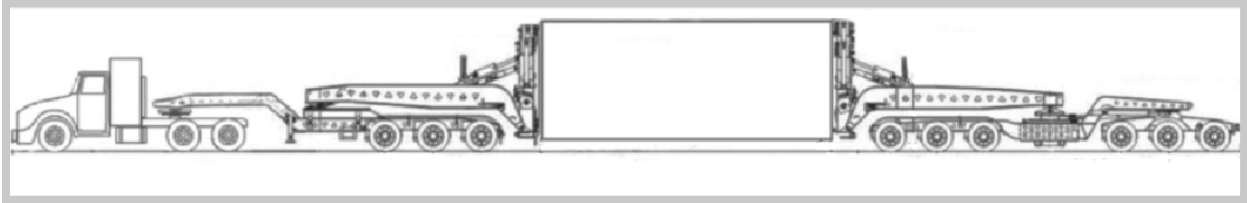
Above charts are estimations only; actual number will be set by on-site contractor

Tower Transport Trailers

Typically, tower sections are transported on schnabel-type trailers. Base and mid-sections will most likely be transported on double schnabels (front and back) and the top most likely on a schnabel-dolly configuration. Truck configurations can and will be changed due to market demand and will be set by the OEM.

Estimated Weights and Dimensions				
	Width	Height	Length	Weight (lbs)
13-Axle Double Schnabel	13'4"	14'2"	145'	200,000
Schnabel-Dolly	12'1"	14'	150'	140,000

Trailer Configurations continued

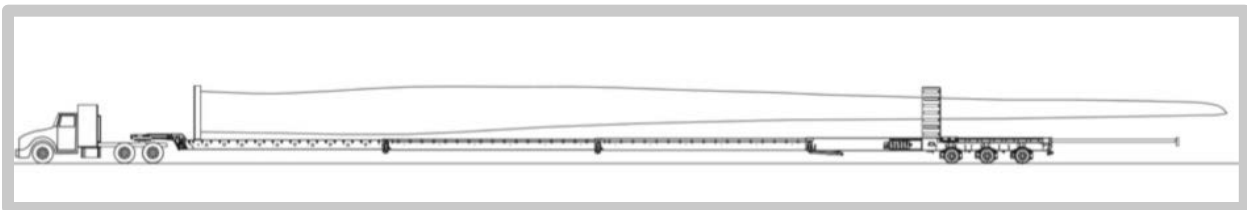


Schnabel-Dolly Configuration

Blade Trailers

Typically, blades are transported by specialized blade trailers which are built to extend the root and tip end. These trailers are highly specialized and stretch out to over 200 ft. Due to their length, these components will have the most extreme turning radii requirements in terms of physical length clearances. Longer blades (60m+) will have a large tip swing clearance as well, which can impact routing.

Estimated Weights and Dimensions				
	Width	Height	Length	Weight (lbs)
Blade Trailer	14'	14'6"	230'	120,000



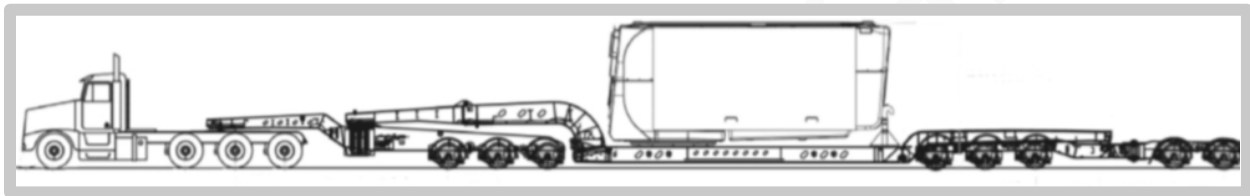
Blade Trailer Configuration

Trailer Configurations continued

Nacelle Transport Trailers

Since the drivetrain will be delivered separately from the nacelle body, this will be a simple 12 to 13-axle configuration to reduce the weight. These trailers will most likely have the heaviest weight per axle for turbine component deliveries.

Estimated Weights and Dimensions				
	Width	Height	Length	Weight (lbs)
Nacelle Trailer	13'1"	14'5"	140'	265,000

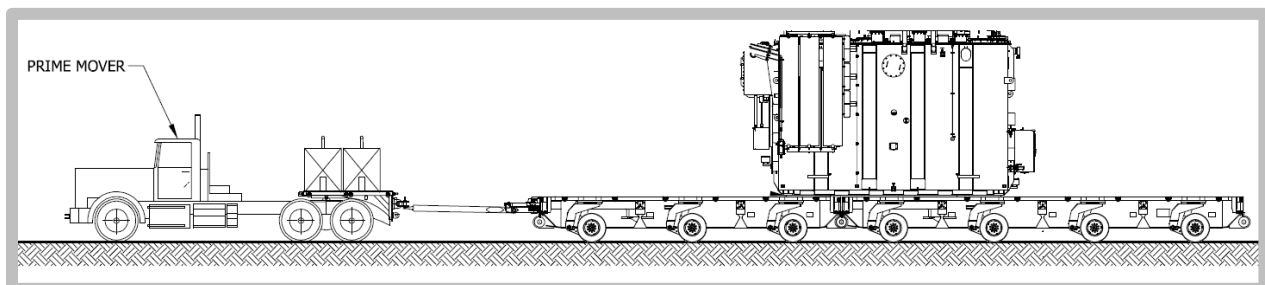


Nacelle Trailer Configuration

MPT Trailers

The Main Power Transformers may come into the nearest rail siding so that the over the road route can be limited in distance. These types of trailers are dual lane configurations, which have two axles across in order to spread weight out over a single line of axles. These trailers will be very short in length but will have the most concentrated weight over structures.

Estimated Weight and Dimensions				
	Width	Height	Length	Weight
Dual Lane Axle Line	16'5"	17'5"	80'	350,000lbs



Project Site Data

CARBON COUNTY, WY

GPS Coordinates: 41°37'11.29"N, 106°11'7.25"W

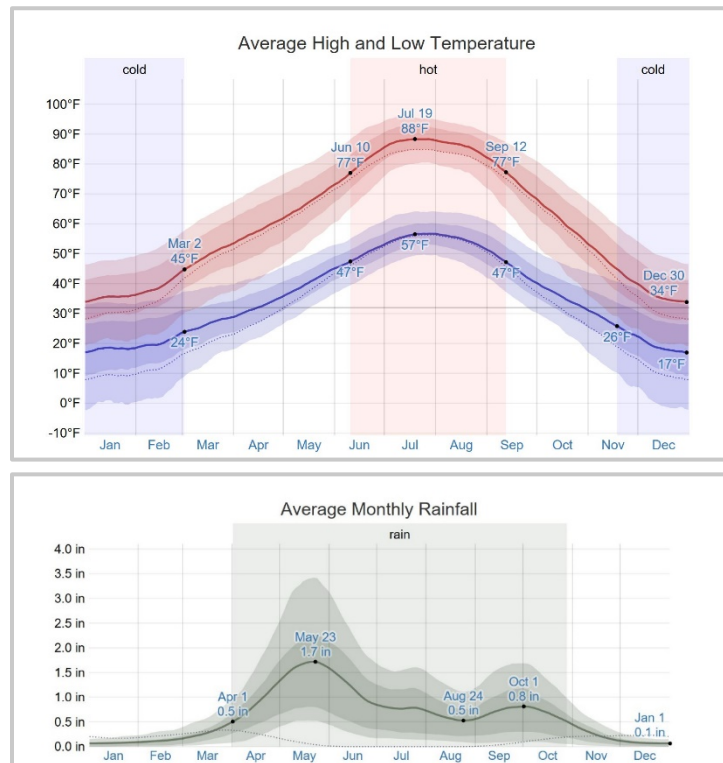
Topography: In Carbon County, the topography is mostly eroded ridgelines with slight rolling grasslands, combined with some vegetated dunes. There are small canyons and high ridgelines near the project site. Multiple small creeks flow through or near the project sites. The project site itself is located on a ridgeline and is bounded by Foote Creek to the west.

Climate: The project site has a cool semi-arid climate and winters are cold and moderately long, but relatively dry.

Annual Rainfall: 10.98 inch

Average Temperature: 17 Degrees Fahrenheit in January

88 Degrees Fahrenheit in July



Transportation Strategy

OVERVIEW

Components will be transported via over-the-road trucking. At this time the developer has not identified potential source locations. Based on the chosen turbine manufacturer and historical source knowledge, the wind turbine generator components will likely be sourced from Colorado. Potential routing utilizes I-25 north to I-80 east. Local routing is discussed in detail below.

Local Truck Routing

Detailed Route: I-80 to WY-13 to project site entrance

Road Improvements: Yes

Holiday Restrictions: Yes (state)

Frost Law: Yes (local only)

Police Escorts: Not at this time

Structures/Bridges: No

DOT Construction: Not at the time of this study

Risk Level: **Low**

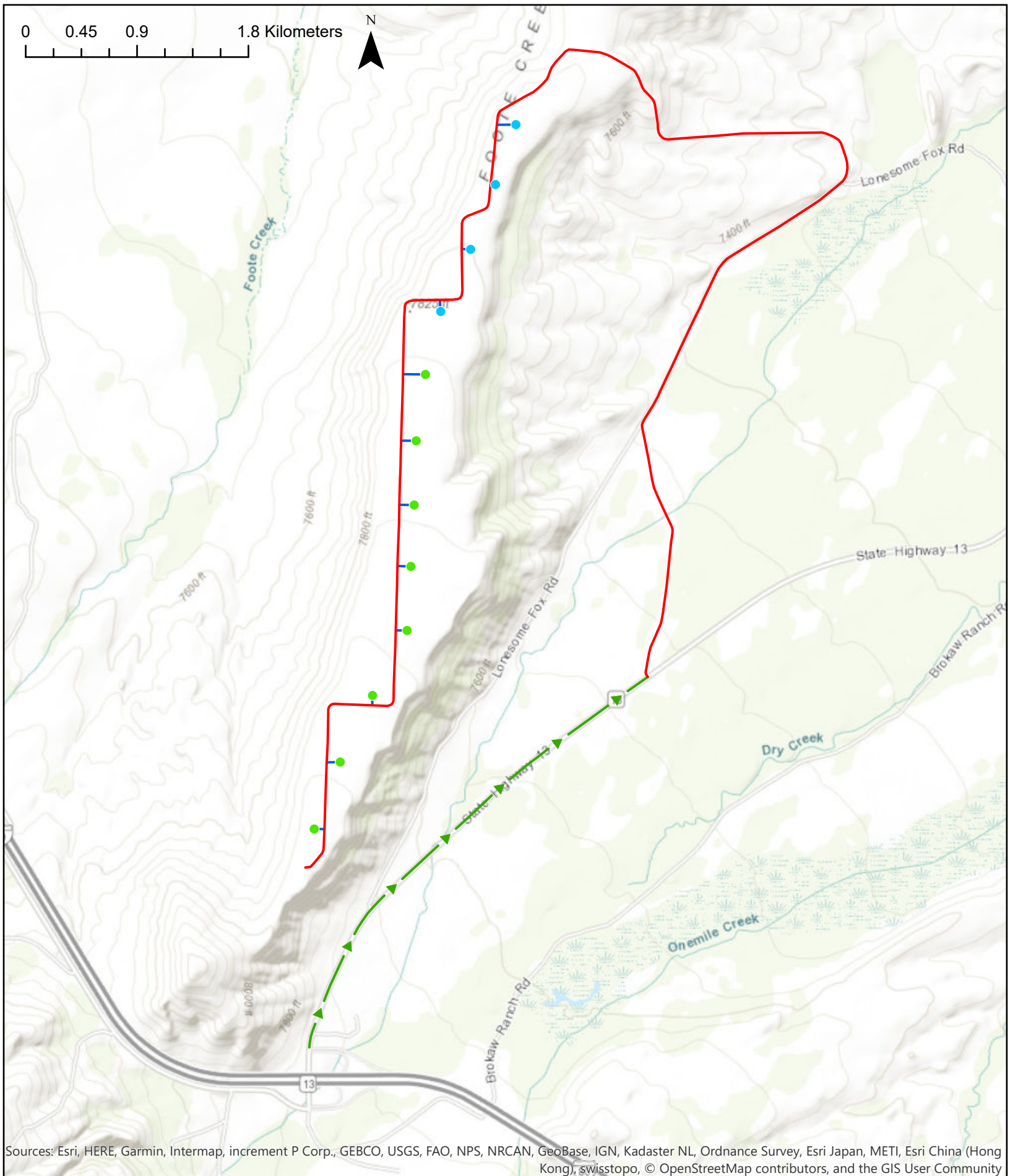
Summary

This route option has a **Low** Risk Rating. Source locations have not yet been identified but the site will be accessed from I-80 to WY-13. The I-80 west offramp to WY-13 has existing graveled intersection improvement and should provide a suitable turning radius. The intersection of I-80 east to WY-13 also appears to have an existing improvement. Utilizing either improved area will require removing and sleeving signs that are currently in the improvement area. It is recommended that a third-party engineer verify the current integrity of the improvements. If components exit I-80 from the west they will have to travel under a the I-80 overpass on WY-13; this is marked at greater than 16' but carriers should verify that components will vertically clear this bridge. A radius improvement will be required at WY-13 and the site entrance. This will likely require modification or removal of the cattle grate at this location.

All carriers should run routes to verify measurements and routing at time of delivery. Specific construction impacts are unknown for the time frame of deliveries; coordination with the DOT districts prior to deliveries is recommended.

Permits/Approvals needed from: Wyoming DOT, Carbon County

0 0.45 0.9 1.8 Kilometers



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

FOOTE CREEK REPOWER PROJECT PRELIMINARY LOCAL ROUTING

- 4.2 MW
- 2 MW
- On_Site
- String_Rds
- ▶ Local_Route



Current Road Conditions

WEATHER ALERT

I-80 may shut down during winter weather, which has the potential to impact delivery of wind turbine components to site depending on when deliveries occur.

Road Improvements On Site

On-site road improvements should be based on the largest components that will be delivered to site. The new turbine components will be larger than the turbine components that are being removed. Turbine specifications for site roads for the 4.2 MW option are as follows:

- Road compaction determined by buyer's civil engineer to support loads based on specific site conditions and project's geotechnical analysis.
 - o Constructed and maintained in a smooth and uniform manner.
- Minimum 16' width with additional widening as required (horizontal curves).
- Cross-slope to edge of road from centerline 2.0% max
- Maximum 8.0% grade
- Vertical radius values:
 - o K_{crest} : 17.5 (min) – US units
 - o K_{sag} : 17.5 (min) – US units
- Minimum intersection improvement radius (horizontal radius):
 - o 150'
- 18' vertical clearance as per Vestas delivery specifications

Road Improvements Off Site

I-80 TO SITE (ALL COMPONENTS)

1. I-80 west to WY-13

- a. Existing radius improvement
- b. Remove and sleeve signage
- c. Engineer to determine integrity of improvement

2. I-80 east to WY-13

- a. Existing radius improvement
- b. Remove and sleeve signage
- c. Engineer to determine integrity of improvement

3. WY-13 to site entrance

- a. Radius improvement
- b. May require modification or removal of cattle grate

Traffic Counts

Traffic data for WY-13 are not currently publicly available. Wyoming DOT has a series of permanent automatic traffic recorders on various roads around the state; however, there is no permanent counter on WY-13. Estimated Annual Average Daily Traffic for the year 2016 is the last available information for WY-13. For the portion of WY-13 that encompasses I-80 to the Foote Creek site entrance the estimated AADT for 2016 is as follows:

Total AADT: 315

Truck AADT: 38

Traffic Counts *continued*

Based on the above estimates, WY-13 is a lightly-traveled rural road. Both car and truck traffic can be expected to increase during the Foote Creek repower project. Estimated truckloads generated by this project are provided in the **Trailer Configurations** section of this report. In addition to these, the daily workforce required for this project will serve to increase the daily traffic. It is assumed in this report that all increased traffic will travel between I-80 and the site entrance.

Summary

FOOTE CREEK REPOWER PROJECT

Site Status: Pre-planning

1. Overall delivery risk

- a. **Low** Risk

2. Source locations

- a. Unknown at the time of this report

3. Off-site road improvements

- a. Two areas identified at the time of this report
 - i. I-80 and WY-13
 - ii. WY-13 and site entrance
 - iii. More improvements may be necessary depending on source location and final routing

4. On-site Improvements

- a. These improvements should be made to meet turbine specifications for the 4.2 MW option.
- b. Once final component and trailer dimensions and configurations are known the site should be reevaluated to ensure construction meets specifications.

- 5. Logisticus recommends that once all site work is complete, prior to deliveries, to perform a follow up survey to ensure site is ready to receive components.

Summary *continued*

6. Carriers should run all routes prior to deliveries and not replace this document with their own state-required route survey.
7. Traffic counts in this report are estimates only.
 - a. Logisticus has the ability to facilitate communications with DOTs and a DOT-approved engineering company should a five-day traffic study on WY-13 be required.

Appendix I: Pictures

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WY-13 north

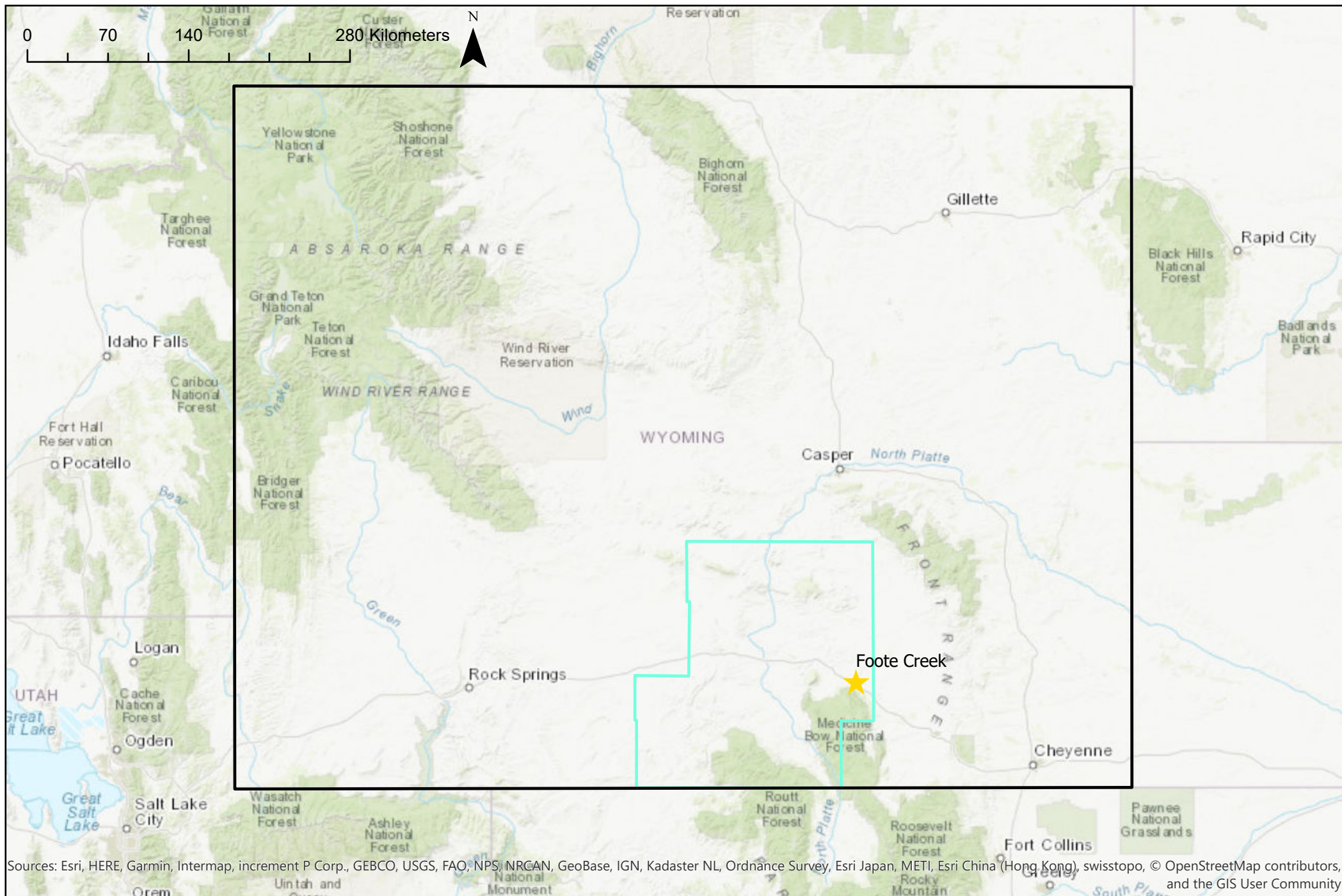


WY-13 to Site entrance

Appendix II: Maps

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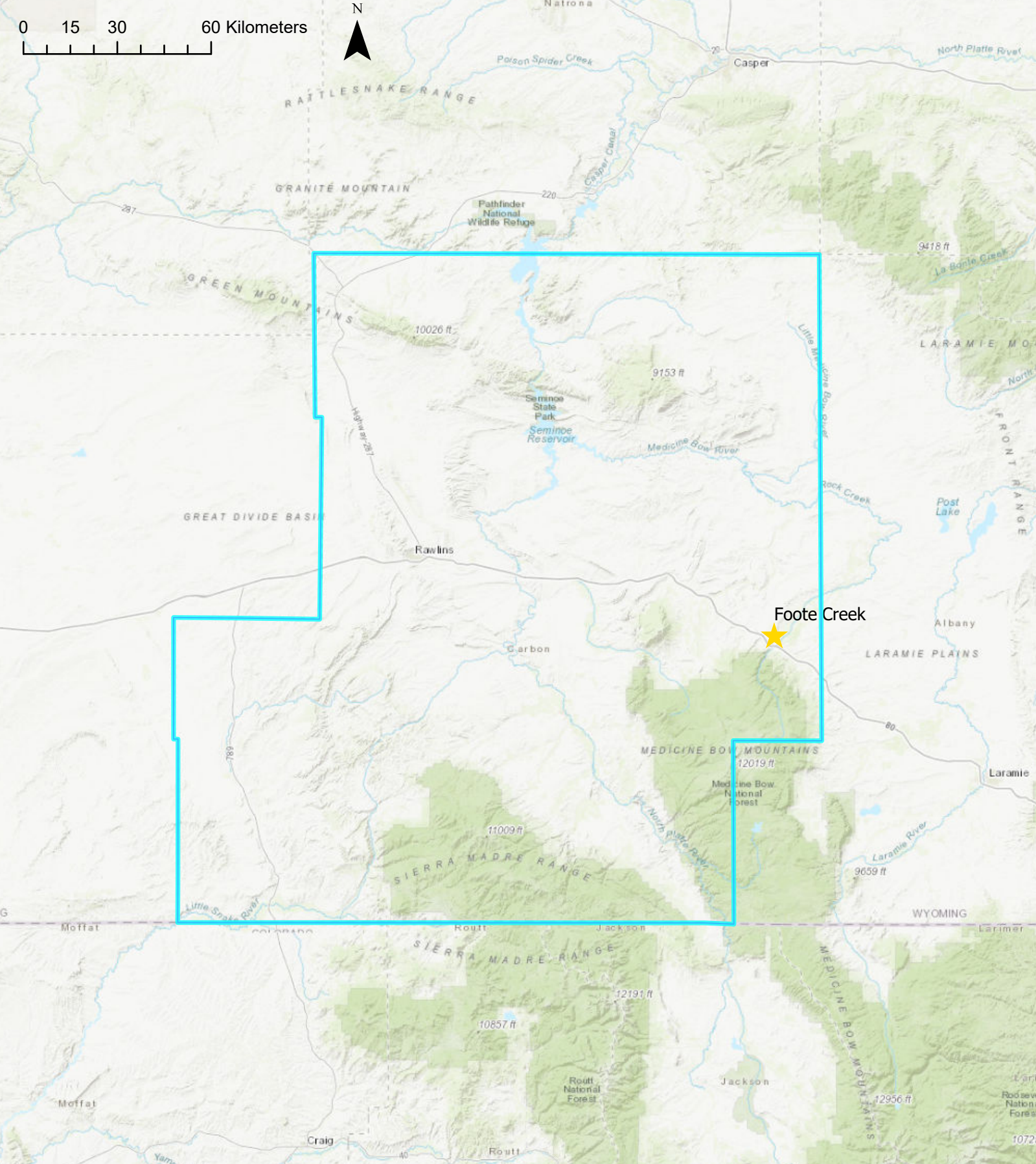
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

FOOTE CREEK REPOWER PROJECT STATE OF WYOMING

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0 15 30 60 Kilometers



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

FOOTE CREEK REPOWER PROJECT CARBON COUNTY

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More Innovation. Less Risk