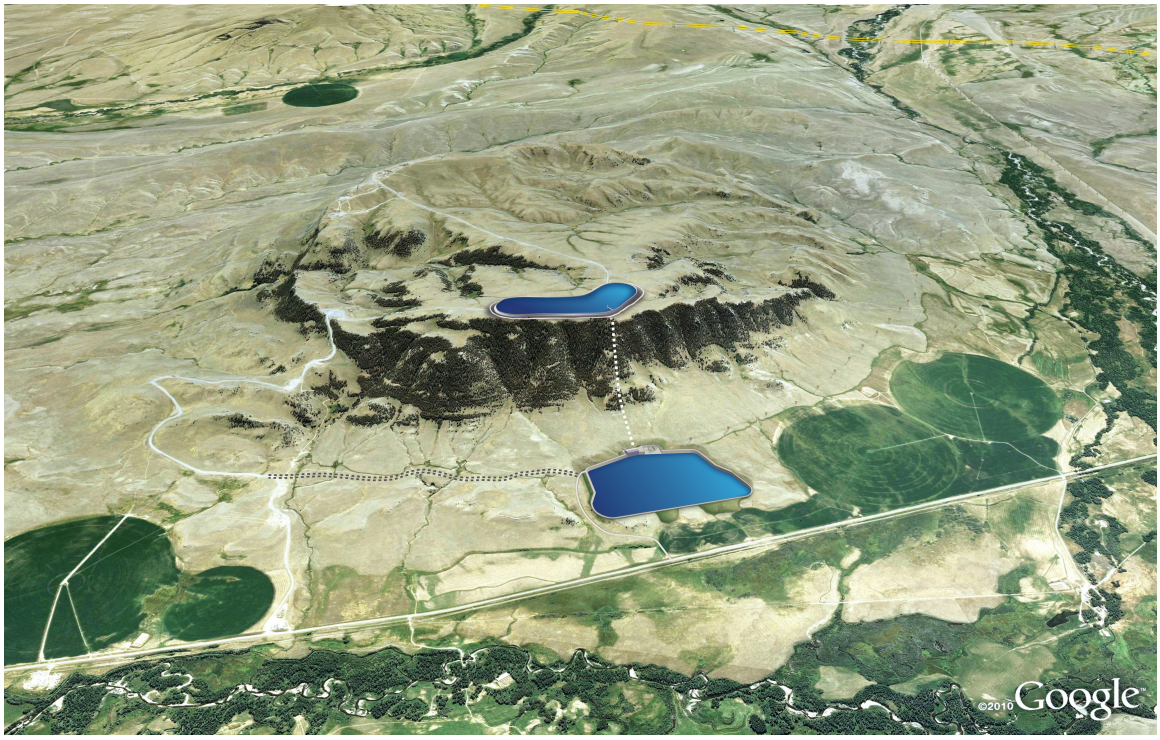
GB ENERGY PARK LLC

Volume I
Engineering Exhibits

GORDON BUTTE CLOSED LOOP
PUMPED STORAGE HYDRO PROJECT

FERC PROJECT NO. P-13642



Initial Statement
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October 2015

Before the Federal Energy Regulatory Commission
Application for Original License for Major Unconstructed Project
Gordon Butte Closed Loop Pumped Storage Hydro Project
FERC No. P-13642

The Initial Statement is presented herein and addresses the FERC regulation at 18 CFR 4.41 (a).

(1) GB Energy Park, LLC (GBEP), **applies to the Federal Energy Regulatory Commission (FERC) for** an original license **for the proposed** Gordon Butte Closed Loop Pumped Storage Hydro Project (Project)**, as described in the attached exhibits.**

(2) The location of the proposed Project is:

State or Territory: Montana
County: Meagher County
Nearby Town: Martinsdale
Stream or other body of water: Closed Loop; water supply from Cottonwood Creek

(3) The exact name, business address, and telephone number of the applicant are:

GB Energy Park, LLC
209 South Willson Ave.
PO Box 309
Bozeman, MT 59771

(4) The applicant is a domestic corporation **and** is not **claiming preference under section 7 (a) of the Federal Power Act. See 16 U.S.C. 796.**

(5)(i) The statutory or regulatory requirements of the state in which the project would be located that affect the Project as proposed with respect to:

bed and banks; and

- Montana Code Annotated (MCA) 75-7-301

to the appropriation, diversion and use of water for power purposes; and

- MCA Title 85 – Water Use
- MCA 75-5-303 – Nondegradation policy
- MCA 75-5-401 – Montana Water Quality Act

The Water Quality Certification pursuant to Section 401(a) of the Clean Water Act of 1977, 33 U.S.C. 134(a)(2000)

with respect to the right to engage in the business of developing, transmitting, and distributing power and in any other business necessary to accomplish the purposes of the license under the Federal Power Act, are:

- MCA Title 75 Chapter 20 – The Major Facilities Siting Act (MFSA)

(5)(ii) The steps which the applicant has taken, or plans to take, to comply with each of the laws cited above are:

Bed and banks

- **Montana Annotated Code 75-7-301** sets the regulatory framework for the State of Montana to protect and preserve its natural rivers and streams and the lands and property immediately adjacent to them, keep soil erosion and sedimentation to a minimum and protects the use of water for any useful or beneficial purposes. The Project will be an off-stream facility, built outside of any watersheds or riparian zones, and will be utilizing an existing diversion and water delivery system, therefore after consultations with Montana Department of Environmental Quality (MTDEQ) a determination was made that a 301 Permit is not required.

Appropriation, diversion and use of water for power purposes

- **Title 85 of the Montana Annotated Code** regulates the use of water in the State of Montana to promote the conservation, development, and beneficial use of the state's water resources. After extensive consultations between GEBP and the Montana Department of Natural Resources and Conservation (MTDNRC), on July 30th, 2014, GBEP applied for a Permit to Appropriate Water for the purpose of hydropower generation. On October 14th, 2014, MTDNRC issued a Provisional Permit to appropriate water (Water Right No. 40A 30069150) from Cottonwood Creek for the purpose of hydropower generation for the Project to GBEP (Project Water Right is located in Exhibit E Appendix 7).

- **MCA 75-5-303** requires the Montana Department of Environmental Quality (MTDEQ) to protect high-quality state water from degradation. GBEP has entered into an agreement with MTDEQ for preconstruction monitoring of Cottonwood Creek and to monitor the water quality of water in the Project reservoirs over the life of the Gordon Butte facility. Water quality analysis of the source water will be performed every 2 weeks during the diversionary period established in GBEP's water right (April 15th to June 30th), prior to the

construction of the Project in years 2015 and 2016. This information will be used to determine the baseline water quality conditions in the Project's source waters. After Project completion, water quality samples will be collected twice per year from each reservoir over the life of the Project. Samples and measurements will be reported to MTDEQ for analysis. For more information on the Water Quality Monitoring Program, see **Section 4.2.2 – Water Resources –** of **Exhibit E.**

- **Montana Code Annotated 75-5-401 – Montana Water Quality Act** On October 15th, 2014, the Montana Department of Environmental Quality (MTDEQ) issued its determination that the proposed Project will not discharge to navigable waters and therefore a 401 certification is not required for any application, federal license, or permit (MTDEQ determination is located in Exhibit E Appendix 2).

The right to engage in the business of developing, transmitting, and distributing power and in any other business necessary to accomplish the purposes of the license under the Federal Power Act

- **Montana Code Annotated Title 75 Chapter 20 – Major Facilities Siting Act (MFSA)** governs the siting of energy generation and transmission facilities in Montana. Under MFSA both, the Gordon Butte Closed Loop Pumped Storage Hydro Project's facilities, and the 6-mile long, 230 kV transmission line are exempt from the law. The facilities are exempt pursuant to MCA 75-20-104(8)(a)(vi), which states that MFSA does not apply to an energy storage facility, as defined in MCA 15-6-157[1]. The Project's transmission line is exempt pursuant to MCA 75-20-104(8)(a)(i)[2], which states that transmission lines with a design capacity of 230 kV or less and 10 miles or less in length do not qualify as "facilities" regulated by the law (see MTDEQ Comment Letter dated October 21st, 2013 in **Exhibit E Appendix 3**).

(6) Brief Project description

The proposed action includes the construction and operation of a new off-stream, closed-loop pumped storage hydro facility located approximately 3 miles west of the unincorporated town of Martinsdale, Meagher County, Montana (population 207). The

[1] MCA 15-6-157(4)(c)(i) "Energy storage facilities" means hydroelectric pumped storage property, compressed air energy storage property, regenerative fuel cells, batteries, flywheel storage property, or any combination of energy storage facilities directly connected to the electrical power grid and associated property, appurtenant land and improvements, and personal property that are designed to:

[2] MCA 75-20-104(8)(a)(i) [Facility]does not include an electric transmission line and associated facilities of a design capacity of 230 kilovolts or less and 10 miles or less in length;

proposed facility will be off-stream, built outside of any existing waterways, thereby eliminating impacts to the local water resources and riparian ecosystems. The Project footprint will be 380 acres and the Area of Potential Effect (APE) of the proposed construction and operation of the Project evaluated during preparation of this license application is approximately 2,026 acres. All Project features will be located entirely on private land- 71 Ranch LP (71 Ranch). The Project will include the following features:

- An Upper Reservoir with an active storage of 4070 acre feet
- An overflow spillway in the upper reservoir for emergency discharges
- An intake structure at the Upper Reservoir
- An 18 foot diameter shaft leading to a high pressure tunnel
- An 18 foot diameter concrete/steel lined tunnel from the shaft to the penstocks at powerhouse
- A series of steel penstocks leading to the powerhouse Units 1 through 4
- A powerhouse with four 100 MW Ternary units, each consisting of a motor-generator, a Pelton turbine and a multi-stage pump
- A lower reservoir with an active storage of 4070 acre feet
- A hydraulic connection to the existing, non-Project 71 Ranch irrigation system
- A substation with generator step-up transformers and switchgear at the powerhouse
- A 230kV transmission line
- An interconnection substation tying the 230kV transmission line to an existing 500kV line
- Use of existing roads to the top of Gordon Butte, a new access road to the powerhouse, and a temporary road for the construction period
- Existing and new access and service roads
- Other appurtenant features

Preliminary drawings of the proposed project facilities and supporting information used as the basis of the conceptual design are presented in **4.41(g) Exhibit F – General Design Drawings and Supporting Preliminary Design Report.** Maps showing the location of the Project and the proposed Project Boundary are presented in **4.41(h) Exhibit G – Project Maps**. **4.41(g) Exhibit F** contains information defined as Critical Energy Infrastructure Information (CEII), and is therefore filed under separate cover as required by the Commission's regulation at 18 CFR 4.32(k) and 18 CFR 388.112. Requests for access to information defined as CEII should be made to the Commission's CEII Coordinator.

INFORMATION REQUIRED BY 18 CFR SECTION 4.32

(1) For a preliminary permit or license, identify every person, citizen, association of citizens, domestic corporation, municipality, or state that has or intends to obtain and will maintain any proprietary right necessary to construct, operate, or maintain the project:

GB Energy Park, LLC
209 South Willson Ave.
PO Box 309
Bozeman, MT 59771
(406) 585-3006

(2) For a preliminary permit or a license, identify (providing names and mailing addresses):

(2)(i) Every county in which any part of the project, and any Federal facilities that would be used by the project, would be located:

Meagher County, Montana
15 West Main Street
White Sulphur Springs, MT 59645

There will be no federal facilities associated with the proposed Project.

(2)(ii) Every city, town, or similar local political subdivision:

(A) In which any part of the project, and any Federal facilities that would be used by the project, would be located; or

The Project is not within any town or city limits.

(B) That has a population of 5,000 or more people and is located within 15 miles of the project dam:

The Project is not within 15 miles of any town of 5,000 or more people.

(2)(iii) Every irrigation district, drainage district, or similar special purpose political subdivision:

(A) In which any part of the project, and any Federal facilities that would be used by the project, would be located; or

(B) That owns, operates, maintains, or uses any project facilities or any Federal facilities that would be use by the project;

Meagher County Conservation District
PO Box 589
White Sulphur Springs, MT 59645

The Project would not use any federal facilities.

(2)(iv) Every other political subdivision in the general area of the project or proposed that there is reason to believe would be likely to be interested in, or affected by, the application; and

Deadman's Basin Water Users Association
125 Autumn Road
Roundup, MT 599072
406.323.3533
http://www.lmcd.mt.nacdnet.org/DBWUA/

Meagher County Commissioners
15 West Main St.
White Sulphur Springs, MT 59645
406.547.3612
http://www.meaghercounty.mt.gov/commissioners.html

Montana Public Service Commission
1701 Prospect Avenue
PO Box 202601
Helena, MT 59620-2601
http://www.psc.state.mt.us/

U.S. Bureau of Reclamation Great Plains Regional Office
PO Box 36900
Billings, MT 59107-6900
406.247.7610
http://usbr.gov/gp/

Upper Musselshell Water Users Association
Two Dot, MT 59085
406.220.2093
http://lmcd.mt.nacdnet.org/MREP/

(2)(v) All Indian tribes that may be affected by the project.

The Project will not affect any Indian reservation land. Letters were sent to the governments of the Crow Nation, Gros Ventre and Assiniboine Tribes, Assiniboine and Sioux Tribes, Blackfeet Nation, Northern Cheyenne Tribe, Confederated Salish and Kootenai Tribes, and the Chippewa and Cree Tribes introducing the Project and inviting tribal consultation and participation in the Project's licensing process. GBEP did not receive a response from any of the tribal governments. GBEP communicated regularly with the Montana Governor's Office of Indian Affairs throughout all stages of the pre-filing process. For a full record of GBEP's pre-filing consultation process see **Section 2** of **Exhibit E** and **Exhibit E Appendix 3** & **17**.

(3)(i) For a license (other than a license under section 15 of the Federal Power Act) state that the applicant has made, either at the time of or before filing the application, a good faith effort to give notification by certified mail of the filing of the application to:

(A) Every property owner of record of any interest in the property within the bounds of the project, or in the case of the project without a specific boundary, each such owner of property which would underlie or be adjacent to any project works including any impoundments; and

71 Ranch LP
106 71 Ranch Road
Martinsdale, MT 59053
406.572.3312

(B) The entities identified in paragraph (a)(2) of this section, as well as any other Federal, state, municipal or other local government agencies that there is reason to believe would likely be interested in or affected by such application.

DNRC Water Resources
1424 9th Avenue
PO Box 201601
Helena, MT 59620-1601
406.444.6607
http://dnrc.mt.gov/wrd/

Montana Department of Environmental Quality
Lee Metcalf Building
1520 E. Sixth Avenue
PO Box 200901
Helena, MT 59620-0901
406.444.2544
http://www.deq.state.mt.us/

Montana Fish, Wildlife and Parks
Region 4 Office
4600 Giant Springs Road
Great Falls, MT 59405
406.454.5840
fwprg4@mt.gov

U.S. Fish and Wildlife Service
Region 6 – Mountain/Prairie
585 Shepard Way
Helena, MT 59601-6287
406.449.5225

Montana State Historic Preservation Office
225 North Roberts
PO Box 201201
Helena, MT 59620
406.444.2694
http://mhs.mt.gov/Shpo

Montana Governor's Office
PO Box 200801
Helena, MT 59620-0801
406.444.3111
https://governor.mt.gov/

Montana Governor's Office of Indian Affairs
State Capitol Building
2nd Floor, Room 202
PO Box 200801
Helena, MT 59620
406.444.3702
http://tribalnations.mt.gov

U.S. Department of Interior, Bureau of Land Management
Lewistown Field Office
920 Northeast Main Street
Lewistown, MT 59457
406.538.1900
http://www.blm.gov/mt/st/en/fo/lewistown_field_office.html

U.S. Forest Service
White Sulphur Springs Ranger District
204 West Folsom

White Sulphur Springs, MT 59645
406.547.3361
http://www.fs.usda.gov/recarea/lcnf/recarea/?recid=79342

Montana Public Service Commission
1701 Prospect Avenue
PO Box 202601
Helena, MT 59620-2601
http://www.psc.state.mt.us/

U.S. Army Corps of Engineers
Omaha District
1616 Capitol Avenue Suite 3300
Omaha, NE 68102
402.221.3906
http://www.nwo.usace.army.mil/

U.S. Bureau of Reclamation Great Plains Regional Office
PO Box 36900
Billings, MT 59107-6900
406.247.7610
http://usbr.gov/gp/

U.S. Environmental Protection Agency
Region 8: Mountain and Plains
1595 Wynkoop Street
Denver, CO 80202-1129
303.312.6312
http://www.epa.gov/region08

U.S. Geological Survey
Denver Federal Center
PO Box 25046
Denver, CO 80225
303.236.5900
http://www.usgs.gov/

Meagher County Commissioners
15 West Main St.
White Sulphur Springs, MT 59645
406.547.3612
http://www.meaghercounty.mt.gov/commissioners.html

(3)(ii) Such notification must contain the name, business address, and telephone number of the applicant and a copy of the Exhibit G contained in the application, and must state that a license application is being filed with the Commission.

The applicant has made a good faith effort at the time of filing to notify, by certified mail, the parties listed in section (3)(i)(A) and (3)(i)(B).

SUBSCRIPTION AND VERIFICATION

(4)(i) As to any facts alleged in the application or other materials filed, be subscribed and verified under oath in the form set forth in paragraph (a)(3)(ii) of this section by the person filing, an officer thereof, or other person having knowledge of the matters sent forth. If the subscription and verification is by anyone other than the person filing or an officer thereof, it shall include a statement of the reasons therefore.

(ii) This Application for Original License for Major Unconstructed Project is executed in the

State of Montana
County of Gallatin
City of Bozeman

By: Carl Borgquist, President
GB Energy Park, LLC
209 South Willson Ave.
PO Box 309
Bozeman, MT 59771

being duly sworn, depose(s) and say(s) that the contents of this Application for Original License for Major Unconstructed Project (Application) are true to the best of his knowledge or belief. The undersigned applicant has signed this Application this 25th day of September, 2015.

Applicant

By: _____
Carl Borgquist, President
GB Energy Park, LLC

Subscribed and sworn to before me, a Notary Public of the State of Montana this 25 day of SEPTEMBER, 2015

_____
Notary Public

DYLAN S CLARKSON
Notary Public
for the State of Montana
Residing at:
Bozeman, Montana
My Commission Expires:
January 23, 2019

GORDON BUTTE CLOSED LOOP
PUMPED STORAGE HYDRO PROJECT

FERC PROJECT NO. P-13642

EXHIBIT A

Description of Project

APPLICATION FOR ORIGINAL LICENSE

PREPARED BY:

GB Energy Park LLC

&

McMillen Jacobs Associates

October 2015

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EXHIBIT A – PROJECT DESCRIPTION

Exhibit A is presented herein and addresses the FERC regulation CFR 4.41 (b).

(b) Exhibit A is a description of the project. If the project includes more than one dam with associated facilities, the information must be provided separately for each discrete development.

Contents and Purpose of This Exhibit

GB Energy Park, LLC (GBEP), a wholly-owned subsidiary of Absaroka Energy Development Group, LLC, is filing this License Application for an original license for the Gordon Butte Closed Loop Pumped Storage Hydro Project (Project) – FERC No. P-13642 – under Part I of the Federal Power Act.

Exhibit A of this License Application describes the proposed Project, including details about the Project structures, the upper and lower reservoirs, pump/turbines, the powerhouse, the penstock, transmission lines and any additional equipment appurtenant of the Project.

General Project Description

The proposed action includes the construction and operation of a new off-stream, closed-loop pumped storage hydro facility located approximately 3 miles west of the unincorporated town of Martinsdale, Meagher County, Montana (population 207). The facility will be off-stream, built outside of any existing waterways, thereby eliminating impacts to the local water resources and riparian ecosystems. The Project footprint is approximately 380 acres and the approximate Area of Potential Effect (APE)[1] of the proposed construction and operation of the Project is approximately 2,026 acres. All Project features will be located entirely on private land – 71 Ranch LP (71 Ranch). The Project will include the following features[2]:

- An Upper Reservoir with an active storage of 4070 acre feet
- An overflow spillway in the upper reservoir for emergency discharges
- An intake structure at the Upper Reservoir
- An 18 foot diameter shaft leading to a high pressure tunnel

[1] The Area of Potential Effects comprises the land underneath the Project's permanent features, access roads for operation and maintenance of the facility, and an additional area for temporary impacts during construction related activities (laydown and staging areas, equipment parking, batching plants, temporary construction roads).

[2] Project dimensions may be slightly adjusted during final design.

- An 18 foot diameter concrete/steel lined tunnel from the shaft to the penstocks at powerhouse
- A series of steel penstocks leading to the powerhouse Units 1 through 4
- A powerhouse with four 100 MW Ternary units, each consisting of a motor-generator, a Pelton turbine and a multi-stage pump
- A lower reservoir with an active storage of 4070 acre feet
- A hydraulic connection to the existing, non-Project 71 Ranch irrigation system
- A substation with generator step-up transformers and switchgear at the powerhouse
- A 230kV transmission line
- An interconnection substation tying the 230kV transmission line to an existing 500kV line
- Use of existing roads to the top of Gordon Butte, a new access road to the powerhouse, and a temporary road for the construction period
- Existing and new access and service roads
- Other appurtenant features

Drawings of the proposed project facilities and supporting information used as the basis of the Project's design are presented in **4.41(g) Exhibit F – Preliminary General Design Drawings and Supporting Design Report.** Maps showing the location of the Project and the proposed Project Boundary are presented in **4.41(h) Exhibit G – Project Maps**. **4.41(g) Exhibit F** contains information defined as Critical Energy Infrastructure Information (CEII), and is therefore filed under separate cover as required by the Commission's regulation at 18 CFR 4.32(k) and 18 CFR 388.112. Requests for access to information defined as CEII should be made to the Commission's CEII Coordinator.

Project Area and Vicinity

The Project will be built on top of and on lands adjacent to Gordon Butte in Meagher County, Montana. Gordon Butte is a landform rising approximately 1,025 feet above the Musselshell River valley. It is bordered to the north by the Little Belt Mountain range and the South Fork Musselshell River, and to the south by the Crazy Mountain range. Elevations range from approximately 4,880 feet at the proposed lower reservoir site to 6,000 feet above mean sea level (amsl) at the top of Gordon Butte. Montana Secondary Highway 294 (Highway 294) borders the Project APE on the north, and Cottonwood Creek Road borders it on the west.

Cottonwood Creek, a perennial stream originating in the north slope of the Crazy Mountains, has a drainage basin of approximately 141 square miles and drains waters from elevations of 9,100 to 5,036 feet. The creek flows northward approximately 13 miles to its confluence with the South Fork Musselshell River approximately 5 miles west

of Martinsdale. The South Fork and North Fork Musselshell Rivers converge near the town of Martinsdale to form the mainstem Musselshell River. From here the river flows easterly for about 120 miles at Melstone, Montana where it turns and flows north about 80 miles where it flows into Fort Peck Reservoir just north of Mosby, Montana.

Surrounding the Project site are numerous small farming and ranching communities and towns with relatively small populations. The Project's location in the central portion of the state makes it reasonably accessible from a number of more densely-populated cities and commercial hubs 90 to 130 miles away. Predominant land uses in the vicinity of the Project area include agriculture (farming and ranching), forestry, hunting, fishing, and various other recreation activities. Agricultural practices include dryland and irrigated farming and livestock production (primarily cattle and sheep).

4.41(b)(1) The physical composition, dimensions, and general configuration of any dams, spillways, penstocks, powerhouses, tailraces or other structures proposed to be included as part of the project.

The Gordon Butte Closed Loop Pumped Storage Hydro Project will consist of: (1) new upper and lower off-stream, closed-loop reservoirs; (2) an overflow spillway in the upper reservoir; (3) an intake structure at the upper reservoir; (4) an underground penstock (conduit) connecting the two reservoirs; (5) a series of steel penstocks leading to the powerhouse Units 1-4; (6) a powerhouse built substantially below grade; (7) a substation with generator step-up transformers and switchgear at the powerhouse; (8) an above ground maintenance bay; (9) a new single circuit, 230-kilovolt (kV) transmission line; (10) existing and new access and service roads; (11) a connection to the existing 71 Ranch irrigation system; (12) a new interconnect substation tying the 230 kV transmission line to an existing 500 kV line; and (13) other appurtenant features (AECOM 2015). The powerhouse will contain four 100 megawatts (MW) pump/turbine units with a combined rated capacity of 400 MW.

The general proposed layout of the Project is shown in **Figure A-1**. Specific proposed facility characteristics are listed in Table A-1 and described in more detail below. Individual proposed facility design drawings are provided in **Exhibits F – Preliminary General Design Drawings and Supporting Design Report** and the proposed locations of facilities within the Project Boundary are shown in **Exhibit G – Project Maps[3].**

[3] **Exhibits F** of this License Application contains information defined Critical Energy Infrastructure Information (CEII), and is therefore filed under separate cover as required by the Commission's regulation at 18 CFR 4.32(k) and 18 CFR 388.112 and 388.113. Requests for access to information defined as CEII should be made to the Commissions' CEII Coordinator.

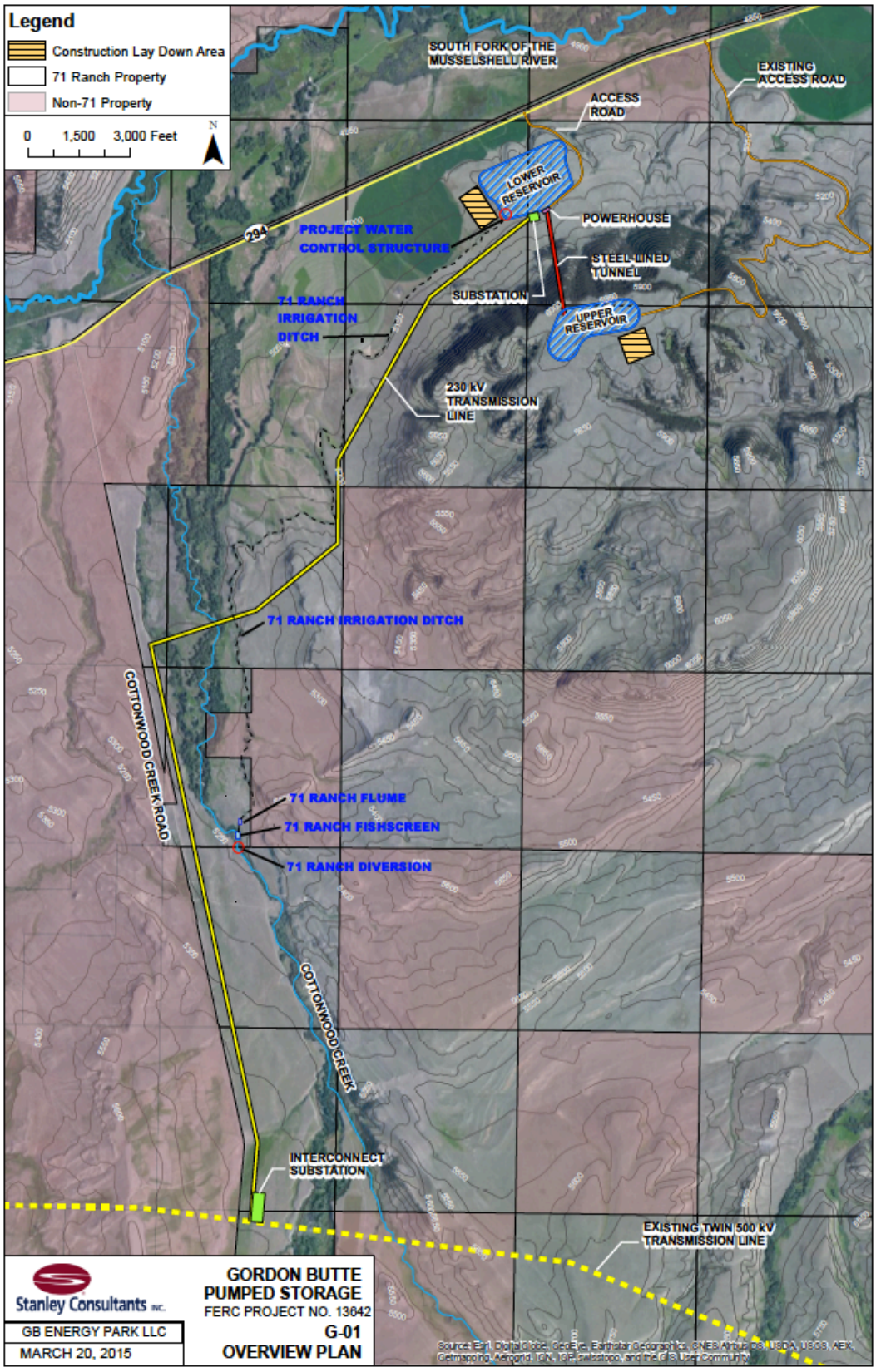

Figure A-1. Proposed Project layout

Table A-1. Significant Data for Gordon Butte Pumped Storage Project

Project Feature	Feature Data
Powerhouse	
Total Rated Capacity	400 MW
Number of Units	4 (Ternary)
Unit Rated Capacity	100 MW
Maximum Head (El 6027- El 5007)	1020 feet
Powerhouse Structure	
Height	206 feet
Length	380 feet
Width	110 feet
Intake/Outlet Structure	
Shaft Diameter	18 feet
Shaft Length	738 feet
Pressure Tunnel	
Diameter	18 feet
Length	3000 feet
Steel Lined Length	2488 feet (TBD)
Penstocks	
Bifurcation Diameters	16-14-12-10 feet
Penstock Diameter	10 feet at the inlet to pump/turbine
Length	150 to 250 feet
Upper Reservoir	
Dam Type	Concrete faced rockfill
Dam Crest Elevation	6034(to top of 4-foot parapet wall)
Reservoir Bottom Elevation	5942.0 +/-
Reservoir Bottom Lining	HDPE Geomembrane
Active Storage	4070 acre feet
Maximum Upper Reservoir Level	6027 feet
Minimum Upper Reservoir Level	5948 feet
Emergency Spillway Capacity	5,200 cfs
Lower Reservoir	
Dam Type	Concrete faced rockfill / concrete faced rock cut
Dam Crest Elevation	5062 (to top of 2-foot parapet wall)
Reservoir Bottom Elevation	5001.0 +/-
Reservoir Bottom Lining	HDPE Geomembrane
Active Storage	4070 acre feet
Maximum Lower Reservoir Level	5057 feet
Minimum Lower Reservoir Level	5007 feet

Power Transmission Line	
Voltage	230 kV
Length to 500kV Interconnect Substation	5.7 miles
Number of Circuits	One

Upper Reservoir

The upper reservoir is located near the north rim of Gordon Butte. The reservoir active storage volume of 4070 acre feet will be obtained through a combination of excavation and dam construction such that the entire reservoir will be contained by a concrete-faced rockfill dam. Prevention of leakage out of the reservoir is critical to maintain the closed system water usage for the project. In addition to the concrete face slab, the reservoir bottom will be lined with an impervious geomembrane.

An emergency spillway is provided on the west side of the reservoir, which could release flow to a natural drainage off of the Butte. The spillway is capable of safely passing the flow from all four pumps (AECOM 2015). The spillway is included in the preliminary design of the upper reservoir to provide relief in the unlikely combination of operational and/or extreme weather events.

Table A-1 summarizes the key reservoir data.

Upper Reservoir Dam

The description of the upper reservoir dam described herein is preliminary and is based on site conditions as are currently understood. As the project advances into final design, additional subsurface exploration will be performed and more rigorous dam analysis methods will be employed. At that time, the design may undergo revisions and refinements.

The upper reservoir dam will be a concrete faced rockfill dam (CFRD). The embankment will have a 24-foot-wide crest set at El 6030 feet. It will have an additional 4-foot-high concrete parapet wall up to El 6034 feet for a total freeboard of 7 feet above the maximum water level of El 6027 feet. The freeboard was established to achieve adequate spillway discharge capacity and to accommodate precipitation and wave action. The parapet wall will also provide a safety barrier for vehicles operating on the crest road.

At the upstream toe of the dam, the reservoir invert is at El 5942 feet. This was established to accommodate a minimum reservoir level of El 5948 feet, with an allowance for three feet of ice in winter months.

Embankment upstream and downstream side slopes were set 1.7H:1V based on preliminary stability analyses. The zoning for the dam consists of upstream transition zones (Zones 1A and 1B) and rockfill shell zones (Zone 2A, 2B and 2C).

Access ramps to the dam crest will be provided along the downstream face within the Zone 2C rockfill.

The reinforced concrete face slab will have a thickness varying from 12 inches at the crest to 18 inches at the toe.

A reinforced concrete gallery will be constructed around the perimeter of the dam at the upstream toe. This will serve as a plinth for the concrete face and will collect leakage through the reservoir membrane liner. Adits will be provided to allow access to the gallery and to dispose of membrane leakage.

An instrumentation program will be established to monitor vertical and horizontal dam movement at the crest. Leakage through the membrane and through the concrete face slab will be monitored. Piezometers will also be located within and beneath the dam to monitor phreatic conditions (AECOM 2015).

Lower Reservoir

The lower reservoir is located on the sloping upland terrain between Gordon Butte and State Route 294. The powerhouse and substation will be located on the south side of the reservoir. The reservoir active storage volume of 4070 acre feet will be obtained through a combination of excavation and dam construction. The lower reservoir will be impounded on the north side by two concrete-faced, zoned rockfill dams that will extend across the two large drainage ravines. Approximately 20 percent of the lower reservoir will be contained by CFR dams with remainder of the reservoir contained by rock cut slopes up to 100 feet high. The reservoir bottom will be lined with an impervious geomembrane. No spillway is required for the lower reservoir.

The concrete face slab will cover the inboard slopes of both the zoned rockfill dams and the cut slopes around the entire perimeter of the reservoir from EL 5001 to EL 5060 feet at a slope of 1:1.7 V:H based on the preliminary dam design. The bottom of the reservoir at EL 5001 feet will be excavated and shaped to achieve the desired reservoir volume, provide borrow material for the rockfill embankments, and accommodate a leveling course/cushion layer, drainage layer, geomembrane liner and protective cover material (AECOM 2015).

Lower Reservoir Dam and Cut Slopes

The description of the lower reservoir dam and reservoir containment slopes described herein are preliminary and are based on site conditions as they are currently understood. As the project advances into final design, additional subsurface exploration will be performed and more rigorous dam and rock slope analysis methods will be employed.

At that time, the dam and cut slope section design may undergo revisions and refinements.

The lower reservoir dam will be a concrete faced rockfill dam (CFRD). The embankment will have a 24-foot-wide crest set at El 5060 feet. It will have an additional 2-foot-high concrete parapet wall up to El 5062 feet for a total freeboard of 5 feet above the maximum water level of El 5057 feet. The freeboard was established to accommodate precipitation and wave action. The parapet will also provide a safety barrier for vehicles operating on the crest road.

At the upstream toe of the dam the reservoir invert is at El 5001 feet. This was established to accommodate a minimum reservoir level of El 5007 feet, with an allowance for three feet of ice in winter months.

Embankment upstream and downstream side slopes were set 1.7H:1V based on preliminary stability analyses. The zoning for the dam consists of upstream transition zones (Zones 1A and 1B) and rockfill shell zones (Zone 2A, 2B and 2C).

Access ramps to the lower reservoir crest road will be provided at the north-west corner.

The reinforced concrete face slab will have a thickness varying from 12 inches at the crest to 18 inches at the toe.

A reinforced concrete gallery will be constructed around the perimeter of the entire lower reservoir. This will serve as a plinth for the concrete face and it will collect leakage through the reservoir membrane liner. An access point will be provided at each end of the powerhouse, together with a third access point via a shaft and adit to the gallery on the north side of the reservoir

Most of the lower reservoir will be formed and contained by rock cuts within moderately to slightly weathered siltstone, claystone and sandstone. The rock cuts will be sloped at 1.7H:1V and lined with a reinforced concrete face slab similar to the dam sections. Drainage behind the face slab will be provided by extending the transition Zones 1A and 1B down to the gallery.

An instrumentation program will be established to monitor vertical and horizontal dam and rock cut slope movement along the crest road. Leakage through the membrane and through the concrete face slab will be monitored. Piezometers will also be located within and beneath the dam to monitor phreatic conditions (AECOM 2015).

Upper Reservoir Emergency Spillway

An emergency spillway is provided for the Upper Reservoir. The preliminary design consists of a 250-foot-long concrete spillway crest slab at El 6029 feet that would be

integral with the concrete face of the dam. The spillway slab would extend over the downstream face of the dam at 1.7:1 H:V. The parapet wall along the dam would transition into a concrete training wall on each side of the spillway slab. The spillway would discharge into a concrete stilling basin and then into a riprap lined channel into an existing drainage (AECOM 2015).

Upper Reservoir Intake

The Upper Reservoir Intake is a hexagonal shaped reinforced concrete structure with six 17.0 foot wide gate bays separated by radial piers. The gate sills are at El 5921 feet, 21 feet below the reservoir minimum water level to meet submergence requirements. Each bay is provided with an inclined trashrack and a roller gate. The intake structure rises 113.5 feet above the gate sills to the operating floor at El 6034.5 feet. The gates will be operated by a polar crane located above the operating floor. Each gate will be designed to be installed or removed in three sections, each of which can be lifted above the operating floor by the polar crane.

Since the intake trashracks will be regularly back flushed during pumping operation, no trashrack cleaning equipment will be required.

A reinforced concrete intake approach slab is included to improve hydraulics and to provide construction access. The approach slab is 2 feet below the gate sills and extends 40 feet radially from the edge of the intake structure proper. From the approach slab the concrete paving slopes up at a 1.7H:1V slope to the reservoir bottom at El 5942 feet or to the dam crest .

The intake structure transitions to the 18 foot diameter intake shaft.

The intake structure is located approximately 300 feet from the crest of the upper reservoir dam. Access to the intake structure will be via a 28 foot wide bridge with pre-cast pre-stressed girders, designed in accordance with Montana Department of Transportation (MTDOT) standards for AASHTO HS-20 Loading. The bridge will be designed so that the bearings for the precast concrete beams will be above the normal maximum water level (AECOM 2015).

Flow Lines

An 18-ft diameter shaft and tunnel will convey water between the upper reservoir intake and the powerhouse. The vertical shaft will extend 750 feet down from the upper reservoir intake. The tunnel will extend from an elbow at the base of the shaft approximately 3000 feet to the bifurcations and individual penstocks leading to the powerhouse. The vertical shaft will be circular in section and lined with concrete. The tunnel will be concrete lined from the shaft elbow to a point where the in-situ rock becomes insufficient to resist the internal water pressure. A steel liner will extend from this point to the powerhouse. The tunnel will be constructed at a 4 percent slope toward the powerhouse.

As the tunnel approaches the powerhouse it will bifurcate three times to connect to each of the four ternary units, as follows:

- Bifurcate from 18 foot diameter to 16 and 10 foot diameters
- Bifurcate from 16 foot diameter to 14 and 10 foot diameters
- Bifurcate from 14 foot diameter to 12 and 10 foot diameters

Each of the four 10 foot diameter penstocks will then continue horizontally to a 10 foot to 8 foot reducer which will connect to the turbine inlet. Each of the 10 foot diameter penstocks will also have a 10 foot diameter branch which will elbow downward and continue horizontally to a 10 foot to 8 foot reducer which will connect to the pump outlet.

Based on guidance in the EPRI Pumped-Storage Planning and Evaluation Guide, January 1990, no surge protection facilities will be required. This will be confirmed in the final design (AECOM 2015).

Powerhouse

The powerhouse is located on the south rim of the lower reservoir. It houses four ternary pump/turbine units each rated at 100 MW.

Each ternary unit consists of a motor-generator, a Pelton turbine and a multi-stage pump. The turbines and pumps are connected to a common shaft with an optional clutch allowing isolation of the pump from the shaft when necessary. The ternary units can operate in pumping mode, generating mode or hydraulic short circuit mode (turbine and pump running at the same time).

The height of the powerhouse is driven by the submergence requirements of the pumps, the need to place the Pelton turbine runners at or near the maximum operating water level and the positioning of the motor-generator above the turbine.

The Powerhouse will consist of a reinforced concrete substructure from the pump foundations up to generator floor at El 5071 feet, and a steel framed superstructure to El 5143 feet.

The generator floor will include the major electrical equipment, the control room and office area and a service bay for major equipment assembly during construction and for future equipment maintenance. An overhead 250-ton bridge crane will provide coverage over the generator floor including the service bay.

The turbine floor will house the Pelton turbines, the turbine inlet valves and the turbine auxiliary mechanical equipment. Provision is including for movement of all equipment,

including the turbine runners and inlet valves, to a hatch through the generator floor above for handling by the 250-ton bridge crane.

The pump floor will house the three stage pumps, the pump discharge valves and the pump auxiliary mechanical equipment. Provision is including for movement of all equipment, including the pump components and discharge valves, to a hatch through the turbine and generator floors above for handling by the 250-ton bridge crane. Two 70-ton bridge cranes located above the pump floor will provide coverage for the pumps.

A dewatering and drainage sump, including an oil-water separator, is provided at the lower level (AECOM 2015).

Powerhouse Substation

Each 13.8kV motor-generator will be connected by an isolated phase bus duct to a 13.8kV/230kV set-up transformer. The high side of each transformer will then be connected through an SF6 circuit breaker and a disconnect switch to a 230kV bus. The bus is then connected, again through SF6 circuit breakers and disconnect switches, to the 230kV transmission line.

An additional 13.8kV/230kV transformer will be connected to the 230kV bus to provide auxiliary power for the powerhouse systems (AECOM 2015).

Make-up Water System

The Project site is located in close proximity (approximately 4 miles east) to Cottonwood Creek, a main tributary of the South Fork Musselshell River. The 71 Ranch has an existing diversion in Cottonwood Creek and a water delivery system to its irrigation operations on the north side of Gordon Butte.

The lower reservoir will draw water from the existing 71 Ranch irrigation system, which currently crosses the location of the lower reservoir south rim. A manually operated head gate will be installed at the end of the irrigation system to control the water inflow to the lower reservoir. This new head gate is the only portions of the water delivery system from Cottonwood Creek that is a Project facility (AECOM 2015).

This irrigation system is currently an open ditch, it is planned, at the discretion of the landowner, to be upgraded to a low pressure pipeline in the future. The existing diversion and water delivery system is currently owned, operated and maintained by the 71 Ranch for their agricultural operations. The Project will utilize the ditch for the initial fill (approximately 40 days) and annual make up fill (approximately 1 to 3 weeks). During the diversion of water for Project needs, GBEP will ensure that the diversion in Cottonwood Creek, the water delivery system, the water measuring device and the fish screen are operational. For the remainder of the year, these features will be maintained and operated by the 71 Ranch for their own uses.

Transmission Line

After leaving the powerhouse substation take-off structures, the 230kV transmission line will run generally southwest for 3 miles and cross Cottonwood Creek. It will then turn generally south for another 2.7 miles, paralleling Cottonwood Creek Road, to a new interconnection substation at the existing Colstrip twin 500kV transmission line (managed by Northwestern Energy). The new transmission line will run entirely on 71 Ranch property and generally cross level terrain. The line will be supported on H-structures with a shield wire and an optical ground wire (AECOM 2015). The average distance between transmission line towers will be approximately 650 ft, with an anticipated total number of towers of 47. The right-of-way for the transmission line will be about 100 ft. The total right-of-way is estimated to be approximately 69 acres.

Interconnect Substation

At the interconnection substation, the 230kV transmission line will be connected to a 230kV/500kV step-up transformer. From there the line will be connected through a series of buses, circuit breakers and disconnect switches to the 500kV line going west to Garrison and the 500kV line going east to Broadview. New line reactors will be provided at the end of each 500 kV line exiting the substation (AECOM 2015).

Access Roads

The existing ranch and wind farm access road to the top of Gordon Butte will be used for access to the upper reservoir. A permanent easement will be maintained for construction related access, as well as long term operations and maintenance access. Because of the multiple uses of this road, including 71 Ranch operations and access to an existing wind farm, GBEP is not proposing to include this road within its project boundary, but rather will secure sufficient rights from 71 Ranch for Project use of the road.

A new access road will be constructed from State Highway 294 to the powerhouse and will be under permanent easement. A temporary road will be established during the construction period that will run from the lower reservoir area to the existing access road to the top of Gordon Butte. The road will be parallel to State Highway 294. This road will be used to minimize construction traffic on the State Highway. The temporary road will be reclaimed after the construction period ends (AECOM 2015).

4.41(b)(2) The normal maximum water surface area and normal maximum water surface elevation (mean sea level), gross storage capacity of any impoundments to be included as part of the project.

Upper Reservoir

A detailed description of the proposed Upper Reservoir for the Project is included in Section 4.41(b)(1) above. The principal characteristics of this reservoir are summarized in **Table A-2** below.

Table A-2. Principal characteristics of Upper Reservoir

Parameter	Upper Reservoir
Minimum Normal Pool	
Water Surface Elevation (amsl)	5,948
Storage (ac-ft)	243
Surface Area (acres)	41.2
Maximum Normal Pool	
Water Surface Elevation (amsl)	6,027
Storage (ac-ft)	4,320
Surface (acres)	62.7

Lower Reservoir

A detailed description of the proposed Lower Reservoir for the Project is included in Section 4.41(b)(1) above. The principal characteristics of this reservoir are summarized in **Table A-3** below.

Table A-3. Principal characteristics of Lower Reservoir

Parameter	Lower Reservoir
Minimum Normal Pool	
Water Surface Elevation (amsl)	5,077
Storage (ac-ft)	442
Surface Area (acres)	74.1
Maximum Normal Pool	
Water Surface Elevation (amsl)	5,057
Storage (ac-ft)	4,512
Surface (acres)	88.2

4.41(b)(3) The number, type and rated capacity of any proposed turbines or generators to be included as part of the project.

There will be four ternary pump/turbine units each rated at 100 MW housed in the Project's powerhouse.

Each ternary unit consists of a motor-generator, a Pelton turbine and a multi-stage pump. The turbines and pumps are connected to a common shaft with an optional clutch allowing isolation of the pump from the shaft when necessary. The ternary units can operate in pumping mode, generating mode or hydraulic short circuit mode (turbine and pump running at the same time).

4.41(b)(4) The number, length, voltage and interconnections of any primary transmission lines proposed to be included a part of the project.

Power will be supplied to and delivered from the Project by a single circuit 230 kV transmission line. The line will extend 5.7 miles from the powerhouse substation to a proposed new interconnect substation at the Colstrip twin 500 kV transmission lines. The Colstrip twin 500 kV transmission lines are owned and operated by Northwestern Energy, PacifiCorp, Avista, Puget Sound Energy and Portland General Electric. The new transmission line will run entirely on 71 Ranch property and generally cross level terrain. The line will be supported on H-structures with a shield wire and an optical ground wire (AECOM 2015). The average distance between transmission line towers will be approximately 650 ft, with an anticipated total number of towers of 47. The right-of-way for the transmission line will be about 100 ft. The total right-of-way is estimated to be approximately 69 acres.

The new interconnect substation will be located directly east of where the Colstrip lines cross Cottonwood Creek Road. The Project's interconnect substation will require approximately 20 acres.

4.41(b)(5) The description of any additional mechanical, electrical, and transmission equipment appurtenant to the project.

A 40kW portable generator will provide power for maintenance at the upper reservoir intake, including lighting and operation of the overhead polar crane (AECOM 2015).

4.41(b)(6) All lands of the United States, including lands patented subject to the provisions of section 24 of the Act, 16 U.S.C. 818, that are enclosed within the project boundary, identified and tabulated by legal subdivisions of a public land survey, by the best available legal description. The tabulation must show the total acreage of the lands of the United States within the project boundary.

The Project will not occupy any lands of the United States.

Information regarding the proposed project boundary and land ownership is included in **4.41(h) Exhibit G – Project Maps** provided in this License Application.

References

AECOM. 2015. Preliminary Supporting Design Report – Gordon Butte Pumped Storage Project. Prepared for GB Energy Park, LLC. September 2015.

GORDON BUTTE CLOSED LOOP
PUMPED STORAGE HYDRO PROJECT

FERC PROJECT NO. P-13642

EXHIBIT B

Project Operation & Resource Utilization

APPLICATION FOR ORIGINAL LICENSE

PREPARED BY:

GB Energy Park LLC

&

McMillen Jacobs Associates

October 2015

4.41(c) Exhibit B – Project Operation and Resource Utilization *has been redacted to omit information filed for privileged treatment.*

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EXHIBIT B – PROJECT OPERATION & RESOURCE UTILIZATION

Exhibit B is presented herein and addresses the FERC regulation 18 CFR 4.41 (c).

(c) Exhibit B is a statement of project operation and resource utilization. If the project includes more than one dam with associated facilities, the information must be provided separately for each discrete development.

4.41(c)(1) A description of each alternative site considered in selecting of the proposed site.

The proposed action includes the construction and operation of a new off-stream, closed-loop pumped storage hydro facility located approximately 3 miles west of the small town of Martinsdale, Meagher County, Montana. All Project features, including the linear facilities, will be located entirely on private land- 71 Ranch LP (71 Ranch).

Drawings of the proposed project facilities and supporting information used as the basis of the Project's design are presented in **4.41(g) Exhibit F – Preliminary General Design Drawings and Supporting Design Report.** Maps showing the location of the Project and the proposed Project Boundary are presented in **4.41(h) Exhibit G – Project Maps**. These Exhibits contain information defined as Critical Energy Infrastructure Information (CEII), and is therefore filed under separate cover as required by the Commission's regulation at 18 CFR 4.32(k) and 18 CFR 388.112. Requests for access to information defined as CEII should be made to the Commission's CEII Coordinator. **Figure B-1** below is a layout of the Project.

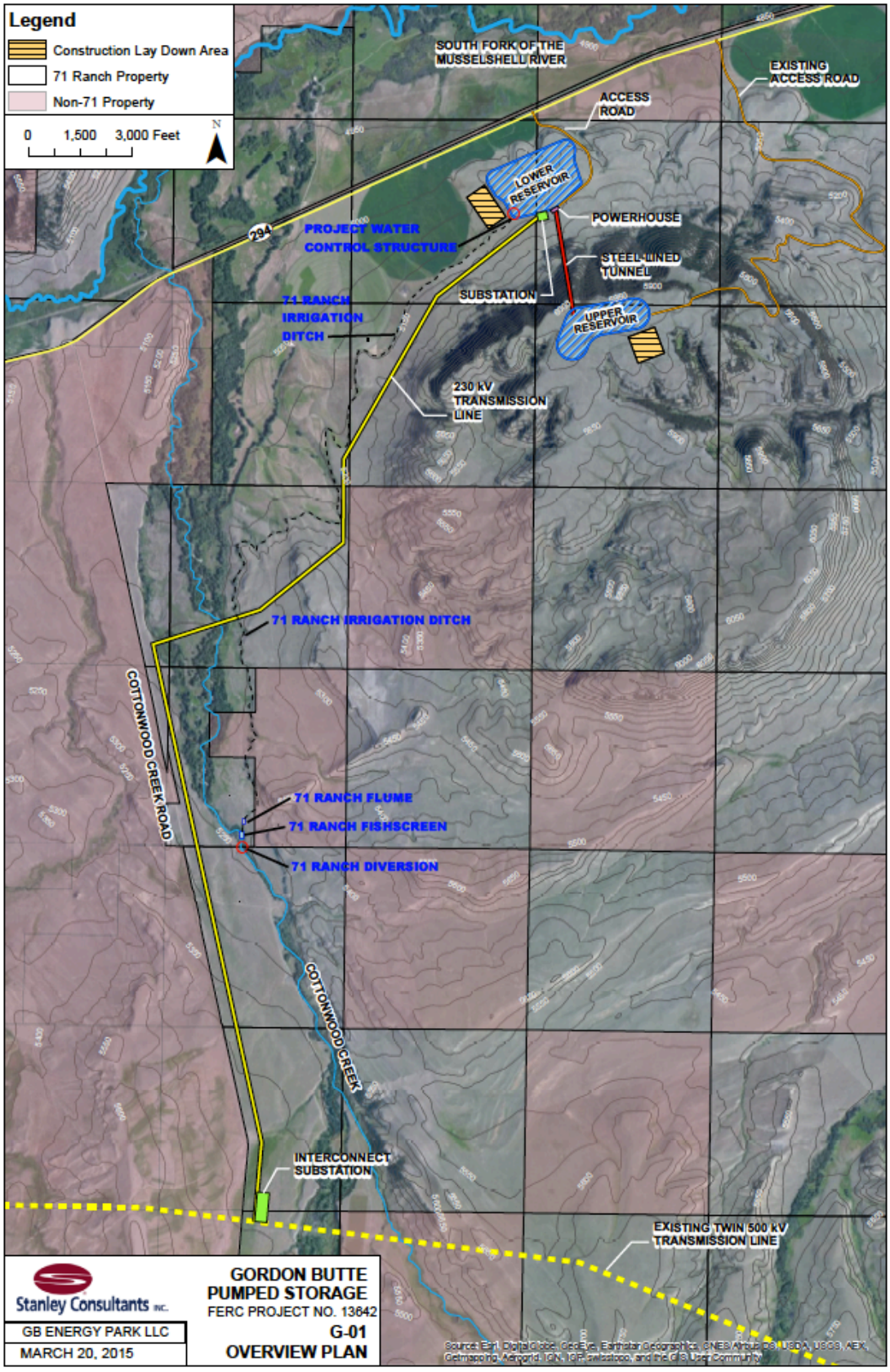

Figure B-1. Proposed Project layout

The siting of a closed loop pumped storage hydro facility requires the proper combination of four key components: 1) geography (sufficient head and proximity between reservoirs); 2) land and accessibility; 3) source water for the initial and annual maintenance fills; and 4) proximity to transmission interconnection. Gordon Butte was carefully selected as the site for a new closed loop pumped storage hydro facility for the following reasons:

Geography

The Project will be built on and adjacent to the geographic features of Gordon Butte, a landform rising approximately 1,025 feet above the surrounding Musselshell River valley. Elevations range from approximately 4,880 feet above mean sea level (amsl) at the proposed lower reservoir site to 6,000 feet amsl at the top of Gordon Butte. The elevation difference between the proposed reservoirs result in an excess of 1,000 feet of head, within the typical range for a utility scale pumped storage hydro facility.

The steep northern aspect of Gordon Butte will allow the proposed upper and lower reservoirs to be sited within approximately 3,000 linear feet of one another. This will result in a relatively short penstock. Penstock construction will be a capital intensive component of constructing the facility, therefore a short penstock is necessary for minimizing the construction cost of the Project.

Land and Access

All proposed Project features will be located on private land (71 Ranch). This has allowed GBEP to enter into a cooperative agreement with a single willing party to conduct its pre-filing activities and site investigations. GBEP also entered into a purchase agreement, contingent on receipt of a FERC-granted License, with the landowner to own and control the land under the footprint of the Project and to secure easements for the linear features. Furthermore, siting the Project on private land has allowed GBEP to use the Traditional Licensing Process (TLP) to streamline the development of the Project, and engage in collaborative consultations with state and federal resource agencies.

An existing road providing access to the top of Gordon Butte will allow for construction related access, as well as long term operations and maintenance access to the upper reservoir area. This minimizes both environmental impacts resulting from road construction (outside of new temporary construction roads) as well as construction costs. Because of the multiple uses of this road, including 71 Ranch operations and access to an existing wind farm, GBEP is not proposing to include this road within its project boundary, but rather will secure sufficient rights from 71 Ranch for project use of the road.

During the term of the Project's first Preliminary Permit, fatal flaw and feasibility studies were performed to assess the potential for environmental, hydrological, geological and/or hazardous material issues to be present at the proposed Project site. Included

was a Phase 1 Environmental Site Assessment (ESA) and an assessment using the Crucial Area Planning System (CAPS) (a tool developed by Montana Fish, Wildlife and Parks (MTFWP)) to identified habitats of federally endangered or threatened plant or animal species. The results from these studies were that no fatal flaws, including threatened or endangered species habitat, were identified. Further onsite studies conducted during the 2014 study season confirmed these results and concluded that the Project would have minimal impacts to environmental resources within the Project's Area of Potential Effects (APE)[1], and that the site is geologically and seismically stable. For more information see **Volume II of the License Application – Exhibit E Environmental Report**.

Water

The Project site is located in close proximity (approximately 4 miles east) to Cottonwood Creek, a main tributary of the South Fork Musselshell River. The existing diversion and water delivery system is owned, operated and maintained by the 71 Ranch for their agricultural operations. The Project will utilize the ditch for the initial fill (approximately 40 days) and annual make up fill (approximately 1 to 3 weeks). During the diversion of water for Project needs, GBEP will ensure that the diversion in Cottonwood Creek, the water delivery system, the water measuring device and the fish screen are operational. For the remainder of the year, these features will be maintained and operated by the 71 Ranch for their own uses.

The Project will connect near the end of the existing system to obtain its initial fill and annual makeup water, which will be conveyed into the lower reservoir. The diversion and ditch are capable of diverting 50 cubic feet per second (cfs) of water. Utilizing this existing non-Project infrastructure minimizes additional impacts to Cottonwood Creek from new construction.

Proximity to Transmission Interconnection

The final consideration in the selection of the Project site is Gordon Butte's proximity to the Colstrip twin 500kV transmission line (approximately 6 miles south of Gordon Butte). The 500 kV transmission line runs from the coal generation stations in Colstrip, Montana northwest to Oregon and Washington. At the point of proposed interconnection, the Colstrip Transmission Line is co-owned by NorthWestern Energy, Puget Sound Energy, PacifiCorp, Portland General Electric, and Avista Corporation. The ownership transitions over to the Bonneville Power Administration (BPA) near the Missouri River at Townsend, Montana. Once tied into this line, the Project will be able to provide transmission system regulation, integration of renewable energy generation,

[1] The Area of Potential Effects comprises the land underneath the Project's permanent features and linear facilities, access roads for operation and maintenance of the facility, and an additional area for temporary impacts during construction related activities (laydown and staging areas, equipment parking, batching plants, temporary construction roads).

and other ancillary services to maintain transmission reliability for electric utilities and other customers across Montana and the Northwest regions. As a result of the Project's close proximity to this 500 kV line, GBEP will be able to build a relatively short single circuit 230 kV transmission line running approximately 6 miles south to the interconnect. The new transmission line and substation will all be sited on 71 Ranch property. GBEP is engaged with the owners of the Colstrip Transmission Line in the interconnection process.

4.41(c)(2) A description of any alternative facility designs, processes, and operations that were considered.

During the preliminary stages of project development, the whole of Gordon Butte was assessed in consultation with the landowner to determine the optimal configuration for a closed loop pumped storage facility. Primary consideration was given to maintaining sufficient head, locating the reservoirs in close linear proximity, fully utilizing the existing access roads and water delivery system, and minimizing impacts to both environmental resources and the landowner's agricultural operations.

Lower Reservoir Alternatives

Alternative 1 – The conceptual design filed in GBEP's Preliminary Application Document (PAD 2013), located the lower reservoir along the 71 Ranch's northern boundary with Highway 294 (see Figure B-2). As the Project's designs were further refined, this location was considered no longer viable due to the length of the penstock, impacts to the 71 Ranch agricultural operations, and impacts to the aesthetic resources resulting from its close proximity to Highway 294.

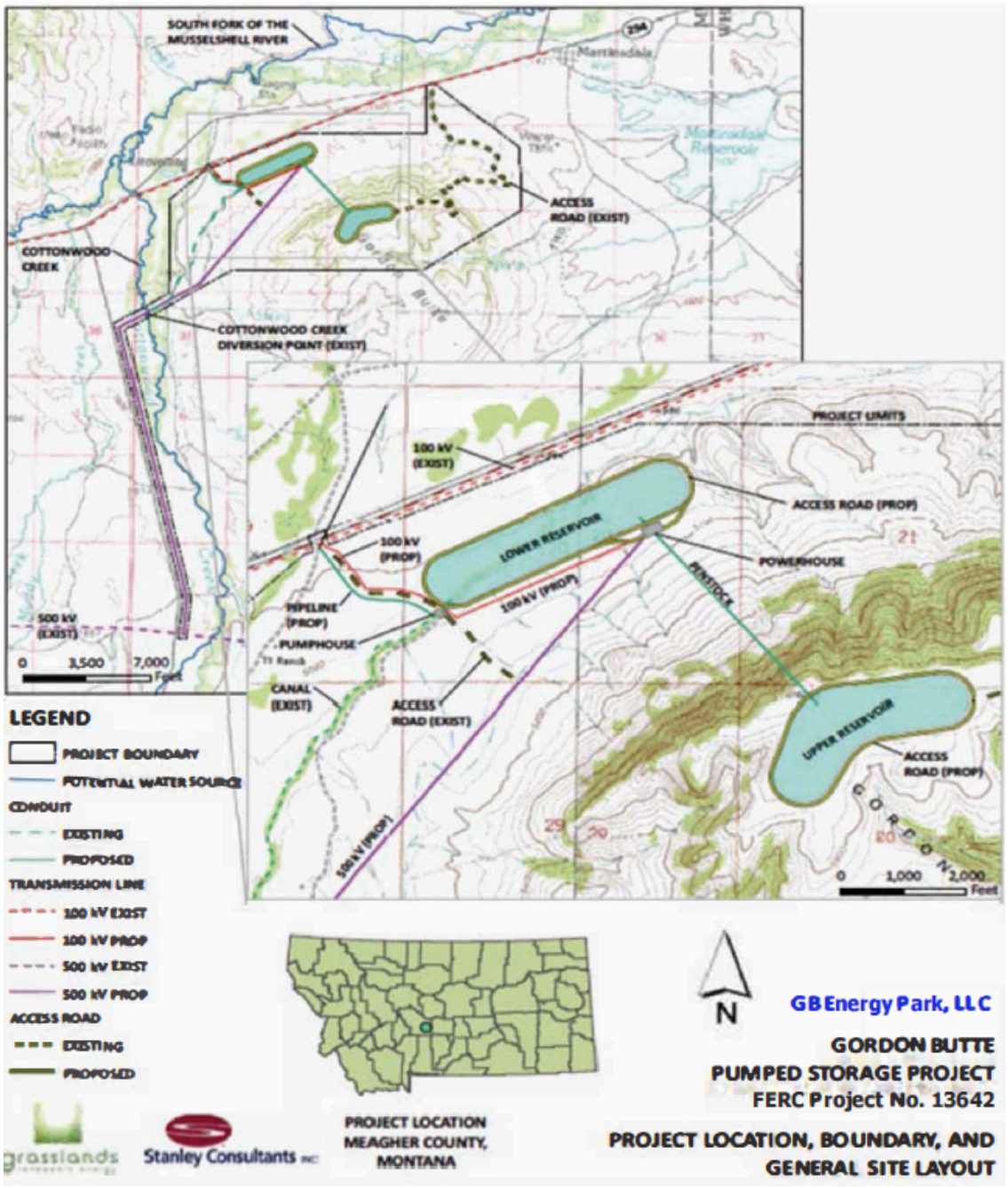

Figure B-2. Proposed layout of Alternative 1

Alternative 2 – On February 11th, 2014, GBEP filed an updated location for the lower reservoir under the Project's docket at FERC – FERC No. P-13642. The lower reservoir was relocated in the irrigated agricultural field directly to the west of the current proposed location (see **Figure B-3**). This location was attractive due to anticipated lower construction costs associated with excavating the reservoir in an existing cleared agricultural field.

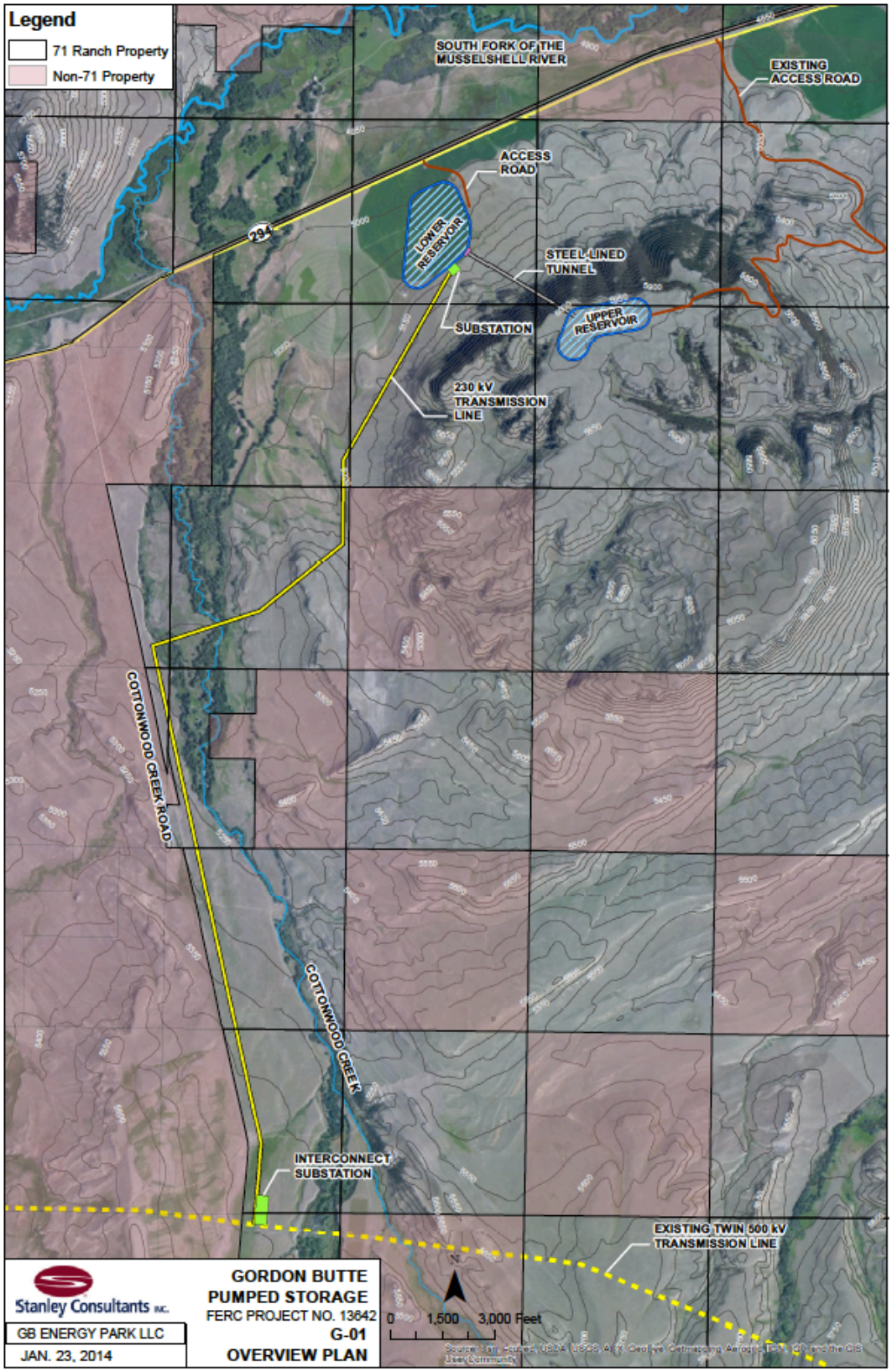

Figure B-3. Proposed layout of Alternative 2

This location was deemed no longer feasible after consultations with the 71 Ranch. The landowner raised concerns about impacts to agricultural production and aesthetic resources. Both parties agreed that relocating the lower reservoir to the east would minimize impacts to the landowner's agricultural production and visibility of the Project, as well as shorten the length of the penstock. Based on the landowner's objections to locating the lower reservoir in the irrigated agricultural field and clear advantages of the new reservoir location, this Alternative 2 was determined to be no longer viable and was eliminated from further analysis.

Alternative 3 – During the Martinsdale public NEPA scoping meeting a further alternative was proposed to FERC staff by a neighboring landowner. It was suggested that the lower reservoir site be moved north of Highway 294 to divert flows from the South Fork Musselshell River or to connect to the Martinsdale reservoir as an alternative way to obtain water for the Project. In Scoping Document 2, FERC staff concluded that moving the reservoir site north to connect with the Musselshell River or obtaining water from Martinsdale Reservoir were not reasonable alternatives that need to be evaluated by GBEP (FERC 2014).

Lower Reservoir

The lower reservoir site's elevation of 4,880 ft above mean sea level (amsl) was selected to ensure that the maximum and minimum operations heads are within the range that is acceptable for the pump/turbines as well as based on the required submergence for the intake structures and pumps.

The lower reservoir is located on the sloping upland terrain between Gordon Butte and State Route 294. The powerhouse and substation will be located on the south side of the reservoir. The reservoir active storage volume of 4,070 acre-feet will be obtained through a combination of excavation and dam construction. The lower reservoir will be impounded on the north side by two concrete-faced, zoned rockfill dams that will extend across the two large drainage ravines. Approximately 20 percent of the lower reservoir will be contained by CFR dams with remainder of the reservoir contained by rock cut slopes up to 100 feet high. The reservoir bottom will be lined with an impervious geomembrane. For further information on the design and layout of the lower reservoir see **4.41(g) Exhibit F – Preliminary General Design Drawings and Supporting Design Report**.

Upper Reservoir

The upper reservoir site was selected based on geographical characteristics and minimal impacts to environmental resources. Aside from minor alterations to the shape and dimensions of the upper reservoir, its location has remained unchanged.

The proposed upper reservoir will be located on private 71 Ranch land generally sited between the existing access road to the top of the Butte, which borders it on the south, and the steep northern face of Gordon Butte immediately to its north. This will allow easy access from the existing access road, maintain the necessary head requirements between reservoirs, minimize the need for material to construct the impoundment, and shorten the required length of the penstock. The site is a relatively flat, uniform grassland currently used as dryland pasture/rangeland for cattle grazing. The attractiveness of this site was immediately identified during the conceptual design of the Project.

The reservoir active storage volume of 4,070 acre-feet will be obtained through a combination of excavation and dam construction such that the entire reservoir will be contained by a concrete-faced rockfill dam. In addition to the concrete face slab, the reservoir bottom will be lined with an impervious geomembrane. For further information on the design and layout of the upper reservoir see **4.41(g) Exhibit F – Preliminary General Design Drawings and Supporting Design Report**.

Transmission Line

The transmission line route was carefully selected in consultation with the landowner to: 1) run entirely on land owned by the 71 Ranch; 2) have minimal impacts to environmental resources; 3) have minimal impacts to the landowner's agricultural operations; and 4) access for long term maintenance. For an overview of the transmission line route, see **Figure B-1** above.

The transmission line route will run from the powerhouse substation approximately 3 miles southwest along the north side of the landowner's irrigation ditch closely following the base of Gordon Butte. This will minimize visual impacts of the line, blending the color and composition of the line against the backdrop of the Butte, and route the line to the south of the landowner's irrigated agricultural fields. The line will then cross Cottonwood Creek and intersect with Cottonwood Creek Road. The site of the creek crossing was selected at a point where Cottonwood Creek is consolidated into a single channel at the narrowest point in the riparian habitat[2]. This will allow the transmission line to span both the creek and the riparian habitat, minimizing impacts. The transmission line will then parallel the eastern side of Cottonwood Creek Road along an existing fence line until reaching the interconnect substation. This is consistent with and conforms to recommended best management practices (BMPs) by the US Department of the Interior in siting transmission line routes along existing roadways to minimize impacts to visual resources (USDOI 2013).

[2] A bald eagle nest was identified in the Cottonwood Creek drainage during the June 4th, 2014 Raptor Nest Survey. The location of the transmission line crossing of Cottonwood Creek was selected in consultation with the US Fish and Wildlife Service. The crossing will occur 0.4 miles from the nest. For a detailed overview of the transmission line route selection in conjunction with the bald eagle nest, see Sections 2.4.1 and 4.2.5 of Exhibit E and Exhibit E Appendix 3, 11, and 17.

Powerhouse and Equipment Selection

The powerhouse will be located on the south rim of the lower reservoir and built below grade to house the four-100 MW pump/turbine units.

The below grade powerhouse was chosen to accommodate the operational needs of the equipment – to achieve the necessary submergence required for the pumps. The below grade powerhouse will also minimize noise and visual impacts.

Each ternary unit consists of a motor-generator, a Pelton turbine and a multi-stage pump. The turbines and pumps are connected to a common shaft with an optional clutch allowing isolation of the pump from the shaft when necessary. The ternary units can operate in pumping mode, generating mode or hydraulic short circuit mode (turbine and pump running at the same time).

The equipment size, number and configuration was chosen for the following reasons: 1) 100 MW is well within the proven size range of pump/turbines currently operational around the world; 2) to maintain redundant capacity at the facility should one or more units be taken off-line; and 3) to utilize the most flexible, fastest acting pump/turbine units in order to respond to the current and future needs of the grid.

Installed Capacity and Storage Capacity

The storage capacity of 4,000 ac-ft in each of the reservoirs was dictated by the geographical constraints of the upper reservoir. The installed capacity of 400 MW was selected so that the facility will have the ability to operate at continuous maximum output for an estimated 8.5 hours.

4.41(c)(3) A statement as to whether operation of the power plant will be manual or automatic: an estimate of the annual plant factor, and a statement of how the project will be operated during adverse, mean, and high water years.

Project Operation

The operation of the Project will be automatic with the capability for manual overrides.

Annual Plant Factor

The facility will operate in one or multiple modes at any given time 0 through 24 hours a days (7 days a week), utilizing 0 through 400 MW of generation and/or 0 through 400 MW of pumping as demanded by off-taker needs.

Project operation during adverse, mean, and high water years

Due to the off-stream, closed loop configuration of the Project, daily plant operations will not be affected by annual precipitation cycles. During adverse water years, the ability to fully utilize the Project's water right for annual maintenance fills may be affected.

4.41(c)(4) An estimate of the dependable capacity and average annual energy production in kilowatt-hours (or mechanical equivalent), supported by the following data.

The plant will be very flexible to meet a wide array of ancillary and balancing services (load following, system control, spinning reserve, regulation, supplemental reserve, energy imbalance, backup supply, real power loss replacement, dynamic scheduling, black start, network stability, and reactive supply and voltage control), store energy, and integrate renewable resources. The dependable capacity of the plant will be 400 MW. If solely used for generation, the annual energy production would be 1300 gigawatt hours (gWh). The 4,000 ac-ft of water storage in each reservoir will allow for an estimated 8.5 hours of energy generation at continuous maximum discharge.

(4)(i) The minimum, mean, and maximum recorded flows in cubic feet per second of the stream or other body of water at the powerplant intake or point of diversion, with a specification of any adjustment made for evaporation, leakage minimum flow releases (including duration of releases) or other reductions in available flow; monthly flow duration curves indicating the period of record and the gauging stations used in deriving the curves; and a specification of the critical streamflow used to determine the dependable capacity;

Note: The Project is an off-stream closed loop system, therefore the information required in this section is not applicable. For a detailed analysis of water resources, see **Section 4.2.2** of **Exhibit E**.

(4)(ii) An area-capacity curve showing the gross storage capacity and usable storage capacity of the impoundment, with a rule curve showing the proposed operation of the impoundment and how the usable storage capacity is to be utilized.

See **Figures B-4** and **B-5.**

The anticipated typical operation of the facility will be to pump water to the upper reservoir during off-peak hours when there is excess energy is in the system. During the day the upper reservoir will be drawn down to allow for peaking needs. Hourly cycling of water between the two reservoirs will occur to provide ancillary services and support to the system.

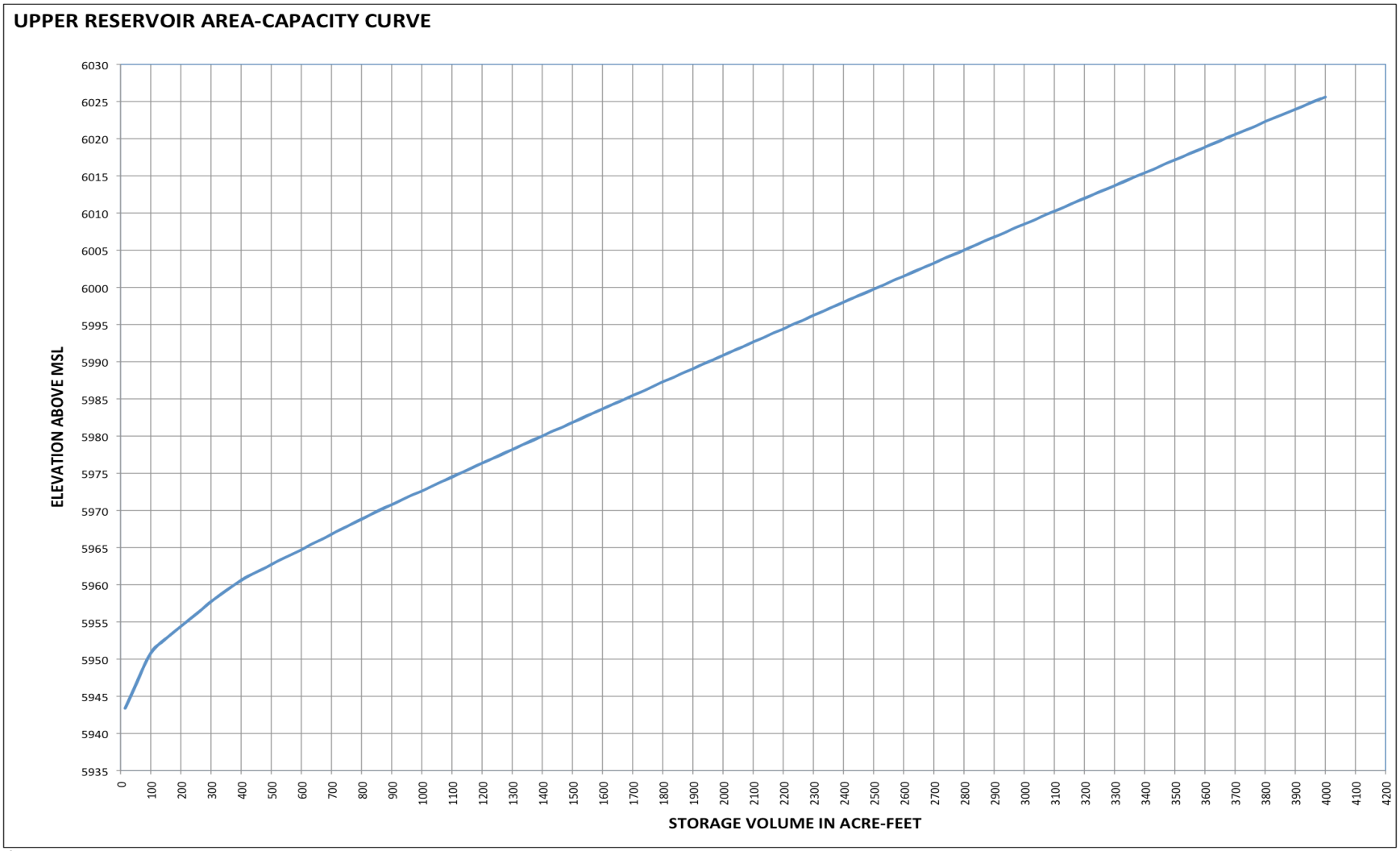

Figure B-4. Upper Reservoir Area-Capacity Curve

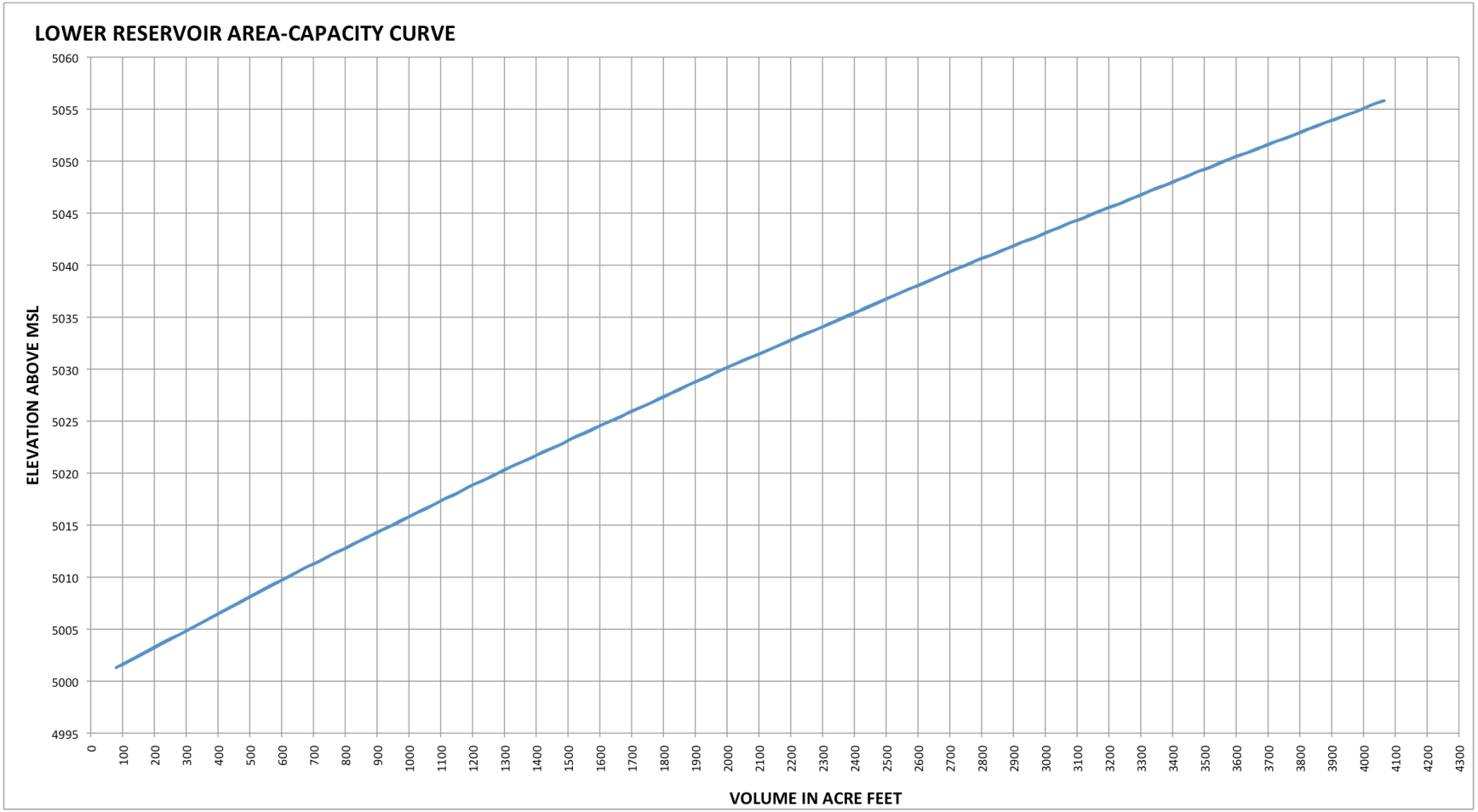

Figure B-5. Lower Reservoir Area-Capacity Curve

(4)(iii) The estimated minimum and maximum hydraulic capacity of the powerplant in terms of flow and efficiency (cubic feet per second at one-half, full and best gate), and the corresponding generator output in kilowatts.

See **Figure B-6** below.

[This information has been filed with a request for privileged treatment]

Figure B-6. Performance curve showing the estimated minimum and maximum hydraulic capacity of the powerplant in terms of flow and efficiency and the corresponding generator output in kilowatts

(4)(iv) A tailwater rating curve

The minimum pool level of the lower reservoir is the tailwater level in the generating cycle. As the upper reservoir level lowers during generation, the tailwater level will rise so that the available head and turbine/generator output will vary with time.

(4)(v) A curve showing powerplant capability versus head and specifying maximum, normal, and minimum heads.

See **Figures B-7** to **B-9** below.

[This information has been filed with a request for privileged treatment]

Figure B-7. Curve showing a single turbine's capability versus head at given head

[This information has been filed with a request for privileged treatment]

Figure B-8. Curve showing a single turbine's capability versus head at given head

[This information has been filed with a request for privileged treatment]

Figure B-9. Curve showing a single turbine's capability versus head at given head

4.41(c)(5) A statement of system and regional power needs and the manner in which the power generated at the project is to be utilized, including the amount of power to be used on-site, if any, supported by the following data.

The Project will be interconnected to the Colstrip twin 500 kV transmission lines that were constructed to interconnect the Colstrip coal generation facility in eastern Montana to load centers in the Pacific Northwest. The location of the Project relative to the other physical aspects of the operational grid places our interconnection into the backbone of the Western Interconnection in the northwestern United States. At the point of our proposed interconnection, the physical transmission line and its capacity is owned by the Colstrip utilities; they are: Portland General Electric, PacifiCorp, Puget Sound Energy, Northwestern Energy and Avista.

The grid in the Western Interconnection has come under greater pressure due to increased regulatory burdens, aging infrastructure, and balancing and integration problems.

- The hydroelectric dams, which are predominate in the region, have come under growing operational constraints as the health of fish and aquatic habitat below the dams are protected in law and regulation at the local, state and federal level.

- The region, particularly in the Columbia River Gorge, has seen an enormous increase in the interconnection of wind energy. The Bonneville Power Administration has interconnected approximately 5,100 MW of wind generation and plans to interconnect an additional 3,000 to 4,000 MW of wind by 2025[3].

- Wind and solar penetration across the Western Interconnection system, has fully utilized the existing regulating reserves and tools in the Northwest Hydro system and utilities have now started looking to build and operate new resources in order to keep the transmission grid safe and reliable.

- Regional policies in the Western Interconnect are moving towards utilities having some level of energy storage in their system. This is being implemented in California, proposed in Oregon and is anticipated in other western states. Energy storage does a number of things to move the utility service areas toward inclusion of additional renewable energy, especially wind and solar. The size and location of the Project will lend itself to serving a number of regional utilities.

- Recent actions under the Clean Power Plan, EPA Section 111(d), requires utilities to increased efficiencies in generation, reduce energy demand and lessen

[3] From BPA.gov website. http://www.bpa.gov/Projects/Initiatives/Wind/Pages/default.aspx. Accessed on Feb. 13th, 2015.

demand on fossil fuels. To accomplish this, additional renewable energy is being planned, distributed energy systems are being developed and closure of coal-fired generation is being scheduled. All of these actions require additional ancillary services in some fashion to maintain a highly reliable transmission grid. With most of the Western Interconnection being served by large generation facilities with long distant transmission, providing reserve energy, strong frequency support and proper energy scheduling support will help stabilize the transmission grid.

- With the national push to more sustainable energy resources, wind and solar leading the way, providing the end users with reliable firm energy is a must. The Project can through its energy storage capabilities provide a buffer to firm energy delivery or through storage and releases meet the shifting demands for energy delivery throughout the day. Integrating renewable energy is being demonstrated in other countries through the use of fast acting pumped storage hydropower.

- The construction of new transmission infrastructure is difficult even under the best circumstances. Balancing need for more transmission, environmental concerns, competing demands on land use and increased population have major impacts on the ability to site new transmission lines. The near term solution is properly loading and therefore fully utilizing the existing infrastructure to minimize growth needs. The Project can be use to facilitate this task.

- With a number of the utilities in the Western Interconnect generating power using run-of-river hydroelectric projects, the ability to store energy, especially at night, when demand is low and shift that energy to a period when demand is high more fully utilizes the hydropower generation. There is a major benefit to the consumer and the environment. The Project will be able to provide this service at a scale the utilities are seeking out.

- In the Western Interconnect, there are currently 38 individual balancing authorities. Some are fully integrated utilities, and some are generation-only working to deliver a cost effective energy as their own balancing authority. All are required to work together, especially with the adjacent balancing authorities, to maintain a reliable and functioning transmission grid. With fast acting pump/turbine equipment, using the most flexible hydraulic short circuit configuration, a full range of ancillary services can be provided by the Project.

There is a growing need to provide a full range of supportive services to the energy industry to provide for a reliable and robust transmission grid. There is also a need, looking to the future, to have available the tools/resources to integrate more sustainable energy resources and more fully utilize the existing infrastructure. The Project fills all these needs especially in the Western Interconnect.

The proposed Project, a closed-loop pumped storage hydro facility utilizing modern fast reacting pump/turbines, will be a robust tool in addressing the region's integration and grid support issues. The Project will be operated as a utility-scale energy storage facility that will provide transmission system regulation services, integration of renewable energy generation, and other ancillary services to maintain transmission reliability for electric utilities in the Northern Great Plains and Northwest.

This facility will provide its customers with a wide array of ancillary and balancing services (load following, system regulation, spinning reserve, peaking capacity, and related services), as well as renewable energy firming, energy storage, and arbitrage capabilities.

(5)(i) Load curves and tabular data, if appropriate.

See **Figures B-10** and **B-11** below.

[This information has been filed with a request for privileged treatment]

Figure B-10. Efficiency Curves – Generator Mode

[This information has been filed with a request for privileged treatment]

Figure B-11. Efficiency Curves – Motor Mode

(5)(ii) Details of conservation and rate design programs and their historic and projected impacts on system loads.

At this time, GBEP does not have any conservation or rate design programs.

(5)(iii) The amount of power to be sold and the identity of proposed purchaser(s).

The Project is anticipated to provide numerous ancillary services to one or more balancing authorities in the Western Interconnect. In doing so it will not have standard daily generation. If the Project were to be used solely for time-shifting energy output via daily storage and generation, it would generate 1300 gWh annually.

4.41(c)(6) A statement of the applicant's plans for future development of the project or of any other existing or proposed water power project on the affected stream or other body of water, indicating the approximate location and estimated installed capacity of the proposed developments.

At this time, GBEP has no plans for additional water power projects on the affected stream or other body of water.

References

Federal Energy Regulatory Commission (FERC), Office of Energy Projects, Division of Hydropower Licensing, August 2014, Scoping Document 2, Gordon Butte Pumped Storage Project, Montana, Project No. 13642-001, Washington, D.C.

GORDON BUTTE CLOSED LOOP
PUMPED STORAGE HYDRO PROJECT

FERC PROJECT NO. P-13642

EXHIBIT C

Construction Schedule

APPLICATION FOR ORIGINAL LICENSE

PREPARED BY:

GB Energy Park LLC

&

McMillen Jacobs Associates

October 2015

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EXHIBIT C – PROPOSED CONSTRUCTION SCHEDULE

Exhibit C is presented herein and addresses the FERC regulation 18 CFR 4.41 (d).

(d) Exhibit C is a proposed construction schedule for the project. The information required may be supplemented with a bar chart. The construction schedule must contain:

4.41(d)(1) The proposed commencement and completion dates of any new construction, modification, or repair of major project works.

The preliminary development schedule for the Gordon Butte Pumped Storage Hydro Project is presented in **Figure C-1**.

The key milestone dates for Project construction and commencement are presented in **Table C-1** below:

Table C-1. Key milestone dates

Start of Construction	Notice to Proceed: January 1, 2017, Ground Breaking: March 1, 2017
Commercial Operation of First Unit	September 25, 2019
Entire Project Commercial Operation	March 27, 2020

The construction of the Project is estimated to last 3+ years for the construction of the major project facilities. The construction schedule is presented below.

First Year of Construction

The first year of construction will consist of opening work on a number of fronts. Preparation of roads, laydown areas, clearing and grubbing, and start of excavation on the upper, lower, powerhouse and tunnel works. The new substations civil and structural work will begin.

Second Year of Construction

The second year will include completion of the excavation for the upper and lower reservoirs and the start of the construction of the rock filled sections of the reservoir embankments. The concrete facing of the embankments will start.

The powerhouse activity will be focus on foundations and cast sections in the powerhouse. Placement of embeds for the equipment as well as penstock bifurcations and valves will take place.

The tunnel will be completed. Transmission line will substantially complete.

Third Year of Construction

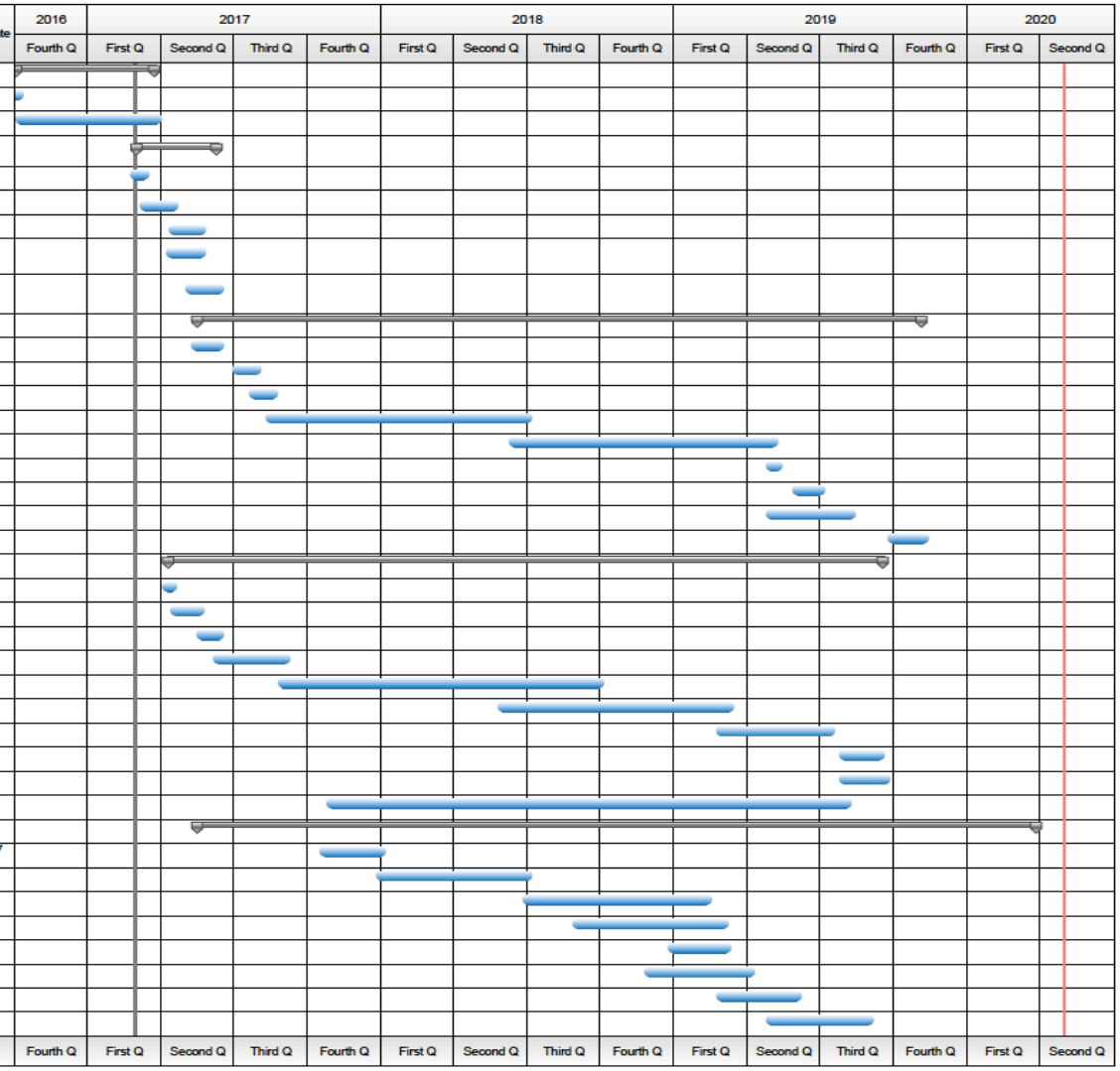
The third year of construction will see the completion of the reservoirs with the installation of liners, control structures and perimeter roads.

The powerhouse will see the installation of the four units completed with all electrical and mechanical systems installed and tested.

Transmission line and interconnection will be completed and the project will reach operational status.

GORDON BUTTE PUMPED STORAGE HYDRO - GB ENERGY PARK LLC - FERC PROJECT NO. 13642

	Activity Name	Duration (Days)	Start Date	Finish Date
1	**FERC ACTIVITIES**	**125.00**	**10/3/16**	**3/24/17**
2	License Order	1.00	10/3/16	10/3/16
3	FERC Design Review	120.00	10/10/16	3/24/17
4	**ACCESS ROADS / LAYDOWN AREAS**	**73.00**	**3/1/17**	**6/9/17**
5	Initial Mobilization and Site Access	7.00	3/1/17	3/8/17
6	Improve Access Road Between Reservoirs	25.00	3/13/17	4/14/17
7	Construct Access Road to Lower Reservoir	25.00	4/17/17	5/19/17
8	Construct Parking / Laydown Upper Reservoir	25.00	4/14/17	5/18/17
9	Construct Parking / Laydown Lower Reservoir	25.00	5/8/17	6/9/17
10	**LOWER RESERVOIR**	**647.00**	**5/15/17**	**11/5/19**
11	Clear and Grub	20.00	5/15/17	6/9/17
12	Strip Topsoil	15.00	7/6/17	7/26/17
13	Excavate Overburden	15.00	7/27/17	8/16/17
14	Excavate Rock	227.00	8/17/17	6/29/18
15	Embankment	230.00	6/15/18	5/2/19
16	Water Control Structure	5.00	5/1/19	5/7/19
17	Slope Concrete	20.00	6/3/19	6/28/19
18	Reservoir Lining	70.00	5/1/19	8/6/19
19	Perimeter Road	26.00	10/1/19	11/5/19
20	**UPPER RESERVOIR**	**638.00**	**4/10/17**	**9/18/19**
21	Clear and Grub	3.00	4/10/17	4/12/17
22	Strip Topsoil	20.00	4/20/17	5/17/17
23	Excavate Overburden	15.00	5/22/17	6/9/17
24	Excavate Rock	60.00	6/12/17	9/1/17
25	Embankment	280.00	9/1/17	9/27/18
26	Slope Concrete	200.00	6/1/18	3/7/19
27	Reservoir Lining	95.00	3/1/19	7/11/19
28	Perimeter Road	30.00	8/1/19	9/11/19
29	Emergency Spillway	35.00	8/1/19	9/18/19
30	Crush Aggregates	456.00	11/1/17	7/31/19
31	**POWERHOUSE**	**750.00**	**5/15/17**	**3/27/20**
32	Excavation	50.00	10/23/17	12/29/17
33	Mass Concrete for Foundation	128.00	1/3/18	6/29/18
34	Cast Concrete Structure	160.00	7/2/18	2/8/19
35	Install Penstock and Bifurcations	129.00	9/3/18	2/28/19
36	Superstructure and Bridge Crane	45.00	1/1/19	3/4/19
37	Powerhouse Mechanical	87.00	12/3/18	4/2/19
38	Powerhouse Electrical	66.00	3/1/19	5/31/19
39	Powerhouse Substation	87.00	5/1/19	8/29/19



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GORDON BUTTE PUMPED STORAGE HYDRO - GB ENERGY PARK LLC - FERC PROJECT NO. 13642

	Activity Name	Duration (Days)	Start Date	Finish Date
40	Site Power Supply	22.00	8/1/19	8/30/19
41	Generating Equipment Notice to Proceed	1.00	5/15/17	5/15/17
42	Commission Unit 1	40.00	8/1/19	9/25/19
43	Commission Unit 2	40.00	10/1/19	11/25/19
44	Commission Unit 3	40.00	12/2/19	1/24/20
45	Commission Unit 4	40.00	2/3/20	3/27/20
46	**SUBSTATION AND TRANSMISSION LINE**	**476.00**	**6/5/17**	**4/1/19**
47	Site and Laydown Preparation	14.00	6/5/17	6/22/17
48	Substation Civil Work	75.00	6/22/17	10/4/17
49	Substation Structural Work	110.00	10/5/17	3/7/18
50	Substation Control Building	60.00	4/2/18	6/22/18
51	Transmission Line	180.00	7/24/18	4/1/19
52	**TUNNEL / PENSTOCK**	**335.00**	**10/2/17**	**1/11/19**
53	Construct Shaft	90.00	10/2/17	2/2/18
54	Intake Structure	90.00	6/15/18	10/18/18
55	Excavate Tunnel	120.00	2/1/18	7/18/18
56	Tunnel Reinforcement / Lining	125.00	7/23/18	1/11/19
57	**SITE RESTORATION**	**127.00**	**11/5/19**	**4/29/20**
58	Upper Reservoir	14.00	11/5/19	11/22/19
59	Lower Reservoir	14.00	11/22/19	12/11/19
60	Roads	14.00	3/2/20	3/19/20
61	Laydown Areas	14.00	3/23/20	4/9/20
62	Transmission Line	14.00	4/10/20	4/29/20

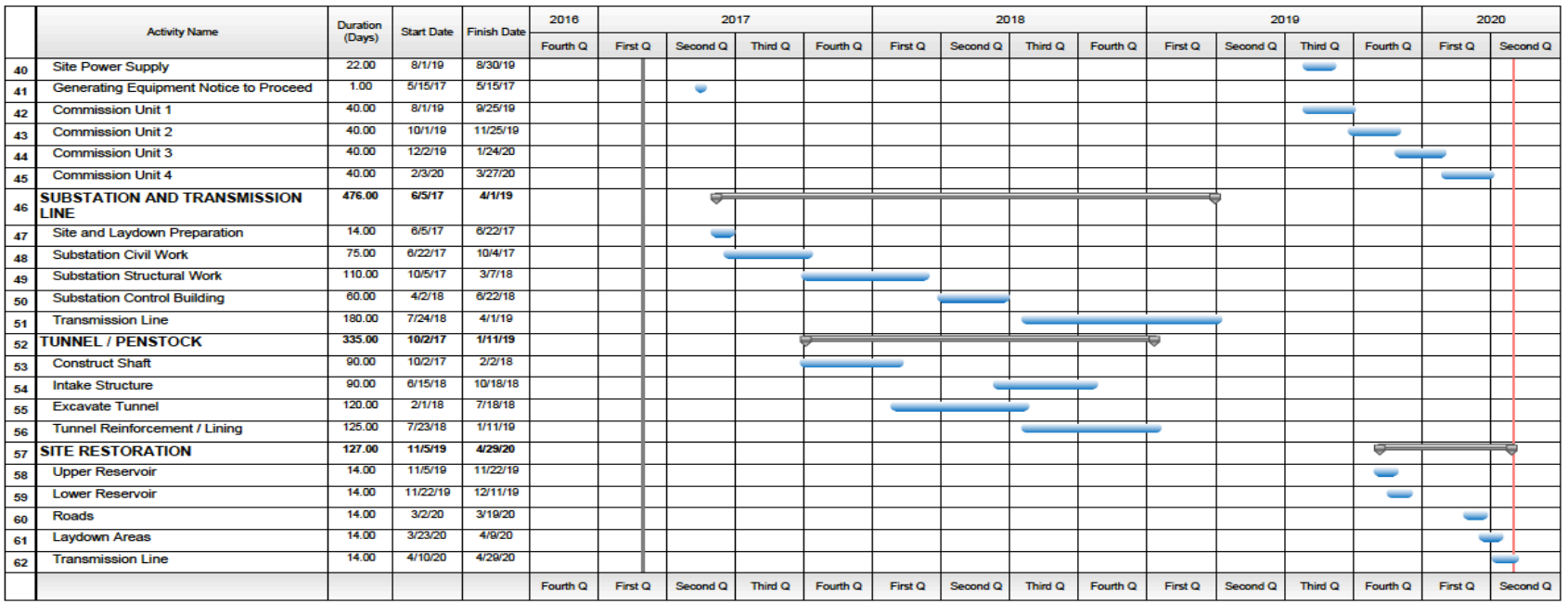

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Figure C-1. Construction schedule Gantt chart

4.41(d)(2) The proposed commencement date of first commercial operation of each new major facility and generating unit.

The four units will go commercial at approximately 60 day intervals with the first unit going commercial September 25, 2019, and the last unit going commercial March 27, 2020.

4.41(d)(3) If any portion of the proposed project consists of previously constructed, unlicensed water power structures or facilities, a chronology of original completion dates of those structures or facilities specifying dates of:

(3)(i) Commencement and completion of construction or installation.
(3)(ii) Commencement of first commercial operation.
(3)(iii) Any additions or modifications other than routine maintenance.

The Project will be a new, unconstructed facility. There are no previously constructed facilities associated with the hydroelectric power generation facilities that will be a part of this Project.

GORDON BUTTE CLOSED LOOP
PUMPED STORAGE HYDRO PROJECT

FERC PROJECT NO. P-13642

EXHIBIT D

Project Cost & Financing

APPLICATION FOR ORIGINAL LICENSE

PREPARED BY:

GB Energy Park LLC

&

McMillen Jacobs Associates

October 2015

4.41(e) Exhibit D – Project Cost and Financing *has been redacted to omit information filed for privileged treatment.*

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EXHIBIT D – STATEMENT OF PROJECT COSTS AND FINANCING

Exhibit D is presented herein and addresses the FERC regulation 18 CFR 4.41 (e).

4.41(e) Exhibit D is a statement of project costs and financing. The exhibit must contain:

4.41(e)(1) A statement of estimated costs of any new construction, modification, or repair, including:

(1)(i) The cost of any land or water rights necessary to the development

Land

GB Energy Park, LLC (GBEP) has executed an "Agreement For Purchase, Sale and Easement of Real Property" with the sole landowner of the project site – 71 Ranch LP (71 Ranch). GBEP has the option to purchase the Project footprint and all necessary easements to construct and operate the facility. The landowner has filed a statement with FERC referencing this agreement. (See FERC Docket Accession Number 20141027-0027, filed October 20, 2014).

Cost - [Information filed with request for privileged treatment (privileged information)]

Water

GBEP has secured a "Permit To Appropriate Water" (40A30069150) from the Montana Department of Natural Resources and Conservation (MTDNRC) for the initial fill and annual make-up water required to operate the Project for its life. The costs of exercising the Project's water rights will be associated with streamflow monitoring in Cottonwood Creek and the South Fork and Mainstem Musselshell Rivers, the Water Quality Monitoring Program, the installation of a water flow device in the landowner's water delivery system, compliance with the Project's Montana issued water right, the Spill Prevention Control and Containment Plan (SPCCP), and the monitoring of the Martinsdale Water Supply Spring.

Construction and Pre-Construction Cost - [privileged information]
Annual Operation and Maintenance Costs - [privileged information]

(1)(ii) The total cost of all major project works

(1)(iii) Indirect construction costs such as costs of construction equipment, camps, and commissaries

These costs were developed in consultation with numerous engineering, construction, and equipment supply companies. The anticipated construction costs for the 400 megawatt (MW) Gordon Butte Closed Loop Pumped Storage Project are summarized in **Table D-1** – categorized

by FERC account numbers. Indirect costs, contingencies and other estimates associated with this section have been included into the cost estimates of **Table D-1**.

Table D-1. Gordon Butte Preliminary Construction Cost Estimate

FERC Account No.	Major Item	Total Cost
330	Land and Water Rights	[privileged information]
331	Structures and Improvements	[privileged information]
332	Reservoirs, Dams, & Tunnels (Penstock)	[privileged information]
333	Waterwheels, Turbines, & Generators	[privileged information]
334	Accessory Electrical Equipment	[privileged information]
335	Miscellaneous Powerplant Equipment	[privileged information]
336	Roads, Rails, & Bridges	[privileged information]
353	Substation & Switch Station Equipment	[privileged information]
354/356	Transmission Line	[privileged information]
	Total Direct Costs	[privileged information]

(1)(iv) Interest during construction

(1)(v) Overhead, construction, legal expenses, and contingencies

Table D-2. Butte Project Indirect Construction Cost Estimates

Major Item	Total Cost
Interest During Construction	[privileged information]
Owner's Engineer	[privileged information]
Construction Management	[privileged information]
Operational Labor During Construction	[privileged information]

Property Taxes during construction	[privileged information]
Other Plant Equipment	[privileged information]
Initial Spare Parts	[privileged information]
Indirect Construction Costs	[privileged information]

4.41(e)(2) If any portion of the proposed project consists of previously constructed, unlicensed water power structures or facilities, a statement of the original cost of those structures or facilities specifying for each, to the extent possible, the actual or approximate total costs (approximate costs must be identified as such) of:

This is a new, project and does not include any previously constructed water power structures or facilities.

4.41(e)(3) If the applicant is a licensee applying for a new license, and is not a municipality or a state, an estimate of the amount which would be payable if the project were to be taken over pursuant to section 14 of the Federal Power Act, 16 U.S.C. 807, upon expiration of the license in effect including: (i) Fair value; (ii) Net investment; and (iii) Severance damages.

Note: The Applicant is filing for an original license, therefore the information required in this section is not applicable.

4.41(e)(4) A statement of the estimated average annual cost of the total project as proposed, specifying any projected changes in the costs (life-cycle costs) over the estimated financing or licensing period if the applicant takes such changes into account, including:

(4)(i) Cost of capital (equity and debt)

Cost of capital is estimated at 7.50% at financial close and 6.50% at COD

(4)(ii) Local, state, and Federal taxes

(4)(iii) Depreciation or amortization

(4)(iv) Operation and maintenance expenses, including interim replacements, insurance, administrative and general expenses, and contingencies

Table D-3. Gordon Butte Pumped Storage Project Estimated Annual Costs

Major Item	**Total Cost**
State Property Taxes (annual averaged over 10 Years)	[privileged information]
County Property Taxes (annual averaged over 10 Years)	[privileged information]
Annual Straight-line Depreciation	[privileged information]
Fixed operating Expenses including labor, management, repairs, parts, operational capital expenditures, misc. plant costs and office administration	[privileged information]
Insurance (property, business interruption and GL (primary and excess))	[privileged information]
Major mechanical capital expenditures	[privileged information]
Initial Spare Parts	[privileged information]
Indirect Construction Costs	[privileged information]

(4)(v) The estimated capital cost and estimated annual operation and maintenance expense of each proposed environmental measure.

Table D-4. Estimated capital cost, annual operation, and maintenance expense of proposed environmental measures

Measure	Components of Measure	Timing	Capital Cost	Annual Cost
Geologic and Soils Resources				
Best Management Practices (BMPs)	Maintenance of slope stability and prevention of erosion	Construction	$ 150,000	$8,000
Erosion and Sediment Control Plan (ESCP)	Protection during construction and implementation of post-construction ground restoration efforts to stabilize disturbed areas and prevent future erosion; contain areas disturbed during construction to mitigate sediment runoff.	Construction	$100,000	$10,000
Hazardous Materials Containment/ Fuel Storage Plan	Contractor Requirement	Construction	$15,000	$10,000

Measure	Components of Measure	Timing	Capital Cost	Annual Cost
Spill Prevention, Control and Containment Plan (SPCCP)	Contractor Requirement	Construction	$25,000	$10,000
Restoration of temporary access roads, disturbed areas	Project elements of concern: temporary construction road, laydown areas.	Construction	$200,000	NA
Water Resources				
Water Quality Monitoring Program	GBEP has entered into an agreement with MTDEQ to sample water quality in Cottonwood Creek preconstruction during diversionary period. Results will be provided to MTDEQ to build a baseline data set. Once the reservoirs are completed and filled, Project waters will be sampled twice a year over life of the Project to monitor for degradation of water quality.	Construction / Pre-Construction O&M	$50,000	$5,000
Measurement of In-stream Flow	Install and maintain a streamflow measuring gage at the bridge where Highway 294 crosses Cottonwood Creek. In-stream flows will be measured in Cottonwood Creek, the South Fork and main stem of the Musselshell River to ensure that MTFWP's in-stream flow requirements and other senior water rights are met during Project water diversion operations.	Construction O & M	$15,000	$5,000
Flow measuring device in water delivery system	A Parshall flume, currently installed in the irrigation canal near the existing irrigation diversion, will be utilized to measure flow of water diverted from Cottonwood Creek during any periods of withdrawals for Project purposes.	Pre-Construction	$12,000 (already completed)	$1,000
Water Right	Compliance with conditions set forth in Project's water right	Construction and O&M	$5,000	$8,000
SPCCP Measures	Contractor requirement	Construction	$2,500	
Water supply spring monitoring	Monitoring of groundwater levels and the flow at Box Car Spring will be conducted in cooperation with the Town of Martinsdale prior to, during, and for a period following the construction phase. If warranted by the monitoring program and any	Construction O&M	$65,000	$10,000

Measure	Components of Measure	Timing	Capital Cost	Annual Cost
	further investigations, mitigation measure will be designed and implemented to maintain the Town's public water supply.			
Fish and Aquatic Resources				
Fish screen on water delivery system	A Farmer's Conservation Alliance fish screen design has been designed and will be installed by 71 Ranch in the irrigation canal adjacent to the irrigation diversion to prevent the entrainment of fish into the 71 Ranch irrigation ditch. GBEP will ensure that the fish screen is operating properly during periods when water is being diverted for Project purposes.	Construction	$350,000	$10,000
Measurement of Instream Flow	Install and maintain a streamflow measuring gage at the bridge where Highway 294 crosses Cottonwood Creek. Instream flows will be measured in Cottonwood Creek, the South Fork and mainstem of the Musselshell River to ensure that MTFWP's instream flow requirements and other senior water rights are met during Project water diversion operations.	(see above)		
Botanical Resources				
Vegetation Management Plan	Restoration of disturbed areas, weed/invasive species management and mitigation.	Construction and O &M	$20,000	$5,000
Wildlife Resources				
Vegetation Management Plan	Restoration of disturbed areas, weed/invasive species management and mitigation.	(see above)		
BMPs – transmission design and installation	~GBEP / contractor will implement the recommendations of the USFWS. Transmission lines will be developed with fixed daytime visual markers on the wires to prevent collisions by raptors or migratory birds 0.5 miles to the east and west of where the line will cross Cottonwood Creek. ~The transmission line and towers will be designed to minimize the potential of avian electrocution.	Construction O&M	$10,000	$10,000
Avian Protection: Construction related	~Transmission realignment – Cottonwood Creek Crossing.	Construction	$150,000	$5,000

Measure	Components of Measure	Timing	Capital Cost	Annual Cost
	~Identify and maintain a 0.5-mile buffer between occupied nests and construction related activities during the breeding and nesting season (Feb. 1 – Aug. 15). ~Prior to construction related activities, a biologist will be sent to assess whether or not the bald eagle nest is still active. ~A biologist will be present during any tree clearing activities to determine if there are any active migratory bird nests in the trees to be cleared. ~Post construction, a biologist will monitor the bald eagle nest for two nesting seasons. Results of these surveys will be reported to USFWS.			
Avian Protection: Operations related	~GBEP, in consultation with MTFWP, has agreed to keep a daily log documenting migratory bird use of reservoirs during spring and fall migrations periods. Daily log entries will be reported to MTFWP for their analysis and recommendations. ~Avoid disturbance 0.5-miles from active raptor nests ~The transmission line will be evaluated twice a year to identify and replace any downed daytime visual markers.	O&M	NA	$18,000
Land Use Resources				
Vegetation Management Plan	Restoration of land disturbed by temporary construction activities, weed/invasive species management.	(see above)		
Cultural and Historic Resources				
Avoidance of identified sites with "unresolved" NRHP status	Sites that have been identified and have an "unresolved" NRHP status will be fenced off and avoided during construction-related activities.	Construction	$5,000	$1,000
Archaeologist on site during certain construction-related	All subsurface excavation	Construction	$160,000	$1,000

Measure	Components of Measure	Timing	Capital Cost	Annual Cost
activities				
Aesthetic Resources				
Vegetation Management Plan	Restoration of disturbed vegetation, landscaping of lower reservoir's saddle dams to blend in with natural terrain.	(see above)		
Socioeconomic Resources				
Workforce Management Plan	Traffic Plan; bus service for workforce personnel; staggered work shifts; alcohol and drug testing requirements; on-site security.	Construction	$150,000	
Erosion and Sediment Control Plan (ESCP)	Protection during construction and implementation of post-construction ground restoration efforts to stabilize disturbed areas and prevent future erosion.	(see above)		
Best Management Practices (BMPs)	Dust Prevention and Control Plan Noise Mitigation Plan; limit time periods for high noise levels associated with batch plants and construction blasting.	Construction	$100,000	

4.41(e)(5) A statement of the estimated annual value of project power based on a showing of the contract price for sale of power or the estimated average annual cost of obtaining an equivalent amount of power (capacity and energy) from the lowest cost alternative source of power, specifying any projected changes in the costs (life-cycle costs) of power from that source over the estimated financing or licensing period if the applicant takes such changes into account.

The Gordon Butte Pumped Storage Project is being designed to provide fast-acting regulation services to the grid and various balancing area operators. In the Western Interconnection there is not an organized market for ancillary services, so the best analysis of comparable cost for the services to be provided by the project lies in an understanding of the capital construction and operating costs associated with the project compared to other tools under consideration to provide the same duty. Though pumped storage is the most commercially prevalent storage technology in use around the world, it is difficult to site and license. In order to address regulation needs that are arising because of increased environmental regulations, scarcity of water and most importantly the impact of renewable generation in the grid, balancing area operators are looking at gas-fired technology for regulation. Pumped storage, particularly when utilizing the technology that is planned for this project, allows utility operators to maintain

reliability and safety at a lower cost. Although pumped storage is often more expensive per MW to install from a capital cost perspective, the fact that the facility can both generate and store energy, means that is less than half of the installed capacity is necessary to accomplish the same regulation duty. Put another way, if a balancing area operator needed 100MW of regulation range in order to maintain their system, they would build (depending on the capacity of the plant) in excess of 100MW of gas fired turbine generator equipment where 50MW of pumped storage would serve the same duty. This results in a net benefit to rate-payers and operators, not to mention the fact that the pumped storage facility can serve many more ancillary needs. Additionally, this analysis does not take into account the potential carbon tax/cost issues that all utility commissions and utilities are including in their forward planning analysis.

Table D-5 below reflects cost estimates for the building of gas generation facilities to provide regulation services compared to project costs for pumped storage.

Table D-5. Comparison of Cost of Various Regional Regulation Tools in the Northwest Region

Resource	Gordon Butte	Gordon Butte	NWE DGGS	PGE PW2	PGE 2013 IRP	PGE 2013 IRP	PSE 2015 IRP	PSE 2015 IRP
Technology	Pumped Hydro	Pumped Hydro	Aero CT	Recip	Aero CT	Recip	Aero CT	Recip
Capacity (MW)	600	400	150	220	100	110	206	220
Min Load (MW)	-600	-400	10	9	30	8	52	9
Reg. Capacity (MW)	1,200	800	105	211	70	102	154	211
Installed Cost ($MM)	$1,100	$800	$183	$249	$135	$181	$259	$352
Cost/kw of Capacity	$1,833	$2,000	$1,217	$1,451	$1,348	$1,648	$1,255	$1,600
Cost/kw of Reg Capacity	**$917**	**$1,000**	**$1,738**	**$1,513**	**$1,925**	**$1,777**	**$1,679**	**$1,668**

Table D-6 indicates current markets for power produced by the project facility over an annual period including some of the ancillary services that have been identified in the WECC market.

Table D-6. Estimated annual value of project power

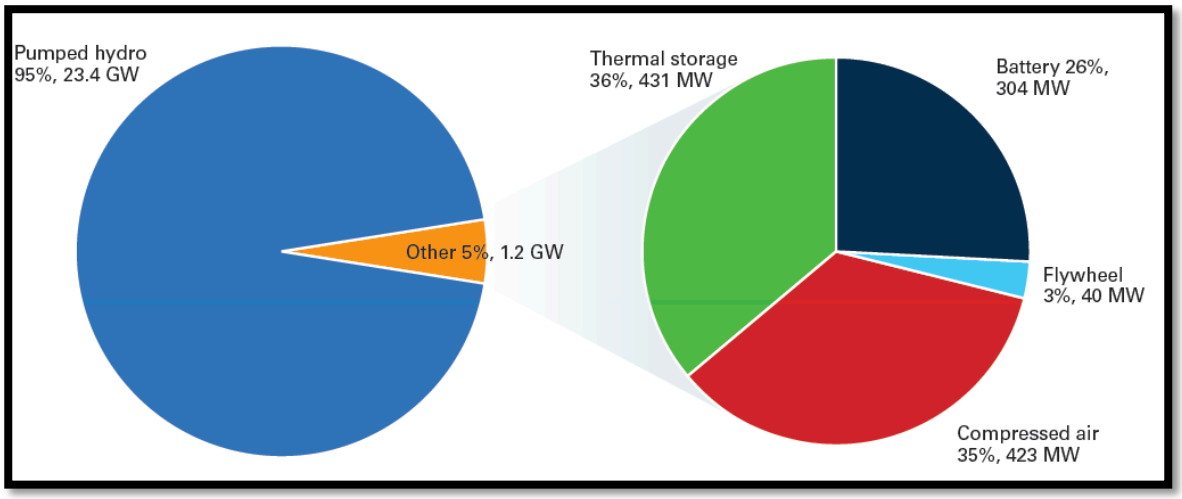
Description	Amount
Plant Capacity (kW)	400,000kW
Plant Generation (kW-h annual)	130,000,000,000

Capacity ($ / kW-mo)	$30.00 (DGGS)
Regulation Up ($ / MW-h)	$9.21 (CAISO)
Regulation Down ($ / MW-h)	$6.93 (CAISO)
10 minute Spinning Reserves ($ / MW-h)	$7.23 (CAISO)
Black Start ($ / kW-year)	$4.58

4.41(e)(6) A statement describing other electric energy alternatives, such as gas, oil, coal and nuclear-fueled powerplants and other conventional and pumped storage hydroelectric plants.

As noted above the facility in this case is designed to provide the region fast acting regulation and storage options in an environmentally benign Project. Across the world, pumped storage is recognized as the leading technology to provide such duty. **Figure D-1** shows a graph of installed storage across the world by technology.

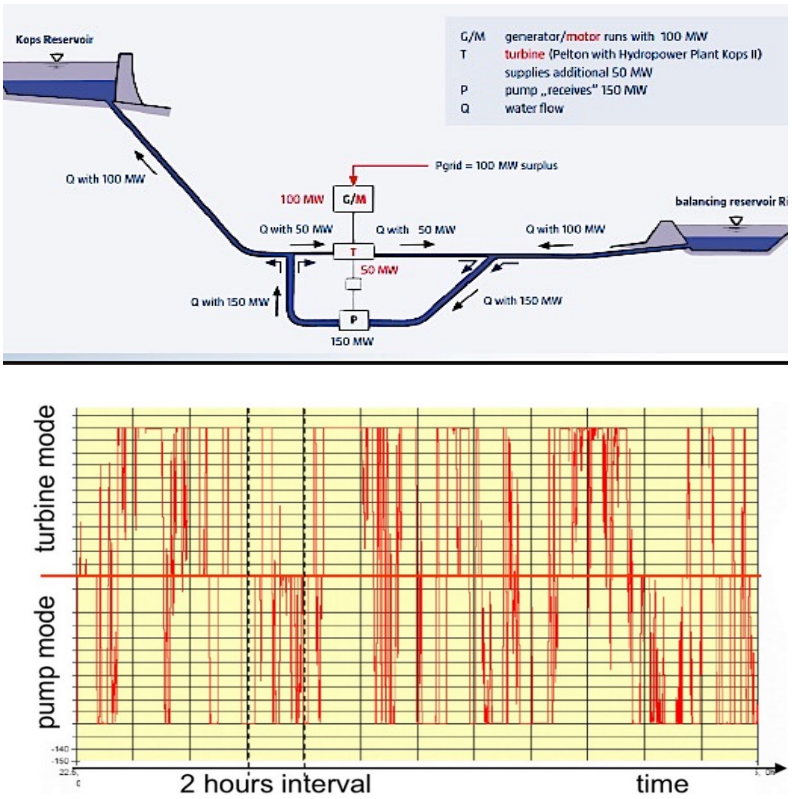
Figure D-1. Storage technology worldwide **(Source: "Grid Energy Storage", US DoE, December 2013)**



Though gas facilities are being proposed in order to provide the grid with regulation capabilities, gas is subject to supply fluctuations, is not renewable, and cannot provide the full range of ancillary service capabilities as the proposed pumped storage hydro facility.

Figure D-2 shows an illustration of the short circuit technology to be installed at the Gordon Butte facility. This short circuit arrangement will have the ability to mode change instantaneously, ramping quickly from pumping to generating and thus providing robust regulation services. This figure also illustrates the KOPS II plant mode changes as it regulates the European grid.

Figure D-2. Illustration of Short Circuit Equipment and Performance Characteristics



4.41(e)(7) A statement and evaluation of the consequences of denial of the license application and a brief perspective of what future use would be made of the proposed site if the proposed project were not constructed

If the license application is denied, then the region would lose the opportunity to install a utility scale, off stream, closed loop pumped storage hydro facility with little environmental impact. Failure to construct this facility would deprive the market with a valuable asset necessary for the integration of renewable energy generation and the reliable management of our existing portfolio of disparate generation and transmission resources.

License denial would also deprive the region of valuable economic benefits. The Project is estimated to create 350 construction jobs, 24 permanent jobs, and generate $94 million into Montana's rural communities (MT Department of Commerce Energy Promotion and Development Division). The Project also provides Montana with the capability to replace Colstrip coal generation capacity with highly valued, firmed, sustainable, renewable generation thus ensuring Montana's future as an energy exporter.

If the property is not used for the project it will continue to be utilized for ranching/grazing activities.

4.41(e)(8) A statement specifying the sources and extent of financing and annual revenues available to the applicant to meet the costs identified in paragraphs (e) (1) and (4) of this section

The GBEP financial model is currently planned with a 70% / 30% debt to equity ratio. The senior debt is conservatively estimated at 7.5% interest rate and scheduled to pay down over the first 12 years of operation. The GBEP parent company, Absaroka Energy Development Group LLC, and several private investors will raise equity capital for the project.

GB Energy Park, LLC anticipates the annual revenue from Project operations will be adequate to meet annual cost obligations and provide a suitable return on investment. The Gordon Butte Pumped Storage Hydro facility will have multiple revenue streams centered around the sale of capacity and ancillary services to one or more customers in the Western Interconnection.

4.41(e)(9) An estimate of the cost to develop the license application

The estimated cost to develop FERC Final License Application is $2,059,265.

Table D-7. Estimated cost to develop FERC Final License Application

DESCRIPTION	AMOUNT	RESOURCE
Study Plans	[privileged information]	Consultant Budget
Licensing Consultant(s)	[privileged information]	Consulting Agreement Tasks
Permit & Licensing	[privileged information]	AEDG Budget (2013 - 2015)
Travel (minus "conference" & "investor")	[privileged information]	AEDG Budget (2013 - 2015)
Legal (FERC)	[privileged information]	AEDG Budget (2013 - 2015)

Hearings (License / Permit)	[privileged information]	AEDG Budget (2013 - 2015)
Public Awareness	[privileged information]	AEDG Budget (2013 - 2015)
Engineering (cost estimation)	[privileged information]	AEDG Budget (2013 - 2015)
Developer Staff	[privileged information]	AEDG Budget (2013 - 2015)
TOTAL	[privileged information]	

4.41(e)(10) The on-peak and off-peak values of project power, and the basis for estimating the values, for projects which are proposed to operate in a mode other than run-of-river.

As noted above, the Gordon Butte Pumped Storage Project is designed to provide fast-acting regulation services to the grid and various balancing area operators. Only one revenue stream will come from the sale of on-peak/off-peak generation. As of the date of this application, regional Mid Columbia "On Peak" value of power is approximately $43 / MWh. Mid Columbia "Off Peak" value of power is approximately $20 / MWh.

GORDON BUTTE CLOSED LOOP
PUMPED STORAGE HYDRO PROJECT

FERC PROJECT NO. P-13642

EXHIBIT F

Preliminary General Design Drawings
& Design Report

APPLICATION FOR ORIGINAL LICENSE

PREPARED BY:

GB Energy Park LLC

&

McMillen Jacobs Associates

October 2015

4.41(g) Exhibit F – Preliminary General Design Drawings and Supporting Design Report *contains information being withheld as Critical Energy Infrastructure Information (CEII) as defined in 18 CFR Section 388.113(c)*[1]*.*

Procedures for obtaining access to Critical Energy Infrastructure Information (CEII) may be found at 18 CFR 388.133. Requests for access to CEII should be made to the Commission's CEII Coordinator.

[1] 18 CFR 388.113 (c) –

(1) *Critical energy infrastructure* information means specific engineering, vulnerability, or detailed design information about proposed or existing critical infrastructure that: **(i)** Relates details about the production, generation, transportation, transmission, or distribution of energy; **(ii)** Could be useful to a person in planning an attack on critical infrastructure; **(iii)** Is exempt from mandatory disclosure under the Freedom of Information Act, 5 U.S.C. 552; and **(iv)** Does not simply give the general location of the critical infrastructure.
(2) *Critical infrastructure* means existing and proposed systems and assets, whether physical or virtual, the incapacity or destruction of which would negatively affect security, economic security, public health or safety, or any combination of those matters.

EXHIBIT F – GENERAL DESIGNS & DRAWINGS

Exhibit F is presented herein and addresses the FERC regulation 18 CFR 4.41 (g).

(g) Exhibit F consists of general design drawings of the principal project works described under paragraph (b) of this section (Exhibit A) and supporting information used as the basis of design. In the Exhibit F submitted with the application is preliminary in nature, applicant must so state in the application. The drawing must conform to the specifications of Section 4.39.

4.41(g)(1) The drawings must show all major project structures in sufficient detail to provide a full understanding of the project, including:

- **(i) Plans (overhead view)**
- **(ii) Elevations**
- **(iii) Profiles**
- **(iv) Sections**

Preliminary general design drawings of the principal project works are attached hereto as follows:

Exhibit Number	Title
F-1	Cover Sheet, Location Plan and Index
F-2	Project Site Plan
F-3	Upper Reservoir Plan
F-4	Upper Reservoir Dam Sections – Sheet 1 of 2
F-5	Upper Reservoir Dam Sections – Sheet 2 of 2
F-6	Upper Reservoir Staging Area Plan
F-7	Upper Reservoir Emergency Spillway Plan
F-8	Upper Reservoir Emergency Spillway Sections
F-9	Reservoir Liner, Drainage Gallery and Adit Sections
F-10	Upper Reservoir Intake Structure
F-11	Upper Reservoir Intake Bridge
F-12	Tunnel and Shaft Plan and Profile
F-13	Penstock Layout
F-14	Powerhouse Plot Plan
F-15	Powerhouse Plan at Drainage Gallery Level
F-16	Powerhouse Plan at Pump Level
F-17	Powerhouse Plan at Turbine Level
F-18	Powerhouse Plan at Generator Level
F-19	Powerhouse Elevation
F-20	Powerhouse Longitudinal Section
F-21	Powerhouse Transverse Section

F-22	Lower Reservoir Plan and Staging Area
F-23	Lower Reservoir Sections
F-24	Powerhouse Substation
F-25	Interconnection Substation Arrangement
F-26	Transmission Line Sheet 1
F-27	Transmission Line Sheet 2

4.41(g)(2) The applicant may submit preliminary design drawings with the application. The final Exhibit F may be submitted during or after the licensing process and must show the precise plans and specifications for proposed structures. If the project is licensed on the basis of preliminary designs, the applicant must submit a final Exhibit F for Commission approval prior to commencement of any construction of the project.

The designs submitted in this Exhibit F are preliminary design drawings. GB Energy Park, LLC's (GBEP) final Exhibit F will be submitted for FERC approval prior to commencement of any construction of the Gordon Butte Pumped Storage Hydro Project (Project).

4.41(g)(3) Supporting design report. **The applicant must furnish, at a minimum, the following supporting information to demonstrate that existing and proposed structures are safe and adequate to fulfill their stated functions and must submit such information in a separate report at the time the application is filed. The report must include:**

(i) An assessment of the suitability of the site and the reservoir rim stability based on geological and subsurface investigations, including investigations of soils and rock borings and tests for the evaluation of all foundations and construction materials sufficient to determine the location and type of dam structure suitable for the site;

(ii) Copies of boring logs, geology reports and laboratory test reports;

(iii) An identification of all borrow areas and quarry sites and an estimate of required quantities of suitable construction material;

(iv) Stability and stress analyses for all major structures and critical abutment slopes under all probable loading conditions, including seismic and hydrostatic forces induced by water loads up to the Probable Maximum Flood as appropriate; and

(v) The bases for determination of seismic loading and the Spillway Design Flood in sufficient detail to permit independent staff evaluation.

The **Supporting Preliminary Design Report – Gordon Butte Pumped Storage Project** is attached below. This report addresses the informational requirements of **4.41(g) (3) (i)** through **4.41(g) (3) (v)** and demonstrates that the proposed structures are safe and adequate to fulfill their stated functions.

Gordon Butte Pumped Storage Project
Meagher County, Montana

Supporting Design Report

for
GB Energy Park, LLC

September 2015

AECOM

Critical Energy Infrastructure Information (CEII)

Gordon Butte Pumped Storage Project
No. P-13642
Final Application for Original License
Exhibit F, Preliminary General Design Drawings

Exhibit Number	Title
F-1	Cover Sheet, Location Plan and Index
F-2	Project Site Plan
F-3	Upper Reservoir Plan
F-4	Upper Reservoir Dam Sections – Sheet 1 of 2
F-5	Upper Reservoir Dam Sections – Sheet 2 of 2
F-6	Upper Reservoir Staging Area Plan
F-7	Upper Reservoir Emergency Spillway Plan
F-8	Upper Reservoir Emergency Spillway Sections
F-9	Reservoir Liner, Drainage Gallery and Adit Sections
F-10	Upper Reservoir Intake Structure
F-11	Upper Reservoir Intake Bridge
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F-14	Powerhouse Plot Plan
F-15	Powerhouse Plan at Drainage Gallery Level
F-16	Powerhouse Plan at Pump Level
F-17	Powerhouse Plan at Turbine Level
F-18	Powerhouse Plan at Generator Level
F-19	Powerhouse Elevation
F-20	Powerhouse Longitudinal Section
F-21	Powerhouse Transverse Section
F-22	Lower Reservoir Plan and Staging Area
F-23	Lower Reservoir Sections
F-24	Powerhouse Substation
F-25	Interconnection Substation Arrangement
F-26	Transmission Line Sheet 1
F-27	Transmission Line Sheet 2

Critical Energy Infrastructure Information (CEII)

GORDON BUTTE CLOSED LOOP
PUMPED STORAGE HYDRO PROJECT

FERC PROJECT NO. P-13642

Draft EXHIBIT G

Project Maps

APPLICATION FOR ORIGINAL LICENSE

PREPARED BY:

GB Energy Park LLC

&

McMillen Jacobs Associates

October 2015

EXHIBIT G – PROJECT MAPS

Exhibit G is presented herein and addresses the FERC regulation 18 CFR 4.41 (h).

Project maps are attached hereto as follows:

Map Number	Title
G-1	Project Area & Land Ownership
G-2	Project Boundary & Project Features
G-3	Project Boundary & Project Features
G-4	Project Boundary & Project Features
G-5	Project Boundary & Project Features

SOUTH FORK MUSSELSHELL RIVER

SURVEYOR'S CONTROL POINT
N= 804250.40
E= 1755698.92
ELEV= 4886.60

HIGHWAY 294

100 KV OVERHEAD TRANSMISSION LINE (EXISTING)

POWERHOUSE ACCESS ROAD

LOWER RESERVOIR

POWERHOUSE

UPPER RESERVOIR ACCESS ROAD (EXISTING)

MARTINSDALE RESERVOIR

TUNNEL

SUBSTATION

VERTICAL SHAFT & INTAKE STRUCTURE

SOUTH FORK MUSSELSHELL RIVER

SURVEYOR'S CONTROL POINT
N= 797239.51
E= 1739496.48
ELEV= 5014.24

HIGHWAY 294

COTTONWOOD CREEK

SURVEYOR'S CONTROL POINT
N= 796740.90
E= 1753591.56
ELEV= 5993.91

UPPER RESERVOIR

SW S21 T08N R11E
N= 796488
E= 1750384

SURVEYOR'S CONTROL POINT
N= 793465.57
E= 1752244.71
ELEV= 5863.79

SURVEYOR'S CONTROL POINT
N= 795060.26
E= 1751299.50
ELEV= 5974.97

230 KV OVERHEAD TRANSMISSION LINE

SURVEYOR'S CONTROL POINT
N= 789603.97
E= 1758510.77
ELEV= 6042.62

SURVEYOR'S CONTROL POINT
N= 782676.23
E= 1756265.00
ELEV= 5254.32

230 KV OVERHEAD TRANSMISSION LINE

COTTONWOOD CREEK ROAD

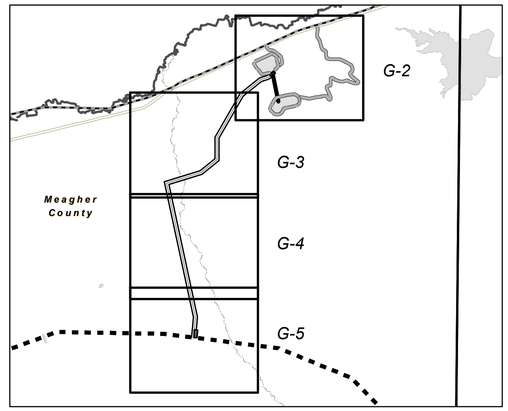
COTTONWOOD CREEK

SW S10 T07N R11E
N= 775481.848
E= 1755448.425

SURVEYOR'S CONTROL POINT
N= 775638.75
E= 1741366.73
ELEV= 5382.76

EXISTING TWIN 500 KV TRANSMISSION LINE

INTERCONNECT SUBSTATION



INSET MAP

LEGEND

- SURVEYOR'S CONTROL POINT
- PLSS REFERENCE POINT
- PROJECT BOUNDARY
- ACCESS ROADS

PROPERTY OWNER

- 71 RANCH PROPERTY
- OTHER PRIVATE PROPERTY
- STATE OF MONTANA
- USDI BUREAU OF LAND MANAGEMENT

TRANSMISSION LINES

- 100 KV EXISTING
- 230 KV PROPOSED
- 500 KV EXISTING

MAGNETIC NORTH

TRUE NORTH (12° E)

MONTANA TIMOTHY R. REED 28997LS LICENSED PROFESSIONAL LAND SURVEYOR

9-23-15

Signed By:
Timothy R. Reed

Property lines shown hereon are for graphical representation only, they do not constitute a land survey. The Project Boundary is considerably within those properties owned by 71 Ranch, their heirs and successors. MCA 76-3-401 quotes that parcels of land that can be described by aliquot part, and are 1/32 (20 acres) or greater are exempt from Survey Requirements. MCA 76-3-201 quotes that "Exemption for certain divisions of land – fees for examination of divisions." Part (1) (h)Furthermore describes this circumstance in that the parcel(s): "is created for rights-of-way or utility sites. A subsequent change in the use of the land to a residential, commercial, or industrial use is subject to the requirements of this chapter.

REFERENCE COORDINATE METADATA
Horizontal Datum: NAD83 (2011) EPOCH 2010.0000
State Plane, Montana (International Feet)
Vertical Datum: NAVD 88 (Geoid 12A)

CONTAINS CRITICAL ENERGY INFRASTRUCTURE INFORMATION (CEII)

PRELIMINARY ISSUE FOR FERC LICENSING - DO NOT USE FOR CONSTRUCTION

PROJECT:
GORDON BUTTE PUMPED STORAGE PROJECT
FERC PROJECT NO. 13642

SCALE: 1 " = 0.35 Miles
0 0.175 0.35 Miles

DATE: **09/23/2015**

PREPARED FOR:
GB ENERGY PARK, LLC

GORDON BUTTE PUMPED STORAGE

EXHIBIT G-1

PREPARED BY: Stanley Consultants INC.

PROJECT AREA & LAND OWNERSHIP

SURVEYOR'S CONTROL POINT
N= 805326.82
E= 1752804.73
ELEV= 4861.99

SOUTH FORK
MUSSELSHELL RIVER

T08N
R11E
S17

EXISTING 100 KV
OVERHEAD TRANSMISSION LINE

HIGHWAY 294

T08N
R11E
S16

SURVEYOR'S CONTROL POINT
N= 804250.40
E= 1755698.92
ELEV= 4886.60

T08N
R11E
S15

4900

POWERHOUSE
ACCESS ROAD

PERMANENT
EASEMENT

LOWER
RESERVOIR

PROJECT
BOUNDARY

T08N
R11E
S20

POWERHOUSE

T08N
R11E
S21

UPPER RESERVOIR
ACCESS ROAD (EXISTING)

PERMANENT
EASEMENT

T08N
R11E
S22

WATER
CONTROL
STRUCTURE

SUBSTATION

PROJECT
BOUNDARY

TUNNEL

SW S21 T08N R11E
N= 796488
E= 1750384

VERTICAL SHAFT &
INTAKE STRUCTURE

5800

SURVEYOR'S CONTROL POINT
N= 796740.90
E= 1753591.56
ELEV= 5993.91

5900

6000

PERMANENT
EASEMENT

230 KV OVERHEAD
TRANSMISSION LINE

UPPER
RESERVOIR

PROJECT
BOUNDARY

T08N
R11E
S28

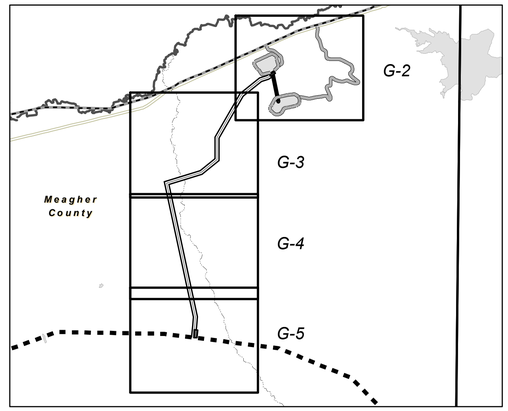
SURVEYOR'S CONTROL POINT
N= 795060.26
E= 1751299.50
ELEV= 5974.97

T08N
R11E
S29

SW S22 T08N R11E
N= 796434
E= 1755684

5800
5600
5550
5800
5800
5500

T08N
R11E
S27



INSET MAP

LEGEND

- SURVEYOR'S CONTROL POINT
- PLSS REFERENCE POINT
- PROJECT BOUNDARY
- PERMANENT EASEMENT
- ACCESS ROADS
- LOCAL ROADS

PROPERTY OWNER

- 71 RANCH PROPERTY
- OTHER PRIVATE PROPERTY
- STATE OF MONTANA

TRANSMISSION LINES

- 100 KV EXISTING
- 230 KV PROPOSED

MAGNETIC NORTH

TRUE NORTH (12° E)

MONTANA
TIMOTHY R. REED
28597LS
LICENSED PROFESSIONAL LAND SURVEYOR

9-23-15

Signed By:
Timothy R. Reed

Property lines shown hereon are for graphical representation only, they do not constitute a land survey. The Project Boundary is considerably within those properties owned by 71 Ranch, their heirs and successors. MCA 76-3-401 quotes that parcels of land that can be described by aliquot part, and are 1/32 (20 acres) or greater are exempt from Survey Requirements. MCA 76-3-201 quotes that "Exemption for certain divisions of land – fees for examination of divisions." Part (1) (h)Furthermore describes this circumstance in that the parcel(s): "is created for rights-of-way or utility sites. A subsequent change in the use of the land to a residential, commercial, or industrial use is subject to the requirements of this chapter.

REFERENCE COORDINATE METADATA
Horizontal Datum: NAD83 (2011) EPOCH 2010.0000
State Plane, Montana (International Feet)
Vertical Datum: NAVD 88 (Geoid 12A)

CONTAINS CRITICAL ENERGY INFRASTRUCTURE INFORMATION (CEII)

PRELIMINARY ISSUE FOR FERC LICENSING - DO NOT USE FOR CONSTRUCTION

PROJECT:
GORDON BUTTE PUMPED STORAGE PROJECT
FERC PROJECT NO. 13642

SCALE: 1 " = 550 feet
0 275 550 Feet

DATE: **09/23/2015**

PREPARED FOR:
GB ENERGY PARK, LLC

GORDON BUTTE PUMPED STORAGE

EXHIBIT G-2

PREPARED BY: Stanley Consultants INC.

PROJECT BOUNDARY & PROJECT FEATURES

HIGHWAY 294

EXISTING 100 KV
OVERHEAD TRANSMISSION LINE

T08N
R10E
S25

T08N
R10E
S36

T08N
R11E
S30

NE S30 T08N R11E
N= 796513
E= 1745062

PERMANENT
EASEMENT

230 KV OVERHEAD
TRANSMISSION LINE

T08N
R11E
S29

T08N
R11E
S31

230 KV OVERHEAD
TRANSMISSION LINE

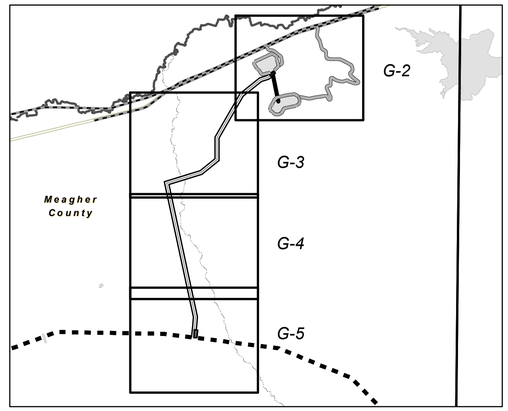
PERMANENT
EASEMENT

T08N
R11E
S32

SW S31 T08N R11E
N= 786018
E= 1739841

SE S31 T08N R11E
N= 785967
E= 1744969

5600
5650
5650
5550
5550
5550
5450
5350
5400
5250
5200
5150



INSET MAP

LEGEND

- PLSS REFERENCE POINT
- PERMANENT EASEMENT
- LOCAL ROADS

PROPERTY OWNER

- 71 RANCH PROPERTY
- OTHER PRIVATE PROPERTY
- STATE OF MONTANA

TRANSMISSION LINES

- 100 KV EXISTING
- 230 KV PROPOSED

MAGNETIC NORTH

TRUE NORTH (12° E)

MONTANA
TIMOTHY R REED
2899/LS
LICENSED
PROFESSIONAL LAND SURVEYOR

9-23-15

Signed By:
Timothy R. Reed

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A subsequent change in the use of the land to a residential, commercial, or industrial use is subject to the requirements of this chapter.

REFERENCE COORDINATE METADATA
Horizontal Datum: NAD83 (2011) EPOCH 2010.0000
State Plane, Montana (International Feet)
Vertical Datum: NAVD 88 (Geoid 12A)

CONTAINS CRITICAL ENERGY INFRASTRUCTURE INFORMATION (CEII)

PRELIMINARY ISSUE FOR FERC LICENSING - DO NOT USE FOR CONSTRUCTION

PROJECT:
GORDON BUTTE PUMPED STORAGE PROJECT
FERC PROJECT NO. 13642

SCALE: 1 " = 550 feet
0 275 550 Feet

DATE: **09/23/2015**

PREPARED FOR:
GB ENERGY PARK, LLC

GORDON BUTTE PUMPED STORAGE

EXHIBIT G-3

PREPARED BY: Stanley Consultants INC.

PROJECT BOUNDARY & PROJECT FEATURES

T07N
R10E
S01

T07N
R11E
S06

T07N
R11E
S05

COTTONWOOD CREEK

COTTONWOOD CREEK RD

SW S06 T07N R11E
N= 780852
E= 1739737

SE S06 T07N R11E
N= 780812
E= 1744923

230 KV OVERHEAD
TRANSMISSION LINE

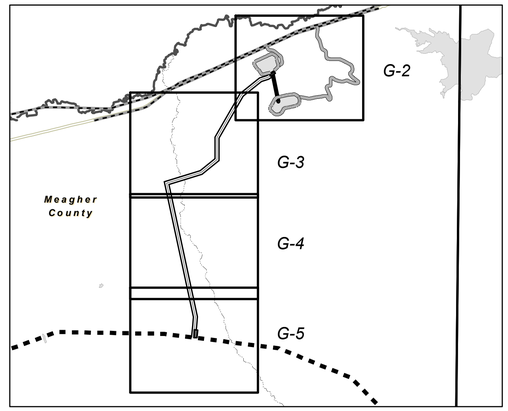
T07N
R10E
S12

T07N
R11E
S7

T07N
R11E
S8

SURVEYOR'S CONTROL POINT
N= 775638.75
E= 1741366.73
ELEV= 5382.76

PERMANENT
EASEMENT



INSET MAP

LEGEND

- SURVEYOR'S CONTROL POINT
- PLSS REFERENCE POINT
- PERMANENT EASEMENT
- LOCAL ROADS

PROPERTY OWNER

- 71 RANCH PROPERTY
- OTHER PRIVATE PROPERTY
- STATE OF MONTANA

TRANSMISSION LINES

- 230 KV PROPOSED

MAGNETIC NORTH

TRUE NORTH (12° E)

MONTANA
TIMOTHY R. REED
28997LS
LICENSED
PROFESSIONAL LAND SURVEYOR

9-23-15

Signed By:
Timothy R. Reed

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PRELIMINARY ISSUE FOR FERC LICENSING - DO NOT USE FOR CONSTRUCTION

PROJECT:
GORDON BUTTE PUMPED STORAGE PROJECT
FERC PROJECT NO. 13642

SCALE: 1 " = 550 feet
0 275 550 Feet

DATE: **09/23/2015**

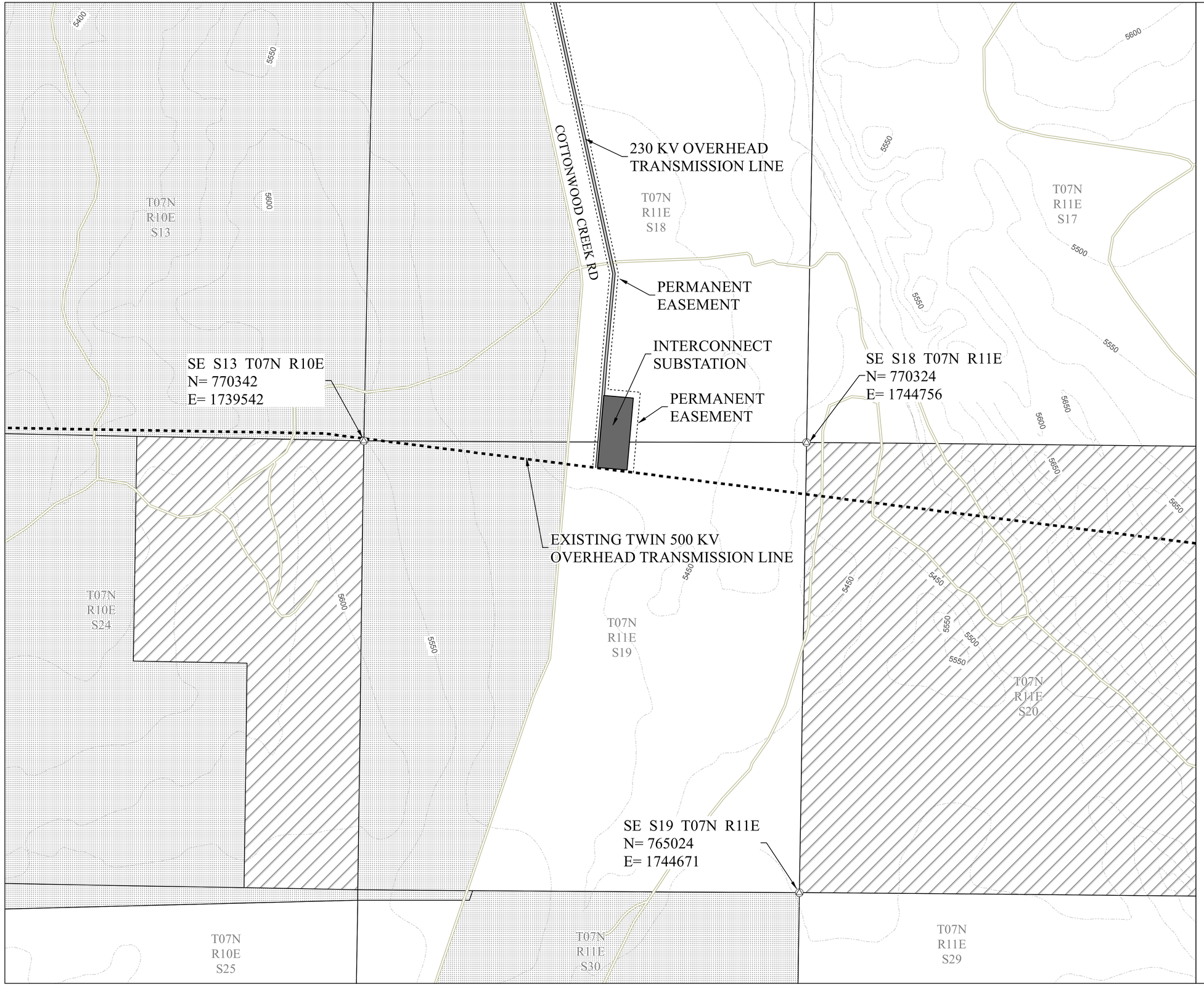
PREPARED FOR:
GB ENERGY PARK, LLC

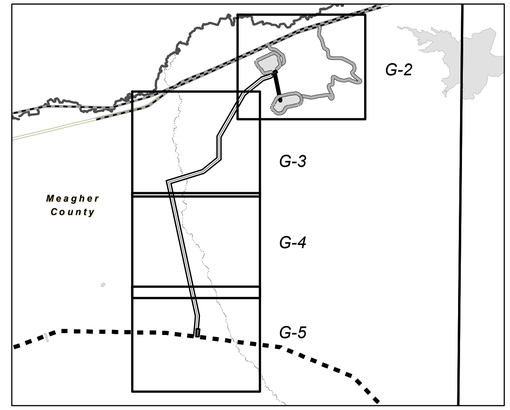
GORDON BUTTE PUMPED STORAGE

EXHIBIT G-4

PREPARED BY: Stanley Consultants INC.

PROJECT BOUNDARY & PROJECT FEATURES





INSET MAP

LEGEND

- PLSS REFERENCE POINT
- PERMANENT EASEMENT
- LOCAL ROADS

PROPERTY OWNER

- 71 RANCH PROPERTY
- OTHER PRIVATE PROPERTY
- STATE OF MONTANA

TRANSMISSION LINES

- 230 KV PROPOSED
- 500 KV EXISTING

MAGNETIC NORTH

TRUE NORTH (12° E)

MONTANA
TIMOTHY R. REED
28591LS
LICENSED PROFESSIONAL LAND SURVEYOR

9-23-15

Signed By:
Timothy R. Reed

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PROJECT:
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FERC PROJECT NO. 13642

SCALE: 1 " = 550 feet
0 275 550 Feet

DATE: **09/23/2015**

PREPARED FOR:
GB ENERGY PARK, LLC

PREPARED BY: Stanley Consultants INC.

GORDON BUTTE PUMPED STORAGE

EXHIBIT G-5

PROJECT BOUNDARY & PROJECT FEATURES