Application for an
Energy Conversion Facility Permit

Astoria Station Project

Submitted to:

Public Utilities Commission of the
State of South Dakota

Submitted by:

Otter Tail Power Company

October 5, 2017

Executive Summary

Otter Tail Power Company (Otter Tail or Company) proposes to develop, own, and operate an approximate 250 megawatt (MW) simple-cycle natural gas fired energy conversion facility and related components, which is known as the Astoria Station Project (Project). The Project is approximately 1.5 miles northwest of Astoria, South Dakota, in Scandinavia Township, Deuel County.

In addition to the simple-cycle natural gas fired energy conversion facility, components of the Project incorporated into this application include:

- A short segment (less than 1,000 feet long) of approximately 10-inch diameter natural gas pipeline necessary to interconnect to the Northern Border Pipeline (NBPL).
- A short segment (preliminarily estimated to be less than 0.5 miles long) of 345 kilovolt (kV) generation-tie (gen-tie) electric transmission line necessary to interconnect to the Big Stone South-Brookings County 345 kV electric transmission line (BSSB 345 Line).
- A short segment (less than 1,500 feet long) of approximately 5-inch diameter water pipe necessary to supply process and potable water.

The Project will provide capacity, dispatchable energy, and grid support as part of Otter Tail's two-part plan to reliably meet its customers' electric needs, replace expiring capacity purchase agreements, and prepare for the 2021 retirement of the 1950s-era 140 MW coal-fired Hoot Lake Plant near Fergus Falls, Minnesota. Otter Tail is embarking on the addition of the Project to meet its customers' electric needs in a least-cost manner. The Project will be capable of quickly starting to serve a load-following function and provide for peak capacity needs. The Project is expected to be in service by May 2021.

The Company's analysis of the Project indicates it will be beneficial for Otter Tail's customers because it is the least-cost resource available to meet the Company's needs. More specifically, Otter Tail's 2013 resource planning process determined that the least-cost method of meeting Otter Tail's 2021 capacity needs would be to add a simple-cycle generator to Otter Tail's system. Otter Tail's 2016 resource planning process confirmed the results of the 2013 process and specifically identified a simple-cycle unit with the Project's size, costs, and operating characteristics as the least-cost resource addition.

Otter Tail acquired land rights near the Project location precisely because the site's proximity at the intersection of the NBPL and the BSSB 345 Line will allow the Company to avoid significant costs for connecting to these facilities and impact as few landowners as possible. The energy conversion facility will be built on a minimal footprint on Company-owned property, the natural gas piping to connect to the NBPL will be within the property owned by the Company, the water piping will be within the property owned by the Company, and the 345 kV gen-tie infrastructure will be constructed within the property owned by the Company or on rights-of-way (ROWs) acquired from adjacent landowners.

The Project is expected to interconnect to a new switching station to be constructed by the co-owners of the BSSB 345 Line (that is, Northern States Power Company-Minnesota and Otter Tail). This switchyard could be used as a common interconnection point for the Project and any other regional electric generation projects, and is therefore outside the scope of this Energy Conversion Facility Permit application for the Project.

The Project will be developed and managed by Otter Tail, which has significant experience in managing large utility projects. Otter Tail expects to engage third parties for detailed engineering support and construction of the Project, with Otter Tail acting as the general contractor.

The Project is prudent because it is least-cost and the risks associated with the Company's development, engineering, procurement, and construction of the Project are being appropriately mitigated. The resource addition allows the Company the flexibility to convert the Project to combined cycle generation should that become advantageous in the future. When paired with wind energy that the Company intends to add to its system, the Project will optimize the delivery of least-cost and reliable energy and capacity for its customers and diversify the Company's energy generation fleet during times of political, regulatory, and market uncertainty. The Project provides low-cost capacity and dispatchable energy, thereby serving as a hedge against high energy market prices and affording grid support, due to its quick-start and load-following capability.

The Project will provide significant economic benefits to the state and region by creating temporary construction and permanent employment opportunities, increasing demand for locally supplied construction equipment and related services, and facilitating continued reliability of electrical power regionally. Expenditures by Project vendors, construction workers, and Otter Tail will also benefit the state and region. Finally, the state and region will benefit from increased property tax base.

Table ES-1 presents a completeness checklist for this application for the Project.

Table ES-1. Completeness Checklist

South Dakota Codified Laws (SDCL)	Administrative Rules of South Dakota (ARSD)	Required Information	Chapter Location
49-41B-35(2)	20:10:22:05	**List of permits**. The application for a permit for a facility shall contain a list of each permit that is known to be required from any other governmental entity at the time of the filing. The list of permits shall be updated, if needed, to include any permit the applicant becomes aware of after filing the application. The list shall state when each permit application will be filed. The application shall also list each notification that is required to be made to any other governmental entity.	29.0
49-41B-11(1)	20:10:22:06	**Name of participants**. The application shall contain the name, address, and telephone number of all persons participating in the proposed facility at the time of filing, as well as the names of any individuals authorized to receive communications relating to the application on behalf of those persons.	2.0
49-41B-11(7)	20:10:22:07	**Name of owner and manager**. The application shall contain a complete description of the current and proposed rights of ownership of the proposed facility. It shall also contain the name of the project manager of the proposed facility.	2.0
49-41B-11(8)	20:10:22:08	**Purpose of facility**. The applicant shall describe the purpose of the proposed facility.	3.0
49-41B-11(12)	20:10:22:09	**Estimated cost of facility**. The applicant shall describe the estimated construction cost of the proposed facility.	4.0
49-41B-11(9)	20:10:22:10	**Demand for facility**. The applicant shall provide a description of present and estimated consumer demand and estimated future energy needs of those customers to be directly served by the proposed facility. The applicant shall also provide data, data sources, assumptions, forecast methods or models, or other reasoning upon which the description is based. This statement shall also include information on the relative contribution to any power or energy distribution network or pool that the proposed facility is projected to supply and a statement on the consequences of delay or termination of the construction of the facility.	5.0
49-41 B-11	20:10:22:11	**General site description**. The application shall contain a general site description of the proposed facility including a description of the specific site and its location with respect to state, county, and other political subdivisions; a map showing prominent features such as cities, lakes and rivers; and maps showing cemeteries, places of historical significance, transportation facilities, or other public facilities adjacent to or abutting the plant or transmission site.	6.0
49-41B-11(6); 49-41B-21; 34A-9-7(4)	20:10:22:12	**Alternative sites**. The applicant shall present information related to its selection of the proposed site for the facility, including the following: (1) The general criteria used to select alternative sites, how these criteria were measured and weighed, and reasons for	7.0

South Dakota Codified Laws (SDCL)	Administrative Rules of South Dakota (ARSD)	Required Information	Chapter Location
		selecting these criteria; (2) An evaluation of alternative sites considered by the applicant for the facility; (3) An evaluation of the proposed plant or transmission site and its advantages over the other alternative sites considered by the applicant, including a discussion of the extent to which reliance upon eminent domain powers could be reduced by use of an alternative site, alternative generation method, or alternative waste handling method.	
49-41B-11(11); 49-41B-21; 49-41B-22(2)	20:10:22:13	**Environmental information**. The applicant shall provide a description of the existing environment at the time of the submission of the application, estimates of changes in the existing environment which are anticipated to result from construction and operation of the proposed facility, and identification of irreversible changes which are anticipated to remain beyond the operating lifetime of the facility. The environmental effects shall be calculated to reveal and assess demonstrated or suspected hazards to the health and welfare of human, plant and animal communities which may be cumulative or synergistic consequences of siting the proposed facility in combination with any operating energy conversion facilities, existing or under construction. The applicant shall provide a list of other major industrial facilities under regulation which may have an adverse effect on the environment as a result of their construction or operation in the transmission site or siting area.	8.0 - 16.0
49-41B-11(11); 49-41B-22(2)	20:10:22:14	**Effect on physical environment**. The applicant shall provide information describing the effect of the proposed facility on the physical environment. The information shall include: (1) A written description of the regional land forms surrounding the proposed plant site or through which the transmission facility will pass; (2) A topographic map of the transmission site or siting area; (3) A written summary of the geological features of the siting area or transmission site using the topographic map as a base showing the bedrock geology and surficial geology with sufficient cross-sections to depict the major subsurface variations in the siting area; (4) A description and location of economic deposits such as lignite, sand and gravel, scoria, and industrial and ceramic quality clay existent within the plan or transmission site; (5) A description of the soil type at the plant site; (6) An analysis of potential erosion or sedimentation which may result from site clearing, construction, or operating activities and measures which will be taken for their control; (7) Information on areas of seismic risks, subsidence potential and slope instability for the siting area or transmission site; and	9.0

South Dakota Codified Laws (SDCL)	Administrative Rules of South Dakota (ARSD)	Required Information	Chapter Location
		(8) An analysis of any constraints that may be imposed by geological characteristics on the design, construction, or operation of the proposed facility and a description of plans to offset such constraints.	
49-41B-11(11); 49-41B-21; 49-41B-22(2)	20:10:22:15	**Hydrology**. The applicant shall provide information concerning the hydrology in the area of the proposed plant or transmission site and the effect of the proposed site on surface and groundwater. The information shall include: (1) A map drawn to scale of the plant or transmission site showing surface water drainage patterns before and expected patterns after construction of the facility; (2) Using plans filed with any local, state, or federal agencies, indication on a map drawn to scale of the current planned water uses by communities, agriculture, recreation, fish, and wildlife which may be affected by the location of the proposed facility and a summary of those effects; (3) A map drawn to scale locating any known surface or groundwater supplies within the siting area to be used as a water source or a direct water discharge site for the proposed facility and all offsite pipelines or channels required for water transmission; (4) If aquifers are to be used as a source of potable water supply or process water, specifications of the aquifers to be used and definition of their characteristics, including the capacity of the aquifer to yield water, the estimated recharge rate, and the quality of ground water; (5) A description of designs for storage, reprocessing, and cooling prior to discharge of heated water entering natural drainage systems; (6) If deep well injection is to be used for effluent disposal, a description of the reservoir storage capacity, rate of injection, and confinement characteristics and potential negative effects on any aquifers and groundwater users which may be affected.	10.0
49-41B-11(11); 49-41B-21; 49-41B-22(2)	20:10:22:16	**Effect on terrestrial ecosystems**. The applicant shall provide information on the effect of the proposed facility on the terrestrial ecosystems, including existing information resulting from biological surveys conducted to identify and quantify the terrestrial fauna and flora potentially affected within the transmission site or siting area; an analysis of the impact of construction and operation of the proposed facility on the terrestrial biotic environment, including breeding times and places and pathways of migration; important species; and planned measures to ameliorate negative biological impacts as a result of construction and operation of the proposed facility.	11.0
49-41B-11(11); 49-41B-21;	20:10:22:17	**Effect on aquatic ecosystems**. The applicant shall provide information of the effect of the proposed facility on aquatic ecosystems, and including existing information resulting from	12.0

South Dakota Codified Laws (SDCL)	Administrative Rules of South Dakota (ARSD)	Required Information	Chapter Location
49-41B-22(2)		biological surveys conducted to identify and quantify the aquatic fauna and flora, potentially affected within the transmission site or siting area, an analysis of the impact of the construction and operation of the proposed facility on the total aquatic biotic environment and planned measures to ameliorate negative biological impacts as a result of construction and operation of the proposed facility.	
49-41B-11(11); 49-41B-22(2)	20:10:22:18	**Land use**. The applicant shall provide the following information concerning present and anticipated use or condition of the land: (1) A map or maps drawn to scale of the siting area and transmission site identifying existing land use according to the following classification system: (a) Land used primarily for row and nonrow crops in rotation; (b) Irrigated lands; (c) Pasturelands and rangelands; (d) Haylands; (e) Undisturbed native grasslands; (f) Existing and potential extractive nonrenewable resources; (g) Other major industries; (h) Rural residences and farmsteads, family farms, and ranches; (i) Residential; (j) Public, commercial, and institutional use; (k) Municipal water supply and water sources for organized rural water districts; and (l) Noise sensitive land uses; (2) Identification of the number of persons and homes which will be displaced by the location of the proposed facility; (3) An analysis of the compatibility of the proposed facility with present land use of the surrounding area, with special attention paid to the effects on rural life and the business of farming; and (4) A general analysis of the effects of the proposed facility and associated facilities on land uses and the planned measures to ameliorate adverse impacts.	13.0
49-41B-11; 49-41B-28	20:10:22:19	**Local land use controls**. The applicant shall provide a general description of local land use controls and the manner in which the proposed facility will comply with the local land use zoning or building rules, regulations or ordinances. If the proposed facility violates local land use controls, the applicant shall provide the commission with a detailed explanation of the reasons why the proposed facility should preempt the local controls. The explanation shall include a detailed description of the restrictiveness of the local controls in view of existing technology, factors of cost, economics, needs of parties, or any additional information to aid the commission in determining	14.0

South Dakota Codified Laws (SDCL)	Administrative Rules of South Dakota (ARSD)	Required Information	Chapter Location
		whether a permit may supersede or preempt a local control pursuant to SDCL 49-41B-28.	
49-41B-11	20:10:22:20	**Water quality**. The applicant shall provide evidence that the proposed facility will comply with all water quality standards and regulations of any federal or state agency having jurisdiction and any variances permitted.	15.0
49-41B-11; 49-41B-21; 49-41B-22	20:10:22:21	**Air quality**. The applicant shall provide evidence that the proposed facility will comply with all air quality standards and regulations of any federal or state agency having jurisdiction and any variances permitted.	16.0
49-41B-11(3)	20:10:22:22	**Time schedule**. The applicant shall provide estimated time schedules for accomplishment of major events in the commencement and duration of construction of the proposed facility.	17.0
49-41B-11(3); 49-41B-22	20:10:22:23	**Community impact**. The applicant shall include an identification and analysis of the effects the construction, operation, and maintenance of the proposed facility will have on the anticipated affected area including the following: (1) A forecast of the impact on commercial and industrial sectors, housing, land values, labor market, health facilities, energy, sewage and water, solid waste management facilities, fire protection, law enforcement, recreational facilities, schools, transportation facilities, and other community and government facilities or services; (2) A forecast of the immediate and long-range impact of property and other taxes of the affected taxing jurisdictions; (3) A forecast of the impact on agricultural production and uses; (4) A forecast of the impact on population, income, occupational distribution, and integration and cohesion of communities; (5) A forecast of the impact on transportation facilities; (6) A forecast of the impact on landmarks and cultural resources of historic, religious, archaeological, scenic, natural, or other cultural significance. The information shall include the applicant's plans to coordinate with the local and state office of disaster services in the event of accidental release of contaminants from the proposed facility; and (7) An indication of means of ameliorating negative social impact of the facility development.	18.0
49-41B-11	20:10:22:24	**Employment estimates**. The application shall contain the estimated number of jobs and a description of job classifications, together with the estimated annual employment expenditures of the applicants, the contractors, and the subcontractors during the construction phase of the proposed facility. In a separate tabulation, the application shall contain the same data with respect to the operating life of the proposed	19.0

South Dakota Codified Laws (SDCL)	Administrative Rules of South Dakota (ARSD)	Required Information	Chapter Location
		facility, to be made for the first ten years of commercial operation in one-year intervals. The application shall include plans of the applicant for utilization and training of the available labor force in South Dakota by categories of special skills required. There shall also be an assessment of the adequacy of local manpower to meet temporary and permanent labor requirements during construction and operation of the proposed facility and the estimated percentage that will remain within the county and the township in which the facility is located after construction is completed.	
49-41B-11(5)	20:10:22:25	**Future additions and modifications**. The applicant shall describe any plans for future modification or expansion of the proposed facility or construction of additional facilities which the applicant may wish to be approved in the permit.	20.0
49-41B-11; 49-41B-21; 49-41B-22.	20:10:22:26	**Nature of proposed energy conversion facility**. The application shall contain a description of the operating nature of the proposed facility, the expected source and quantity of its raw materials, and energy requirements. The preceding shall be illustrated by means of an annotated map. The description shall include the following: (1) The proposed on-line life of the facility and its projected operating capacity during its on-line life; (2) A general description of the major components of the proposed facility such as boilers, steam generators, turbine generators, cooling facilities, production equipment, pollution control equipment, and other associated facilities; (3) An identification of materials flowing into the facility, including all materials such as air, water, coal, and chemical compounds that will be utilized by the proposed facility, recorded in accordance with accepted scientific practices regarding their estimated consumption rate; (4) An inventory of all materials flowing out of the proposed facility, including the method of control, treatment, destination, and disposal monitoring programs of each of the materials; and (5) The procedures proposed to avoid or ameliorate the possibility that the discharges, emissions, or solid wastes would do any of the following: (a) Constitute a public nuisance; (b) Endanger the public health and safety; (c) Endanger human, animal, or plant life; or (d) Endanger recreational facilities.	21.0
49-41B-11	20:10:22:27	**Products to be produced**. The applicant shall describe both in general terms and by technical description the products and by-products to be produced by the proposed facility and their destinations.	22.0
49-41B-11	20:10:22:28	**Fuel type used**. The applicant shall provide a description of the type of fuel used, including:	22.0

South Dakota Codified Laws (SDCL)	Administrative Rules of South Dakota (ARSD)	Required Information	Chapter Location
		(1) Primary proposed fuel types; (2) Anticipated yield and range (BTU or appropriate unit); and (3) Approximate chemical analysis of the proposed design fuel.	
49-41B-11	20:10:22:29	**Proposed primary and secondary fuel sources and transportation**. On a map drawn to scale, the applicant shall provide the location of proposed primary and secondary sources of fuel and method of its transportation. When possible, the map shall show the location of the proposed facility; where distances are too great to show the facility, and proposed primary and alternate supply sources, smaller scale inserts showing relative location shall be presented. The applicant shall also describe any additional transportation facilities needed to deliver raw materials and to remove wastes.	22.0
49-41B-11 49-41B-21 34A-9-7(4).	20:10:22:30	**Alternate energy resources**. The applicant shall provide information concerning the alternate energy resources considered in the construction of the energy conversion facility. The applicant shall also discuss the reasons for selecting the proposed energy resource rather than an alternative resource.	23.0
49-41B-11	20:10:22:31	**Solid or radioactive waste**. The applicant shall provide information concerning the generation, treatment, storage, transport, and disposal of solid or radioactive waste generated by the proposed facility and evidence that all disposal of the waste will comply with the standards and regulations of any federal or state agency having jurisdiction. Any variations from these standards shall be indicated.	24.0
49-41B-35	20:10:22:32	**Estimate of expected efficiency**. The applicant shall provide an estimate of the expected efficiency of the proposed energy conversion process and discuss the assumptions on which the estimate is based.	25.0
49-41B-11; 49-41B-21; 49-41B-22; 34A-9-7(2) and (5).	20:10:22:33	**Decommissioning**. The applicant shall provide a plan or policy statement on action to be taken at the end of the energy conversion facility's on-line life. Estimates of monetary costs, site condition after decommissioning, and the amount of land irretrievably committed shall be included in this statement.	26.0
49-41B-11	20:10:22:34	**Transmission facility layout and construction**. If a transmission facility is proposed, the applicant shall submit a policy statement concerning the route clearing, construction and landscaping operations, and a description of plans for continued right-of-way maintenance, including stabilization and weed control.	27.0
49-41B-11(2)(11)	20:10:22:35	**Information concerning transmission facilities**. If a transmission facility is proposed, the applicant shall provide the following information as it becomes available to the applicant: (1) Configuration of the towers and poles, including material, overall height and width; (2) Conductor configuration and size, length of span between	27.0

South Dakota Codified Laws (SDCL)	Administrative Rules of South Dakota (ARSD)	Required Information	Chapter Location
		structures, and number of circuits per pole or tower; (3) The proposed transmission site and major alternatives as depicted on overhead photographs and land use culture maps; (4) Reliability and safety; (5) Right-of-way or condemnation requirements; (6) Necessary clearing activities; and (7) If the transmission facility is placed underground, the depth of burial, distance between access points, conductor configuration and size, and number of circuits.	
49-41B-7; 49-41B-22	20:10:22:36	**Additional information in application**. The applicant shall also submit as part of the application any additional information necessary for the local review committees to assess the effects of the proposed facility pursuant to SDCL 49-41B-7. The applicant shall also submit as part of its application any additional information necessary to meet the burden of proof specified in SDCL 49-41B-22.	30.0
49-41B-11; 49-41B-22	20:10:22:37	**Statement required describing gas or liquid transmission line standards of construction**. The applicant shall submit a statement describing existing pipeline standards and regulations that will be followed during construction and operation of the proposed transmission facility.	28.0
49-41B-11	20:10:22:38	**Gas or liquid transmission line description**. The applicant shall provide the following information describing the proposed gas or liquid transmission line: (1) A flow diagram showing daily design capacity of the proposed transmission facility; (2) Changes in flow in the transmission facilities connected to the proposed facility; (3) Technical specifications of the pipe proposed to be installed, including the certified maximum operating pressure, expressed in terms of pounds per square inch gauge (psig); (4) A description of each new compressor station and the specific operating characteristics of each station; and (5) A description of all storage facilities associated with the proposed facility.	28.0
49-41B-11	20:10:22:39	**Testimony and exhibits**. Upon the filing of an application pursuant to SDCL 49-41B-11, an applicant shall also file all data, exhibits, and related testimony which the applicant intends to submit in support of its application. The application shall specifically show the witnesses supporting the information contained in the application.	31.0

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Appendix G: Air Quality Construction Permit Application
Appendix H: Water Appropriation Permit Application

Acronyms and Abbreviations

Abbreviation	Meaning
ANSI	American National Standards Institute
API	American Petroleum Institute
Applicant	Otter Tail Power Company
AQCS	Air Quality Control System
ARSD	Administrative Rules of South Dakota
BMPs	Best Management Practices
BSSB 345 Line	Big Stone South to Brookings Transmission Line
Btu	British Thermal Unit
CFR	Code of Federal Regulations
Commission	Public Utilities Commission of the State of South Dakota (also SDPUC)
Company	Otter Tail Power Company
CRP	Conservation Reserve Program
CT	Combustion Turbine
CWA	Clean Water Act
dB	Decibels
dBA	A-weighted sound level in decibels
EF	electric field
EMF	electromagnetic field
EPA	United States Environmental Protection Agency
ERW	Electric Resistance Welding
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
First District	First District Association of Local Governments
GI	Generator Interconnection
GIA	Generator Interconnection Agreement
GIS	Geographic Information System
gpm	gallons per minute (gpm)
GPS	Global Positioning System
GSU	Generation Step-up Transformer
HHV	High Heating Value
HVTL	high-voltage transmission line
IRP	Integrated Resource Plan
JD	jurisdictional determination
kV	kilovolt

Abbreviation	Meaning
kV/m	kilovolts per meter
kW	kilowatt
kWh	Kilowatt - hour
L_{10}	Noise level exceeded n percent of the time
L_{EQ}	Equivalent Average Sound Level
LHV	Lower Heating Value
m	meter
mA	milliamperes
MF	magnetic field
mG	milliGauss
MISO	Midcontinent Independent System Operator, Inc.
ML	Noise Measurement Location
mmscfd	million standard cubic feet per day
MW	megawatt
MWh	Megawatt hour
NAAQS	National Ambient Air Quality Standards
NBPL	Northern Border Pipeline
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NO_X	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standard
NWI	National Wetlands Inventory
OSHA	Occupational Safety and Health Administration
Otter Tail	Otter Tail Power Company
ppm	parts per million
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psig	pounds per square inch gauge
ROW	right-of-way
SDCL	South Dakota Codified Laws

Abbreviation	Meaning
SDDENR	South Dakota Department of Environment and Natural Resources
SDDOT	South Dakota Department of Transportation
SDGFP	South Dakota Department of Game, Fish and Parks
SDPUC	Public Utilities Commission of the State of South Dakota (also Commission)
SDSHPO	South Dakota State Historic Preservation Office
SPCC	Spill Prevention Control and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TPY	Tons per Year
TSI	Trophic Status Index
ULSD	Ultra Low Sulfur Diesel
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 Description of the Nature and Location of the Proposed Facility

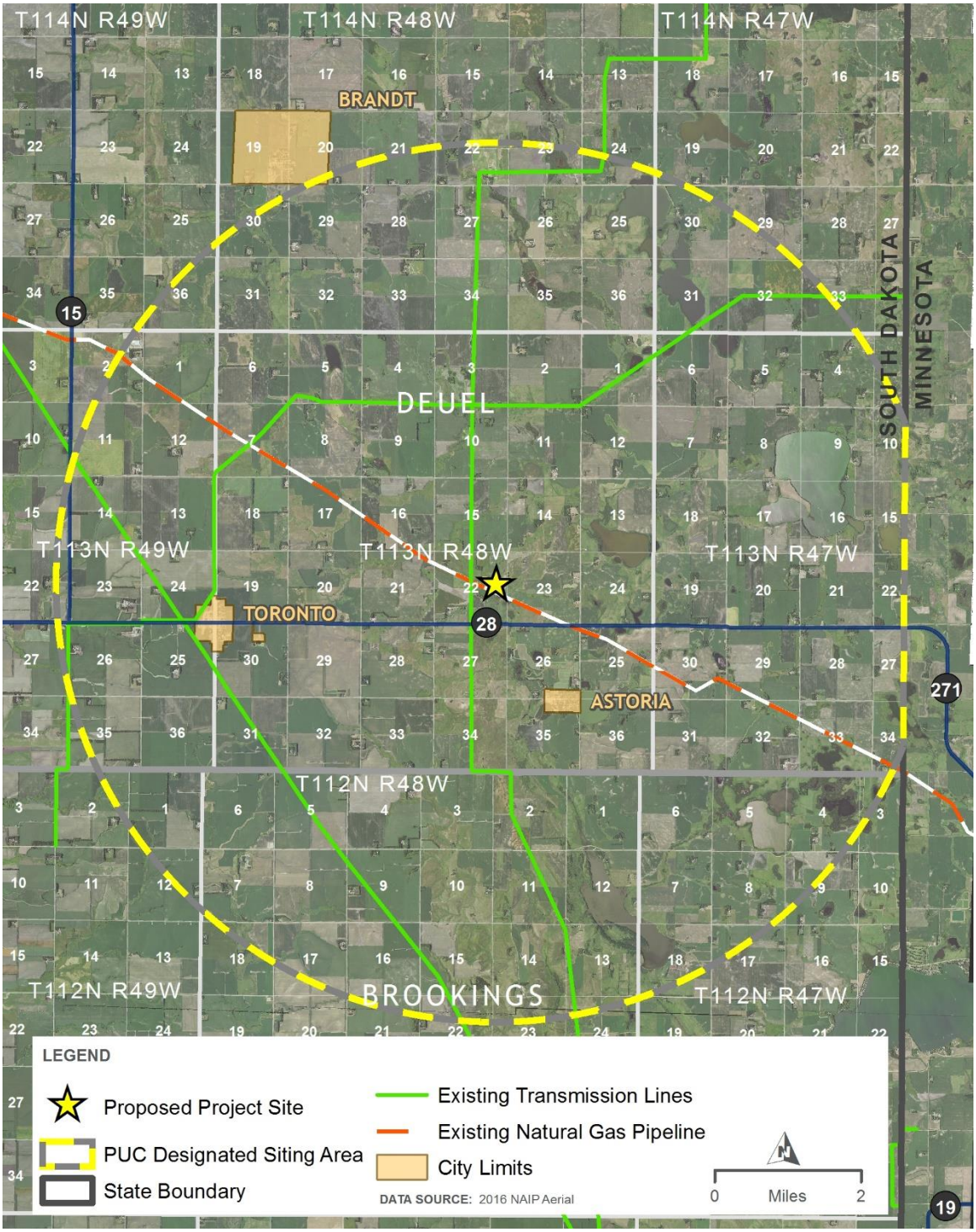
Otter Tail Power Company (Otter Tail or Company) proposes to develop, own, and operate an approximate 250 megawatt (MW) simple-cycle natural gas fired energy conversion facility and related components, which is known as the Astoria Station Project (Project). The Project is approximately 1.5 miles northwest of Astoria, South Dakota, in Scandinavia Township, Deuel County. Exhibit 1-1 shows an overview of the Project Area and the affected siting area designated by the SDPUC in the Order Designating Affected Area and Designating Local Review Committee; Order Granting Motion to Defer Prefiled Testimony; and Order Granting Motion to Schedule Prehearing Conference in Docket EL 17-017 (SDPUC 2017). The Project will be capable of quickly starting to serve a load-following function and provide for peak capacity needs.

In addition to the simple-cycle natural gas fired energy conversion facility, components of the Project incorporated this application include:

- A short segment (less than 1,000 feet long) of approximately 10-inch diameter natural gas pipeline on Company property necessary to interconnect to the Northern Border Pipeline (NBPL).
- A short segment (preliminarily estimated to be less than 0.5 miles long) of 345 kilovolt (kV) generation-tie (gen-tie) electric transmission line necessary to interconnect to the Big Stone South-Brookings County 345 kV electric transmission line (BSSB 345 Line).
- A short segment (less than 1,500 feet long) of approximately 5-inch diameter water pipe on Company property necessary to supply process water and potable water.

The information presented in this application is based on preliminary design efforts and is accurate to the best of Otter Tail's knowledge at this time. For example, the final size of the combustion turbine and the specific features to be included will be determined through Otter Tail's sourcing efforts, initiated closer to the time of construction. Additionally, a Generation Interconnection Agreement (GIA) will need to be negotiated and signed to allow the Project to interconnect to the electric transmission system. The siting and construction of any new or modified interconnection upgrades identified in the GIA, such as a new switchyard, while funded by the Project, are the responsibility of the BSSB 345 Line owners and could be used as a common interconnection point for the Project and any other regional energy generation projects, and are therefore outside the scope of permitting for the Project. However, changes in the final location of the interconnection upgrades could affect the length and route of the Project's 345 kV gen-tie line as referenced herein.

Exhibit 1-1. Project Area



2.0 Name of Owner, Manager, and Participants (ARSD 20:10:22:06-07)

Otter Tail is an investor-owned electric utility that provides electricity for residential, commercial, and industrial customers in western Minnesota, eastern North Dakota, and northeastern South Dakota. Otter Tail's headquarters are located in Fergus Falls, Minnesota, and the Company serves approximately 131,200 customers in 422 communities, including 49 communities in South Dakota. Since 2013, Otter Tail has been involved in a number of large, jointly-owned projects including an Air Quality Control System (AQCS) project at Big Stone Plant, and the BSSB 345 Line and Big Stone South-Ellendale electric transmission projects totaling over $1 billion in investment in South Dakota. Otter Tail's own investment in these projects was greater than $600 million. Otter Tail will wholly own, operate, and manage this Project.

The Applicant's name, address, telephone, and Project website are provided in the following:

Otter Tail Power Company
215 South Cascade Street
Fergus Falls, MN 56537
(218) 739 - 8200
www.otpco.com/AstoriaStation

The individuals authorized to receive communications relating to this application on behalf of Otter Tail are shown in Table 2-1.

Table 2-1. Applicant Contact Information

Otter Tail Power Company	
William Swanson Manager, Supply Engineering Astoria Station Project Manager 215 S. Cascade Street Fergus Falls, MN 56538-0496 Telephone: (218) 739-8205	Mark Thoma Manager, Environmental Services 215 S. Cascade Street Fergus Falls, MN 56538-0496 Telephone: (218) 739-8526
Project Counsel	
Thomas Welk Jason Sutton Boyce Law Firm, L.L.P 300 S. Main Avenue Sioux Falls, SD 57104 Telephone: (605) 336-2424	

3.0 Purpose of the Facility (ARSD 20:10:22:08)

The Project will provide capacity, dispatchable energy, and grid support as part of Otter Tail's two-part plan to reliably meet its customers' electric needs, replace expiring capacity purchase agreements, and prepare for the 2021 retirement of the 1950s-era coal-fired Hoot Lake Plant near Fergus Falls, Minnesota. The other component of Otter Tail's two-part plan is the construction of an approximately 150 MW wind generation facility near Merricourt, North Dakota. Together, the components of the Company's two-part plan exemplify Otter Tail's balanced energy strategy by securing least-cost wind energy and capacity while bolstering grid reliability with dispatchable energy and load-following capability.

The Company's analysis of the Project indicates that it will be beneficial for Otter Tail's customers because it is the least-cost resource available to meet the Company's needs and reliably serve customers during periods of high demand for power. More specifically, Otter Tail's 2013 resource planning process determined that the least-cost method of meeting Otter Tail's 2021 capacity needs would be to add a simple cycle generator to Otter Tail's system. Otter Tail's 2016 resource planning process confirmed the results of the 2013 process and specifically identified a simple cycle unit with the Project's size, costs, and operating characteristics as the least-cost resource addition. Otter Tail's proposed development, ownership, and operation of the Project is a prudent resource addition; it will provide a cost effective, dispatchable generation resource for the Company's electric customers.

Otter Tail acquired land rights near Astoria because that is where the NBPL and the BSSB 345 Line intersect, which will help the Company avoid significant costs for connecting to these facilities. This optimal location will also minimize landowner impacts.

4.0 Estimated Cost of Facility (ARSD 20:10:22:09)

Otter Tail estimates the total capital cost of the Project at approximately $165 million, which is an effective cost of $665 per kilowatt (kW) of installed capacity. The estimated cost includes engineering, procurement, and construction of the generation plant; the natural gas pipeline segment; the 345 kV gen-tie segment; the water pipe segment; interconnection facilities; and reasonable contingencies. This initial cost estimate is based on preliminary design and is provided in advance of the bidding and procurement process for the Project. While the estimate includes escalation, it does not include allowance for funds used during construction.

5.0 Demand for Facility (ARSD 20:10:22:10)

5.1 Present and Projected Future Demand and Energy Needs

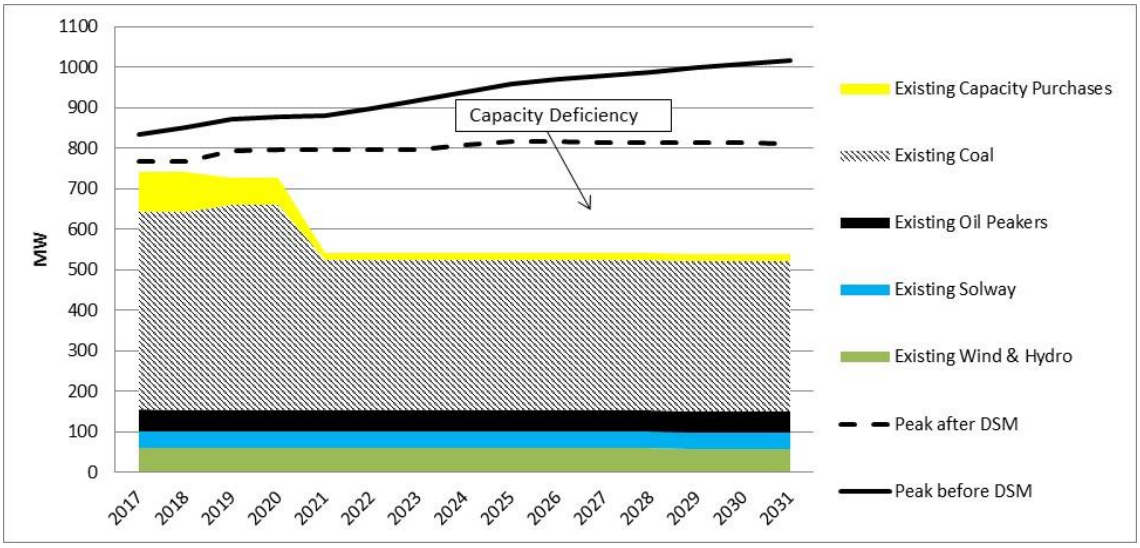
Otter Tail's development of the Project and need for capacity and energy are precipitated by three factors: (1) load growth forecasts; (2) the expiration of a series of capacity purchase agreements; and (3) the 2021 retirement of the Company's Hoot Lake Plant Unit 2 and Unit 3.

Consistent with the Company's plans to retire the Hoot Lake Plant in 2021, Otter Tail entered into a series of capacity purchase agreements to meet its obligation to serve customers. The capacity purchased through these agreements was intended to bridge the Company's capacity needs until Hoot Lake Plant is retired in 2021 and additional generation could be added to the Company's generation portfolio. Otter Tail timed the expiration of these capacity purchases with the retirement of Hoot Lake Plant so that it could aggregate its capacity needs to support the addition of new generation, rather than rely on the market. Capacity reserves are declining within the Midcontinent Independent System Operator (MISO); therefore, it may be difficult to obtain future economical replacement capacity agreements of sufficient size (MISO 2016). By aggregating the capacity needs attributable to the retirement of Hoot Lake Plant and the expiration of the capacity purchases, Otter Tail is able to add optimal complements of new generation, providing grid support and a long-term market hedge.

Otter Tail forecasts continued load growth into the future. The Company's MISO obligation (non-coincident summer peak demand plus transmission losses plus reserve margins) for 2017 is 795 MW; this is expected to increase to 938 MW by 2031. A significant portion of this load growth is expected to result from expansion of pipelines that transport oil from the Bakken Shale in North Dakota and from Canada. While load growth forecasts are inherently uncertain, the need to reliably serve customers with capacity and energy is an additional driver of the need for the Project.

Together, these events require Otter Tail to take action. The 2016 Integrated Resource Plan (IRP) indicates that without replacement capacity and energy, Otter Tail will have a capacity deficit of approximately 273 MW in 2021, and will need to source between approximately 26 percent to 31 percent of its energy from the MISO market. This capacity deficit is illustrated in Exhibit 5-1.

Exhibit 5-1. Projected Capacity Needs



Otter Tail uses the resource planning software Strategist to aid in the resource planning process. The goal of the resource planning process is to develop a single preferred plan (on an integrated system basis) that will reliably and economically meet the capacity and energy needs of customers in the three states Otter Tail serves, while complying with all legal and regulatory obligations, and adequately addressing risk. Otter Tail provides service in three states on an integrated system basis, which affords significant benefits to customers due to the economies of scale achieved from planning and integrating generation assets on a larger scale. The resource planning process incorporates the full complement of the Company's existing fleet of generation, bilateral transactions, and demand-side management programs, as well as evaluating new resource alternatives to meet customer demand, expiring bilateral transactions, and the expected retirement of existing generation resources. The preferred plan is considered under numerous scenarios relating to forecasted fuel prices (that is, coal and natural gas), market energy prices, market capacity prices, load growth, and resource costs (including both capital and operations & maintenance).

As part of the Company's 2013 resource planning process, Otter Tail analyzed potential replacement scenarios in expectation of Hoot Lake Plant's retirement. The Company used the Strategist resource planning model to aid in this analysis. To conduct its analysis, Otter Tail made available to the model several different resource selection options, including a 311 MW combined cycle generator, three different-sized simple-cycle generators, the repowering of Hoot Lake Plant to natural gas, and wind and solar resources. Notwithstanding the need for both capacity and energy, the Strategist model indicated that moving forward with a combined cycle plant would not be economical, nor would it be economical to repower the Hoot Lake Plant to natural gas.

Rather, the results indicated that replacing Hoot Lake Plant's capacity with a simple-cycle generator was the most economical choice. The modeling results indicated that if wind energy was priced at $45 per Megawatt-hour (MWh), market purchases should be

made to meet the Company's energy needs. However, when wind energy was priced at $30/MWh, Strategist selected wind energy instead of market purchases for energy, signaling that acquiring 150 MW of wind generation in 2021 would be the most economical choice to meet Otter Tail's energy needs. In the Company's 2016 resource planning cycle, Strategist continued to select a wind-plus-gas configuration in all scenarios analyzed because the Production Tax Credit had been extended and the base case assumed availability of wind at $30/MWh. This analysis confirmed the prudence of moving forward with the Company's two-part plan.

Additionally, a combination of wind and natural gas fired simple-cycle generation provides beneficial operating characteristics. The natural gas fired simple-cycle component of the Company's two-part plan, the Astoria Station Project, provides low-cost capacity and dispatchable energy. The addition of dispatchable energy provides both a hedge against high energy market prices and grid support due to its capability of starting quickly and then following load. The wind component provides low-cost energy. Backing wind with gas captures the low-cost energy made possible by the current market for wind generation while helping to ensure sufficient system reliability from dispatchable simple-cycle generation (which yields low-cost capacity). Natural gas fired simple-cycle generation paired with wind is particularly appealing because the Company's service territory has some of the best wind resources in the country. Consequently, a wind-plus-gas configuration can provide many of the same operational and economic benefits of a combined cycle plant.

A wind-plus-gas configuration has hedge and expansion value. If Otter Tail instead installed a combined cycle plant rather than the proposed simple-cycle, the Company and its customers would face significantly more exposure to fluctuations in natural gas pricing. Moreover, a natural gas fired simple-cycle plant can include sufficient space and design parameters to accommodate the potential future addition of combined cycle generation, if market conditions later warrant it. The wind component can provide low-cost energy from a zero-cost fuel source, providing both a market and fuel hedge. The Company's service area has excellent wind resources, providing an economical generation resource for meeting the Company's energy needs.

5.2 Consequences of Delay or Termination of the Construction of the Facility

If the Project were delayed, the Company would have to seek other options to address the capacity need. The MISO interconnection process is currently the cause of the greatest uncertainty for cost and schedule. If the Project's existing queue position were lost due to delay or termination of the Project, it would be difficult to predict the schedule and cost of a different project at a different time. Otter Tail would likely have to procure capacity purchases in the MISO market, and Otter Tail's customers could thereby be exposed to high market energy prices without the Project. While the Company could procure bilaterally purchased wholesale energy, it would not be added in quantities that provide the same level of energy price protection afforded by the Project. Additionally, delay would likely add to the cost of the new generation unit, because the components of

construction may escalate over time, or the market for generation equipment could change significantly if a large new build-out of dispatchable natural gas generation equipment is needed to balance a significant amount of variable energy renewable generation added to the bulk electric system.

6.0 General Site Description (ARSD 20:10:22:11)

The combustion turbine and main plant buildings for the Project are planned in the northeast quarter of Section 22, Township 113N, Range 48 West, Scandinavia Township, Deuel County, approximately 1.5 miles northwest of Astoria, South Dakota. This location consists of a combination of tilled, fallow, and pasture land with isolated patches of trees and a small creek. The natural gas supply line necessary to interconnect to the NBPL will be located south of the facility (on Company-owned property). A 345 kV gen-tie line will connect to the BSSB 345 Line that is less than 0.5 miles west from the combustion turbine. The gen-tie infrastructure will be constructed within land owned by the Company or on rights-of-way (ROWs) acquired from adjacent landowners. There are no cemeteries or places of historical significance adjacent to or abutting the Project site.

7.0 Alternative Sites (ARSD 20:10:22:12)

7.1 Energy Conversion Facility

The primary considerations for siting a combustion turbine include proximity to adequate natural gas and electric transmission infrastructure. One of the largest drivers of the overall cost for developing simple-cycle generation is the need to construct pipeline segments for natural gas access and electric transmission lines to interconnect to the existing electric transmission grid. Minimizing these costs enables a least-cost project, because turbine and installation costs are generally the same for any site. Other considerations include site suitability for construction, capital costs, availability of water, permitting, local conditions, and tax incentives.

The Company reviewed locations within its service area where major natural gas pipelines intersected with or were near significant electric transmission infrastructure and narrowed the sites to near Ellendale, North Dakota; Solway, Minnesota; and Astoria, South Dakota.

The Company identified the Astoria site as the preferred location because of its proximity to the intersection of the NBPL and the BSSB 345 Line. The Astoria site required the least amount of natural gas and transmission interconnection infrastructure, which reduces capital investment and ensures the Project will be least-cost. Additionally, the Project provides supply diversity for the Company's natural gas-fired generation, allowing Otter Tail to use a different natural gas supply line for the Project than the other existing natural gas-fired generation owned by the Company to prudently hedge against natural gas supply disruptions. Moreover, it would impose minimal disruption to landowners, as opposed to a project requiring construction of a long natural gas pipeline

segment or electric transmission line. Furthermore, the Astoria site was large enough to allow for plant expansion in the future, and due to the proximity of the Astoria site to the NBPL and the BSSB 345 Line, the use of eminent domain would not be reduced by selection of an alternative site.

The Ellendale, ND site would require the construction of a natural gas pipeline absent additional regional need for natural gas. Therefore, a long natural gas pipeline would add significant cost and would have affected significantly more landowners as compared to the Astoria site.

Otter Tail explored brownfield development at its existing Solway simple-cycle plant, which is reliant on the Great Lakes Gas Transmission pipeline. The Solway site lacks sufficient electric transmission infrastructure to support the Project. Moreover, adding the Project at the Astoria site on a separate natural gas transmission line, in a different part of the Company's service territory, provides geographic diversity for our natural gas-fired generation resources.

7.2 345 kV Generation-Tie Corridor

The Generator Interconnection (GI) process at MISO is used to determine the location of the electric transmission system interconnection facilities and network upgrades necessary to safely and reliably interconnect the Project to the electric transmission system. Information collected through the GI process preliminarily indicates that the preferred location is less than 0.5 miles west of the combustion turbine, and immediately west of the BSSB 345 Line. Because the Company owns land that connects to this preferred switchyard location, the gen-tie was preliminary designed to fit within this Company-owned land. It is possible during detailed design that cost savings could be realized by a more direct route across a parcel of land that is not currently owned by the Company. This alternate route is still likely to be less than 0.5 miles, but would require an easement or land purchase from the neighboring landowner.

8.0 Environmental Information (ARSD 20:10:22:13)

Chapters 9 through 16 provide a description of the existing environment at the time of the submission of the application, an estimate of changes to the existing environment that are expected to result from construction and operation of the Project, and identification of irreversible changes that are expected to remain beyond the operating lifetime of the Project, along with mitigation measures to be taken by the Company.

The siting of the Project at the proposed site is not expected to cause environmental effects that would be hazards to the health and welfare of human, plant, and animal communities, even when the cumulative and synergistic consequences of siting the proposed facility is considered in combination with any operating energy conversion facilities, existing or under construction.

In addition, Otter Tail is not aware of any other major industrial facilities under regulation which may have an adverse effect on the environment as a result of their construction or operation in the Project's siting area.

9.0 Effect on Physical Environment (ARSD 20:10:22:14)

Chapter 9 describes the effect of the proposed Project on the physical environment surrounding the proposed site.

9.1 Existing Environment

9.1.1 Description of Land Forms

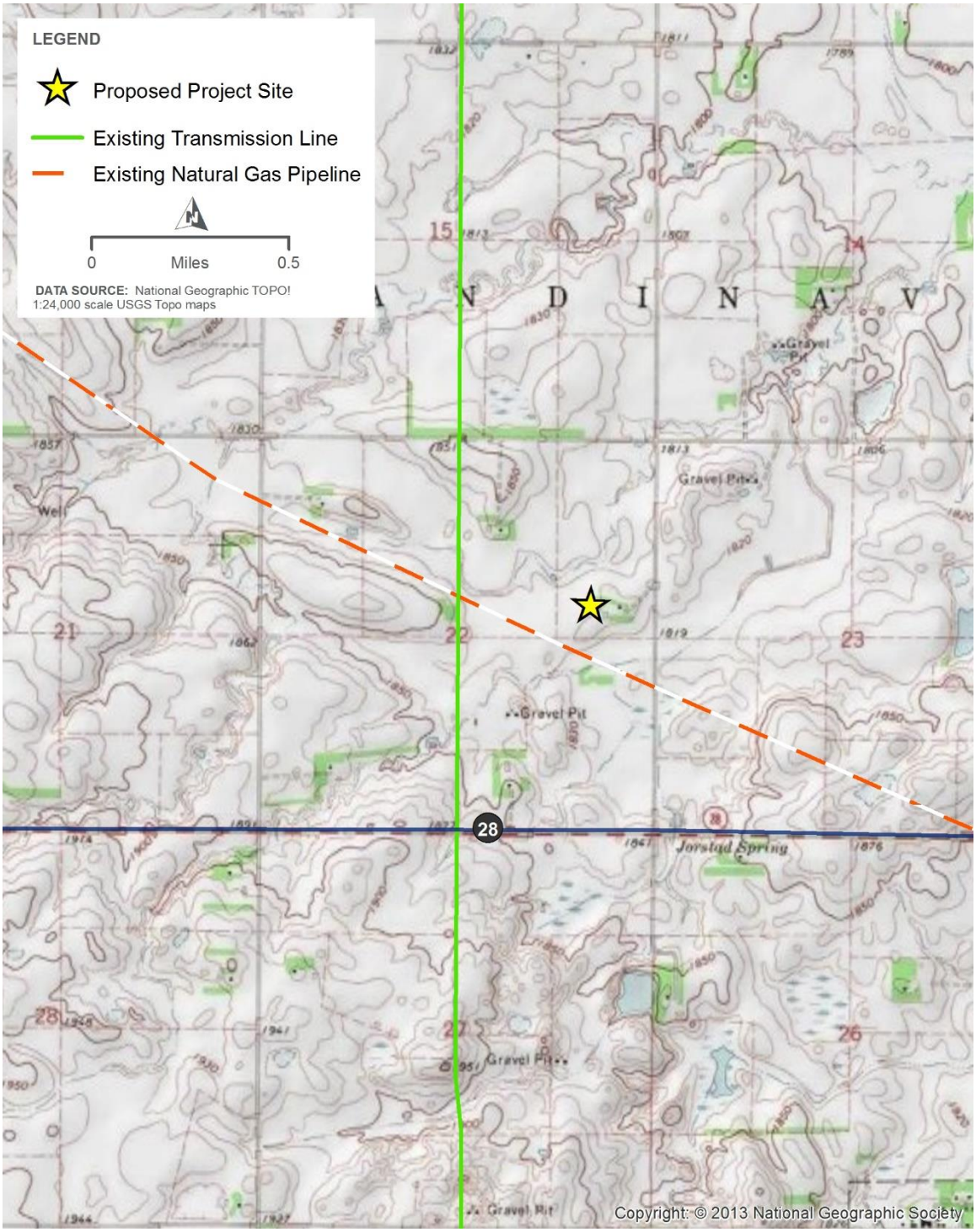
The proposed Project site is in an area that is generally flat with gently rolling plains. Multiple small streams and wetlands are in the vicinity surrounding the Project site (Exhibit 9-1). The area surrounding the Project is predominantly used for agriculture. Dominant landforms in this region include the Big Sioux River to the west and the Coteau des Prairies. The Project is located entirely on the Coteau des Prairies plateau. This landform is a moderately dissected, relatively high plateau that rises out of a nearly level till plain. It consists of bedrock covered by thick layers of glacial sediment deposits and extends from North Dakota down through eastern South Dakota and western Minnesota. During the Wisconsinan glaciation, ice sheets split into two lobes, the Des Moines Lobe and the James Lobe, as they advanced south around the Coteau des Prairies (North Dakota State University 1996).

9.1.2 Geological Features

Surficial geology of the Project site and surrounding vicinity is made up of alluvium and till deposits. Unconsolidated quaternary alluvium deposits consisting of clay to boulder-sized clasts with locally abundant organic material can be found at thicknesses up to 75 feet. Unconsolidated Pleistocene glacial till deposits consist of heterogeneous clay with silt to boulder-sized clasts at thicknesses up to 150 feet. This formation exhibits a distinctive weathered, dissected surface and is typically overlain by up to 10 feet of loess (United States Geological Survey [USGS] 2017).

The entire Project site is underlain by the Pierre Shale Bedrock unit (South Dakota Geographic Information Systems [GIS] 2015). No significant geologic features, aquifers, mineral deposits, or fossils are expected to be affected by the Project because of the minimal ground disturbance required for Project construction.

Exhibit 9-1. Topography Map



9.1.3 Economic Deposits

Within the Project site there are no substantial mineral resources or economic deposits. Three construction aggregate mining sites exist within 5 miles of the Project site. There are no oil or gas extraction wells near the Project site, and the Project will not affect any active quarry or mine sites (South Dakota Department of Environment and Natural Resources [SDDENR] 2017).

9.1.4 Soil Types

Soils in the Project site are primarily composed of the Barnes-Buse-Svea complexes, Lamoure-Rauville complex, Parnell series, and Lowe series. Barnes-Buse-Svea complexes typically consist of layers of clay loam formed from loamy till on plains and glacial moraines. The Lamoure-Rauville complex typically consists of layers of silty clay loam over stratified sandy loam to silty clay loam. The Lamoure-Rauville complex is formed from silty alluvium and is associated with flood plains. The Lowe series consists of loam over stratified loamy sand to silty clay loam and is formed from loamy alluvium. Both the Lamoure-Rauville complex and Lowe series are associated with flood plains, and both are expected along the sides of the drainage running through the northern half of Section 22. The Parnell series typically consists of a layer of silty clay loam over silty clay; the series is associated with potholes and typically formed from clayey alluvium. The Parnell series is expected to occur in the southeastern corner of the Project site (United States Department of Agriculture [USDA] Natural Resources Conservation Service [NRCS] 2017).

Some soil types in the Project site are considered prime farmland by the United States Department of Agriculture (USDA). Prime farmland is defined as:

> [L]and that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. (NRCS 2000).

Both the Barnes-Buse-Svea loam and Divide loam are considered prime farmland and make up approximately 14 acres of the Project site. The Barnes-Buse-Svea loams are considered farmland of statewide importance and make up approximately 17.7 acres of the Project site. The Hamerly-Badger complex, Hegne-Fulda silty clay loam, and the Lowe loam are considered prime farmland if they are drained and make up approximately 6.5 acres of the Project site. The Lamoure-Rauville silty clay loam and Parnell silty clay loam are not prime farmland and make up approximately 5.5 acres of the Project site (NRCS 2017). In Deuel County, 205,024 acres of land, or approximately 50 percent of the total acreage in the county, meets the soil requirements for prime farmland. (NRCS 1997).

9.1.5 Seismic Risks

There are several small magnitude 3 earthquakes that were recorded in eastern South Dakota in the past century; however, USGS rates this region as having a less than 1 percent chance of damage due to seismicity (USGS 2017a). Therefore, due to the relatively flat topography of the site and the low probability of seismic activity, subsidence and slope instability is not expected to be a risk at the proposed Project site.

9.2 Potential Impacts

The Project is likely to have an adverse impact on soils in the area due to compaction, excavation, and alteration from construction equipment. During construction, there is an elevated risk of erosion of disturbed soils from wind and water. Sensitive soils such as hydric soils are more susceptible to impacts during construction. There is a potential for the spread of invasive species on construction equipment. Equipment containing large amounts of oil has the potential for spills and subsequent contamination of soil and water resources in the area. Available geologic data indicate that the Project will not substantially affect bedrock geology. Seismic activity is not expected to adversely affect the performance of the facility or transmission line structures. The placement of structure foundations in the ground will have a minor impact on the underlying geologic conditions. There are no other known constraints imposed by geological characteristics on the design, construction, or operation of the Project.

9.3 Mitigation

Impacts on soils will be minimized or mitigated by soil protection measures identified in a stormwater pollution prevention plan (SWPPP) required for construction activities under the National Pollutant Discharge Elimination Systems (NPDES) program. The SWPPP will include appropriate best management practices (BMPs) to obtain and implement to reduce impacts of erosion and sedimentation on soils in the Project site. These measures may include procedures for segregating and replacing topsoil, relieving areas compacted by heavy equipment, and implementing water and wind erosion control practices. A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be developed for the site in accordance with the federal oil pollution prevention rule, 40 Code of Federal Regulations (CFR) Part 112, for the site to prescribe spill prevention and response procedures.

After the completion of construction, a SWPPP for the operational phase will be developed and implemented. The SWPPP will include site specific BMPs to minimize exposure of stormwater to industrial activities. All stormwater coming into contact with plant operations will flow to a stormwater retention pond.

10.0 Hydrology (ARSD 20:10:22:15)

10.1 Existing Environment

10.1.1 Surface Waters

Surface water hydrology at the Project site consists of three palustrine emergent wetland areas, one located along the north boundary of the site, one along the west boundary, and one along the south border of the site. The wetlands along the north and west boundary drain to a perennial drainage ditch that flows northeast from the site. The wetland along the southern boundary of the site drains to a separate unnamed drainage ditch that flows northeast to where the two drainages meet and then flows east to Singsaas Slough. Singsaas Slough is approximately 1.5 miles east of the Project site. Singsaas Slough drains to Fish Lake and subsequently to the La qui Parle River. Exhibit 10-1 shows surface water and the existing drainage patterns in the Project vicinity. The Project site is not in a defined floodplain area.

10.1.2 Groundwater and Aquifers

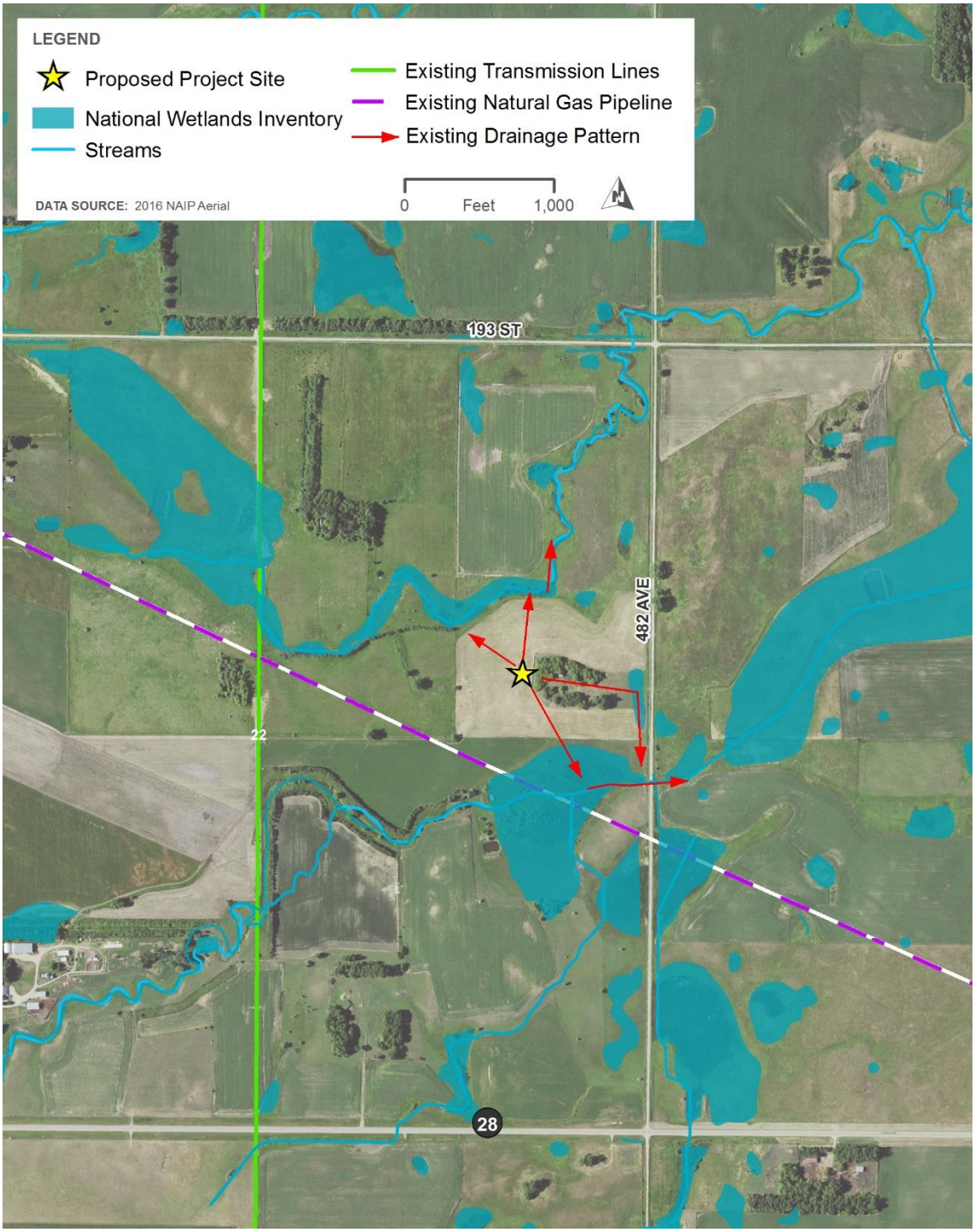
A field investigation of groundwater availability at the Project site has been completed. According to available technical sources, there were three main aquifers that were possible to be encountered: local glacial aquifers, the Prairie Coteau aquifer, and the Altamont aquifer.

Local glacial aquifers are composed mostly of exposed sand and gravel outwash on slopes and valleys. Water occurs under water-table conditions in the exposed outwashes and under artesian conditions in the buried outwash. In general, because the aquifers are less than 20 feet thick and can vary largely over a short distance, local glacial aquifers were not evaluated as a potential supply of groundwater for the Project.

The Prairie Coteau is an artesian supplied aquifer that is generally not part of the surface or near-surface aquifer. Depth to the top of this aquifer averages 52 feet, and an average well depth of 117 feet for 989 wells inventoried between 1971 and 1974 in Deuel and Hamlin counties. Although this aquifer would have been expected to yield sufficient water for the Project, it was not encountered during the field investigation.

The Altamont is generally a deeper aquifer that consists of outwash deposits that lie directly on top of or slightly above the bedrock surface. Depth to the top of this aquifer ranges from 150 feet to 820 feet below ground surface. A summary of hydrologic information for the Altamont aquifer shows an average well depth of 472 feet for 31 wells inventoried between 1971 and 1974 in Deuel and Hamlin counties. This aquifer was encountered during the field investigation and subsequently, a test well was advanced to 679 feet below ground surface.

Exhibit 10-1. Surface Water



10.2 Potential Impacts

10.2.1 Surface Waters

Permanent loss of surface waters may occur if fill placement in wetlands result from construction of the Project; however, the general arrangement of the Project will be designed to minimize and avoid impacts on wetland resources to the extent feasible. Based on preliminary engineering, the Company does not expect any impacts to wetlands. The Project will not impact the existing surface water drainage patterns near the site; however, drainage within the energy conversion facility site will be altered to ensure that stormwater coming into contact with facility operations will be directed to an on-site stormwater retention pond.

Surface waters will not be used as a water supply for the Project and there will not be any discharge of heated water to natural drainage systems.

10.2.2 Impacts on Groundwater and Aquifers

Water uses for the facility include process water and potable water. This water is expected to be provided by an on-site groundwater well. The local Brookings-Deuel rural water supply is also a potential alternative source, either through upgrades to their pipe distribution system or through trucking from an off-site location. The proposed capacity of the on-site well is 100 gallons per minute (gpm) and 4.0 million gallons per year. The on-site well or rural water supply will transfer water into an on-site water storage tank preliminarily sized to be 350,000 gallons. Outside of consuming less than 1 gpm for potable water, process water consumption will only be needed at ambient temperatures above 59 degrees Fahrenheit (°F). Typical consumption from the water storage tank at warm ambient conditions will be less than 40 gpm, with a possible short term maximum rate of approximately 200 gpm. Based on annual average ambient conditions, there will be many days or months when process water is not required.

After receiving approval from SDDENR, an 8-hour pump test was conducted at the test well that was advanced into the Altamont aquifer. An initial static water elevation of approximately 270 feet below grade was noted at the beginning of the test, and within 5 minutes of concluding the test pumping, the static water level recovered to within 1 foot of the initial level.

The Project is not expected to affect planned water uses by any nearby communities, agriculture, fish and wildlife. Also, deep well injection will not be used for effluent disposal.

10.3 Mitigation

Based on preliminary design, no permanent impacts to wetlands are expected by the Project. Additionally, by using the Altamont aquifer approximately 700 feet below ground surface, no adverse effects on groundwater are expected. The Project will acquire a water rights permit for non-irrigation use from SDDENR. A copy of the water rights

permit application, including a map showing the location of the proposed on-site groundwater appropriation well, that was submitted to SDDENR is included as Appendix H.

11.0 Effect on Terrestrial Ecosystems (ARSD 20:10:22:16)

11.1 Existing Environment

The Project is in the Prairie Parkland (Temperate) and the Great Plains Steppe Ecological Provinces as defined in the *Ecological Subregions of the United States* (McNab 1994). Historically, land cover in the North Central Glaciated Plains Section of the Prairie Parkland (Temperate) Province near the South Dakota and Minnesota state border was characterized by a predominance of treeless fire-dependent grassland and brushland types interrupted by lakes, rivers, streams, marshes, and pothole wetlands. The Project lies within the Coteau des Prairies. This landform is a moderately dissected, relatively high plateau that rises out of a nearly level till plain. This feature and the Minnesota River's broad valley were created by the Pleistocene draining of Glacial Lake Agassiz. Historically, Prairie Coteau was dominated by treeless community types reflective of fire-dependent plants such as mesic prairie, dry hill prairie, wet prairies, and to a lesser extent, wooded communities associated with rivers, streams, or creeks.

11.1.1 Flora

Biological resource data were obtained from the United States Fish and Wildlife Service (USFWS), South Dakota Game Fish and Parks (SDGFP), and the National Wetland Inventory. A field survey was conducted on June 8, 2017, to collect site-specific data on terrestrial vegetation, wildlife, and special status species.

Based on field investigations, the Project site includes five general habitat or cover types: Conservation Reserve Program (CRP)/planted grasses, non-native upland meadow, upland/riparian woodland, wetland, and cropland. Native plant communities have largely been converted or degraded by agricultural activities in the Project site. Both native and introduced species are present in the CRP/planted grass portion of the site. The non-native upland meadow adjacent to a swale on the Project site is dominated by smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), Canada goldenrod (*Solidago canadensis*), and green ash seedlings (*Fraxinus pennsylvanica*), with some water smartweed *(Polygonum amphibium*), reed canary grass (*Phalaris arundinacea*), yellow foxtail (*Setaria glauca*), and giant goldenrod (*Solidago gigantea*). A wetland community on the Project site is discussed in more detail in Chapter 12. The forested shelterbelts contain tree species including green ash and choke cherry (*Prunus virginiana*) and has an herbaceous understory of Kentucky bluegrass. Croplands were planted with alfalfa at the time of the field review.

11.1.2 Fauna

A review of the USFWS Environmental Conservation Online System found that five species protected under Section 7 of the Endangered Species Act are recorded in Deuel County. The five species listed include; red knot (*Calidris canutus rufa*), Topeka shiner (*Notropis topeka)*, Dakota skipper (*Hesperia dacotae*), Poweshiek skipperling (*Oarisma poweshiek*), and northern long-eared bat (*Myotis septentrionalis*). Biologists reviewed habitat types at the Project site for conditions that may be suitable for the presence of all five of the species listed for Deuel County. No suitable habitat was found for red knot and the remaining habitat types are discussed in the following.

Habitat is characteristic of a highly utilized agricultural landscape with cultivated lands, altered watercourses, windrows, and farm outbuildings present within the Project site. The site was evaluated for rare native fauna and no native prairie capable of supporting prairie obligate species such as Dakota skipper, Poweshiek skipperling, or western prairie-fringed orchid (*Platanthera praeclara*) was identified within lands affected by the Project. Trees and farm outbuildings do occur within the Project site that may provide roost sites for bats or other mammals. Species or signs observed on the site included the following species: American robin (*Turdus migratorius*), song sparrow (*Melospiza melodia*), vesper sparrow (*Pooecetes gramineus*), eastern bluebird (*Sialia sialis*), red-winged blackbird (*Agelaius phoeniceus*), western meadowlark (*Sturnella neglecta*), killdeer (*Charadrius vociferus*), red-tailed hawk (*Buteo jamaicensis*), barn swallow (*Hirundo rustica*), American goldfinch (*Spinus tristis*), common yellowthroat (*Geothlypis trichas*), orchard oriole (*Icterus spurius*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and white-tailed deer (*Odocoileus virginianus*).

11.2 Potential Impacts

Noise and construction activities created by equipment used to grade and construct the facilities are likely to displace species when construction activities take place. Woodlots, outbuildings, and trees on the Project site may support bat use. The clearing of trees, brush, and grassland to accommodate the new facilities will remove potential nesting and foraging habitat that could be used by avian, mammal, and invertebrate species. Vegetation removal will affect primarily non-native, pioneering, or invasive species because most of the site was converted from native plant communities when the land was converted to a farmstead, crops, and pasture. The Project is not expected to have any impact on any endangered species or rare native fauna.

11.3 Mitigation

Construction activities will be temporary and once the facilities are in operation, displacement due to noise and construction activities will be minimal. Tree removal will take place outside the bat maternity roosting period of June 1 through July 31, to avoid adverse effects on potential listed species such as the northern long-eared bat. If tree removal takes place during the winter months, a further reduction of adverse effects on avian species would occur.

12.0 Effect on Aquatic Ecosystems (ARSD 20:10:22:17)

12.1 Existing Environment

A wetland delineation was performed on the Project site in June 2017. The wetland delineation was conducted using the Routine Determination, Onsite Inspection Necessary method outlined in the *1987 Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the *Great Plains Regional Supplement* (Great Plains Regional Supplement) (USACE 2012) for all wetlands. The United States Army Corps of Engineers (USACE) defines areas as wetlands based on the following:

> Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (33 CFR 328 3.b)

The delineation of a wetland area based on the presence of the following three parameters:

- The area must exhibit indicators of wetland hydrology
- The area must have a predominance of hydrophytic vegetation
- The area must have a presence of hydric soils

Atypical areas or problem areas may be missing one or more of the three parameters, and still can be classified as wetlands.

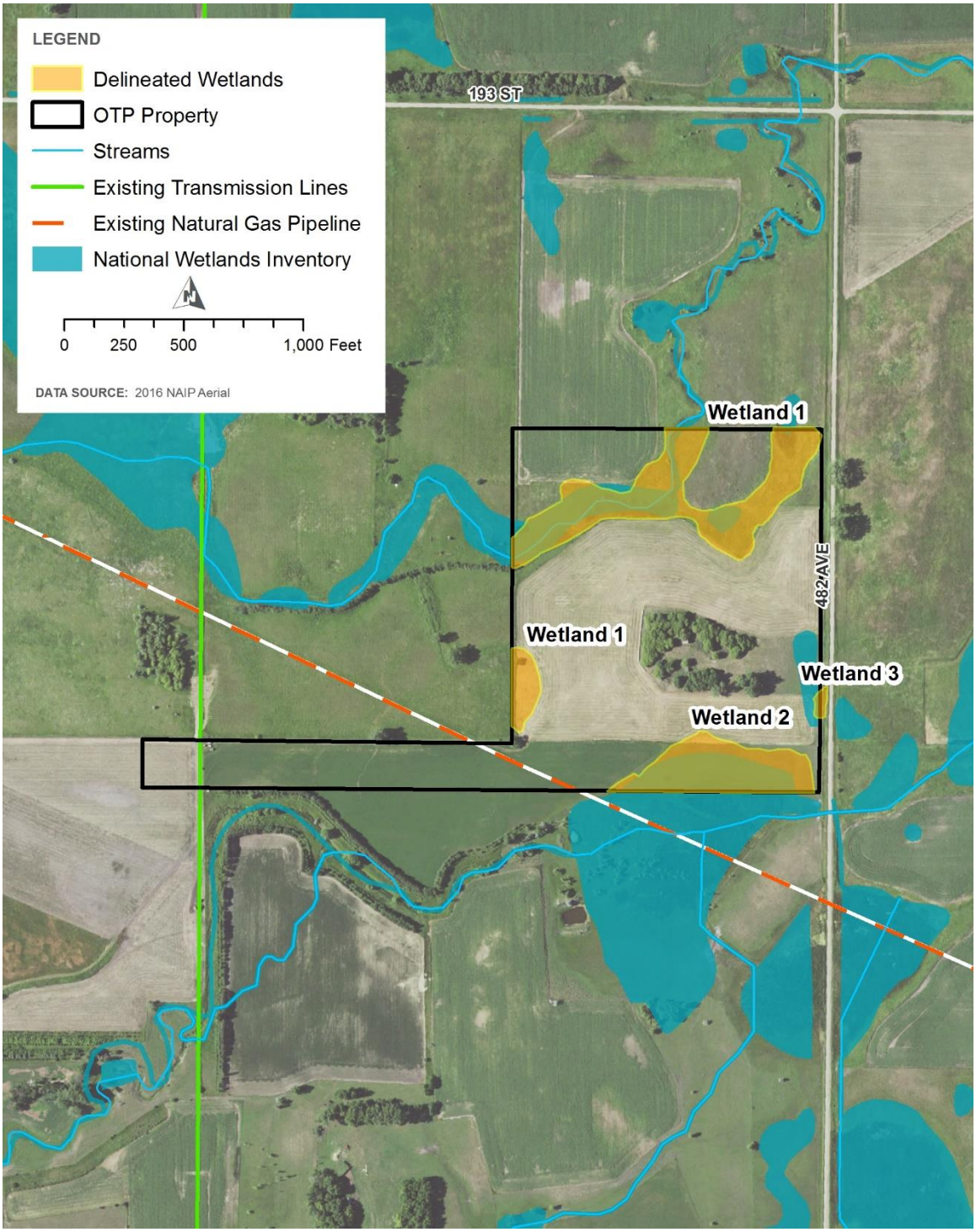
The delineations included a review of the entire Project site and focused on wetlands identified as part of an offsite review as well as all low-lying and/or wet areas not identified by the offsite data. Upland and wetland data plots were collected and evaluated for all wetland areas. At each plot location, a soil pit was dug for observation of soil and hydrology characteristics. Data collection points and the wetland boundaries were mapped using a Global Positioning System (GPS) unit with sub-meter accuracy.

Three palustrine emergent wetlands were delineated totaling approximately 10.67 acres (Exhibit 12-1). The wetlands are associated with two unnamed drainages that flow northeast to Singsaas Slough approximately 1.5 miles east of Project site.

12.1.1 Fisheries

Fisheries habitats are not present on the Project site.

Exhibit 12-1. Delineated Wetlands



12.1.2 Sensitive Aquatic Species

State listed aquatic species that could potentially occur in Deuel County include the northern redbelly dace (*Phoxinus eos*), banded killifish (*Fundulus diaphanous*), and Topeka shiner. USFWS listed the Topeka shiner as federally endangered in December 1998.

The Topeka shiner generally occupies small, prairie streams with groundwater inputs, high water quality, and sand or gravel substrates (10 CFR 2.17). Topeka shiner habitats in South Dakota include streams with silt substrates, off-channel backwater areas, borrow pits, and sloughs connected to occupied streams. Topeka shiners have been collected in varying abundance from streams with incised channels, high bank erosion, and intensive grazing pressure along the riparian zone. No Topeka shiner critical habitat is designated in South Dakota. Suitable habitat does not occur at the Project site for this species.

12.2 Potential Impacts

Permanent loss of wetlands is not expected from construction of the Project; however, because the Project is still in the preliminary design phase, the Company requested a jurisdictional determination (JD) from USACE. USACE subsequently conducted a review and issued a JD that concluded the wetlands at the Project site should be considered jurisdictional waters. Therefore, if adverse effects on wetlands occur, mitigation will be done in compliance with direction from USACE. Otter Tail will obtain and adhere to any permit(s) required by USACE.

Ground disturbance during construction may result in short-term or long-term effects on aquatic ecosystems from erosion of exposed sediments disturbed by excavation, grading, and construction traffic or accidental hazardous spills from construction equipment. No other impacts of the Project are expected on any aquatic ecosystems.

12.3 Mitigation

Permanent impacts on wetland areas, if they were to occur, will be mitigated as directed by the USACE under Section 404 of the Clean Water Act (CWA).

In the event construction activities could cause a disturbance to aquatic ecosystems, Otter Tail will adopt BMPs so that, in the event construction activities have the potential to impact surface waters, steps will be in place to minimize these effects. Temporary erosion and sediment control methods will be properly placed, monitored, and maintained adjacent to water resources. These erosion control methods will remain in place until work areas become re-vegetated or are stable. BMPs may include vegetative buffers, silt fencing, mulching, seeding, and straw wattles. Where appropriate, Otter Tail will revegetate disturbed areas to as close to preconstruction conditions as possible.

To reduce the potential for a hazardous materials release during the construction phase, work will be planned and performed in accordance with Occupational Safety and Health Administration (OSHA) standards and protocols addressing the use of potentially

hazardous materials and applicable federal and state environmental regulations. If a release occurred, cleanup, management, and disposal of contaminated soils will be conducted according to Environmental Protection Agency (EPA) and SDDENR standards, including following contingency planning as established in the SPCC Plan for the Project site and site-specific emergency response procedures.

13.0 Land Use (ARSD 20:10:22:18)

Chapter 13 describes the existing environment, potential impacts, and mitigation measures to land use features within the Project site. It includes a discussion of land use, displacement, noise, and aesthetics.

13.1 Current Land Use

13.1.1 Existing Environment

Land use in the Project site is mostly classified as grasslands/herbaceous with a small portion of developed open space (Exhibit 13-1). The current location of the gen-tie line corridor is classified as mostly cultivated crops with some grasslands/herbaceous land. Other land uses surrounding the Project site include emergent herbaceous wetlands, hay/pasture, and mixed forest (USGS 2017b).

13.1.2 Potential Impacts

The Project will include both temporary and permanent impacts on existing features of the landscape at the site. Based on preliminary design, permanent facilities are expected to cover approximately 8 acres, while the rest of the Project site will be undisturbed by the Project or returned to crop land or seeded with native vegetation after the completion of construction (Exhibit 13-2). Temporary impacts will be associated with construction of the facility, including site access, laydown areas, construction equipment, and facility construction that will be visible in the area.

13.1.3 Mitigation

To mitigate these impacts, construction BMPs will be observed to reduce the temporary impacts of construction on the site. Additionally, permanent impacts will be mitigated by minimizing the overall footprint of the site and following all setback and size requirements for the facility as described in the Deuel County Zoning Ordinance (Deuel County 2004a). Areas of the Project site that experience temporary construction impacts will be seeded or potentially used as crop land.

Exhibit 13-1. Land Cover

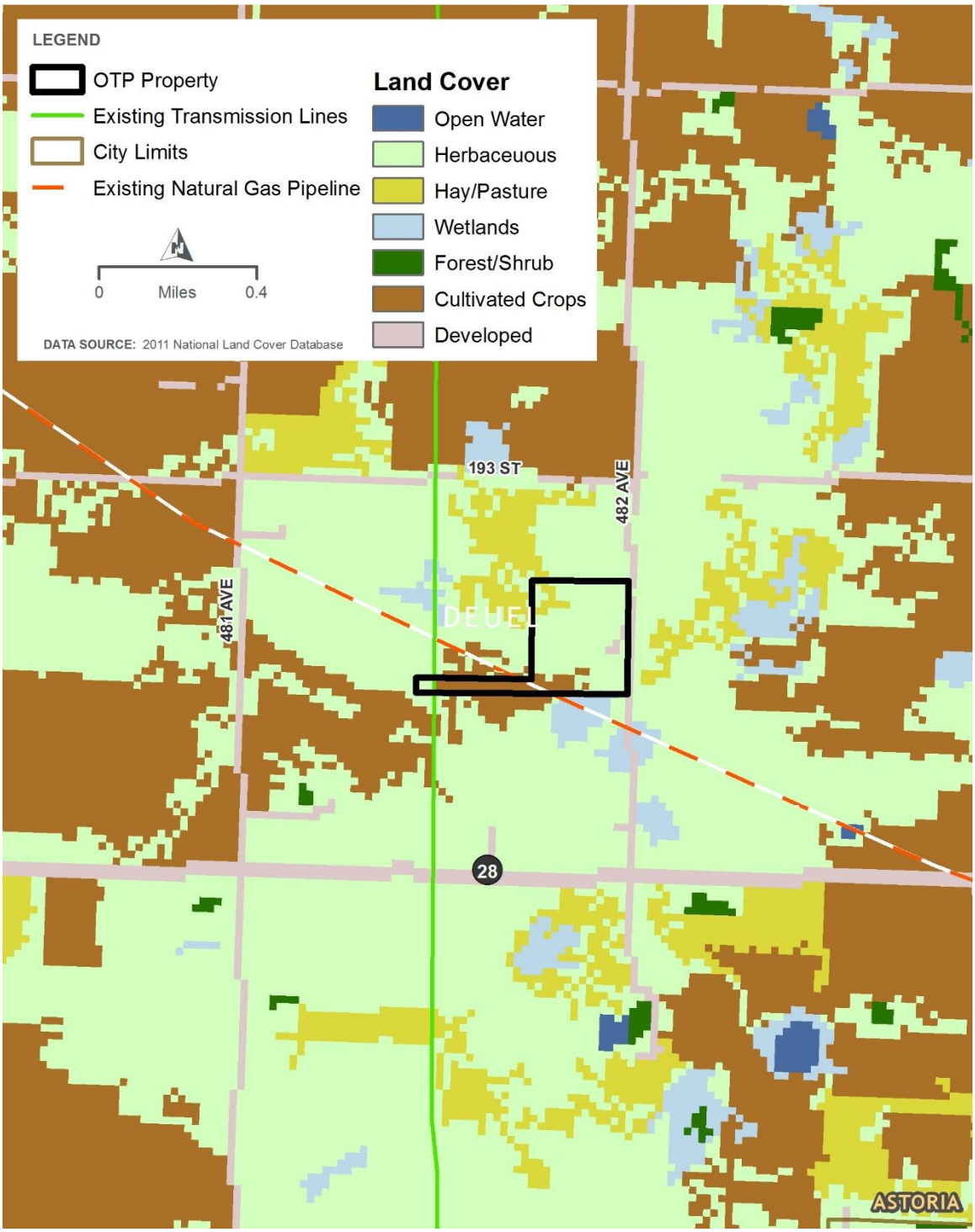
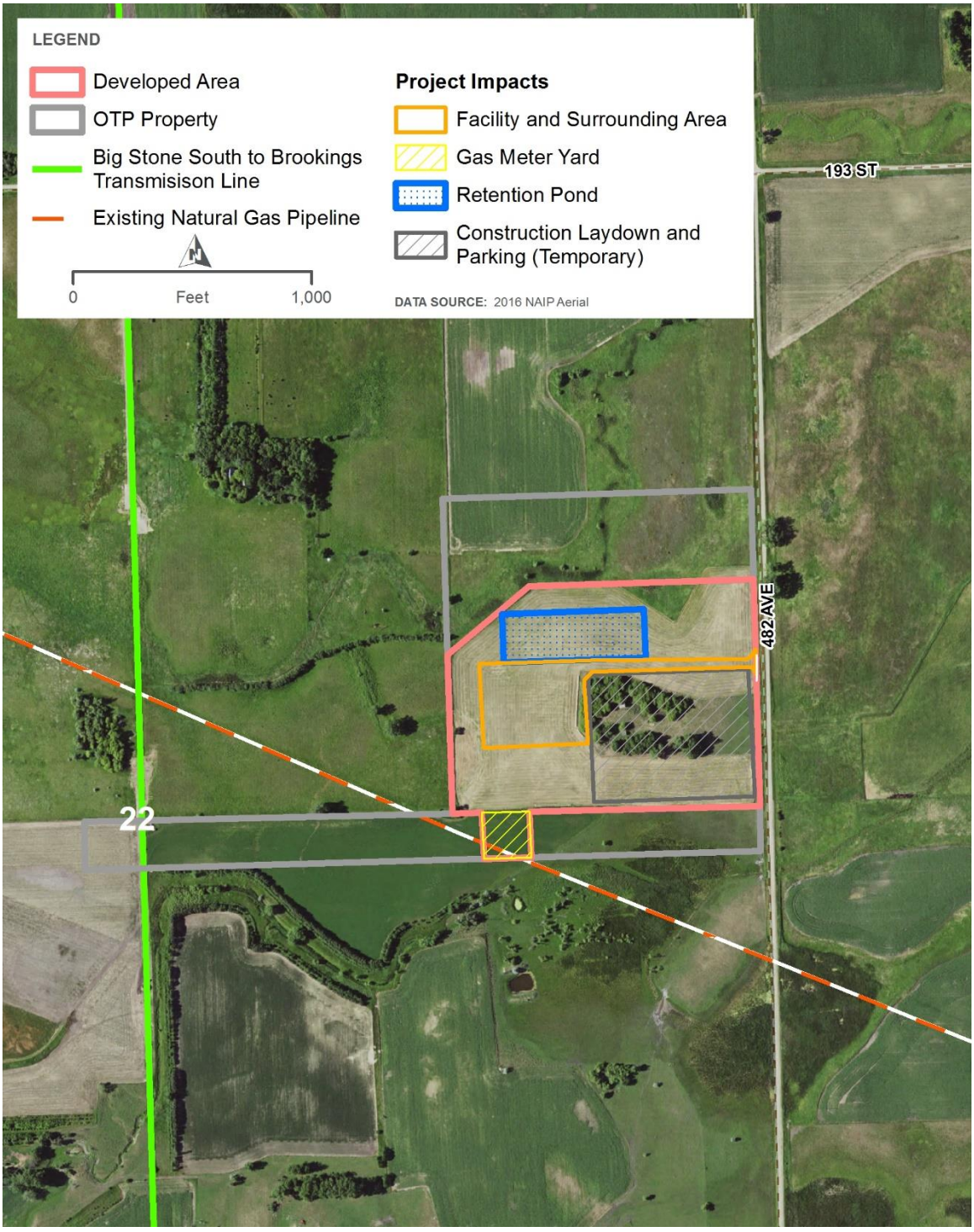


Exhibit 13-2. Project Features



13.2 Displacement

Displacement of residents from construction and operation of the facility is not expected as part of the proposed Project.

13.2.1 Existing Environment

There are no existing residences within the Project site. There is an abandoned farmstead consisting of foundations, material scatters, and two extant buildings in the Project site that will be removed during construction. Within approximately 1 mile of the Project site, there are four occupied dwellings and five barn structures.

13.2.2 Potential Impacts

No permanent impacts causing displacement are expected as part of the Project.

13.2.3 Mitigation

No permanent displacement is expected; therefore, no mitigation is proposed.

13.3 Noise

Sound is made up of tiny fluctuations in air pressure. Sound is characterized by its amplitude (how loud it is), frequency (or pitch), and duration. Sound, within the range of human hearing, can vary in amplitude by over one million units. Therefore, a logarithmic scale, known as the decibel (dB) scale, is used to quantify sound intensity and to compress the scale to a more manageable range. Noise is simply defined as unwanted sound; the terms noise and sound are often used interchangeably. The most common weighting scale used to reflect this selective sensitivity of human hearing is the A-weighted sound level (dBA). The range of human hearing extends from approximately 3 dBA to 140 dBA.

Environmental sound levels are often expressed over periods of time, allowing time-varying signals to be represented by sound levels averaged over intervals (for example, a 1-hour period). One metric used to describe environmental sound is the equivalent average sound level (Leq). The Leq represents a constant sound that, over the specified time period, has the same acoustic energy as the time-varying signal. Another descriptor is the Ln, which is the noise level exceeded n percent of the time. For example, the L10 is the noise level exceeded 10 percent of the time (90 percent of the time it is quieter than the L10)

South Dakota Administrative Rules do not contain noise limits for energy facilities. However, in the case of a combined-cycle combustion turbine electric generation facility approximately 13 miles south of the Project, the SDPUC established noise standards at the nearest occupied residence of: daytime: L10=60 dBA; nighttime: L10=55 dBA (SD PUC 2009).

13.3.1 Existing Environment

Existing noise levels were measured in the study area at two measurement locations that were adjacent to the Project site and were representative of nearby residences (Exhibit 13-3). The existing noise environment surrounding the proposed site is influenced by natural noise sources, agricultural activities, and traffic on local roads. Noise levels were measured for approximately 24 hours at each location from July 5 to July 6, 2017. The measurement systems ran continuously and stored the hourly Leq, spectral noise levels, wind speeds, and audio files.

Measurement location 1 (ML1) is approximately 3,800 feet southwest of the proposed facility power block. ML2 is approximately 6,000 feet east-southeast of the proposed facility power block.

13.3.2 Potential Impacts

Project-related noise levels (meaning only future Project noise sources and no existing noise sources) were modeled throughout a Cartesian coordinate grid and at specific receiver points for the nearest residences (Exhibit 13-4). The model was configured to calculate Project-related noise at ML1 and ML2 to evaluate any changes in the noise environment due to the proposed Project. The measured existing noise levels were then summed with the modeled Project noise levels. Table 13-1 presents the results of summing measured existing and modeled Project noise levels at ML1 and ML2.

Table 13-1. Measured and Modeled Noise Levels at ML1 and ML2

Sound Pressure Level, dBA/dBC/dBL (re 20 µPa)				
	Measured Existing	**Modeled Project**	**Calculated Future Condition (Existing + Project)**	**Change over Existing**
Quietest Existing Nighttime Hour				
Broadband Leq, dBA (ML1)	36	43	44	+8
Broadband Leq, dBA (ML2)	40	38	42	+2
Loudest Existing Daytime Hour				
Broadband Leq, dBA (ML1)	51	43	52	+1
Broadband Leq, dBA (ML2)	51	38	52	+1

Exhibit 13-3. Noise Monitoring Locations

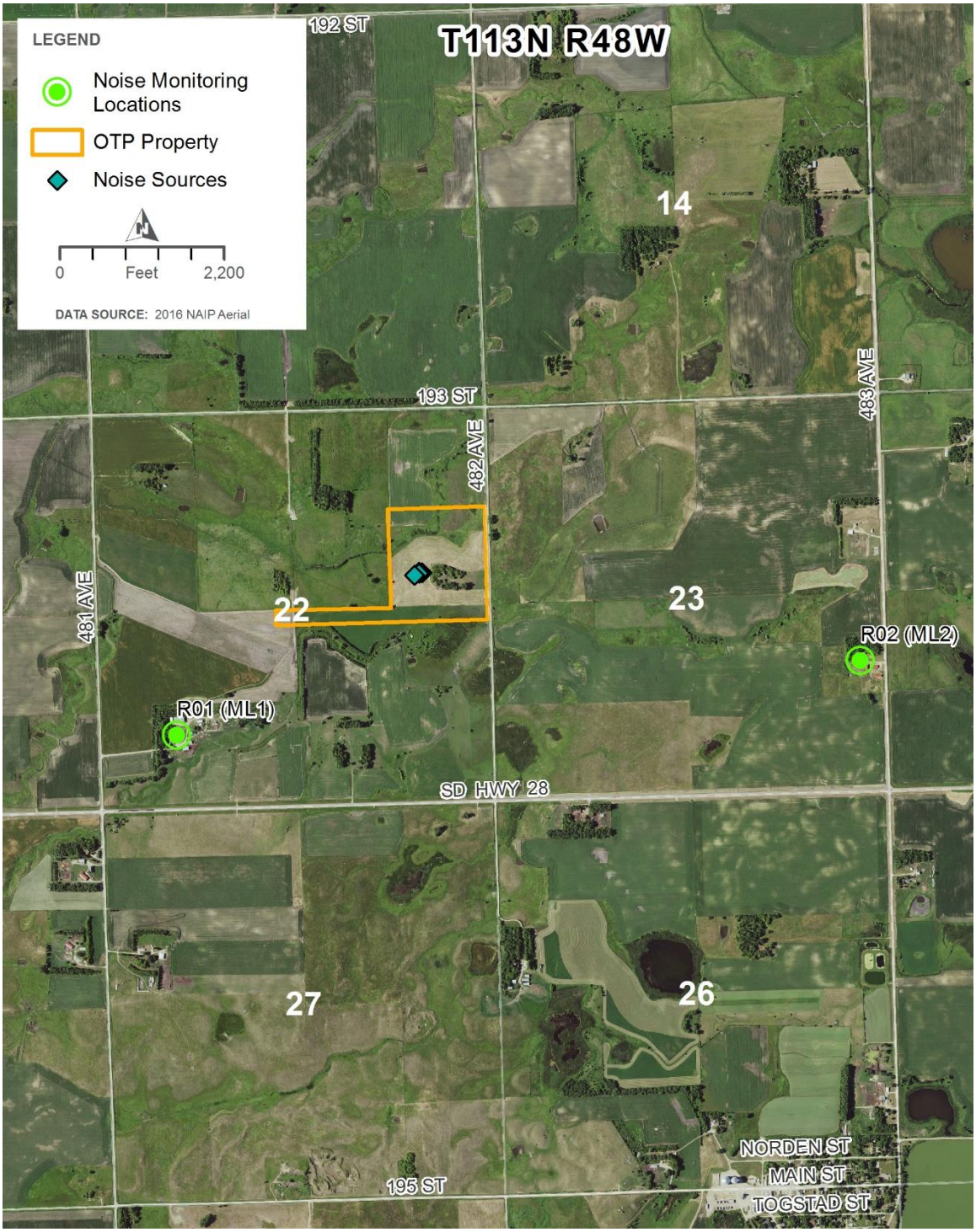
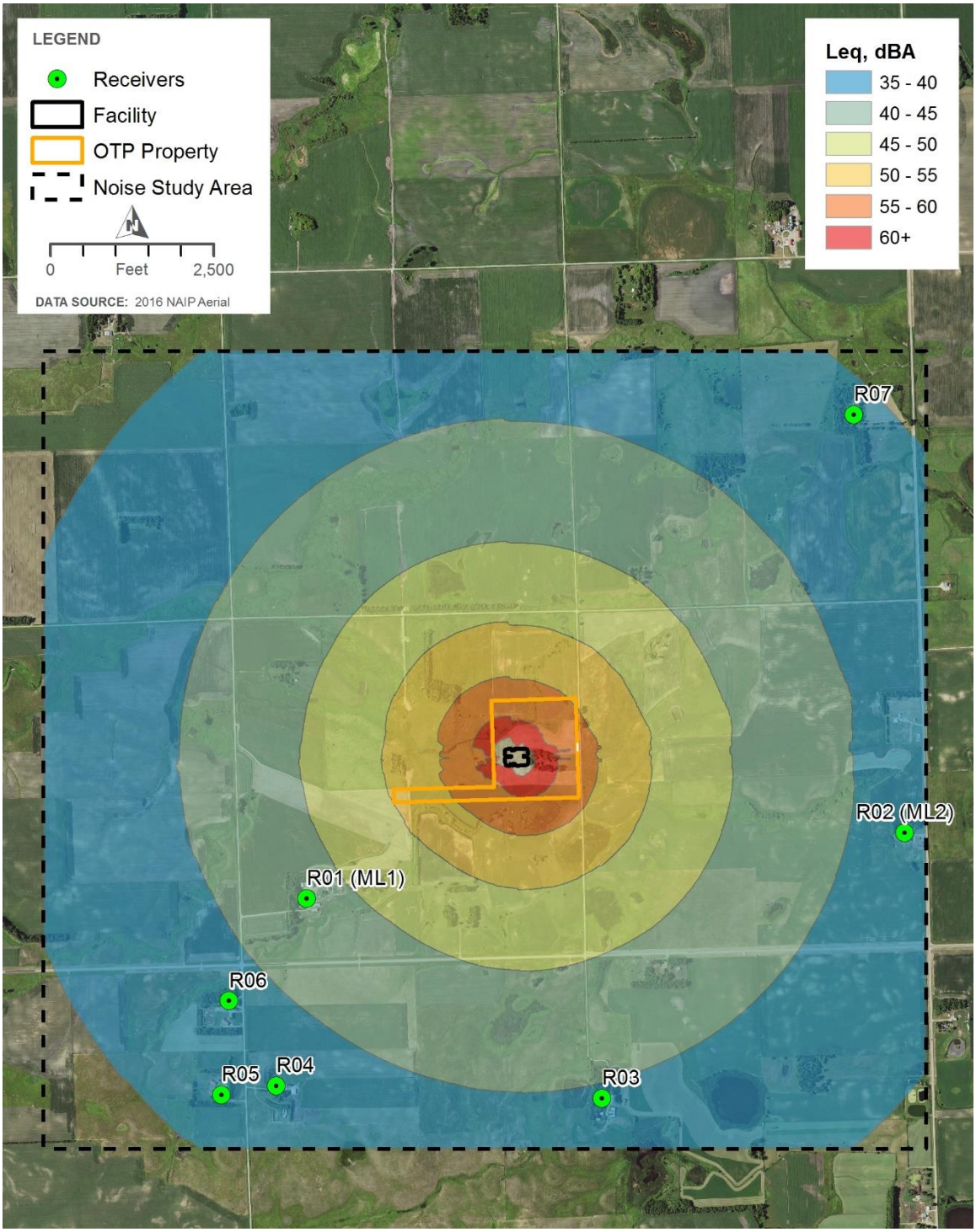


Exhibit 13-4. Modeled Noise Contours



During the quietest measured nighttime hour at ML1, the proposed Project was modeled to produce a future (existing plus Project) Leq nighttime condition of 44 dBA. Thus, the Project could increase A-weighted noise levels by 8 dBA. This increase would be expected to be a noticeable change, but would be perceived as being less than twice as loud (a 10 dBA increase is generally perceived to be as twice as loud to a person with average hearing abilities). The primary noise source is the exhaust stack. During the loudest measured daytime conditions, the estimated increase over existing is 1 dBA. This increase would not be noticeable to a person with average hearing abilities. Both nighttime and daytime modeled results are below the previous standard set by the SDPUC for a nearby combined-cycle electric generation facility.

The modeled Project noise levels at ML2 are below the measured existing noise levels.

The complete Noise Study can be found in Appendix D.

13.3.3 Mitigation

Otter Tail will conduct post-operational monitoring to verify that the Project meets noise levels established by the SDPUC.

13.4 Satellite, Cellular, Radio, Television, and GPS Reception

Corona, which consists of the breakdown or ionization of air within a few centimeters of conductors and hardware, can generate electromagnetic noise at the same frequencies that radio waves are transmitted. This noise can cause interference with the reception of these signals depending on the frequency and strength of the radio signal. The effects of corona noise can intensify during wet weather (Chen 2012 as cited in Big Stone South-Ellendale Facility Site Application [Montana Dakota 2013]). Routine maintenance activities such as tightening loose hardware on the facility can help to minimize corona noise.

13.4.1 Existing Environment

The Federal Communications Commission (FCC) database was searched for Antenna Structures within 1 mile of the Project site; no registered structures were found (FCC 2017).

13.4.2 Potential Impacts

The proposed Project is not expected to have substantial adverse effects on satellite, cellular, radio, television, or GPS reception. The gen-tie line is expected to be less than 0.5 miles, thus limiting Project effects. All hardware used for the Project will be designed and maintained to minimize interferences. The height of the Project components is not expected to cause interference.

13.4.3 Mitigation

Although interference is not expected to occur, if it does, the Company will work with the tower owner or residents to mitigate the Project effects.

13.5 Aesthetics

13.5.1 Existing Environment

The visual character and quality of the Astoria area in South Dakota can be characterized by cultivated lands, natural habitats, topography, existing human-made structures, and open space. The existing BSSB 345 Line runs north and south just the west of the Project site and there is a wind farm 1.5 miles south. The Project site is zoned as agricultural land by Deuel County. In addition to agricultural use, land cover is a mixture of rural residential, wetland, and other water features. Human-made infrastructure in the area includes rural homesteads, barns, silos and other farm facilities, roads, transmission lines, communication towers, and other structures. The Project site sits on the Coteau des Prairies, a high plateau feature featuring prairie flatlands with slopes along its margins. There are no officially designated State Scenic Byways in the Project vicinity (SD DOT 2017).

The Deuel County General Plan describes objectives for future land use and the management of Deuel County's visual resources as open space.

> Open space is a desired amenity of the urban environment. Circumstances and conditions under which open space areas should be set aside relate largely to a community's commitment for improving the visual appearance of the area. As a minimum aquifers, wetlands, flood plains and floodway, and land areas with twenty (20) percent grade or greater should be protected from extensive urban development, if possible. In addition, there are other areas within and around the area that have a scenic value that enhances the quality of life. These areas should be identified and protected whenever possible. Further, roadway and utility improvements, as well as buildings and signage should be controlled so that they are sensitive to adjacent scenic areas. With appropriate planning and coordination of adjacent development projects, a system of interconnected belts of permanent open space can be created to provide a haven for wildlife, enhance community views and vistas or simply provide a pleasant contrast to the urban scene. (Deuel County 2004b)

13.5.2 Potential Impacts

The project will change the visual landscape in the immediate area. Initially, existing trees on the project site will be cut down and the site will be graded for the construction of the facility. During construction; site clearing and associated dust, increased vehicular traffic (construction deliveries and workers) and construction cranes will increase the visual impacts for a short period of time.

The power plant permanent facilities will cover approximately 8 acres of land and the plant stack will reach an estimated 105 feet above the graded surface. Preliminarily, the gen-tie line structures will be a similar height as the existing BSSB 345 Line.

The facility will be lit during nighttime hours; however, it is not expected that the stack or transmission lines will require lights.

13.5.3 Mitigation

During construction, the contractor will exercise care to preserve the natural landscape as much as practicable and will operate construction activities to reduce any unnecessary damage or destruction to natural features. Construction lighting will be minimized to reduce adverse effects on the night sky. Trees, shrubs, and other native vegetation will be preserved whenever possible and vegetative screening and fencing materials will be used in accordance with county regulations. There are no other anticipated impacts on the present use of the surrounding area, rural life, or the business of farming.

14.0 Local Land Use Controls (ARSD 20:10:22:19)

County zoning and land use information was obtained from the Deuel County Zoning Office. Deuel County has adopted a zoning ordinance and comprehensive land use plan. The Project will be constructed on land zoned as agricultural and an aquifer protection overlay district. The purpose of the agricultural district is to maintain and promote farming in an environment free of other land use activities. Residential uses are discouraged to reduce demands for expanded public services and facilities (Deuel County 2004a). All surrounding land is zoned as agricultural. Although the primary focus of the area is agriculture, essential services, including electrical transmission and distribution systems and structures, are designated as a special exception to permitted uses in agricultural zones (Deuel County 2004a).

The Project is compatible with existing land uses and re-zoning of the site may not be required; however, a special exception permit must be granted by the Board of Adjustment (Deuel County 2004a). If required, Otter Tail would intend to seek this special exception for the Project. There are no known local ordinances in place that would restrict development of a power station facility and it is not expected that there will be future ordinances that might restrict the Project. All appropriate planning and construction permits will be obtained and all appropriate codes and regulations will be followed. The aquifer protection overlay district is intended to protect public health and safety by minimizing contamination to shallow/surficial aquifers in Deuel County. All appropriate land use restrictions will be followed in accordance with the aquifer protection overlay district (Deuel County 2004a). To the best of its knowledge at this time, Otter Tail does not anticipate asking the SDPUC to supersede or preempt any local control requirements pursuant to SDCL 49-41B-28.

15.0 Water Quality (ARSD 20:10:22:20)

15.1 Existing Environment

There are currently no impaired water bodies, as defined by Section 303(d) of the CWA in the Project site (SDDENR 2016). The closest receiving water body to the site that is included in the *South Dakota Integrated Report for Surface Water Quality Assessment* as required by Section 305(b) of the CWA is Fish Lake. Fish Lake is located approximately 4 miles east of the Project. Fish Lake is listed as a Category 1 water meeting all of its designated uses; fish/wildlife production, recreation and stocking, immersion recreation, limited contact recreation, and warm water marginal fish life (SDDENR 2016). Although Fish Lake meets all of its designated uses, the lake has as an EPA approved total maximum daily load (TMDL) for trophic status index (TSI). TSI is not directly regulated under the CWA or South Dakota by Surface Water Quality standards. TSI TMDLs are developed as part of the Nonpoint Source Pollution Management Program.

15.2 Potential Impacts

Ground disturbance during construction may result in short- or long-term effects on water quality from erosion of exposed sediments disturbed by excavation, grading, and construction traffic or accidental hazardous spills from construction equipment.

15.3 Mitigation

The Company will ensure BMPs are identified in the construction SWPP and implemented to minimize Project effects on surface waters. Temporary erosion and sediment control methods will be properly placed, monitored, and maintained adjacent to water resources. These erosion control methods will remain in place until work areas become re-vegetated or are stable. BMPs may include vegetative buffers, silt fencing, mulching, seeding, and straw wattles. Where appropriate, the Company will re-vegetate disturbed areas to as close to preconstruction conditions as possible in accordance with appropriate permit requirements. Stormwater runoff will be collected and routed to a stormwater retention pond, and the Company will adhere to the requirements of the stormwater discharge permit that will be obtained from the DENR.

To reduce the potential for a hazardous materials release during the construction phase, work will be planned and performed in accordance with OSHA standards and protocols addressing the use of potentially hazardous materials and applicable federal and state environmental regulations. If a release occurred, cleanup, management, and disposal of contaminated soils will be conducted according to EPA and state standards, including following contingency planning as established in the Project SPCC Plan and site-specific emergency response procedures.

These mitigation measures, in combination with designing the Project to operate without any discharge of process water, enable the Project to comply with all federal and state water quality standards and regulations.

16.0 Air Quality (ARSD 20:10:22:21)

16.1 Existing Environment

The Project site is relatively remote from other substantial air pollutant emissions sources and is expected to have very good existing air quality. All of South Dakota and adjoining areas of Minnesota are classified by EPA as being in attainment with all National Ambient Air Quality Standards (NAAQS).

16.2 Potential Impacts

The Project will include three combustion-related emission units: the simple-cycle combustion turbine, a dew point heater to warm the incoming natural gas, and an emergency fire pump engine. The combustion turbine and dew point heater will be fired on pipeline natural gas, while the fire pump engine will burn only ultra-low sulfur diesel (ULSD) fuel, which by federal rules must contain no more than 15 parts per million (ppm) sulfur by weight.

By accepting federally enforceable limitations on emissions, combined with using clean fuels and continuous emission monitoring systems, the facility will be a minor source under Prevention of Significant Deterioration (PSD) construction air permitting rules. This means that emissions of any PSD-regulated air pollutant will remain below the PSD major source threshold of 250 tons per year (TPY). Given the existing good air quality in the Project site, and the well-controlled emissions from the proposed facility, operation of the Project will not adversely affect air quality in the area.

Project construction will result in minor emissions from construction equipment exhaust and from fugitive dust generated by earthmoving activities and truck traffic over unpaved surfaces.

16.3 Mitigation

The turbine will use a combustor designed to produce low emissions of nitrogen oxides (dry-low-NO_x technology), to meet the applicable 40 CFR 60, Subpart KKKK, New Source Performance Standard (NSPS) for NOx emissions, which is 15 ppm of NOx in the exhaust gas when corrected to 15 percent oxygen. Due to the very clean, low-sulfur fuels for the facility emission units, and the dry-low-NO_x combustor technology to be used for the combustion turbine, the facility will have relatively low emissions. Continuous emissions monitoring systems will be used on the combustion turbine stack to ensure compliance with NSPS and the minor emissions source (less than 250 TPY) status for the facility. A detailed analysis of emissions forecasts and regulatory review can be found in the Air Quality Construction Permit application, included in Appendix G. Otter Tail will be compliant with the air permit issued by SDDENR.

The construction emissions will be mitigated as needed to minimize fugitive dust emissions by limiting vehicle speeds on unpaved surfaces, and by application of dust suppressants on an as-needed basis.

17.0 Time Schedule (ARSD 20:10:22:22)

Commercial operation is proposed for spring 2021. A preliminary permitting, procurement, and construction schedule is provided in the following.

Table 17-1. Astoria Station Project Major Events Schedule

Activity	Schedule
Permitting (Air Quality, Water Appropriations, Energy Conversion Facility)	September 2017 through September 2018
Combustion Turbine Selection	October 2018 through February 2019
Detailed Engineering/Design	February 2019 through April 2020
Site Development, Grading, Foundation Construction	April 2020 through September 2020
Building Erection and Gas Turbine Installation	September 2020 through April 2021
First Fire	April 2021
Commercial Operation	May 2021

This schedule is based on information known as of this filing and on planning assumptions. The schedule may be subject to adjustment and revision as further information is developed. Otter Tail plans to provide milestone updates through the Project's website.

18.0 Community Impact (ARSD 20:10:22:23)

Pursuant to SDCL 49-41B-6, after filing a notification of intent to apply for an energy conversion facility, the SDPUC is required to designate the affected area and a local review committee. Otter Tail filed a notification of intent for the Project on April 4, 2017 and at its regularly scheduled meeting on April 27, 2017, the SDPUC designated the affected area as a 6-mile radius from the proposed facility within the state of South Dakota. In ARSD 20:10:22:01(1), affected area is defined as, "that area which may be affected environmentally, socially, or economically by the location of a facility at a proposed site."

In accordance with SDCL 49-41B-6, the SDPUC voted unanimously to designate the local review committee, which will be composed of the following individuals, ex officio:

1. The Presidents of the Boards of Education of Deuel School District 19-4 and Deubrook School District 05-6;
2. The Chairs of the Brookings and Deuel County Commissions;
3. The Mayors of the cities of Astoria, Brandt, and Toronto; and
4. A representative of Otter Tail.

Resolutions of support for the Project from the Deuel County Commission, Brookings County Commission, Town of Toronto Trustees, City Council of Clear Lake, Deubrook Area School District 5-6, Senator John Wiik (R-Big Stone City), and Representative John Mills (R-Volga) are provided in Appendix B.

18.1 Socioeconomic and Community Resources Impacts

To evaluate the community impact of the Project and to aid the local review committee, Otter Tail retained the First District Association of Local Governments (First District) to conduct a Social and Economic Impact Study. The results of this study are summarized in Section 18.1, and the full report is included as Appendix C.

18.1.1 Housing Supplies

Although some Project employees and construction workers will seek housing within the 6-mile SDPUC-defined affected area, it is unlikely that all of the estimated three to five permanent employees and 70 temporary construction workers needed during peak construction will seek housing only within this area. Therefore, a larger 50-mile commuting radius was used to determine the effect on housing supplies for operational and construction workers.

The three municipalities within 6 miles of the Project (Astoria, Brandt, and Toronto) currently have 35 vacant housing or rental units, which is half of the temporary 70 Project construction workers. There are a total of 2,856 available housing and rental units within a 50-mile commuting radius from the Project site. Approximately 1,011 of the total units are rental units. This existing supply of available homes and rental units will be more than sufficient to meet the demands of the Project, particularly since many temporary workers may stay in hotels and motels.

18.1.2 Educational Facilities

Deubrook 05-6 and Deuel 19-4 are the two school districts within the 6-mile affected area.

The current enrollment in the Deubrook School District is 346 students and its peak enrollment since 2010 was 365. The current enrollment in the Deuel School District is 501 students and its peak enrollment since 2010 was 547. This results in a total additional student capacity of the two school districts within the study area of 65 students.

According to the 2010 Census the average size of the Unites States household unit is approximately 2.58 members per household unit. The .58 represents the average number of children per household unit. Based on the assumption that each member of the projected construction workforce peak of 70 new workers would fall within the parameter of .58 children per household unit, the projected maximum number of additional new students would peak at approximately 41 new students. Therefore, the Project is not expected to have an adverse effect on educational facilities.

18.1.3 Waste Disposal and Water Usage

Solid waste generated during construction and operation will be disposed of at a properly permitted waste site. While there are no permitted waste sites within the 6-mile affected area, there are two municipal solid waste landfill sites located nearby. The Brookings Landfill and the Watertown Landfill are both within approximately 30 minutes of the Project site.

Three to five permanent operational employees are expected to work at the facility. If five new operational employees move into the area with average-sized families, then 13 new inhabitants will increase water usage by approximately 39,542 gallons per month. During peak construction, if 70 construction workers move into the area with average sized families, then 182 new inhabitants will temporarily increase water usage by approximately 553,583 gallons per month. These figures are calculated using the USGS estimate of 100 gallons per person per day as an average for individual water usage (USGS 2016).

Increases in residential water usage will result in corresponding increases in wastewater volumes where workers live during construction and operation of the Astoria Station. Brookings and Watertown are within commuting distance of the Project site and an increase of 182 persons will increase their total populations by approximately 0.42 percent. This increase does not represent a significant population expansion that would adversely affect municipal wastewater collection and treatment systems at either location.

18.1.4 Law Enforcement

Two law enforcement agencies, the Brookings County Sheriff's Department and the Deuel County Sheriff's Department, serve the 6-mile affected area. First District contacted both law enforcement agencies to provide input as to the expected effect of the construction and operation of the Project.

While neither law enforcement agency expected any adverse effects resulting from the construction or operation of the Project, both sheriff offices agreed that effective communications between all parties affected by the Project would be the most effective means to avoid potential conflicts before they arise.

18.1.5 Fire Protection

There are fire departments in the towns of Astoria, Brandt, and Toronto that provide fire protection services within the 6-mile affected area. All three are staffed exclusively by volunteer firefighters. A total of 55 volunteer firefighters provide fire protection services within the survey area. All three fire departments have mutual aid agreements that allow neighboring firefighters to respond to events should the need arise. All three fire departments use Hendricks, Minnesota, and Clear Lake, South Dakota, for ambulance service.

The local fire departments will be contacted by Otter Tail prior to the start of construction to establish communications and coordinate for effective emergency response.

18.1.6 Health

There are no healthcare facilities located within the 6-mile affected area for the Social and Economic Impact Study.

18.1.7 Recreation

There are existing recreational facilities inside of the city limits of the three municipalities that fall within the 6-mile affected area.

Astoria has existing recreational opportunities that include a city park with picnic tables, gazebo, playground equipment, and a lighted softball complex. There are also two privately-owned camper hook-ups.

Brandt has existing recreational opportunities that include a city park with picnic tables, playground equipment, restrooms, and a lighted softball complex.

Toronto has existing recreational opportunities that include a city park with picnic shelter, playground equipment, restrooms, a lighted softball complex, and tennis courts. Toronto owns and operates four camper hook-ups at the city park site.

A portion of Project construction workers are likely to occupy camper hook-up sites for the duration of Project construction. This will create a short-term increase in the demand for camper hook-up sites; however, the expected 13-month long construction time frame will not result in a long-term adverse effect on recreational facilities within the Project Area. There are many other recreational opportunities outside of the 6-mile affected area that will provide opportunities to both permanent and temporary construction workers. No other impacts on recreational facilities are expected.

18.1.8 Government Facilities and Services

The Project is not expected to have a substantial effect on government facilities and services. Otter Tail will work with these governmental entities to ensure effective communications are established and to determine the best course of action for effective emergency response.

18.1.9 Workforce

The source of the workforce identified in this Section includes workers in Deuel County and the four South Dakota counties that border Deuel County: Brookings, Codington, Grant, and Hamlin counties.

The workforce in those five counties consists of 44,516 workers and includes 4,185 construction, extraction, and maintenance workers. Seventy construction workers (1.67

percent of area construction, extraction, and maintenance workers) are expected to be working at the Project site during peak construction. Three to five operational workers are expected to work at the Astoria Station facility after construction is complete and operation commences.

Project construction will require a workforce with a variety of skills including, but not limited to, general carpenters, iron workers, millwrights, and electricians. It is expected that a portion of the construction workforce will be hired locally. Recruitment of additional construction personnel from outside of the affected area will usually include specialists and supervisory personnel who will temporarily relocate to the affected area. Other than the temporary increase in construction jobs during the construction of the facility, the Project is not anticipated to have a significant impact on the population, income, occupational distribution, and integration and cohesion of the communities in the affected area.

18.1.10 Energy

The Project is not expected to have a substantial negative impact on the energy needs of the affected area. Natural gas will be sourced from the existing NBPL 42-inch pipeline that intersects the Company's property.

18.2 Economic and Tax Impacts

The Project will provide economic benefit by creating construction employment opportunities, increased demand for locally-supplied construction equipment, and continued reliability of electrical power. Additionally, there will be local expenditures by construction workers and it is likely that Otter Tail will procure a variety of construction materials, supplies, and fuel in the area.

Although land values within the platted property improved by the Project will increase substantially, land values outside of the Project site are not expected to increase or decrease noticeably. Adjacent properties are located within the agricultural zoning district.

The Company applied for sales and use tax relief for the Project under South Dakota's Reinvestment Payment Program pursuant to SDCL 1-16G-56 to 1-16G-68. Applications approved under the program allow project owners to receive a reinvestment payment that does not exceed the sales and use tax paid on project costs. Otter Tail's application was approved by the South Dakota Board of Economic Development on February 14, 2017. However, sales tax revenue will be derived from construction worker expenditures.

The Project qualifies for a statutory discretionary formula for property taxes. This will yield property tax relief during the Project's first 5 years. Thereafter, the annual property taxes are estimated to be approximately $1 million. This amount will decrease as the assets are depreciated. These property tax revenues will be allocated between the state, county, and school district pursuant to the applicable state law.

18.3 Agriculture

The proposed Project is preliminarily designed to be located on 51 acres of land used predominantly for agriculture. The land is currently zoned "Agriculture". Eighteen percent of Deuel County residents work in the Agriculture industry (United States Census Bureau 2015). Alfalfa is currently cultivated on the site. Agriculture is the major land use in the approximately 640 square miles of Deuel County. This basic land use has been altered very little through urbanization or the development of communities. Future agricultural land use is managed by Deuel County and the preservation of agricultural production is considered a priority. Land areas not expected to be developed within the 15-year planning period have been designated as agricultural in the future land use plan. The implementation of this plan through zoning and subdivision regulations will help minimize the disturbance of agricultural land and promote a smooth transition to other uses (Deuel County 2004b).

Deuel County notes that if agricultural lands are not protected though land use controls, their optimum utilization will diminish in disproportion to the amount of area reverting to urban use. Thus, much of the remaining economic potential of the land, in terms of agricultural production, is lost (Deuel County 2004b).

Deuel County has set forth the following agricultural preservation policies (2004b):

- The premature development of agricultural land should be discouraged.
- Discourage development patterns that require public improvements financed in part by the arming community but which are not necessary to support agriculture.
- Best management land practices must be employed to protect valuable agricultural land, soils, water supplies, as well as other amenities.
- Preserve agricultural lands and protect the rural area from uses which interfere with and are not compatible with general farming practices.
- Recognize and improve upon regulations which have a negative impact on farming operations.
- Promote development patterns which will avoid producing inflated agricultural land values.

18.3.1 Agriculture Impacts and Mitigation

The Project will temporarily disturb approximately 20 acres of agricultural land during construction. Additionally, during construction, temporary adverse effects on farmland such as soil compaction and crop damage are likely to occur on the Project site. Approximately 8 acres will be permanently disturbed due to the footprint of the constructed Project facilities. The exact acreage temporarily and permanently disturbed will vary based on final design.

Adverse effects on vegetation by construction operations will be minimized to the extent practicable. The following mitigation practices will be implemented:

- To minimize the spread of invasive species, suppliers will ensure that gravel and fill imported to the site come from weed-free sources.
- Upon completion of the work, disturbed areas will be graded and re-vegetated with a natural seed mix to retain the natural character of the site. These practices will provide proper drainage and prevent erosion.
- After construction, tillable agricultural land will be deeply tilled to alleviate compaction.

18.4 Transportation

The Project will be well served by a transportation system that provides excellent access to Interstate 29. Interstate 29 is located 10 miles west of the proposed Project site. The major identified routes to the proposed Project are Interstate 29 and South Dakota Highway 28 (SD Hwy 28). Both facilities are in good condition and will provide access to the facility in a safe and efficient manner. The rural nature of this area provides for roadways along the section lines establishing a grid type transportation network. A variety of roadways exist near the proposed site and will allow for access. The roadways identified in the following allow for access in the southern part of Deuel County connecting the communities as well as providing direct access to Interstate 29. Due to relatively low traffic volumes on all the roadways near the proposed Project site, traffic capacity during the construction and after start-up are not expected to cause capacity concerns.

Table 18-1. Average Daily Traffic Volumes

Route	Daily Traffic (Yr.)	% Trucks
Interstate 29 South of Toronto Exit 150	7560 (2016)	21%
Interstate 29 North of Toronto Exit 150	7424 (2016)	21%
SD Highway 28 east of SD Highway 15	492 (2016)	35%
SD Highway 28 west of SD 15	1910 (2016)	6%
SD Highway 15	1289 (2016)	20%
479th Avenue / CR 315 north of SD 28	148 (2013)	20% to 30%
483rd Avenue / CR 311 north of SD 28	227 (2013)	20% to 30%
CR 317 south of SD 28	594 (2013)	20% to 30%
CR 314 east of SD 15	262 (2015)	20% to 30%

Source: Deuel County Highway Department and SDDOT Office of Traffic Inventory

The local roadways in and around the Project site have the following surfacing characteristics:

Table 18-2. County and Township Roadways

Route	Jurisdiction	Surface
CR 311 / CR 42 – From south of Astoria north towards SD Hwy 22	Deuel County / Brookings County	Asphalt
CR 314 – SD Hwy 15 east to Minnesota Border	Deuel County	Asphalt
CR 315 – Brandt, SD south to SD Hwy 28	Deuel County	Asphalt
CR 317 / CR 25 – Toronto, SD south towards White, SD	Deuel County / Brookings County	Asphalt
193rd Street – between CR 311 and CR 315	Scandinavia Township	Gravel
481st Avenue – SD Hwy 28 north to 193rd Street	Scandinavia Township	Gravel
482nd Avenue – SD Hwy 28 north to 193rd Street	Scandinavia Township	Gravel

Source: Visual Inspection

A variety of bridges are located along these routes. The bridges are in relatively good condition and are not posted for reduced load limits. The following tables identify the major structures that will be used or have the potential to be used with the construction of the Project.

Table 18-3. Interstate 29 Structures in the Project Area

Structure Number	MRM	ADT	Sufficiency Rating
06184010	147.80	3780	97.8
06185010	147.80	3780	97.8
20064288	150.06	7560	82.6
20060271	151.85	3745	97.8
20061271	151.85	3745	97.8
20049248	154.50	3745	85.8
20050248	154.50	3745	95.8

Source: SDDOT Bridge Office

Table 18-4. South Dakota Highway 28 Structures in the Project Area

Structure Number	MRM	ADT	Sufficiency Rating
20061280	361.61	1910	83.9
20086280	364.22	1910	82.3
20096280	365.16	1910	82.3
20201280	375.67	478	79.9

Source: SDDOT Bridge Office

Table 18-5. County / Township Structures in the Project Area

Structure Number	Location	ADT	Sufficiency Rating
20-111-220	1.2 miles east of SD Hwy 15 on CR 314	381	62.7
20-156-220	2.6 miles east of Brandt on CR 314 (Cobb Creek)	260	Will be replaced in 2017 with Box Culverts
20-170-235	1.5 miles south of CR 314 on CR 311 (Cobb Creek)	145	79.2
20-170-249	2.99 miles south of CR 314 on CR 311	157	79.2

Source: SDDOT Bridge Office
Note: On the routes identified as being affected by construction or permanent workforce traffic ADT was provided based on a 20-year projection for these structures. Actual ADT is less than shown. All bridges are not posted and can accommodate legal limits as established by the County.

In addition, there are smaller culverts and minor creek crossings on the county and township facilities consisting of both corrugated metal and concrete culverts. County and township officials are generally the parties that maintain those smaller structures on their respective facilities. No railways or airports/airfields are near the Project site.

18.4.1 Transportation Impacts and Mitigation

With the proposed Project construction, a workforce traveling to the site on a periodic basis will cause some short-term traffic increases to the routes within the Project Area. The workforce is primarily expected to come from the Brookings and Watertown area, and therefore a majority of the generated traffic will likely use Interstate 29 and SD Hwy 28. Both roadways can serve this additional traffic with little to no adverse effect on the current level of service. The following table represents the expected roadway use for the construction workforce.

Table 18-6. Roadway Assignment for Workforce

Route	% of Workforce Using Route	One-Way Trip Increases due to Construction Workforce
Interstate 29	89%	62
SD Hwy 28	94% - 100%	66 - 70
SD Hwy 15	6%	4
County Road 311 (represents only CR 311 between 193rd Street and SD Hwy 28)	100%	70
County Roads 311, 314, 315, 317	6%	4

Source: Assumes best route choice from Community to project site based on facility speeds and access. Since two site access options exist, both CR 311 and SD Hwy 28 indicate 100% of the traffic depending on option acceptance.

Construction materials and equipment will be shipped and delivered by truck to the site. As they near the site, shipments delivered by truck will travel on Interstate 29 and SD Hwy 28. The final route from SD Hwy 28 will either be on 482nd Avenue or 193rd Street, which are both township gravel roadways. It is expected that 7 to 15 heavy haul loads will be delivered to the Project site. These vehicles will likely need to be permitted for load weights and size; this permitting will be coordinated with the State, County, and Townships by the haulers. It is expected that the route to serve these heavy loads will be the same as the standard construction workforce route to the Project site. Coordination with the haulers will be necessary to ensure that the roadway facilities of 482nd Avenue and 193rd Street are prepared for these loads and widths. South Dakota motor vehicle permits will be obtained as necessary by the haulers. An agreement for maintenance with the local township will be needed to define requirements for access in the winter, dust control, and repair/maintenance.

Otter Tail will work with the county and township authorities to develop a Road Haul plan that will identify appropriate signage to minimize traffic impacts and develop a mitigation plan for Project effects on county and township roads. The full version of the Traffic and Transportation Technical Report can be found in Appendix F.

18.5 Cultural Resources

This Section summarizes the results of the cultural resources records search and Level III archaeological survey for the Project. The Company has been coordinating with the South Dakota State Historic Preservation Office (SDSHPO) regarding cultural and historic resources (see Appendix E Agency Correspondence).

18.5.1 Existing Environment

On April 18, 2017, a request was made for a records search from the South Dakota Archaeological Research Center. Data were requested for previously recorded cultural sites and surveys for the Project site plus a 1-mile buffer. The records search documented

five previously recorded archaeological sites and no previously recorded standing structures within 1 mile. One previously recorded prehistoric site intersects the proposed facility. The site is currently considered unevaluated for the National Register of Historic Places (NRHP). Of the four remaining sites, two are unevaluated and two are considered not eligible by SDSHPO for listing on the NRHP. There are no recorded NRHP-listed properties within 1 mile of the proposed facility. A review of the 1873 General Land Office plat map documented no features that would suggest early Euro-American or contact period occupation of the proposed facility area (BLM 1873).

From June 19 to 21, 2017, a Level III archaeological survey was conducted for the Project. No evidence of the previously recorded prehistoric site was identified during the Level III survey. The survey did identify a typical mid-twentieth century abandoned farmstead consisting of foundations, material scatters, and depressions. Two extant buildings are also present within the site.

The foundational remains on the site include a farmhouse, wells, a large barn, and smaller outbuildings. Foundations consist of a combination of field stones with Portland cement mortar, poured concrete, and cinder blocks. Some foundations are partially covered by collapsed wooden structural remains. The two material scatters consist primarily of abandoned farm machinery, household appliances, and some small domestic items.

The two extant agricultural outbuildings at the site have concrete foundations, wood siding, and an open gable roof with asphalt shingles. One building is a two-story structure that appears to have been a barn/storage area; the other is a single-story structure with a wide, sliding door and appears to be a storage shed.

18.5.2 Potential Impacts

Site leveling during construction of the Project will impact the abandoned farmstead and the two extant buildings. However, the initial assessment of these sites is that they are not eligible for listing on the NRHP. As a result, there is no expected impact on landmarks and cultural resources of historic, religious, archeological, scenic, natural, or other cultural significance. There are also no anticipated negative social impacts.

18.5.3 Mitigation

In the event of an unexpected discovery during construction, work will cease and a cultural resource specialist and SDSHPO will be consulted to determine further action. If human remains are discovered during construction, work will cease and the appropriate authorities will be contacted in accordance with state law (SDCL Chapter 34-27).

The Company will manage any risk of contaminants during construction through BMPs. The Company does not expect any impacts on landmarks or cultural resources of historic, religious, archaeological, scenic, natural, or other cultural significance resulting from the accidental release of contaminants.

19.0 Employment Estimates (ARSD 20:10:22:24)

19.1 Construction

Project construction will require a workforce with a variety of skills including, but not limited to, general carpenters, iron workers, millwrights, and electricians. Construction is expected to begin in April 2020 and continue for approximately 13 months. Using historical data and industry recognized estimating techniques, the estimated peak workforce is 70 workers on site during construction.

It is expected that a portion of the construction workforce will be hired locally. Recruitment of additional construction personnel from outside the affected area will usually include specialists and supervisory personnel who will temporarily relocate to the affected area. Table 19-1 lists estimated number of jobs during construction of the Project. It is expected that the local labor force will be adequate, when augmented by necessary outside personnel, to meet the construction needs of the Project.

Table 19-1. Estimated Number of Jobs During Construction

Date	Number of Jobs
Break ground and Month 1	20
Month 2	30
Month 3	30
Month 4	40
Month 5	50
Month 6	60
Month 7	60
Month 8	70
Month 9	70
Month 10	70
Month 11	60
Month 12	40
Month 13	30

19.2 Operation

Once the Project has reached commercial operation, it is expected that three to five permanent employees will maintain and operate the facility. Projected annual payroll for the initial year of operation is $240,000 to $400,000 (with annual increases to be determined). However, the unit may be operated remotely. Additional employees will be contracted to perform maintenance, as required.

20.0 Future Additions and Modifications (ARSD 20:10:22:25)

While Otter Tail desires to keep opportunities open for future modification or expansion of the proposed Project, or for construction of additional facilities, there are no current or pending specific generation expansions or modifications planned.

21.0 Nature of Proposed Energy Conversion Facility (ARSD 20:10:22:26)

21.1 Energy Conversion Facility Description

The proposed Project includes one natural gas fired combustion turbine (CT) operating in simple cycle. The Project is expected to be in service by May 2021 and will be capable of starting quickly to serve a load-following function and peak capacity needs. The Company's resource planning modeling indicates that under forecast market conditions, the Project will have a 10 percent to 12 percent annual net capacity factor and provide approximately 5 percent of our customers' annual energy requirements.

Simple-cycle combustion turbines can be broadly categorized into small aero-derivative and large frame technologies. Aero-derivative turbines are analogous to jet engines and generally characterized by smaller size, quicker starting capability, and modular construction. Their electric generation output is less than that of frame machines. Frame machines, by contrast, are characterized by lower pressure ratios and tend to be physically large. Frame machines can have output capability in excess of 300 MW. On a per kilowatt basis, frame-style combustion turbines are less costly due to economies of scale and recent frame technology has reduced the start time to less than 10 minutes. In addition, recent technical gains by manufacturers have improved the efficiency in current frame turbine models. The proposed turbine is a frame machine of approximately 250 MW.

Major components will include an air compressor section, advanced natural gas combustion section, power turbine, an air cooled electrical generator, and a generator step up transformer. Ambient air is drawn through the air inlet system, consisting of an inlet air filter, silencer, and evaporative cooler, before entering the CT inlet casing, and compressed in a multiple-stage axial flow compressor. Compressed air and natural gas are mixed and combusted in the CT combustion chamber. Dry low-NOx combustors will be used to minimize NOx formation during combustion. Exhaust gas from the combustion chamber is expanded through a multi-stage power turbine, which drives both the air compressor and a cold-end drive electric power generator. Exhaust gas from the combustion turbine is discharged to the atmosphere through a single stack. The preliminary general arrangements of the facility, including the location of major pieces of equipment and the location of all emission sources, is shown in Appendix A. The ultimate facility arrangements may vary based on final engineering design.

Based on information obtained from three potential turbine suppliers, the CT is designed to produce a nominal range of 254 MW to 263 MW of gross electrical power at full load at an average annual ambient temperature of 43.7°F. Typically, the CT power output will decrease as the ambient air temperature increases, and output will increase as ambient temperature decreases. This change in power output is related to the mass flow of combustion air through the turbine. The CT power output at full load would be in the range of 240 MW to 265 MW at a summer ambient temperature of 84.9°F, and increase to a range of 252 MW to 282 MW at a winter ambient temperature of -9.4°F. The final output may differ based on the final turbine selection.

21.2 Materials Flowing into the Energy Conversion Facility

The materials flowing into this facility will be water, air, and natural gas.

Water uses for the facility include process water and potable water. This water is expected to be provided by an on-site groundwater well. The local Brookings-Deuel rural water supply is also a potential alternative source, either through upgrades to their pipe distribution system or through trucking from an off-site location. The on-site well or rural water supply will pump water into the on-site water storage tank preliminarily sized to be 350,000 gallons. The proposed capacity of the on-site well is 100 gpm. Outside of consuming less than 1 gpm for potable water, process water consumption will only be needed at ambient temperatures above 59°F. Typical consumption from the water storage tank at warm ambient conditions will be less than 40 gpm, with a possible short term maximum rate of approximately 200 gpm. Based on annual average ambient conditions there will be many days or months when process water is not required.

The CT will include an inlet air filter system capable of removing airborne dust and an exhaust gas stack. The maximum required gas flow for the facility is 63.3 million standard cubic feet per day at full load.

21.3 Materials Flowing Out of the Energy Conversion Facility

Stormwater runoff will be collected on site and routed to a stormwater retention pond. The collected runoff will adhere to the requirements of the stormwater discharge permit that will be obtained prior to construction.

A mobile demineralizer system that is regenerated off-site by the supplier will be provided to produce demineralized water for the Project. The mobile demineralizer system, together with the recycle of relatively small quantities of process waste water, enables the Project to operate in a zero liquid discharge mode. A secondary oil/water separator will be provided to assure that no oil is contained in recycled process waste water. Also, combustion turbine wash water will be hauled off-site.

Sanitary waste generated by the Project will be directed to an on-site septic field.

Although no discharge of process waste water from the Project is expected under normal operating conditions, provisions are included for off-loading from the clean waste water sump and lift station in the event of an abnormal occurrence.

The procedures proposed by the Project to avoid or ameliorate the possibility that discharges, emissions, or solid wastes would constitute a public nuisance or endanger public health and safety; human, animal, or plant life; or recreational facilities, are described throughout this application.

22.0 Products to be Produced and Fuel Type Used (ARSD 20:10:22:27-29)

The combustion turbine will produce electricity that will be provided to the MISO transmission and distribution system. The proposed fuel type is natural gas. The natural gas to be used for the simple-cycle electricity generation will be sourced from the NBPL via a 10-inch nominal pipeline. The operating pressure for the pipeline will range between 1,435 pounds per square inch gauge (psig) (NBPL maximum operating pressure) and 795 psig (NBPL minimum operating pressure).

The yield, based on lower heating value, is expected to be 956 British thermal units (Btu) per standard cubic foot of natural gas. The quality analysis of the proposed fuel is shown in Table 22-1.

The existing 42-inch natural gas NBPL transmission line is located approximately 500 feet from the turbine location, within Otter Tail's property. The tie-in location will include an approximate 200-foot by 200-foot area to install a gas metering station. The combustion turbine will be fired by natural gas only.

Table 22-1. Fuel Gas Analysis

Month	Year	BTU	CO2 Mole%	N2 Mole%	C1 Mole%	C2 Mole%	C3 Mole%	NC4 Mole%	IC4 Mole%	NC5 Mole%	IC5 Mole%	C6+ Mole%	Mole%	Total Sulfur Grains/ 100SCF
January	2016	1060.49	0.8032	1.2736	89.5109	7.5385	0.6340	0.0247	0.0174	0.0017	0.0024	0.0012	0.0145	0.0462
February	2016	1055.61	0.7984	1.3086	89.8960	7.3335	0.4610	0.0154	0.0098	0.0006	0.0011	0.0003	0.0139	0.0707
March	2016	1057.35	0.7971	1.3426	89.5574	7.6730	0.4297	0.0129	0.0087	0.0007	0.0011	0.0004	0.0142	0.0598
April	2016	1062.64	0.8293	1.2728	89.1163	8.0354	0.5020	0.0306	0.0240	0.0038	0.0053	0.0031	0.0161	0.0833
May	2016	1063.08	0.8354	1.2446	89.3416	7.7252	0.6066	0.0446	0.0353	0.0058	0.0081	0.0048	0.0161	0.0841
June	2016	1066.07	0.8494	1.2648	89.2103	7.5412	0.8140	0.0746	0.0600	0.0100	0.0139	0.0083	0.0145	0.1536
July	2016	1054.71	0.8149	1.3436	90.2079	6.9364	0.5484	0.0300	0.0209	0.0029	0.0038	0.0020	0.0148	0.0939
August	2016	1059.17	0.8330	1.3159	89.5689	7.4292	0.5891	0.0383	0.0289	0.0047	0.0064	0.0037	0.0160	0.1073
September	2016	1058.46	0.8436	1.2974	89.7003	7.3225	0.5676	0.0434	0.0334	0.0055	0.0076	0.0048	0.0158	0.1069
October	2016	1059.24	0.8446	1.2971	89.5053	7.5726	0.5316	0.0338	0.0252	0.0040	0.0054	0.0032	0.0152	0.0901
November	2016	1058.42	0.8311	1.3884	89.2707	7.8570	0.4424	0.0199	0.0120	0.0015	0.0019	0.0006	0.0152	0.0650
December	2016	1052.39	0.7976	1.2285	90.3646	7.0221	0.3614	0.0149	0.0101	0.0009	0.0013	0.0006	0.0152	0.0735
AVERAGE		**1058.97**	**0.8231**	**1.2982**	**89.6042**	**7.4989**	**0.5407**	**0.0319**	**0.0238**	**0.0035**	**0.0049**	**0.0027**	**0.0151**	**0.0862**

Source: Sargent & Lundy, 2017.

23.0 Alternate Energy Resources (ARSD 20:10:22:30)

As part of the Company's 2013 resource planning cycle, Otter Tail analyzed potential replacement scenarios in anticipation of the retirement of Hoot Lake Plant. Several different resource selection options were available in the Strategist model used in this analysis, including a 311 MW combined cycle generator, three different sized simple-cycle generators, the repowering of Hoot Lake Plant to natural gas, and wind and solar resources. The Company's analysis indicated that selection of a simple-cycle generator was the most economic outcome.

In the Company's 2016 resource planning cycle, Strategist selected a wind-plus-gas configuration under updated assumptions in all scenarios analyzed. In fact, Strategist was permitted to select a simple-cycle generator with the characteristics of the Project and did so in every scenario analyzed. The Company's 2016 analyses confirmed that moving forward with a simple-cycle natural gas fired generator with the characteristics of the Astoria Station Project was the most economical way to meet Otter Tail's needs.

Solar technology was considered as an alternative since the capital cost of installing solar technology continues to become less expensive. At the same time, solar is becoming increasingly more efficient. However, according to the Company's modeling in its 2016 resource plan, solar is still not a cost-effective resource.

Coal, hydroelectric, geothermal, and biomass power were screened out at the beginning of the 2016 resource plan process for various reasons including cost and availability of the resource in or near the service territory.

24.0 Solid or Radioactive Waste (ARSD 20:10:22:31)

Waste associated with the Project will be minimal. No hazardous wastes will be generated by process operations. Industrial wastes will consist of waste fluids and detergents from turbine maintenance and other miscellaneous materials. All industrial wastes will be removed from the facility site and held for disposal in a licensed and permitted commercial waste disposal facility.

Office and lunchroom-type waste will be disposed of on site in dumpsters and then hauled away by local waste management services for placement in permitted facilities. Construction debris will be removed and taken to a permitted landfill. The Brookings Landfill and the Watertown Landfill are both within approximately 30 minutes of the Project site.

Solid waste disposal from Project construction and operation will comply with federal and state regulations and standards.

25.0 Estimate of Expected Efficiency (ARSD 20:10:22:32)

Expected efficiency is based on the manufacturer's specifications for the energy conversion facility equipment. Plant efficiency is a measure of electrical power generated per unit of fuel heat input, as compared with the theoretical maximum energy conversion. Data used to calculate efficiency included the natural gas supply lower heating value (LHV) and higher heating value (HHV), the power output of the CT, and the fuel flow rate. Expected Net Efficiency is based on an assumed plant auxiliary power of 1 percent of gross output, which accounts for turbine and plant auxiliaries in simple cycle as well as generator step-up transformer (GSU) losses. Based on these assumptions, Table 25-1 presents an estimated average of expected efficiencies from three potential turbine suppliers.

Table 25-1. Expected Net Efficiency

Expected Net Efficiency	Supplier Average
Net Heat Rate, LHV (Btu/kWh)	8,620
Net Heat Rate, HHV (Btu/kWh)	9,548
Net Efficiency, LHV (%)	39.6
Net Efficiency, HHV (%)	35.8

(based on annual average ambient conditions)

26.0 Decommissioning (ARSD 20:10:22:33)

At the time of decommissioning, the facility will be evaluated for other site-compatible beneficial uses. In absence of such uses for portions or all of the facility, the site will be decommissioned based on the applicable regulatory requirements that are in effect at that time. The following decommissioning measures assume that there is no alternative use for the facility and that the facility will be rendered unusable for any future purpose.

26.1 Decommissioning Action Plan

Equipment and Buildings—All equipment and buildings will be removed from the site and either offered for recycling or disposed of in accordance with applicable regulations. All structures will be cleared below the finished intended ground level on the site. Concrete elements will be buried on site as allowed.

Fuel Tanks and Fuel Pipelines—An environmental site assessment will be conducted prior to the demolition of fuel tanks and pipelines to determine whether any fuel-related spills or leakage has occurred on the site. If required, soil sampling may occur to determine whether any levels exceed the action level for cleanup in accordance with applicable regulations at the time of decommissioning. The underground gas and water pipelines will be capped below grade and abandoned in place.

Other Miscellaneous Materials—As appropriate, buildings will be inventoried and non-hazardous materials will be removed to other operating facilities for use, disposed of in landfills permitted to accept such waste, or destroyed in permitted facilities. The facility will not produce any hazardous material that will be stored or disposed of on site, or require hazardous material removal at decommissioning.

The ground surface will be returned to its original contour quality and usage to the extent practicable. The estimated cost of decommissioning is $2 million.

27.0 Transmission Facility Layout and Construction (ARSD 20:10:22:34-35)

27.1 Right-of-Way Requirements and Route Clearing

The ROW for the overhead gen-tie line will be cleared of vegetation as necessary and will be 150 feet wide. The Project is located in relatively open, cultivated fields with few trees, therefore very little tree clearing activities are expected. Disposal of timber, tree tops, limbs, and slash will comply with state and local ordinances. Due to the fact that the Company owns property that connects to the preliminary switchyard location that is less than 0.5 miles from the combustion turbine, condemnation is not expected to be needed to acquire any ROW for the Project.

27.2 Construction Procedures

The precise timing of construction will consider various requirements that may be in place due to permit conditions, prudent construction timing with the generation components of the Project, and available workforce. Once access to the ROW has been granted and the necessary permits are received, site preparation activities could begin. These activities include clearing the ROW of vegetation that will interfere with construction or the safe operation of the gen-tie line.

Typical construction equipment consists of tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed trucks, pickup trucks, concrete trucks, helicopters, and various construction trailers. Many types of excavation equipment are set on wheel or track-driven vehicles. Structures are transported on tractor-trailer trucks. For foundations involving concrete, it will be delivered to the structure site by truck and allowed to cure for approximately 3 weeks prior to attaching the structures.

From the construction laydown area, the structures and components are transported to the structure assembly areas by truck. The structure assembly areas are typically located immediately adjacent to the structure site. At each structure assembly area, the structures are assembled and insulators and other hardware are attached while the structure is on the ground. The structure is then lifted and set on top of the concrete foundation or placed into an excavated hole (direct embedded) depending on the type of structure.

27.2.1 Best Management Practices during Construction

Standard construction and mitigation practices will be employed that have been developed from experience with past practices as well as industry-specific BMPs. These BMPs address ROW clearance, erecting transmission line structures, stringing transmission lines, and minimizing environmental impacts. In areas where construction occurs close to waterways, BMPs will be employed to help prevent soil erosion and siltation of waterways. Should vehicle fueling be required within the ROW, BMPs will be employed to ensure that equipment fueling and lubricating occur at a safe distance from waterways.

27.3 Restoration Procedures

During construction, ground disturbance at the structure sites and structure assembly areas may occur. Following the completion of construction, disturbed areas will be restored through employing appropriate erosion control measures and reseeding areas. Native grasses that will not interfere with the safe operation of the Project will be allowed to reestablish in the disturbed areas, or it will be returned to crop production.

27.4 Maintenance Procedures

Once completed, access to the ROW is required periodically to perform inspections, conduct maintenance, and repair damage. Regular maintenance and inspections will be performed during the life of the Project to ensure its continued integrity. Minimal disruption to agricultural practices within the ROW are expected.

27.5 Facility Configuration

The gen-tie line will consist of three phases, each at the end of a separate insulator string, all physically supported by structures. Each phase consists of one or more conductors. There are also shield wires strung above the electrical phases to prevent damage from lightning strikes. The conductors will be approximately 1 to 2 inches in diameter. Based on preliminary design, span lengths between towers will be between 400 feet and 800 feet.

The gen-tie line will be designed to meet or surpass all relevant local and state codes, National Electric Safety Code (NESC) requirements. Appropriate standards will be met for construction and installation and all applicable safety procedures will be followed during and after installation.

27.6 Tower Configuration

Based on the preliminary route and design, the Company proposes to use three to five single pole, steel single-circuit structures, ranging in height between 140 feet tall and 150 feet tall.

Single pole, steel structures are typically placed on concrete foundations measuring about 8 to 11 feet in diameter. Preliminary drawings of two types of possible single pole, steel structures for the Project are included in Appendix A. Alternative designs under consideration include steel H-frame or guyed structures. Typically, H-frame structures consist of two steel poles directly embedded within the ground with cross bracing. A guyed structure is a single pole or H-frame structure with guy wires that extend diagonally out to the ground.

27.7 Reliability

In general, transmission infrastructure is built to withstand weather extremes that can be encountered within this region. Except during severe weather conditions such as tornadoes and extreme ice, transmission lines typically fail only when subjected to conditions beyond the design parameters.

The design parameters for the gen-tie line are expected to be consistent with the design parameters used with other recently constructed Otter Tail transmission lines.

27.8 Safety

The gen-tie line will be designed to meet the local, state, and NESC standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and ROW widths. Construction crews will comply with local, state, NESC and the Company's standards regarding installation of facilities and standard construction practices.

27.9 Farming Operations, Vehicle Use, and Metal Buildings near Power Lines

All current farming operations in the area are compatible with the construction and operation of the Project. Insulated electric fences used in livestock operations can pick up an induced charge from transmission lines. Electric shocks can be caused when a charger is disconnected. This can be prevented by either shorting an insulator with a wire or installing an electric filter.

Farm equipment and trucks may be safely used under and near power lines, although Otter Tail does not recommend refueling vehicles directly under or within 100 feet of a power line operated at 200 kV or greater. The gen-tie line will be designed to meet or exceed minimum clearance requirements over roads, driveways, cultivated fields, and grazing lands as specified by the NESC.

Buildings are permitted near transmission lines, but are generally prohibited within the ROW. Otter Tail will work with any affected landowners with questions about new or existing metal structures near the ROW of the gen-tie line about proper grounding requirements.

27.10 Electric and Magnetic Fields

The term electromagnetic field (EMF) refers to electric and magnetic fields that are coupled together and present around appliances, devices, and other equipment that use or carry electricity. For power lines, EMF should be separated into electric fields (EFs) and magnetic fields (MFs). EFs and MFs arise from the voltage of a line and the flow of current along a line, and are measured in kilovolts per meter (kV/m) and milliGauss (mG), respectively. The intensity of the electric field is proportional to the voltage of the line, and the intensity of the magnetic field is proportional to the current flow through the conductors. Transmission lines operate at a power frequency of 60 hertz (cycles per second).

The EFs from a transmission line can couple with a conductive object, such as a vehicle or a metal fence, which is in proximity to the line. This will induce a voltage on the object, and the magnitude of this voltage is dependent on many factors, including the weather condition, object shape, object size, object orientation, object to ground resistance, object capacitance, and location along the ROW. If the object is insulated or semi-insulated from the ground and a person touches it, a small current could pass through the person's body to the ground. This might be accompanied by a spark discharge and mild shock, similar to what can occur when a person walks across a carpet and touches a grounded object or another person.

To ensure that any discharge does not reach unsafe levels, the NESC requires that any discharge be less than 5 milliamperes (mA). Based on industry experience, the discharge from any large mobile object—such as a truck or farm machinery—parked under or adjacent to the line would be unlikely to reach levels considered to be an annoyance, and will be less than the 5 mA NESC limit. Otter Tail will ensure that any fixed object, such as a fence or other large permanent conductive object close to or parallel to the gen-tie line, will be grounded such that any discharge would be less than the 5 mA NESC limit. Currently, there are no state regulations within South Dakota for maximum EF limits for transmission line siting. The facilities will comply with the recommended NESC standards.

Electrical current passing through any conductor produces a MF in the area around the conductor. The MF associated with a high voltage transmission line surrounds the conductor and decreases rapidly with increasing distance from the conductor. Considerable research has been conducted to determine whether exposure to power-frequency (60 hertz) MFs causes biological responses and health effects.

EMF research expert Dr. Peter A. Valberg provided testimony in 2010 (Valberg 2010 [Montana Dakota 2013]) on EMF calculation and potential health effects, and the conclusions of his 2009 literature review (Valberg 2009 [Montana Dakota 2013]) of the status of scientific research on potential health effects. He summarized scientific research on high voltage transmission lines and MFs as:

> [T]hese studies do not change the factual conclusion that power-line MF exposure is not an established cause of health effects, as has been detailed throughout this

> report. As has been noted, the overall weight of evidence, combing the epidemiology with laboratory-animal and mechanistic research, fails to support a role for power-line MF in disease risk... [overall] the scientific research literature to date remains an insufficient basis for assigning any actual health risk to power-line MF exposure levels.

There is no federal standard for transmission line EFs and MFs, nor state standards in South Dakota. Table 27-1 shows the calculated EMF levels for the Project. Computations were performed using Bonneville Power Administration's Corona and Field Effects Program CORONAII version 3.0 (United States Department of Energy undated).

Table 27-1. Maximum Calculated EMF

Location	Electric Field (kV/m)	Magnetic Field (mG)
Max in ROW	6.46	68.2
Max Outside ROW	0.26	18.6

Notes:
1. Calculated for winter ambient condition load of 472 Amps (282 MW)
2. Maximum operating voltage is 362.25 kV (1.05 per unit)

In addition to EMF, transmission lines can generate a small amount of sound energy. The audible noise is produced by corona from AC transmission lines and is generally highest in fog or rain and decreases during fair weather. Project noise level impacts are detailed in Section 13.3.

27.11 Underground Transmission

No portion of the gen-tie line will require underground transmission. While it is common for lower voltage distribution lines to be buried, it is progressively more unlikely the higher the voltage of the line. Transmission lines can be placed underground, but construction costs can be well over 10 times the cost of overhead construction. Because of the significantly greater expense associated with underground transmission construction, the use of underground technology is limited to locations where the adverse effects of overhead construction are completely unacceptable or where physical circumstances allow for no other option. Otter Tail concluded that the environmental and land use setting for the gen-tie line does not warrant underground construction.

28.0 Gas or Liquid Transmission Line Description (ARSD 20:10:22:37-38)

The Project will connect to the existing NBPL interstate pipeline at a new approximate 1-acre gas yard (see Appendix A). From the gas yard, less than 1,000 feet of new piping will be needed to connect to the combustion turbine. The new gas yard and any new piping will be on existing property owned by Otter Tail.

28.1 Design Capacity

The inlet flow capacity will be 126.6 million standard cubic feet per day (mmscfd). The pipe will have a 10.75-inch outside diameter and a design pressure of 1,440 psig. Delivery to the gas turbines will be approximately 630 psig. The entire pipe length is within a Class I location. A Class I location, as defined in 49 CFR Part 192.5, refers to an onshore location for a pipeline with 10 or fewer buildings intended for human occupancy. See Appendix A for a diagram of pipeline flow and daily capacity, and Table 28-1 summarizes the pipe parameters.

Table 28-1. Summary of Pipe Design Parameters

Parameter	Characteristic	Measurement
Flow Rates	NBPL Inlet Capacity	126.6 mmscfd
	Turbine Delivery Capacity	63.3 mmscfd
	Future Capacity	63.3 mmscfd
Pressure	Inlet Pressure	1435 psig
	Turbine Delivery Pressure	630 psig
	Maximum Operating Pressure	1435 psig
	Minimum Operating Pressure	795 psig
Temperature	Minimum	-41° F
	Maximum	109° F

28.2 Changes in Flow

The Project will be connected to the NBPL transmission facilities. Flow characteristics of the NBPL system are dynamic and cannot be generally determined with respect to a pipe interconnection intended to operate on a demand basis. The Project is a normal use associated with the NBPL system and is not expected to change the flow.

28.3 Technical Specifications of Pipeline

The American Petroleum Institute (API) provides a published specification for high-test line pipe. This specification covers various grades of seamless and welded steel line pipe. Process of manufacture, chemical and physical requirements, methods of test,

dimensions, and other parameters are specified. Grade designates pipe manufactured according to API specifications. The pipe type, according to API is 5L PSL2 with a specified minimum yield strength designated in pounds per square inch. Electric resistance welding (ERW) has one longitudinal seam formed during the manufacturing process. The pipe will be constructed of welded steel and is designed to accommodate the passage of instrumented internal inspection devices. Table 28-2 provides an overview of the proposed pipe technical specifications.

Table 28-2. Pipe Technical Specifications

Technical Specification	Measurement
Weight per foot	24.65 lbs for 0.219-inch wall thickness and 31.23 lbs for 0.279-inch wall thickness
Outside Diameter	10.75 inches
Nominal Wall Thickness	0.219 inches
	0.279 inches (bores)
Pipe Type	API 5L PSL2, ERW
Pipe Design Factor	0.72
Longitudinal or Seam Joint Factor	1.0
Temperature De-rating Factor	1.0
Specified Minimum Yield Strength	52,000 pounds per square inch
Tensile Strength	66,000 pounds per square inch
Coating Type	Fusion Bonded Epoxy
Manufacturer of Pipe	Domestic
% SMYS at MAOP for Main	Line 68%
% SMYS at MAOP for Bores	N/A

The maximum actual operating pressure (psig) of the proposed pipe will be approximately 1,200 psig at the inlet side of the line and is dependent on NBPL and the volume throughput of the pipeline. The maximum allowable operating pressure design point will be 1,440 psig. The design pressure for steel pipe is determined in accordance with the following formula:

$$P = \left(\frac{2St}{D}\right) x\ E\ x\ F\ x\ T$$

Where:

P = design pressure in psig

S = yield strength in pounds per square inch (psi)

D = nominal outside diameter of pipe in inches

t = nominal wall thickness of the pipe in inches

F = design factor

E = longitudinal joint factor

T = temperature de-rating factor.

Pipe testing will use either nitrogen or water and will have a minimum test pressure of 1,800 psig. The pipe will be tested upon completion in accordance with applicable provisions of 49 CFR part 192, latest or replacement issue.

28.4 Other Facilities

One gas regulator station will be located at the new 1-acre gas yard on the south end of the property. No compressor stations or storage facilities will be constructed for this proposed Project. All components other than the pipe material, including valves, fittings, flanges, regulators, and other components, will be designed and purchased for an American National Standards Institute (ANSI) 600 minimum rating.

A cathodic protection system will be designed for the pipeline. Plug and ball valves and welded and flanged valve connections will be used and will be of API class 6D, ANSI 600. Plug valves will be sourced from either Flowserve-Nordstrom or Grove manufacturers. Ball valves will be sourced from either Grove or Cameron manufacturers.

29.0 List of Permits (ARSD 20:10:22:05)

The Company needs to obtain approvals from a variety of applicable federal, state, and local agencies. Table 29-1 shows the federal, state, and local permits, approvals, and consultation required for construction and operation of the Project.

Table 29-1. Required Permits, Approvals, and Consultations

Federal/ State/ Local	Agency	Type of Permit/Approval/Consultation	Timing
Federal	U.S. Army Corps of Engineers	Section 404 compliance for impacts to jurisdictional Waters of the United States	Prior to Construction (if wetlands are impacted)
	U.S. Environmental Protection Agency	Spill Prevention, Control, and Countermeasure Plan	Prior to Operation
	U.S. Environmental Protection Agency	Title IV Acid Rain Permit	Prior to Operation
	U.S. Fish and Wildlife Service	Threatened and Endangered Species Consultation	Prior to Construction

Federal/ State/ Local	Agency	Type of Permit/Approval/Consultation	Timing
State	Public Utilities Commission	Facility Siting Permit	Prior to Construction
	South Dakota Department of Environment and Natural Resources	Water Right Permit for Non-Irrigation Uses	Prior to Construction
		Permit to Construct for a Non-PSD Source of Air Emissions	Prior to Construction
		Septic Tank Installation Plan Review	Prior to Construction
		Section 401 of the Clean Water Act Water Quality Certification	Prior to Construction
		NPDES Construction Storm Water Discharge Permit	Prior to Construction
		NPDES Industrial Storm Water Discharge Permit	Prior to Operation
		Registration of Above-ground Storage Tanks	Prior to Operation
		Temporary Surface Water Discharge Permit	Prior to Construction
		Temporary Water Use Permit for Construction Activities	Prior to Construction
	South Dakota Game, Fish, and Parks	State-listed Endangered Fish and Wildlife Review	Prior to Construction
	South Dakota State Historical Society, State Historical Preservation Officer	Cultural and Historic Resources Review	Prior to Construction
	South Dakota Department of Transportation	Oversize/Overweight Permit	Prior to Heavy Hauling
Local	Deuel County and/or Scandinavia Township	Special Exception/Variance and/or Zoning Change	Prior to Construction
		Oversize/Overweight Permit	Prior to Heavy Hauling
		Building Permit, Driveway/Access Permit, Road Agreements	Prior to Construction

30.0 Additional Information in Application (ARSD 20:10:22:36)

This application and all appendices and attachments contains all the information required under the necessary and appropriate rules and statutes of the state of South Dakota. To assist the local review committee in their review of this Project, Otter Tail commissioned First District Association of Local Governments of Watertown, South Dakota, to prepare a Social and Economic Impact Study. This study is attached as Appendix C.

31.0 Testimony and Exhibits (ARSD 20:10:22:39)

The testimony and exhibits in support of the application will depend on the issues disputed. The Commission previously entered an Order Designating Affected Area and Designating Local Review Committee; Order Granting Motion to Defer Prefiled Testimony; Order Granting Motion to Schedule Prehearing Conference in Docket EL 17-017, which authorized Otter Tail to file this application without the testimony and exhibits. Testimony and exhibits will be filed later. Along with this application, Otter Tail will be filing a motion for a scheduling order to request a prehearing conference to set a schedule of prefiled testimony and exhibits after the disputed issues are determined. However, Otter Tail will at a minimum have individuals from the following entities available to testify in support of the application:

Otter Tail Power Company
215 South Cascade Street
Fergus Falls, MN 56537
218-739-8200

HDR Engineering, Inc
701 Xenia Avenue South, Suite 600
Minneapolis, MN 55416
763-591-5400

32.0 Applicant's Verification

VERIFIED APPLICANT'S SIGNATURE

State of Minnesota)
)ss
County of Otter Tail)

William Swanson, being duly sworn, deposes and says that he is the Project Manager of the Astoria Station Project and is the authorized agent of Otter Tail Power Company.

He states that he does not have personal knowledge of all the facts recited in the foregoing application, but the information in the application has been gathered by and from employees and contractors of the Applicant, and that the information in the application is verified by him as being true and correct on behalf of the Applicant.

Dated this 5th day of October, 2017.

William Swanson, P.E.
Manager, Supply Engineering

Subscribed and sworn to before me on this
The 5th of October, 2017.

Notary Public

(SEAL)

My Commission Expires:

January 31, 2020

LORI D. DAWKINS
Notary Public-Minnesota
My Commission Expires Jan 31, 2020

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