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Bureau of Land Management

**Twin Bridges Bowknot Helium Project
Environmental Assessment
Emery County, Utah
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BLM EA Cost Estimate

The approximate cost for creation of
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The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

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ABBREVIATIONS

AFY: acre-feet per year	ID Team: Interdisciplinary Team
ANSI: American National Standards Institute	IPCC: Intergovernmental Panel on Climate Change
AO: authorized officer	IWG: Interagency Working Group
APD: application for permit to drill	km: kilometer
AQRV: air quality related values	LWC: land with wilderness characteristics
BGEPA: Bald and Golden Eagle Protection Act	m: meter
BLM: Bureau of Land Management	MBTA: Migratory Bird Treaty Act
BTU: British thermal unit	MLA: Mineral Leasing Act
°C: degrees Celsius	MLP: Master Leasing Plan
CAA: Clean Air Act	MMT: million metric tons
CEQ: Council on Environmental Quality	MRDG: Minimum Requirements Decision Guide
CFR: Code of Federal Regulations	NAAQS: National Ambient Air Quality Standards
CIAA: cumulative impacts analysis area	NDC: National Determined Contribution
dB: decibel	NEPA: National Environmental Policy Act
dba: A-weighted decibel	NESHAPs: National Emission Standards for Hazardous Air Pollutants
DR: decision record	NPS: National Park Service
EA: environmental assessment	NRA: national recreation area
EIA: U.S. Energy Information Administration	NRCS: Natural Resources Conservation Service
EIS: environmental impact statement	NSPS: New Source Performance Standards
EO: executive order	OHV: off-highway vehicle
EPA: U.S. Environmental Protection Agency	PSD: Prevention of Significant Deterioration
ESA: Endangered Species Act	RCP: representative concentration pathways
°F: degrees Fahrenheit	RFD: reasonably foreseeable development
FLPMA: Federal Land Policy and Management Act	RFFA: reasonably foreseeable future action
FO: field office	RMP: resource management plan
FONSI: Finding of No Significant Impact	ROS: Recreation Opportunity Spectrum
GHG: greenhouse gas	ROW: right-of-way
GIS: geographic information system	SCC: social cost of carbon
GMU: game management unit	SITLA: School and Institutional Trust Lands Administration
GtCO ₂ : gigatons of carbon dioxide	SLRU: sensitivity level rating units
GWP: global warming potential	SQRUs: scenic quality rating units
HAPs: hazardous air pollutants	
HUC: hydrologic unit code	

SRMA: special recreation management area

SRPs: Special Recreation Permits

SSPS: special-status plant species

SSURGO: Soil Survey Geographic database

STATSGO: State Soil Geographic database

SWCA: SWCA Environmental Consultants

SWReGAP: Southwest Regional Gap Analysis Project

TMP: travel management plan

tpy: tons per year

UCRRP: Upper Colorado River Endangered Fish Recovery Program

UDNR: Utah Division of Natural Resources

UDOGM: Utah Division of Oil, Gas, and Mining

UDWR: Utah Division of Wildlife Resources

UDWS: Utah Department of Workforce Services

UNEP: United Nations Environment Programme

U.S.: United States

USC: United States Code

USDOI: U.S. Department of the Interior

USDOT: U.S. Department of Transportation

USFWS: U.S. Fish and Wildlife Service

USGS: U.S. Geological Survey

VOCs: volatile organic compounds

VRI: Visual Resource Inventory

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CHAPTER 1. PURPOSE AND NEED

1.1 INTRODUCTION

This environmental assessment (EA) has been prepared to analyze the potential impacts of Twin Bridges LLC's (Twin Bridges' or the Applicant's) proposed application to develop its Federal Lease and two state leases, issued by the Utah School and Institutional Trust Lands Administration (SITLA) for exploratory helium. In addition to submitting an application for a permit to drill (APD) its Federal Lease, the development of any of these three leases also requires Twin Bridges to obtain Federal authorization for other associated activities, including right-of-way authorizations (ROWs) for the well pad, road improvements, associated product lines and communications infrastructure, and an authorization for underground well bores to reach the mineral leases (collectively the Project). The proposed Project is located in Emery County, Utah.

This EA is a site-specific analysis of potential impacts that could result from the implementation of the proposed action or its alternatives. An EA assists the Bureau of Land Management (BLM) in project planning, ensuring compliance with the National Environmental Policy Act (NEPA) of 1969, and determining whether any significant impacts could result from the analyzed actions. The Council on Environmental Quality (CEQ) updated the regulations implementing the procedural provisions of the NEPA in 2020. These new regulations became effective on September 14, 2020. As outlined in 40 Code of Federal Regulations (CFR) 1506.13 of the new regulations, the new regulations apply to all NEPA processes begun after the effective date, but agencies have the discretion to apply them to ongoing NEPA processes. The BLM had already initiated the preparation of this EA on September 14, 2020. Therefore, the BLM is completing the EA using the CEQ NEPA regulations that were in place before September 14, 2020. Significance is defined by the applicable CEQ regulations for implementing NEPA in 40 CFR 1508.27. An EA provides evidence for determining whether to prepare a Finding of No Significant Impact (FONSI) or an environmental impact statement (EIS). A FONSI documents why the selected action would not result in significant environmental impacts beyond those already addressed in BLM's *Price Field Office Record of Decision and Approved Resource Management Plan* (Price RMP) (BLM 2008a), as amended. If the BLM determines that approving Twin Bridges' ROWs and/or APDs would result in significant impacts, then the BLM would prepare an EIS for the action. If not, a decision record (DR) may be signed for the EA that approves the alternative selected.

1.1.1 Background and Project Overview

Twin Bridges holds three mineral leases in Emery County, Utah, all located within a recently designated wilderness area (Appendix F, Figure F-1).

The two SITLA leases are:

- ML-53189, was effective July 1, 2015, and located in Section 2, Township 26 South (T26S), Range 16 East (R16E) (596 acres).
- ML-53420, was effective December 1, 2016, and located in Section 36, Township 25 South (T25S), R16E (640 acres).

On December 11, 2018, Twin Bridges purchased its Federal oil and gas lease (UTU-93713), which is located in Section 7, and portions of Sections 5, 6, and 8, Township 26 South, Range (T26S), Range 17 East (R17E) (1,410 acres). On February 18, 2020, Twin Bridges and the BLM entered into a Contract for Extraction and Sale of Federal Helium (Contract No. 20-02) for the Federal lease pursuant to the Helium Privatization Act (50 United States Code (USC) § 167).

Surface ownership of the potentially affected lands includes Federal land managed by the U.S. Department of the Interior (USDOI) BLM Price Field Office (FO), as well as state land managed by SITLA. On March 12, 2019, Congress enacted the John D. Dingell, Jr. Conservation, Management, and Recreation Act (Dingell Act) (16 United States Code [USC] 1132; Public Law 116-9, Title 1, Subtitle C, Part II, Subpart B, Under Section 1231(a)(7)) of the Dingell Act, Congress designated more than 1,300,000 acres of land as Wilderness, including the Labyrinth Canyon Wilderness Area, which completely surrounds the three leases related to the proposed Project (see Appendix F, Figure F-1). The Labyrinth Canyon Wilderness Area includes 54,643-acres of BLM-administered lands and BLM is required to manage this Wilderness Area in accordance with the provisions of the Wilderness Act of 1968. Two existing roads in the vicinity of the Project, Emery County Road 1025 and Emery County Road 1026, were excluded from the Labyrinth Canyon Wilderness Area. The terminus of Emery County Road 1025 (Spur Road 1025) includes a circular roundabout that was also excluded from the Labyrinth Canyon Wilderness Area. Additionally, the Dingell Act designated 49.2 miles of the Green River in Labyrinth Canyon to be managed as a Scenic River under the provisions of the Wild and Scenic Rivers Act of 1968.

The BLM has considered a range of options that would allow Twin Bridges the opportunity to explore, develop, and extract helium in accordance with its valid existing rights under its Federal and SITLA leases. Twin Bridges has submitted two Federal APDs and applied for associated Federal ROWs and authorizations for various facilities and infrastructure required to access the mineral resources associated with each lease. In association with this EA, the BLM is considering approving the well pad and associated facilities. As described throughout this EA, in order to develop its Federal Lease and potentially the two SITLA leases (which do not require a Federal APD), the alternatives considered in this EA include:

- (1) Approval of a well pad, the location of which would vary depending on the alternative selected. The well pad would be authorized with an off-lease ROW if the off-lease alternative is selected and approved as an on-lease facility if the on-lease alternative is selected.
- (2) Three ROW authorizations for pipelines (one 14 inch gathering pipeline, one 8 inch produced water pipeline, and one 8-inch fluids transfer pipeline) to transport product to the proposed processing plant.
- (3) One ROW for power and communication infrastructure that would run from the well pad location to the proposed processing plant.
- (4) One ROW for proposed road improvements, the location of which would vary depending on the alternative selected. The improvements would occur on Spur Road 1025 if the off-lease well pad alternative is selected or on County Road 1026 if the on-lease well pad alternative is selected.
- (5) Potential approval of one Federal APD. The 5-2 Federal APD is associated with the off-lease alternative and the 5-1 APD is associated with the on-lease alternative.
- (6) Up to three separate underground authorizations to horizontally drill to each of the three leases.

In addition to these Federal authorizations, Twin Bridges has applied to the SITLA for a permit to construct and operate a helium processing plant on SITLA lands to separate helium from noncommercial gases. The location of the processing plant on SITLA lands would vary based on the location of the well pads and associated production facilities (see Appendix F, Figure F-1). The helium processing plant is not a Federal action. However, because the non-Federal action could be prevented or modified by BLM decision making, the impacts of the helium processing plant are analyzed as indirect effects of the BLM actions analyzed in this EA.

1.2 PURPOSE AND NEED FOR FEDERAL ACTIONS

The purpose of the Federal action is to respond to Twin Bridges' applications for APDs and various ROWs to support the development of its three mineral leases. The need is established by the various statutes and BLM's responsibility under the Mineral Leasing Act (MLA) of 1920, as amended by the Federal Land Policy and Management Act (FLPMA) of 1976; the Wilderness Act of 1964, which addresses preservation and allowable uses within designated wilderness areas; the Wild and Scenic Rivers Act of 1968, which addresses preservation of outstandingly remarkable values with designated river corridors; the Federal Onshore Oil and Gas Leasing Act of 1987; and the Helium Privatization Act of 1996, which establishes the BLM's authority and authorizes the Secretary of the Interior to enter into agreements with private parties for the recovery and disposal of helium on Federal lands.

1.3 DECISIONS TO BE MADE

On the basis of this NEPA analysis, the BLM may select one of the 3 alternatives analyzed in this EA or a combination thereof. If the BLM selects Alternative A (off-lease well pad) or Alternative B (on-lease well pad), the BLM may approve the associated ROW applications, underground authorizations, and APD for the Federal lease with no modifications, or the BLM may approve the applications with adjustments or conditions. These adjustments or conditions could include actions to minimize impacts to wilderness characteristics within the Labyrinth Canyon Wilderness Area, to address potential impacts to the Green River Wild and Scenic River corridor, and other actions that might be necessary to prevent unnecessary or undue degradation of public lands. If the BLM determines that the approvals could result in significant impacts, then the BLM would prepare an EIS for the action. If not, a Finding of No Significant Impact and Decision Record may be signed for the EA that approves the alternative selected.

1.4 RELATIONSHIP TO POLICIES, PROGRAMS, AND PLANS

1.4.1 Conformance with Bureau of Land Management Resource Management Plan

The BLM lands are administered with direction provided in land use plans that establish the goals and objectives for the management of the resources and land uses. BLM resource management plans (RMPs) must be prepared in accordance with FLPMA. The affected Federal lands are managed by BLM Price FO. The applicable RMP is the Price RMP (BLM 2008a), as amended.

The Price RMP provides guidance for the management of 2.5 million acres of public land administered by BLM in Carbon and Emery Counties in central-eastern Utah. The purpose of the Price RMP is to provide a comprehensive framework for public land management within the jurisdiction of the Price FO and its allocation of resources pursuant to the multiple-use and sustained-yield mandate of FLPMA.

The proposed action and alternatives are in conformance with the Price RMP because they are consistent with the following RMP decisions (objectives, terms, and conditions):

- Mineral and Energy Resources Goal: Provide opportunities for mineral exploration and development under the mining and mineral leasing laws subject to legal requirements to protect other resource values.
- Mineral and Energy Resources Objective: Manage oil and gas leasing, exploration and development while minimizing impact to other resource values.

- LAR-28: Additional ROWs will be granted consistent with RMP goals and objectives.
- LAR-10: In accordance with the State of Utah v. Andrus, Oct. 1, 1979 (Cotter Decision), the BLM will grant the State of Utah reasonable access to State lands for economic purposes, on a case-by-case basis.
- Visual Resources Management Objective: Use proper design techniques and mitigation measures, future projects and use authorizations under this plan to minimize contrast with the characteristic landscape and not exceed the VRM [Visual Resource Management] Management Class Standards.

The Price RMP provides specific lease stipulations, best management practices and goals, objectives, and management direction that apply to a variety of resources and activities on BLM-administered lands. The BLM would apply appropriate mitigation measures at the permitting stage to provide appropriate protective conditions for the resources on BLM-administered lands and ensure compliance with the RMP and all applicable laws, regulations, and policies.

The well pad for the off-lease alternative would be located in a ROW avoidance area. A ROW avoidance area is defined in the Price RMP as “areas with sensitive resource values where rights-of-way leases and easements will be strongly discouraged. Authorization made in avoidance areas will have to be compatible with the purpose for which the area was designated and is not otherwise feasible on lands outside the avoidance area.” BLM issuing a ROW in the avoidance area is in conformance with the RMP because locations outside the avoidance area are either located in a designated wilderness area or are too far away to provide access via directional drilling to the valid existing leases. Furthermore, the area is identified as an avoidance area to protect visual resources (the area is identified as Visual Resource Management [VRM] Class II in the Price RMP). The analysis contained in this EA determined that the facilities have been designed in conformance with the VRM Class II designation.

1.4.2 Relationship to Other Federal Laws, Regulations, and Policies

Executive Order (EO) 13817 (83 *Federal Register* 23295), issued on December 20, 2017, outlines the importance of critical minerals, including helium, and the need to streamline leasing and permitting to expedite exploration, production, processing, reprocessing, recycling, and domestic refining of critical minerals.

Under Title V of FLPMA, BLM has discretion to authorize ROWs for a variety of uses, including roads and pipelines, while taking into consideration impacts on natural and cultural resources (including historical resources). When issuing any ROW grants, the BLM must include appropriate terms and conditions, including any actions that the BLM determines are appropriate “to minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment.”

Sections 302, 303, and 310 of FLPMA and BLM’s associated regulations at 43 CFR 2920 allow the BLM to issue leases, permits, and easements for the non-Federal use of public lands not specifically authorized under other laws or regulations and not specifically forbidden by law. If BLM issues underground authorizations for a well bore to access the Federal and SITLA mineral leases, the BLM would utilize these authorities.

Sections 4(d)(2) and 4(d)(3) of the Wilderness Act of 1964 describe how minerals and mining activities are to be managed in wilderness areas. The BLM manages mineral resources within designated wilderness in accordance with the BLM’s wilderness regulations at 43 CFR 6305 (Access to State and Private Land of Valid Occupancies within Wilderness Areas). Manual 6340 – Management of Designated Wilderness Areas (BLM 2012b) also directs the BLM to honor valid existing rights while

preserving wilderness characteristics to the greatest extent possible. In accordance with BLM Manual 6340, the BLM will grant access to valid existing mineral rights that are wholly within a designated wilderness, as provided for in Section 5(b) of the Wilderness Act, in a manner consistent with other areas in the National Wilderness Preservation System similarly situated. In most cases, this means such access will be treated in the same way as access to inholdings, but in some instances, applying the regulations found at 43 CFR 6305.30 may result in granting mineral lease holders a greater degree of access than would be granted an inholder.

1.4.3 Consistency with Other Federal and Local Land Management Plans and Policies

The BLM will process and evaluate the ROW applications and APDs submitted by Twin Bridges pursuant to the BLM's statutory mandates and authorities governing Federal helium leasing and other Federal authorities to include the MLA (as amended), the Wilderness Act of 1964, NEPA (as amended), FLPMA, and the Helium Privatization Act and regulations (43 CFR 16.1(a) and 16.2).

The BLM reviewed the land use plans for the State of Utah, as well as Emery County's General and Land Use Plans, and considered the land management objectives established in these plans. The state manages SITLA lands under a mandate to produce funding for the state's school system.

1.4.4 Federal, Tribal, State, and Local Approvals

Twin Bridges would need to obtain federal, state, and local permits before construction. Key federal, state, and local permits, approvals, and authorizing actions for construction, operation, maintenance, and abandonment of the Project are included in Appendix A.

1.5 IDENTIFICATION OF ISSUES

A BLM Interdisciplinary Team (ID Team) reviewed the proposed well locations and ROW applications submitted by Twin Bridges using an ID Team Checklist (Appendix B) and identified resources that may be affected by the proposed action and alternatives that warranted analysis in the EA. The resources and issues identified by the BLM ID Team include the following:

- **Air Quality and Greenhouse Gas (GHG) Emissions:**
 - What are the potential effects of the Project on air quality?
 - What are the potential GHG emissions of the Project and how do GHG emissions contribute to climate change?
- **Soils:** What are the potential effects on soils from the construction, operation, and maintenance of the Project?
- **Vegetation:** What are the potential effects on vegetation from the construction, operation, and maintenance of the Project?
- **Special-Status Plants:** How would the Project affect known populations and/or habitat of federally listed endangered and BLM sensitive plants including flat-top buckwheat, Utah spurge, Trotter's oreoxis and entrada rushpink?
- **General Wildlife:** What are the potential effects of the Project on general wildlife species (e.g., desert bighorn sheep, pronghorn, and BLM sensitive species, including their habitats)?
- **Socioeconomics:** How would the Project affect socioeconomics, including employment, mineral lease revenue, and tourism and recreational revenue?

- **Special-Status Wildlife:** What are the potential effects of the Project on migratory birds, raptor species, bat species, kit fox and Mexican spotted owl including their habitat?
- **Recreation:** How would the Project affect recreation opportunities in the analysis area?
- **Wilderness:** What are the potential effects of the Project on wilderness?
- **Lands with Wilderness Characteristics (LWCs):** What are the potential effects of the Project on LWCs?
- **Visual Resources:** What are the potential effects of the Project on the visual landscape of the region?

1.5.1 Issues Considered but Eliminated from Detailed Consideration

The BLM ID Team Checklist (Appendix B) documents BLM's consideration of other issues and contains the BLM's rationale for dismissing these issues from detailed analysis in the EA; however, the BLM received comments on the Draft EA that indicated that some of the resources that were not analyzed in detail in the Draft EA should have been. As described in Appendix J, in response to these comments, the BLM reviewed these resources and either included additional analysis in the EA or added additional information to the ID Team Checklist regarding the BLM's determination that detailed analysis was not warranted.

In addition to the information contained in the BLM's ID Team Checklist, the BLM developed the following information about issues considered but eliminated from detailed analysis:

Water Use and Availability: Under all action alternatives, the Applicant would obtain the necessary water supply for the proposed Project from the City of Green River's existing Water Rights 91-336, 91-1902, and 91-102. The Applicant does not propose any action that would further deplete surface waters, aquifers, or otherwise contribute to issues with water use and availability. The proposed total water use under either alternative is estimated to be 4 acre-feet annually (AFY). This includes 3 AFY for production and 1 AFY for road maintenance. The Applicant's proposal does not include hydraulic fracturing, a completion method used for well development that is typically water intensive. The U.S. Geologic Survey (USGS) reports water use in Emery County (Dieter et al. 2015). The USGS data show a total of 171,872 AFY use in Emery County. Of that total, 504 AFY are in the mining category where oil and gas and helium development use would fall). The proposed action would be 0.002% of total use and 0.8 % of all mining use in Emery County. Within Emery County the largest use is irrigation, which comprises 83% of all water use. Thermoelectric power generation comprises another 15% of water use. As such, detailed direct, indirect, or cumulative impacts analysis is not necessary to assist the decisionmaker in making a determination of the context and intensity of water use impacts or in distinguishing between alternatives.

CHAPTER 2. DESCRIPTION OF THE ALTERNATIVES

2.1 INTRODUCTION

This EA analyzes the potential impacts of implementing Alternative A (Proposed Action), Alternative B (On-Lease Surface Action), and Alternative C (No Action). The No Action Alternative is considered and analyzed to provide a baseline against which to compare the impacts of the two action alternatives. Appendix F, Figure F-1 contains a map of the facilities associated with Alternative A and Alternative B.

Both Alternatives A and B would be implemented in a sequential manner, with Twin Bridges first constructing access road improvements, constructing the well pad, and drilling an initial exploratory well (under Alternative A the initial well would be to its SITLA lease using proposed well 36-1; under Alternative B the initial well would be to its Federal lease using proposed well 5-1). If sufficient quality and quantity of helium-bearing gas is produced from the original exploratory well, Twin Bridges would develop a second exploratory well (under Alternative A this second exploratory well would be to the Federal lease using proposed well 5-2; under Alternative B the second well target would be determined based on the results of the first well), construct the proposed processing facility on SITLA lands, and install the pipelines and communication infrastructure between the well pad and processing facility. Up to 5 additional wells may be developed from the proposed well pad under both Alternatives A and B in subsequent phases of the project.

2.2 ALTERNATIVE A – PROPOSED ACTION: BOWKNOT 36-1

Under Alternative A, the BLM would issue Twin Bridges a ROW to construct road improvements to Spur Road 1025 from Emery County Road 1025 to the proposed well pad, a ROW to construct an off-lease well pad, underground authorizations required to access the Federal and SITLA mineral lease pursuant to 43 CFR 2920, approve Twin Bridges' APD for the Federal Lease (the 5-2 well), and issue three ROWs for pipelines (one 14 inch gathering pipeline, one 8 inch produced water pipeline, and one 8 inch fluids transfer pipeline) and one ROW for running power and communication infrastructure that would run from the well pad location to the proposed processing plant. Up to 5 additional development wells may be drilled from the proposed well pad in subsequent phases of the project.

Twin Bridges conducted geological research to define the structure of the subsurface helium reservoir and determined that the crest of the target formation occurs under its SITLA lease ML-53420 located in Section 36, T25S, R16E, Emery County, Utah. Therefore, Twin Bridges proposes to drill proposed well 36-1, which targets the formation under this SITLA lease, as the first well to be developed under this alternative. This alternative is technically preferable to Twin Bridges because the trajectory of the well bore from the Alternative A surface location to the 36-1 bottom hole location would allow a more complete delineation of the potential reservoir and improved reservoir access compared to the well bores from the Alternative B surface location. To conduct exploratory drilling and testing for helium resources

on this SITLA lease, Twin Bridges has included the following primary components in its proposed action (see Appendix F, Figure F-2):

- Road improvements on approximately 2.7 miles of Spur Road 1025 from Emery County Road 1025 to the proposed well pad. Upgrades to the road would result in 9.9 acres of surface disturbance.
- Construction of a 5.4-acre well pad located in an area of existing disturbance. The well pad is smaller than the well pad for Alternative B because a smaller drilling rig can be used to reach the target formation from the Alternative A surface location.
- Drilling and testing of one exploratory helium well (Bowknot 36-1) to access the SITLA Lease ML-53420 located in Section 36, T25S, R16E, Emery County, Utah.

If a sufficient quality and quantity of helium-bearing gas is confirmed through flow testing of the exploratory well, the following actions would also be constructed:

- Installation of three pipelines and one conduit: 1) up to 14-inch-diameter steel or fiber-reinforced polyethylene gathering pipeline, 2) up to 8-inch-diameter polyethylene fluid transfer pipeline, 3) an 8-inch diameter polyethylene produced water pipeline, and 4) up to 6-inch-diameter conduit for running control and power cables. All infrastructure would be buried (3–4 feet) within a 30-foot-wide ROW parallel to Spur Road 1025, Emery County Road 1025, and Emery County Road 1010. Approximately 4.9 miles of proposed pipeline ROW from the well pad to the proposed processing facility would result in 17.8 acres of surface disturbance. The proposed pipelines are shown in Figure F-2 in Appendix F.
- Drilling, testing, and production of a second delineation well (Bowknot 5-2) from the same well pad as the Bowknot 36-1 well under the terms and stipulations of Twin Bridges' Federal lease UTU-93713 located in Section 7 and portions of Sections 5, 6, and 8, T26S, R17E, Emery County, Utah. The drilling of the second delineation well is subject to the terms of the Federal Helium Contract No. 20-02. Drilling and completion procedures would be similar to those described above and no new surface disturbance would occur (the well would be drilled from the existing 36-1 well pad). Additional surface facilities would be limited to an additional wellhead, separator, and flowlines to connect to the well to existing facility and pipeline network. All other existing infrastructure would be utilized for the subsequent well.
- Construction of a helium processing plant on SITLA-managed lands in Section 16, T25S, R16E, Emery County, Utah.

Based upon the results of the initial well test and subsequent delineation well, up to 5 additional development wells could be drilled and put into production targeting the mineral resources under both SITLA leases and the Federal lease. The number of wells would be determined based upon the results of the initial test well and subsequent delineation well. The number of wells needed would largely be dictated by the viability of future horizontal drilling. It is possible that Twin Bridges may not request to drill more than the two initial wellbores, however up to five additional wells could be needed. All future wells would be drilled from the 5.4 acre well pad and no additional disturbance would occur. Additional surface facilities would be limited to an additional wellheads, separators, and flowlines to connect to each well to existing facility and pipeline network. All other existing infrastructure would be utilized for the subsequent wells. All wells would be drilled from the 5.4 acre well pad and no additional disturbance would occur.

Twin Bridges' detailed Project description is in Appendix G, which describes the processes involved in the Project construction and operation. These processes include construction of access roads and road improvements; construction of the well pad; drilling activities; well completion and testing; water supply;

construction of the pipelines; construction of a processing plant (on non-Federal lands); product transportation; hazardous waste material and handling; construction of additional delineation wells; interim reclamation; well abandonment and final reclamation; and Applicant-committed environmental protection measures.

2.3 ALTERNATIVE B – ON-LEASE SURFACE FACILITY: BOWKNOT 5-1

Under Alternative B, the BLM would issue Twin Bridges a ROW to construct road improvements to Emery County Road 1026 from the beginning of the road to the proposed well pad, underground authorizations required to access the SITLA mineral leases pursuant to 43 CFR 2920, approve Twin Bridges' APD for the 5-1 well and associated well pad, and issue three ROWs for pipelines (one 14 inch gathering pipeline, one 8 inch produced water pipeline, and one 8 inch fluids transfer pipeline) and one ROW for running power and communication infrastructure that would run from the well pad location to the proposed processing plant. Up to 6 additional wells may be drilled from the proposed well pad in subsequent phases of the project.

Under this alternative, the first exploratory drilling would occur on Twin Bridges' existing Federal lease (UTU-93713). This alternative would consist of the following primary components (see Appendix F, Figure F-6):

- Road improvements on approximately 4.0 miles of Emery County Road 1026 to the proposed well pad. Upgrades to the road would result in 14.5 acres of surface disturbance and may require use of more intensive construction techniques (e.g., blasting of exposed bedrock) compared to Alternative A.
- Construction of a 7.3-acre well pad located in a previously undisturbed area.
- Drilling and testing of one exploratory helium well (Bowknot 5-1) on Federal lease UTU-93713 located in Section 7 and portions of Sections 5, 6, and 8, T26S, R17E, Emery County, Utah. The 5-1 well would be completed subject to the terms of the Federal Helium Contract No. 20-02.

If a sufficient quality and quantity of helium-bearing gas is confirmed through flow testing of the exploratory well, the following actions would also be constructed:

- Installation of three pipelines and one conduit: 1) up to 14-inch-diameter steel or fiber-reinforced polyethylene gathering pipeline, 2) up to 8-inch-diameter polyethylene fluid transfer pipeline, 3) an 8-inch diameter polyethylene produced water pipeline, and 4) up to 6-inch-diameter conduit for running control and power cables. All infrastructure would be buried (3–4 feet) within a 30-foot-wide ROW parallel to Emery County Road 1026 and Emery County Road 1010. Construction and installation along the 5.6-mile-long proposed pipeline ROW would result in 20.5 acres of surface disturbance.
- Drilling, testing and production of a second delineation well. The design and target of the second delineation well would be determined based on the results of the 5-1 exploration well but is likely to target either Federal lease UTU-93713 located in Sections 5, 6, 7, and 8, T26S, R17E, Emery County, Utah or State lease ML-53420 located in Section 36, T25S, R16E, Emery County, Utah. Drilling and completion procedures would be similar to those described above and no new surface disturbance would occur (the well would be drilled from the existing 7.3 acre well pad). Additional surface facilities would be limited to an additional wellhead, separator, and flowlines to connect to the well to existing facility and pipeline network. All other existing infrastructure would be utilized for the subsequent well.

- Construction of a helium processing plant located on SITLA-managed lands in Section 16, T26S, R16E, Emery County, Utah.

Based upon the results of the initial well test and subsequent delineation well, up to 5 additional development wells could be drilled and put into production targeting the mineral resources under both SITLA leases and the Federal lease. The number of wells would be determined based upon the results of the initial test well and subsequent delineation well. The number of development wells needed would largely be dictated by the viability of future horizontal drilling. It is possible that Twin Bridges may not request to drill more than the two initial wellbores, however up to five additional wells could be needed. . Additional surface facilities would be limited to an additional wellheads, separators, and flowlines to connect to each well to existing facility and pipeline network. All other existing infrastructure would be utilized for the subsequent wells. All future wells would be drilled from the 7.3 acre well pad and no additional disturbance would occur.

Twin Bridges has a detailed Project description located in Appendix G. The Alternative B details are very similar to Alternative A as construction and operation sequences are the same and construction and operational methods are the same.

2.4 ALTERNATIVE C – NO ACTION ALTERNATIVE

Under the No Action Alternative, Twin Bridges' ROW applications and APDs would be denied, and the action alternatives would not be developed. Exploration by Twin Bridges to access its UTU-93713 Federal lease and SITLA leases would need to be assessed and conducted in a different manner.

2.5 SUMMARY OF PROJECT COMPONENTS AND PROPOSED SURFACE DISTURBANCE FOR EACH ALTERNATIVE

Table 2-1 summarizes the Project components and the subsequent surface disturbance associated with each proposed alternative.

Table 2-1. Summary of Alternatives

Alternative	Project Component	Location/Specifics	ROW Dimensions	Disturbance (acres)
Alternative A – Proposed Action: Bowknot 36-1	Road upgrades	Spur Road 1025	30-foot-wide ROW for approximately 2.7 miles (14,445 feet)	9.9
	Well pad	Section 26, T25S, R16E	300 × 590 feet	5.4 (2.4 after initial reclamation)
	Pipeline ROWs	Well pad to gas plant	30-foot-wide ROWs for approximately 4.9 miles (25,880 feet)	17.8
	Gas plant ¹	Section 16, T25S, R16E, Emery County	Not applicable	10.0

Alternative	Project Component	Location/Specifics	ROW Dimensions	Disturbance (acres)
Total Disturbance of Alternative A				43.1
Alternative B – On-Lease Surface Facility: Bowknot 5-1	Road upgrades	Emery County Road 1026	30-foot-wide ROW for approximately 4.0 miles (21,140 feet)	14.5
	Well pad	Section 7, T26S, R17E	400 × 500 feet	7.3 (3.4 after initial reclamation)
	Pipeline ROWs	Well pad to gas plant	30-foot-wide ROWs for approximately 5.6 miles (29,780 feet)	20.5
	Gas plant ¹	Section 16, T26S, R16E, Emery County	Not applicable	10.0
Total Disturbance of Alternative B				52.3
Alternative C – No Action Alternative	Project application would be denied, and no new develop would occur.			0.0
Total Disturbance of Alternative C				0.0

¹The Helium Processing Plant is located on SITLA lands. The effects of the construction and operation of the Helium Processing Plant are analyzed as non-federal indirect effects of the BLM actions analyzed in this EA.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Twin Bridges originally submitted an APD for Alternative B, as described in this EA. The BLM worked with Twin Bridges to consider other alternatives that would reduce impacts on BLM-managed resources, including the Labyrinth Canyon Wilderness Area during the early review of the APD for Alternative B. The result of these conversations was the development of Alternative A. Prior to submitting the APDs, Twin Bridges considered other surface locations for well pads to access their SITLA and Federal leases, including surface locations on the SITLA leases. Twin Bridges has stated that the company did not submit APDs for these surface locations out of a commitment to minimizing impacts on the Labyrinth Canyon Wilderness Area. Even though Twin Bridges did not submit an APD and other associated applications for well pad surface locations on the SITLA leases, the BLM considered this alternative during the alternative development process. The BLM concluded that construction of a well pad on the SITLA leases within the wilderness and providing the necessary overland travel access to reach the SITLA leases would have been more impactful than those alternatives considered in the EA. Therefore, the BLM, in collaboration with Twin Bridges, did not identify any other alternatives that would be technically feasible for evaluation in the EA.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter presents the existing environment and the environmental consequences on resources that could be affected by the alternatives presented in Chapter 2. In accordance with NEPA regulations (40 CFR 1500.4(g)), the Price FO ID Team used internal scoping and comments submitted by the public on the Draft EA to identify the resources that could be affected by the alternatives. The ID Team Checklist prepared by BLM Price FO staff (Appendix B) lists all the resources considered and indicates whether they are not present in the area that would be affected by the proposed action, present but not affected to a degree that requires detailed analysis, or present with potential for relevant impacts that need to be analyzed in detail in the EA. Section 1.6 of this EA describes the resources that were identified as present with the potential to be impacted and are therefore analyzed in detail in this EA.

3.1.1 General Setting

The Project is in southeastern Emery County, Utah, approximately 30 miles south of Green River, Utah, at the eastern edge of the San Rafael Desert, near Keg Spring Canyon, Keg Knoll and the BLM-administered Labyrinth Canyon Wilderness Area. Emery County Road 1010 provides access to the Project site from Interstate 70 near Green River. The proposed well pads would be located approximately 4,630 feet (Alternative A) and 5,250 feet above mean sea level (Alternative B). Vegetation in the area includes blackbrush (*Coleogyne ramosissima*), Mormon tea (*Ephedra* sp.), and sand sagebrush (*Artemisia filifolia*) shrublands with areas of exposed bedrock and sand sheets known as surficial eolian deposits.

3.1.2 Cumulative Impacts Scenario

The information contained in this section was used to support the cumulative impacts analysis for the resources analyzed in detail in this EA.

3.1.2.1 Cumulative Impacts Analysis Areas

For each resource analyzed in this EA, the BLM identified a geographic scope (analysis area) for the cumulative effects analysis (Figure F-9). Each cumulative impacts analysis area (CIAAs) was identified to include all of the direct and indirect impacts of the alternatives analyzed in the EA on that particular resource. Within these CIAAs, the BLM assessed the impacts of the past, present, and reasonably foreseeable future actions (RFFAs) that may contribute to cumulative impacts on those resources. The CIAAs for the resources analyzed in this EA are described below:

- **Soils, vegetation, special-status plants species, general wildlife, and special-status wildlife species were analyzed using a watershed CIAA (529,838 acres):** This area includes four 10-digit hydrologic unit code (HUC-10) watersheds within which the alternatives would be located: Salt Wash-Green River, Moonshine Wash, Taylor Canyon-Green River, and Horseshoe Canyon. This CIAA represents a hydrologic boundary surrounding the Project within which all direct and indirect impacts from the alternatives on soils, habitats, and plant and wildlife species would occur (see Figure F-9 in Appendix F).
- **Wilderness CIAA (60,029 acres):** Includes in its entirety the Labyrinth Canyon wilderness area, including all SITLA inholdings. This CIAA is used because it is the only wilderness area that could be affected by the Project.

- **LWC CIAA (100,488 acres):** includes Labyrinth Canyon Unit A, Labyrinth Canyon Unit B, and Sweetwater Reef Unit A LWCs. This CIAA area is used because it includes in their entirety all LWC units with potential to be affected by the Project.
- **Recreation and Visual CIAA (115,120 acres):** Comprises all areas within 5 miles of the Project. This CIAA is used for the cumulative analysis because it includes all areas in which the Project would be visible (foreground and middle ground). This CIAA is used because it includes in its entirety all the recreation areas that could be affected by the Project. This CIAA includes the following recreation areas: Labyrinth Canyon Special Recreation Management Area (SRMA), Labyrinth Rims/Gemini Bridges SRMA, and the Five Hole Arch Trail.
- **Socioeconomics CIAA:** The CIAA for socioeconomics is the entirety of Emery County. This CIAA is used because the Project and the communities that would benefit from jobs and mineral royalty revenue and may be negatively impacted by impacts on recreation and tourism revenue are all located in Emery County.
- **Air quality and GHG:** The CIAA for ambient air quality and Air Quality Related Values (AQRVs) is the near field modeling domain evaluated in a modeling study evaluating oil and gas development occurring in the same airshed as the Project (see further discussion in Section 3.2.2.2.1). Since climate change impacts are the result of cumulative global GHG emissions, the effects of GHG emissions are inherently cumulative and impact various regions differently. Therefore, for the purpose of this EA, climate change impacts are broadly discussed in terms of global trends and projections as well as on a more regional levels in Section 3.2.2.5 and Appendix H.

The temporal scope of the cumulative effects analysis was identified as 100 years, which includes the planned 20-year life of the Project and the time that may be required to restore the affected lands after the Project area is reclaimed.

3.1.2.2 Past, Present, and Reasonably Foreseeable Future Actions

Although the Project area is located in the Price FO, portions of the CIAAs identified in Section 3.1.2.1 includes lands located in the Moab and Richfield FO. The following section describes current and RFFAs within the Price, Moab and Richfield FOs that have been identified as occurring within the CIAAs and having the potential to contribute to the cumulative impacts on the resources analyzed in this EA. The projects listed are not presented as an exhaustive list of actions; however, every effort has been made to present a comprehensive list of actions that could contribute to cumulative impacts. Past decisions and management objectives that continue to affect the resources analyzed are also in described in the relevant affected environment sections.

3.1.2.2.1 OIL AND GAS DEVELOPMENT

BLM approved RMPs for the Price, Richfield and Moab FOs in 2008. Each FO prepared reasonably foreseeable development (RFD) scenarios for oil and gas development to support their respective planning efforts. An RFD is a technical report informed by local geology, current historical trends in oil and gas activity and forecasts of crude oil and natural gas markets. An RFD is intended to project a baseline scenario of oil and gas exploration, development, production, and reclamation activity to aid the BLM with land-use planning by providing a mechanism to analyze the effects that discretionary management decisions may have on oil and gas development; local and regional economies; and resource values.

In 2012 and 2016, the BLM prepared revised RFDs for oil and gas development to support the Moab and San Rafael Desert Master Leasing Plan (MLP) planning efforts, respectively. The San Rafael Desert MLP was never completed by the BLM and the need for this MLP was superseded by BLM IM No. 2018-034 - Updating Oil and Gas Leasing Reform – Land Use Planning and Lease Parcel Reviews. Nonetheless, for purposes of this EA, the RFDs developed for that initial effort are relevant. The RFD prepared for the San

Rafael Desert MLP addressed 524,849 acres of BLM, state and private lands, and includes those portions of the Price and a small portion of the Richfield FO closest to the Project. The RFD prepared for the Moab MLP addressed 946,469 acres of BLM, state, state parks, and private lands, and includes those portions of the Moab FO closest to the Project. Because the RFDs for the Moab and San Rafael Desert MLPs do not cover an entire FO, the most current RFD for the portions of the FOs not covered by these RFDs are the RFDs prepared in association with the 2008 RMPs. Recent or proposed oil and gas lease sales and APD permitting projects are assumed to be accounted for in these RFDs.

The following information on past, present, and reasonably foreseeable future oil and gas actions are incorporated by reference from the 2016 San Rafael Desert MLP RFD (BLM 2016a):

- Seventy-nine wells have been drilled in the San Rafael Desert MLP area, all of which have been plugged and abandoned. Five wells have been drilled in the planning area during the past 31 years. The last well drilled in the planning area was in 1989. The estimated total existing surface disturbance from previous oil and gas activity in the planning area is 0 acres because the last well drilled there was plugged and abandoned more than 25 years ago. Geophysical exploration has also historically occurred in the planning area. Both 2-D and 3-D seismic projects have taken place.
- Future oil and gas drilling is projected to comprise two wells per year for a total of 30 wells over the next 15 years, resulting in a total surface disturbance of 585 acres from construction of new well pads and associated infrastructure, including roads and pipelines. Of this total, 492 acres would be reclaimed, resulting a net surface disturbance of 93 acres. The RFD projects future disturbance from geophysical exploration over the next 15 years to be 270 linear miles of source lines with an associated surface disturbance of 330 acres. Of this total, 264 acres would be reclaimed, resulting a net surface disturbance of 66 acres.
- Total existing and proposed disturbance within the area addressed by the RFD for the San Rafael Desert MLP would be 915 acres over the next 15 years. Approximately 756 acres of this disturbance would be reclaimed.

The following information on past, present, and reasonably foreseeable future oil and gas actions are incorporated by reference from the 2012 RFD Scenario for Oil and Gas in the Moab MLP Area (BLM 2012b):

- There are 29 actives well and 24 wells that have been plugged and abandoned resulting in a total of 318 acres of existing surface disturbance. Geophysical exploration operations have been conducted throughout the entire planning area in the past, using both 2-D and 3-D technology. Since 2001, one 3-D geophysical project has been conducted in each of the four oil and gas development areas within the planning area.
- Future oil and gas drilling is projected to comprise 128 wells, resulting in a 1,050 acres of additional total surface disturbance from construction of new well pads and associated infrastructure, including roads and pipelines. Of this total, 17 wells are presumed to be dry. Of the total 1,368 acres of past, present and reasonably foreseeable disturbance, approximately 611 acres would be reclaimed, resulting in a net disturbance of 575 acres. Future geophysical exploration using similar technologies would likely occur in each of the four oil and gas development areas within the MLP area during the next 15 years. The RFD estimates 61 linear miles of source lines per year, or a total of 915 linear miles of source lines, most of which would occur in the Salt Wash-Big Flat and Hatch Point areas. Total surface disturbance would be 1,109 acres over the next 15 years. Of this total, 888 acres would be reclaimed. Using an average surface disturbance of 74 acres per year would be reclaimed, total surface disturbance that would be reclaimed during the next 15 years would be 888 acres.
- Total existing and proposed total disturbance with the area addressed by the RFD for the Moab MLP would be 2,159 acres over the next 15 years. Approximately 1,499 acres of this disturbance would be reclaimed.

The easternmost portion of the Richfield FO includes a 134,244-acre area that within the soils, vegetation, special-status plants species, general wildlife, and special-status wildlife species CIAA. As mapped in the Richfield FO RFD, this area is part of one of four Paradox Basin playas. The following information on past, present, and reasonably foreseeable future oil and gas actions in this area are incorporated by reference from the Richfield FO RFD (BLM 2005):

- Present disturbance is minimal and past disturbance is largely reclaimed.
- Potential for oil and gas development in the eastern and southern portions of the planning area (described as Area 1 and 2 respectively) is described as low. Some exploration is expected to continue at historic levels (three wells per year). Surface disturbance across this area is expected to result in 1,980 acres of surface disturbance over 15 years.¹
- Few geophysical surveys are expected in Areas 1 and 2. Based on past activity and current interest these areas are collectively expected to have 240 acres of surface disturbance.
- Total existing and proposed total disturbance with the of the Richfield RFD Areas 1 and 2 would be 2,220 acres.

Considered together, the projections in the three RFDs include a total of 5,264 acres of surface disturbance from oil and gas development.

3.1.2.2.2 POTASH DEVELOPMENT

Potash resources within the Moab MLP area found within the Paradox Formation deposited in the Paradox Basin. The BLM estimates that 129,999 acres of the 946,469-acre Moab MLP area have a high development potential for potash and approximately 375,895 acres have a moderate to high potential for potash. Two Known Potash Leasing Areas (KPLAs) were established within the planning area in the 1960s as a result of exploration activity for both oil and gas and potash. The Seven Mile KPLA was established in 1960 and includes approximately 5,156 acres. The Cane Creek KPLA was established in 1965 and includes approximately 34,696 acres. The Cane Creek Mine, the only mine producing potash in the planning area, is located in this KPLA. The Ten Mile Known Potash Leasing KPLA (90,152 acres) was established in 2012.

The RFD projects following types of activities associated with potash development: exploration drilling on prospective permits, exploration drilling within KLPAs, geophysical explorations, potash development using solution mining and processing methods that utilize solar evaporation and crystallization, development of a crystallization plant, production drilling and drilling for water wells, disposal wells and monitoring wells. The BLM projects 7,519 acres of surface disturbance from exploration, production drilling, and processing operations over the next 35 years and 1,200 acres of surface disturbance from geophysical exploration (all of which would be reclaimed). Considered together, there would be a total of 7,719 acres of surface disturbance.

3.1.2.2.3 TRAVEL MANAGEMENT

The BLM approved the Travel Management Plan (TMP) for the San Rafael Desert Travel Management Area in August 2020 (BLM 2020f). The 2020 TMP designated existing routes as open, limited or closed to off-highway vehicle (OHV) use and was based on a comprehensive route inventory and evaluation of all routes within the Travel Management Area. The 2020 TMP did not authorize route realignments, reroutes, new route construction, or facility extensions.

¹While not quantified in the RFD, Area 1 and 2 are conservatively estimated to comprise approximately 3 million acres. The 96,00-acre area within the soils, vegetation, special-status plants species, general wildlife, and special-status wildlife species CIAA is approximately 4% of these areas.

Prior to adoption of the 2020 TMP, 302.6 miles of routes on BLM-administered lands were available for public motorized vehicle use (OHV—open and BLM System/County Roads) as described in the 2008 Price RMP and TMP (BLM 2008a).

The approved 2020 TMP designated 701.6 miles of routes OHV-open, 65.2 miles OHV-limited, and 414 miles OHV-closed (BLM 2020f).

3.1.2.2.4 RECREATION

The BLM Price FO expects an increase in recreational use of BLM-administered lands, both motorized and non-motorized. The BLM also expects some increase in applications for and issuance of BLM Special Recreation Permits in the Price and Moab FO, including continued issuance of BLM Special Recreation Permits for Labyrinth Canyon river trips. As disclosed in the Moab MLP EIS, there is an estimated 3% growth in recreation use per year on BLM-administered lands in the vicinity of the Project (BLM 2016b).

3.1.2.2.5 OTHER ACTIONS

BLM would continue to issue livestock grazing permits in the vicinity of the Project. Allottees would continue to look for opportunities to develop water through wells and pipelines to allow for better livestock distribution and reduce the need to haul water.

In 2015, Price FO began implementing the San Rafael River Restoration Project. The project was designed to improve the ecological condition of the lower San Rafael River, which has degraded severely over time through a combination of impacts, including altered flow regimes and non-native vegetation encroachment. Implementation of the project will improve the riparian habitat (BLM 2014b).

3.1.2.2.6 TOTAL CUMULATIVE DISTURBANCE IN EACH CUMULATIVE IMPACTS ANALYSIS AREA

Considering the overlay between the four RFDs and the CIAAs, for the purpose of analysis the BLM assigned an amount of surface disturbance commensurate with the proportion of the CIAA that falls within each RFD area. The resulting anticipated amount of surface disturbance attributable to oil and gas development within each CIAA would be as follows:

- Soils, vegetation, special-status plants species, general wildlife, and special-status wildlife species CIAA: 2,982 acres (343 acres associated with oil and gas development the San Rafael Desert MLP RFD projections, 353 acres associated with Moab MLP Oil and Gas RFD projections, 91 acres associated with the Richfield RFD projections, and 2,195 acres associated with the Moab MLP Potash RFD projections).
- Wilderness CIAA: 0 acres. Although 53% of the wilderness CIAA was included in the San Rafael MLP RFD area, these areas have been closed to oil and gas development (subject to valid existing rights). Aside from the actions considered in this EA, any future development is assumed to occur outside the Wilderness Area.
- LWC CIAA: 175 acres, all of which is associated with the San Rafael Desert MLP RFD projections.
- Recreation/Visual CIAA: 208 acres (128 acres associated with San Rafael Desert MLP RFD projections, and 17 acres associated with the Moab MLP Oil and Gas RFD projections, 5 acres associated with the Richfield Oil and Gas RFD projections and 58 acres associated with the Moab MLP Potash projections).

3.2 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

This section outlines the procedures and analyses used in conducting the air quality assessment. The impact assessment examines and quantifies the impacts from potential emissions sources that may be developed.

NEPA requires the BLM to analyze impacts on air quality and other components of the human environment, such as water quality, soil, flora, and fauna from major Federal actions. Other relevant laws and regulations associated with this analysis include FPLMA, the Clean Air Act (CAA) of 1970 and CAA Amendments in 1977 and 1990, the CEQ regulations for implementing NEPA, and the Utah Division of Air Quality regulations.

3.2.1 Affected Environment

The analysis area for Project and cumulative impacts assessment for ambient air quality and AQRVs is the near field modeling domain evaluated in a modeling study evaluating oil and gas development occurring in the same airshed as the Project (see further discussion in Section 3.2.2.2.1). Since climate change impacts are the result of cumulative global GHG emissions, the effects of GHG emissions are inherently cumulative and impact various regions differently. Therefore, for the purpose of this EA, climate change impacts are broadly discussed in terms of global trends and projections as well as on regional levels in Section 3.2.2.5 and Appendix H.

3.2.1.1 *Existing Setting*

The development of helium resources, such as the proposed action, would emit air pollutants that are regulated under the regulatory framework of the CAA including the applicable provisions of the National Ambient Air Quality Standards (NAAQS), various Federal regulatory standards, and minor and major source air permitting. A detailed explanation of the regulatory framework for air quality and greenhouse gas emissions is found in Appendix H of this document.

The 2020 Monitoring Report from the Utah Bureau of Land Management (BLM 2020e) details the air monitoring data from 2019 at the county-level for the state of Utah. The detailed report lists the current air emissions statewide by source. Current greenhouse gases and other air quality pollutant emissions within the state can be found using this document. The 2020 Monitoring Report also details the emission inventories for different Utah airsheds for 2017 (BLM 2020e).

3.2.2 Environmental Consequences

3.2.2.1 *Analysis Methods and Assumptions*

Several methods and assumptions were used to determine the Project's impact to air quality and GHG emissions. Emissions calculations for the Project were subdivided into construction-related emissions (which are expected to be temporary in nature) and operations-related emissions (which are expected to occur throughout the operational lifetime of the Project). A detailed list of methods and assumptions can be found in Appendix H of this document. Carbon dioxide equivalent or "CO₂e" is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO₂e signifies the amount of CO₂ which would have the equivalent global warming impact. The CO₂e emission totals presented in this section are based on the IPCC's AR5 100-year global warming potential values.

3.2.2.1.1 ISSUE INDICATORS

The following indicators were used to analyze impacts to air quality:

- Emission estimates for regulated pollutants and GHGs
- Comparison of Project emission estimates to county emissions inventories
- Exceedance of Federal Land Managers' Air Quality Related Values Work Group screening-level criteria
- National Ambient Air Quality Standards (NAAQS)

3.2.2.2 *Environmental Consequences – Alternative A*

A detailed breakdown of the construction emissions is in Appendix H of this document. The estimated construction emissions are in Table 3-1.

3.2.2.2.1 TOTAL CONSTRUCTION EMISSIONS

Direct and indirect construction activities would result in air pollutant emissions from equipment exhaust, including the use of drills during construction; vehicle exhaust from travel to and from the Project site; and fugitive dust from soil disturbance. Table 3-1 presents the estimated total criteria air pollutant, hazardous air pollutants (HAPs), and GHG emissions from Alternative A construction activities, as well as a comparison with county-level annual emissions based on calculating the total Alternative A construction emissions as a percentage of the total county emissions estimated in the 2017 National Emissions Inventory. The calculation methodology, which details the equations, emission factors, and assumption used, can be found in Appendix H.

Table 3-1. Estimated Total Construction Emissions – Alternative A

Construction Activity	Emissions (tpy)							Emissions (metric tpy)
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	VOCs	HAPs	CO _{2e}
Fugitive dust*	–	–	–	11.95	1.19	–	–	–
Heavy equipment combustive emissions	10.50	39.88	0.739	2.07	2.01	2.936	0.1620	4,418.54
Commuting vehicles	0.66	0.68	0.0011	105.6	10.59	0.057	0.021	125.32
Wind erosion	–	–	–	3.18	0.48	–	–	–
Well test flaring (via portable combustor)	16.10	2.96	63.08	0.32	0.32	30.25	0.08	5,758.74
Alternative A – Total Construction Emissions	27.25	43.52	63.82	123.12	14.60	33.24	0.26	10,302.59
Emery County – Total Annual Emissions[†]	14,686	18,117	5,797	7,336	1,504	14,740	3,339	15,171,711.00

Construction Activity	Emissions (tpy)							Emissions (metric tpy)
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	VOCs	HAPs	CO _{2e}
Construction Emissions Percentage of County Total	0.186%	0.240%	1.101%	1.678%	0.971%	0.226%	0.008%	0.068%

Notes: SO_x = sulfur oxides, tpy = tons per year, VOCs = volatile organic compounds.

* The Applicant has included dust abatement methods as Applicant-committed environmental protection measures (see Appendix G).

Construction calculations for unpaved roads do not include a control efficiency because the extent to which these dust abatement measures would be applied is not known. Actual fugitive dust emissions from Project construction are, therefore, likely to be lower than those disclosed in Table 3-1.

† From 2017 National Emissions Inventory (EPA 2020b).

The overall projected emissions estimate for each pollutant from the construction of the Project is small compared with the proportion each pollutant contributes to the county's annual emissions. Furthermore, this comparison is even smaller when the indirect Project construction emissions are removed from the emissions totals. Non-construction emissions from wind add particulate matter to the overall emission totals since wind can carry loose dirt and debris as a cause of indirect emissions. The construction emissions would be temporary and transient in nature and are not likely to impact compliance with the National Ambient Air Quality Standards (NAAQS) in the county. Background concentrations can be found using the 2020 BLM Utah Air Monitoring Report (BLM 2020e), which details air quality in different regions of Utah. Construction of the Project would have short-term, minor impacts on air quality.

3.2.2.2.2 TOTAL OPERATIONS AND MAINTENANCE EMISSIONS

Operations and maintenance emissions would include vehicle exhaust from travel to and from the well pad, access road, pipeline, and the processing plant for routine inspections; combustion emissions from the turbine (provide power generation for the proposed processing plant), fugitive emissions from piping components; working emissions from storage tanks; well workover emissions; and blowdown venting at the well pad and processing plant. Table 3-2 presents the estimated total criteria air pollutant, HAPs, and GHG emissions from Alternative A operations and maintenance activities, as well as a comparison with county-level annual emissions based on calculating the total Alternative A operations emissions as a percentage of the total county emissions estimated in the 2017 National Emissions Inventory.

Table 3-2. Estimated Total Operations and Maintenance Emissions – Alternative A

Operations and Maintenance Activities	Emissions (tpy)							Emissions (metric tpy)
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	VOCs	HAPs	CO _{2e}
Heavy equipment combustive emissions	0.01	0.05	0.001	0.003	0.003	0.003	0.0001	6.09
On-road equipment*	0.58	0.08	0.0004	36.92	3.69	0.018	0.004	50.23
Turbine	3.00	4.50	1.146	1.60	0.64	7.000	0.254	36,011.83
Fugitive components	–	–	–	–	–	1.901	1.294	72.17
Water tank	–	–	–	–	–	0.13	0.013	22.98
Sump tank	–	–	–	–	–	0.05	0.005	0.00

Operations and Maintenance Activities	Emissions (tpy)							Emissions (metric tpy)
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	VOCs	HAPs	CO _{2e}
Blowdowns	–	–	–	–	–	0.221	0.151	15.76
Alternative A – Total Operations Emissions	3.59	4.62	1.147	38.52	4.34	9.32	1.722	36,179.06
Emery County – Total Annual Emissions[†]	14,686	18,117	5,797	7,336	1,504	14,740	3,339	15,171,711
Operations Emissions Percentage of County Total	0.024%	0.026%	0.020%	0.525%	0.289%	0.063%	0.052%	0.238%

Notes: SO_x = sulfur oxides, tpy = tons per year, VOCs = volatile organic compounds.

* The Applicant has included dust abatement methods as Applicant-committed environmental protection measures (see Appendix G). Operation calculations for unpaved roads do not include a control efficiency because the extent to which these dust abatement measures would be applied is not known. Actual fugitive dust emissions from Project operations are, therefore, likely to be lower than those disclosed in Table 3-2.

[†] From 2017 National Emissions Inventory (EPA 2020b).

Emissions from vehicle travel during operations and maintenance would be minimal, and mileage for vehicle travel for routine inspection would be much less than during construction. Criteria pollutant emissions from vehicle exhaust during operations and maintenance would be substantially lower than the emissions generated during construction. Therefore, impacts to air quality resources from operations would be minor but long term.

An additional potential impact due to surface disturbance over the life of the Project until the site is fully reclaimed is a reduction of carbon sequestration ability due to land use change. Site-specific changes to sequestration cannot be quantified as factors such as vegetation type, amount of biomass, and future weather affecting plant regrowth are unknown. However, due to the relatively small amount of disturbance associated with the Project, changes to carbon storage and sequestration are likely to be well below the natural variability from wildfires and other land use changes.

Total operation and maintenance GHG emissions for the 20-year life of the Project are 0.72 million metric tons CO_{2e}. Note that these emissions are for the life of the Project and are significantly lower than the total aggregate global emissions that drive climate change. According to the 2020 BLM Air Monitoring Report (BLM 2020e), 71.8 million metric tons of GHG emission in CO_{2e} were released in Utah, 6,676.6 million metric tons were released in the United States, while 46,140.95 million metric tons were released globally (BLM 2020e).

EPA Rule 40 CFR Part 98, Mandatory Reporting of Greenhouse Gases requires the mandatory reporting of GHG emissions for certain facilities that emit more than 25,000 metric tons of CO_{2e} emissions per year. Therefore, the proposed processing plant would likely be subject to these reporting requirements, depending on its actual level of operation.

Criteria air pollutant and GHG emissions from the construction, operation, and maintenance of the Project under Alternative A would result in a minor, long-term increase in emissions, as demonstrated in Table 3-1 and Table 3-2.

3.2.2.2.3 NEAR-FIELD MODELING ANALYSIS

The results from a nearfield modeling analysis (Kleinfelder 2019) of an oil and gas development occurring in the same airshed as the Project showed no potential exceedances of any of the NAAQS in the analysis area, including at Arches and Canyonlands National Parks. Concentrations for the criteria air pollutants ranged from 2% to 94% of the NAAQS. Analysis of secondary air pollutants, such as O₃ and secondary PM_{2.5}, show that concentrations are considerably below impact thresholds. The cancer and non-carcinogenic risks from HAPs emissions are shown to be negligible from individual chemicals or a combination of chemicals. A visibility analysis at both Arches and Canyonlands National Parks shows no exceedance of screening criteria. Predictions of nitrogen and sulfur deposition are considerably lower than the critical load thresholds for Arches and Canyonlands National Parks. The nearfield modeling analysis evaluated the direct and indirect impacts for developing 45 oil and gas wells which is considerably higher than the level of development being considered for the Project. On the basis of this assumption, the use of nearfield modeling results for this analysis is conservative.

3.2.2.2.4 VISIBILITY

Sources of air pollution can cause visible plumes if emissions of particulates and NO_x are of sufficient magnitude. A plume will be visible if these emissions scatter or absorb sufficient light, making the plume brighter or darker than the viewing background. The primary variables that affect whether or not a plume is visible at a given location include the quantity of emissions, type of emissions, relative location of the emissions source and the observer, and the background visibility range.

VISCREEN software was used to assess potential visibility impacts within the near-field modeling at Canyonlands National Park. The closest distance to this Class I area is approximately 8.3 miles (13.3 kilometers [km]) southeast of the Alternative A proposed well pad.

The visibility impacts from the construction of Alternative A were analyzed using a Level 1 screening that assumed maximum hourly emission rates of 0.156 g/s for PM₁₀ and 2.723 g/s for NO_x, as determined in the Construction Emissions section. These emission rates correspond to the operation of the drill rig engines. No on-road emissions were included in the model as those emissions take place at different locations along the access road and other roads connecting the Project with Green River, Utah.

Visibility impacts from the operation of Alternative A were analyzed assuming maximum hourly emission rates of 0.04676 g/s for PM₁₀ and 0.99165 g/s for NO_x, as determined in the Operations Emissions section. These emission rates correspond to the estimated emissions from the operation of the well pad without accounting for on-road emissions, because those emissions would occur at different locations along the access road and other roads connecting the Project with Green River, Utah. In specific, the activities that yielded the maximum hourly emission rate included the combustion emissions from the operation of the turbine.

In the VISCREEN model, it is assumed that other pollutants do not substantially affect visual air quality at the source-receptor distances analyzed in the VISCREEN model. A default particle size and density and conservative meteorological conditions were assumed (i.e., extremely stable [F] atmospheric conditions and very low wind speed [1 meters/second]).

The default Level 1 screening criteria were used. In addition, a background visibility range of 259.6 km was used for the VISCREEN analysis. A review of the recently measured visual ranges (257–264 km) at Canyonlands National Park indicated that the annual average visual range of 259.6 km would be considered reasonable for a plume impact evaluation.

The visual air quality parameter of interest presented by VISCREEN is “plume contrast,” which is the contrast of the hypothetical plume against the background sky or background terrain that is assumed to be immediately adjacent to the plume.

The Level 1 screening results demonstrated that there would be no exceedances inside the Class I area due to the operational conditions evaluated; therefore, Canyonlands National Park would be protected from plume blight impacts during operations and maintenance activities associated with Alternative A.

3.2.2.3 **Environmental Impacts – Alternative B**

3.2.2.3.1 **TOTAL CONSTRUCTION EMISSIONS**

As presented in Appendix H of this document, direct and indirect construction activities would result in air pollutant emissions from equipment exhaust, including the use of drills during construction; vehicle exhaust from travel to and from the Project site; and fugitive dust from soil disturbance. Table 3-3 presents the estimated total criteria air pollutant, HAPs, and GHG emissions from Alternative B construction activities, as well as a comparison with county-level annual emissions based on calculating the total Alternative B construction emissions as a percentage of the total county emissions estimated in the 2017 National Emissions Inventory.

Table 3-3. Estimated Total Construction Emissions – Alternative B

Construction Activity	Emissions (tpy)							Emissions (metric tpy)
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	VOCs	HAPs	CO _{2e}
Fugitive dust	–	–	–	16.04	1.60	–	–	–
Heavy equipment combustive emissions	10.63	40.26	0.74014	2.09	2.03	2.963	0.1757	4,554.90
Commuting vehicles	0.91	0.87	0.00149	144.72	14.51	0.075	0.0272	166.49
Wind erosion	–	–	–	3.79	0.57	–	–	–
Well test flaring (via portable combustor)	16.10	2.96	63.08	0.32	0.32	30.25	0.08	5,758.74
Alternative B – Total Construction Emissions	27.64	44.09	63.82	166.97	19.04	33.29	0.28	10,480.12
Emery County – Total Annual Emissions*	14,686.00	18,117.00	5,797.00	7,336.00	1,504.00	14,740.00	3,339.00	15,171,711.00
Construction Emissions Percentage of County Total	0.188%	0.243%	1.101%	2.276%	1.266%	0.226%	0.008%	0.069%

Notes: SO_x = sulfur oxides, tpy = tons per year, VOCs = volatile organic compounds.

* From 2017 National Emissions Inventory (EPA 2020).

The overall projected emissions estimate for each pollutant from the construction of the Project is small compared with the proportion each pollutant contributes to the county’s annual emissions. Furthermore, this comparison is even smaller when the indirect Project construction emissions are removed from the emissions totals. The construction emissions would be temporary and transient in nature. Construction of the Project would have short-term, minor impacts on air quality.

3.2.2.3.2 TOTAL OPERATIONS AND MAINTENANCE EMISSIONS

As presented in Appendix H of this document, operations and maintenance-related emissions would include vehicle exhaust from travel to and from the well pad, access road, pipeline, and the processing plant for routine inspections; combustion emissions from the turbine, fugitive emissions from piping components; working emissions from storage tanks; well workover emissions; and blowdown venting at the well pad and processing plant.

Table 3-4 presents the estimated total criteria air pollutant, HAPs, and GHG emissions from Alternative B operations activities, as well as a comparison with county-level annual emissions based on calculating the total Alternative B operations emissions as a percentage of the total county emissions estimated in the 2017 National Emissions Inventory.

Table 3-4. Estimated Total Operations Emissions – Alternative B

Operations Activity	Emissions (tpy)							Emissions (metric tpy)
	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	VOCs	HAPs	CO ₂ e
Heavy equipment combustive emissions	0.01	0.05	0.00	0.00	0.00	0.00	0.00	6.09
On-road equipment	0.68	0.09	0.00	43.68	4.37	0.02	0.01	58.64
Turbine	3.00	4.50	1.15	1.60	0.64	7.00	0.25	36,011.83
Fugitive components	–	–	–	–	–	1.90	1.29	72.17
Water tank	–	–	–	–	–	0.13	0.01	22.98
Sump tank	–	–	–	–	–	0.05	0.01	0.00
Blowdowns	–	–	–	–	–	0.22	0.15	15.76
Alternative B – Total Operations Emissions	3.69	4.64	1.15	45.28	5.02	9.33	1.72	36,187.47
Emery County – Total Annual Emissions*	14,686.00	18,117.00	5,797.00	7,336.00	1,504.00	14,740.00	3,339.00	15,171,711.00
Operations Emissions Percentage of County Total	0.025%	0.026%	0.020%	0.617%	0.334%	0.063%	0.052%	0.239%

Notes: SO_x = sulfur oxides, tpy = tons per year, VOCs = volatile organic compounds.

* From 2017 National Emissions Inventory (EPA 2020b).

Total operational GHG emissions for the 20-year life of the Project are 0.72 million metric tons CO₂e under Alternative B.

Total operation and maintenance GHG emissions for the 20-year life of the Project are 0.72 million metric tons CO₂e. Note that these emissions are for the life of the Project and are significantly lower than the total aggregate global emissions that drive climate change. According to the 2020 BLM Air Monitoring Report (BLM 2020e), 71.8 million metric tons of GHG emission in CO₂e were released in

Utah, 6,676.6 million metric tons were released in the United States, while 46,140.95 million metric tons were released globally (BLM 2020e).

EPA Rule 40 CFR Part 98, Mandatory Reporting of Greenhouse Gases requires the mandatory reporting of GHG emissions for certain facilities that emit more than 25,000 metric tons of CO₂e emissions per year. Therefore, the proposed processing plant would likely be subject to these reporting requirements, depending on its actual level of operation.

Criteria air pollutant and GHG emissions from the construction, operation, and maintenance of the Project under Alternative B would result in a minor, long-term increase in emissions, as demonstrated in Table 3-3 and Table 3-4

3.2.2.3.3 NEAR-FIELD MODELING ANALYSIS

Near-field impacts to air quality would be similar to those presented in Section 3.2.2.2 for Alternative A. However, as emissions under Alternative B are slightly higher than Alternative A, impacts would also be slightly higher.

3.2.2.3.4 VISIBILITY

As presented in Section 3.2.2.2, VISCREEN software was used to assess potential visibility impacts within the near-field modeling at Canyonlands National Park. The closest distance to this Class I area is approximately 6.1 miles (9.8 km) southeast of the Alternative B proposed well pad.

The visibility impacts from the construction of Alternative B were analyzed using a Level 1 screening that assumed maximum hourly emission rates of 0.166 g/s for PM₁₀ and 2.723 g/s for NO_x, as determined in the Construction Emissions section. These emission rates correspond to the operation of the drill rig engines. No on-road emissions were included in the model as those emissions take place at different locations along the access road and other roads connecting the Project with Green River, Utah.

Visibility impacts from the operation of Alternative B were analyzed assuming maximum hourly emission rates of 0.04676 g/s for PM₁₀ and 0.99165 g/s for NO_x, as determined in the Operations Emissions section. These emission rates correspond to the estimated emissions from the operation of the well pad without accounting for on-road emissions, because those emissions would occur at different locations along the access road and other roads connecting the Project with Green River, Utah. In specific, the activities that yielded the maximum hourly emission rate included the combustion emissions from the operation of the turbine.

In the VISCREEN model, it is assumed that other pollutants do not substantially affect visual air quality at the source-receptor distances analyzed in the VISCREEN model. A default particle size and density and conservative meteorological conditions were assumed (i.e., extremely stable [F] atmospheric conditions and very low wind speed [1 meter/second]).

The default Level 1 screening criteria were used. In addition, a background visibility range of 259.6 km was used for the VISCREEN analysis. A review of the recently measured visual ranges (257–264 km) at Canyonlands National Park indicated that the annual average visual range of 259.6 km would be considered reasonable for a plume impact evaluation.

3.2.2.4 ***Environmental Impacts – Alternative C: No Action Alternative***

Under the No Action Alternative, Twin Bridges would not be permitted to construct the well pad and pipeline corridor, nor would it make road improvements. No surface disturbance would occur, and air resources would not be affected. Climate change would continue as defined by current trends.

3.2.2.5 ***Cumulative Effects***

Impacts from past and present actions in the analysis area are captured in the discussion of the affected environment (Section 3.2.1). RFFAs to evaluate potential cumulative air quality and AQRV impacts were based on the analysis assumptions in the Moab MLP far-field modeling analysis. No cumulative effects to air quality, beyond the potential impacts discussed in Section 3.2.2, are expected in the analysis area.

The Moab MLP far-field modeling analysis (BLM 2015) examined multiple source impacts to NAAQS and AQRVs in the planning area using the CALMET/CALPUFF dispersion modeling system. The modeling domain for this EA analysis included the near-field (within 50-km) impact area for the Project. Three years of meteorological data sets were used to evaluate year-to-year variability and how variability impacts modeled concentrations:

- **High scenario:** no aggregation of wells on pads, 9 wells drilled per year, 100% of wells go into production (232 wells), 50% dust control, and more unpaved roads
- **Medium scenario:** no aggregation of wells on pads, 9 wells drilled per year, 60% of wells go into production (140 wells), 50% dust control, and fewer unpaved roads
- **Low scenario:** aggregation of four wells per pad, 4 wells drilled per year, 60% of wells go into production (140 wells), 70% dust control, and smallest number of unpaved roads

Modeling results show no exceedances of the NAAQS for any pollutant for any of the modeled scenarios (BLM 2015). The proposed development for the Project is substantially lower than all three Moab MLP scenarios for oil and gas development. From 2015 through 2019 an average of less than 2 wells have been drilled per year in the Moab FO, which includes most of the Moab MLP planning area. Development of the Project in addition to existing development in the area is closest to the low scenario analyzed in the Moab MLP. On the basis of this assumption, the cumulative impacts to air quality are within the range evaluated in the Moab MLP's modeling results.

Maximum modeled concentrations at Arches and Canyonlands National Parks showed no exceedances of the NAAQS for any criteria air pollutant for any of the modeled scenarios (BLM 2015). According to these modeling results, no NAAQS exceedances would be expected from the development of Alternative A or Alternative B. Potential impacts to visibility at the Arches and Canyonland National Parks were also evaluated in the Moab MLP. The BLM uses a screening threshold of a 10% change in extinction (1.0 deciview). Under the low development scenario, the maximum percentage change in deciview would be 4.59% at the Arches National Park and 9.83% at the Canyonlands National Park (BLM 2015). Given that actual levels of development in the Moab MLP planning have been lower than even the low development scenarios modeled in the far-field analysis, it is not anticipated that the proposed action in combination with other past, present, and RFD would contribute to impacts to regional haze.

Because GHGs circulate freely throughout Earth's atmosphere, climate change is a global issue, and therefore cumulative impacts are based on global cumulative GHG emissions. Therefore, potential climate change impacts are discussed at multiple geographic scales (Refer to Appendix H). A recent Air Resource Management Strategy 2020 Monitoring Report (BLM 2020e) examined climate change impacts in Utah. It noted the Utah Roadmap: Positive Solutions on Climate and Air Quality developed by the

University of Utah Kem C. Gardner Policy Institute projected future GHG emissions in Utah under a “Business as Usual” scenario and a “Planned Reduction” scenario. This roadmap set a goal to reduce GHG emissions to approximately 15 million metric tons (MMT) CO₂e, approximately 80% below current emissions, but noted additional action by the State of Utah was needed.

Additionally, the Monitoring Report cited the U.S. Energy Information Administration (EIA) which provides projections of energy sector GHG emissions through the year 2050. These projections noted that energy related GHG emissions are expected to decrease in the short term as the power sector transitions away from coal, but these decreases may be offset from increases in the transportation and industrial sectors in the later years. Future economic growth was noted as the biggest factor in the national GHG emissions projections.

Further, the International Panel on Climate Change developed representative concentration pathways (RCP) based on the amount of radiative forcing that is projected to occur by the year 2100 if actual atmospheric concentrations of GHGs follow one of four paths (RCP2.6, RCP4.5, RCP6, and RCP8.5). The national BLM normal and high emissions scenarios track closest to RCP 8.5 in 2020 and between RCP 2.5 and RCP 4.5 in 2030. The USGS National Climate Change Viewer (USGS 2019) provides a tool that can be used to evaluate potential climate change at the state and county level based on RCPs. The BLM oil and gas lease sale EA’s found these scenarios show lower amounts of snow water equivalent and runoff for all future time periods resulting in increased frequency of drought and wildfires, increased demand for water compound by a reduced water supply, and increased impacts to human health. Additional detail on the potential impacts of climate change can be found in Appendix H.

The proposed action may result in emissions of (0.72 MMT CO₂e) over a 20-year period, which would be that 0.06% of the low (1,086.27 MMT CO₂e) and 0.05% of the high (1,325.05 MMT CO₂e) aggregate emissions estimates based on EIA projections for oil and gas production growth. While annual GHG operation and combustion emissions would increase statewide annual emissions (71.8 MMT) by 0.05% and national annual emissions (6,676.6 MMT) by 0.0006% based on most recently available annual emission totals.

3.2.2.5.1 COMPARISON OF THE PROPOSED ACTION TO BLM’S PAST PRESENT, AND REASONABLY FORESEEABLE FUTURE EMISSIONS

For additional context regarding the direct and indirect emissions from the proposed Project, in November of 2018, the USGS published a scientific investigation report, *Federal Lands Greenhouse Gas Emissions and Sequestration in the United States: Estimates 2005-2014* (Merrill et al. 2018). Table 3-5 below shows estimates from this report for end-use combustion and extraction of fossil fuels including coal, oil, and natural gas produced on Federal Lands.

Table 3-5. USGS Report GHG Emissions from Extraction and End-Use Combustion of Fuel Produced on Federal Lands (2005-2014)

State	2014 CO ₂ e Emissions (MMT)	2005-2014 Annual Average CO ₂ e Emissions (MMT)	2005-2014 Total Cumulative CO ₂ e (MMT)
Utah	46.75	46.95	469.5
Colorado	55.78	61.77	617.7
New Mexico	91.63	81.95	819.5
Wyoming	744.2	788.32	7,883.2
Nation-Wide	1,332.1	1,414.1	14,140.6

Projected future direct (extraction) and indirect (transportation and end-use combustion) impacts from Federal lease coal, oil, and natural gas lease sale activities are projected in a technical memo (SWCA 2020c) based on EIA's 2020 Annual Energy Outlook (AEO) forecasts. Cumulative federal emissions from 2020-2050 are estimated based on over 20 different growth forecast scenarios. The high and low AEO projection scenarios show that the range of potential contributions to GHG emissions as CO₂e from federal mineral production to the U.S. totals is approximately 14.24% (high scenario) and 10.12% (low scenario). Of the 2020 AEO forecasts, the "High Oil Price" scenario results in the greatest total U.S. GHG emissions over the period of 2020 – 2050, of which approximately 12.96% of the emissions are projected to result from federal mineral production and end-use. The results of this scenario are presented below in Table 3-6.

Table 3-6. Projected Cumulative and Annual Average Federal Lease Sale GHG emissions

State	2020-2050 Cumulative Total CO ₂ e Emissions (MMT)	2005-2050 Annual Average CO ₂ e Emissions (MMT)
Utah (Federal)	1,215.3	40.51
Colorado (Federal)	2,159.6	71.99
New Mexico (Federal)	4,671.9	155.73
Wyoming (Federal)	16,405.6	546.85
Nation-Wide (Federal)	27,050.2	901.67
Nation-Wide (Federal and Non-federal)	208,662.2	6,955.4

Based on this "High Oil Price" scenario, the Proposed Action's contribution (0.72 MMT) to the reasonably foreseeable federal GHG emissions as well as total U.S. GHG emissions over the period of 2020-2050 are presented in Table 3-7 below. For more information regarding additional forecasted AEO scenarios, refer to the Draft Greenhouse Gas & Climate Change Report located in the Project File.

Table 3-7. Proposed Action Contribution to Reasonably Foreseeable Federal and Non-Federal U.S. GHG Emissions

Region	Proposed Action % of Reasonably Foreseeable Emissions
Utah (Federal)	0.0592%
Colorado, Utah, New Mexico, Wyoming (Federal)	0.0029%
Nation-Wide (Federal)	0.0027%
Nation-Wide (Federal and Non-federal)	0.0003%

All GHGs, regardless of the source, contribute incrementally to the global climate change phenomenon. While GHG emissions resulting from individual decisions can certainly be modified or potentially prevented by analyzing and selecting reasonable alternatives that appropriately respond to the action's purpose and need, the BLM has limited decision authority to meaningfully or measurably prevent the cumulative climate change impacts that would result from global emissions.

To further contextualize impacts, in 2017, the BLM commissioned a climate change report with an energy focus that used similar emission quantification methodologies as the USGS Report. Information about assumptions and data used to develop this report is available in the *Greenhouse Gas and Climate Change*

Report, 2017, which is incorporated by reference (Golder Associates 2017). The report calculates GHG emissions associated with production and consumption activities related to coal, oil, natural gas, and natural gas liquids. The baseline year is 2014 and forecasts production/consumption GHG emissions for 2020 and 2030 for Federal and non-Federal lands on a national level and for 13 energy-producing states, including Utah. BLM's Utah reasonably foreseeable coal, oil, and gas production and consumption GHG emissions from Federal activities are 60.34 MMT/yr of CO₂e for the 2020 high scenario and 52.18 MMT/yr of CO₂e for the 2030 high scenario. The total projections for Federal fossil production and consumption activities for the 13 BLM states analyzed which encompass a vast majority of Federal leasing activity were estimated to be 1,218 MMT/yr under the 2020 high scenario and 1,016 MMT/yr under the 2030 high scenario.

Golder Associates demonstrates a comparison of the projected BLM annual emission rates derived from Federal lease sale and production information from the 13 western states and compares them against the RCP scenario emissions profile (a derived value estimating the annual GHG emission rate for each scenario). By comparing the relative emission rates of the derived ranges of BLM emissions profiles (low and high estimates) with the RCP scenarios, the BLM emissions most closely track with RCP 8.5 in 2020 and between RCP 2.6 and RCP 4.5 in 2030 (Golder Associates 2017). The reduction in the BLM's emissions profile in 2030 compared with 2020 is a result of a projected change to the Federal energy resource mixture. Less coal development is projected, while a slight increase in oil, gas, and natural gas liquids are projected into 2030 relative to 2020. Because coal is the most GHG-intensive fossil fuel, the reduction in this resource development is anticipated to reduce BLM's lease sale emissions profile (annual GHG emission rate) overall. Based on the analysis in Golder Associates (2017), BLM activities are estimated to be conducted at a level that would be in line with the level of emissions anticipated in the RCP 2.6 and RCP 4.5 through 2060. However, estimates of BLM activities in future years are more uncertain and have a wider range of variability due to the numerous future projections discussed in paragraphs above. To understand the impacts of climate change, three RCP scenario projections of global temperature and precipitation changes in both the near term (representing the period from 2021 through 2040) and far term (representing the period of 2081 through 2100) are presented in Table 3-8. These estimates are derived from the average of over 30 different climate change models using the inputs of each RCP scenario (Golder Associates 2017).

Table 3-8. Projected Changes in Climate under Representative Concentration Pathways

RCP Pathway	Near Term		Far Term	
	Temperature (°C)	Precipitation (%)	Temperature (°C)	Precipitation (%)
RCP 2.6	0.78	1.44	0.97	2.27
RCP 4.5	0.85	1.49	1.81	3.51
RCP 8.5	0.98	1.62	3.68	5.89

The information and projections presented above are based on best available data and assumptions used to provide context to BLM's cumulative impact. Information in the Golder Report, projects that BLM emission profile in future years would be in line with RCP scenario 2.6 or 4.5 by 2030. The near and far-term temperature projections associated with these RCP scenarios are projected to conform the Paris Agreement goal to keep global temperature rise this century below 2°C. However, temperature projections under different RCP scenarios are estimates based on averaged global climate model results, so actual warming trends may differ slightly. Additionally, due to the levels of uncertainty in projections of future Federal leasing activities, this information should be understood to be an estimate of impacts

based on best available information after a review of relevant scientific information and available studies commissioned by the BLM.

3.3 SOIL RESOURCES

The analysis area for soil-related issues consists of the following HUC-10 watersheds: Salt Wash-Green River, Moonshine Wash, Taylor Canyon-Green River, and Horseshoe Canyon. This area covers 529,837.05 acres and was chosen because it provides a distinct, natural topographic boundary in which to analyze potential impacts to soil and because it encompasses the proposed Project.

3.3.1 Affected Environment

3.3.1.1 *Existing Setting*

The analysis area occurs entirely within the Colorado Plateau ecological province. Soils of the Colorado Plateau are relatively young and undeveloped. Soil types in the analysis area were identified and described using land cover data from the State Soil Geographic (STATSGO) database and the Soil Survey Geographic (SSURGO) database, which provide spatial reference and descriptive data for soil characteristics. A total of 123 soil types are in the analysis area, and two of these soil types are specifically in the disturbance area. The two soil types identified within the disturbance area are characterized as Rock outcrop-Moffat-Moenkopie and Sheppard-Nakai-Moffat. These soils exist as a sand sheet landscape called surficial eolian deposits, which are sand deposits from parent material (Natural Resources Conservation Service [NRCS] 2020). This soil is sensitive and is considered saline and highly erodible (NRCS 2020). There are no available data for biological soil crusts in the disturbance area, though this area has high potential for them. Soils of this type may be especially vulnerable to impacts and harder to reclaim or restore after disturbance (BLM 2007b).

Past and present actions that have affected and could continue to affect soils in the analysis area include surface disturbance from oil and gas development and associated infrastructure, geophysical exploration, livestock grazing, range improvements, OHV use, ROW authorizations, and recreation. These activities may have resulted in short-term and long-term impacts to soils by contributing to reduced soil productivity, soil compaction, loss of biological soil crusts, soil erosion, and surface runoff. These past and present cumulative effects, along with ongoing landscape-scale phenomena including climate change and drought, could lead to a loss of soil productivity and an increase in soil erosion and soil loss in the analysis area over time.

3.3.2 Environmental Consequences

3.3.2.1 *Analysis Methods and Assumptions*

Analysis assumptions are as follows:

- Climatic fluctuation (e.g., drought) would continue to influence the health and productivity of native vegetation and therefore soils.
- Surface-disturbing activities could lead to modification (positive or negative), loss (short or long term), or fragmentation of soils, depending on the amount of area disturbed and location of the disturbance.
- Though temporary and permanent impacts within the analysis area would be constructed within existing disturbance, this fails to address the regeneration that has taken place since previous disturbance was implemented. Documentation from on-site visits and descriptions within the San Rafael Desert Lands with Wilderness Characteristics Inventory (BLM 2016e) confirm that native

vegetation and soil regeneration has taken place within the previously disturbed areas. Most impacts to soils have since been remediated by physical acts and the passage of time. New surface disturbing activities in this area would be similar to disturbance of untouched soils and therefore have similar effects. Disturbance calculations therefore include these previously disturbed areas.

- Changes in air, water, and habitat quality could lead to direct impacts and could have cumulative impacts on soils.
- In disturbed areas, reestablishment of a vegetative landscape and plant composition similar to adjacent undisturbed lands, including trees and shrubs, has taken more than 50 years and in some areas could take more than 100 years (BLM 2016e). Habitats such as biological soil crusts and mature shrub habitats will take the longest to reestablish, and habitats dominated by grasses and forbs will regenerate more quickly.

3.3.2.2 *Environmental Impacts – Alternative A*

Implementation of Alternative A would cause both temporary and permanent disturbance to soils in the analysis area. The proposed well pad would cause 5.4 acres of temporary disturbance (2.4 acres of permanent disturbance after initial reclamation) (0.0001% of the analysis area), and the proposed pipeline ROW would cause 17.8 acres of temporary disturbance (0.00003% of the analysis area). The proposed gas plant, which is an indirect effect of the BLM's decision making, would cause 10.0 acres of permanent disturbance (0.00001% of the analysis area). There would also be permanent long-term disturbance to soil from approximately 9.9 acres of road upgrades during pipeline construction. The Project would cause 22.3 acres of permanent disturbance (0.00004% of the analysis area) and 20.8 acres of temporary disturbance (0.00003% of the analysis area), for a total of 43.1 acres of soil disturbance in the analysis area.

These disturbances could result in soil compaction, increased susceptibility to soil erosion, mixing of soil horizons, changes in soil function due to soil exposure from vegetation removal, and loss of soil productivity (ability to support vegetation). Soil types that would be disturbed are highly erodible and susceptible to wind erosion and to water erosion. Because of this susceptibility, loss of soil and soil productivity could occur in areas of surface disturbance (0.00008% of the analysis area). A loss of soil and soil productivity could reduce the health of local vegetation communities and impact the livestock and wildlife that depend on them. Restoration treatments for soil and vegetation in the drylands of the southwestern United States can be time-consuming and expensive with low success (Lovich and Bainbridge 1999). This is because drylands exist within fragile soils and are particularly susceptible to degradation (Copeland et al. 2018).

Should biological soil crusts be encountered and disturbed, it would lead to reduced soil productivity, decreased plant cover and vigor, and increased wind and water erosion. Severity, size, frequency, and timing of a surface-disturbing activity affect the degree of impacts to biological soil crusts. "Soil crust populations are degraded when mechanical disturbances such as vehicular traffic, land clearing, or trampling disturb the soil surface. While any of these disturbances may not directly eliminate soil crusts, repeated disturbance degrades and fragments crust cover and may keep it in an early successional state" (Bryce 2012:51).

The disturbance of 43.1 acres of soil represents a loss of this resource in terms of structure and function. Because of the highly saline and erodible nature of the soil, combined with the arid climate, successful reclamation would be difficult, and the loss of soil productivity may essentially be permanent, even with the proposed reclamation. However, the analysis area is generally undeveloped, and a permanent loss of

soil would be relatively small (0.00008%) when compared with the total amount of soil types present in the analysis area.

3.3.2.3 Environmental Impacts – Alternative B

The type of impacts on soils from Alternative B would be similar to those from Alternative A; however, the location and magnitude of the impacts would be different. Implementation of Alternative B would cause both temporary and permanent disturbance to soils in the analysis area. The proposed well pad would cause 7.3 acres of temporary disturbance (3.4 acres of permanent disturbance after initial reclamation) (0.0001% of the analysis area), and the proposed pipeline ROW would cause 20.5 acres of temporary disturbance (0.00003% of the analysis area). The proposed gas plant would cause 10.0 acres of permanent disturbance (0.00001% of the analysis area). There would also be permanent long-term disturbance to soil from approximately 14.5 acres of road upgrades during pipeline construction. Implementation of the Project would cause 27.9 acres of permanent disturbance (0.00005% of the analysis area) 24.4 acres of temporary disturbance (0.00004% of the analysis area), for a total of 52.3 acres of soil disturbance in the analysis area.

3.3.2.4 Environmental Impacts – Alternative C: No Action Alternative

Under the No Action Alternative, Twin Bridges would not be permitted to construct the well pad and pipeline ROW, nor would it make road improvements. No surface disturbance to soil would occur, and there would be no permanent or temporary loss of soil. Existing, approved uses (e.g., recreation) would continue to occur that could potentially impact soils.

3.3.2.5 Cumulative Effects

The CIAA used to analyze cumulative impacts to soil resources consists of the following HUC-10 watersheds: Salt Wash-Green River, Moonshine Wash, Taylor Canyon-Green River, and Horseshoe Canyon. This area covers 529,838 acres.

Past and present actions that have affected and will continue to affect soils in the CIAA are described in EA Section 3.1.2 and impacts from those actions are captured through the description of the affected environment for soil resources.

RFD within the CIAA for soil resources includes oil and gas development, potash mining, travel management, recreation, livestock grazing, and river restoration RFFAs (totaling approximately 2,981 acres of surface disturbance and 0.6% of the CIAA). For a detailed explanation of RFFAs and the associated surface disturbance for each RFFA, refer to the cumulative scenario in EA Section 3.1.2. Oil and gas development and associated infrastructure are anticipated to cause the greatest amount of reasonably foreseeable future surface disturbance and impacts to soils in the CIAA through construction of well pads, roads, pipelines, and other infrastructure. The impacts would likely be greater where mineral development is more intense, in areas where development overlaps sensitive soils (e.g., sandy wind erodible soils, steep slopes, or saline soils). Increased mineral development could lead to an increase in the potential for reduced soil productivity and soil erosion. Past and present cumulative effects to soils from travel and recreation within the analysis area include disturbance of soils which prevents cryptobiotic soils' recolonization, and instability, erosion, and loss of soils on routes in areas with steep slopes or high erosive potential from OHV-open vehicle travel. The recently approved San Rafael Desert TMP designated route networks that would result in erosion scars, maintaining bare ground susceptible to erosion, and compaction.

Under both Alternatives A and B, the proposed Project would result in surface disturbance, which would contribute to cumulative impacts to soils. Alternative B is anticipated to result in the most surface disturbance and contribution of adverse impact to soils in the CIAA with 52.3 acres of disturbance followed by Alternative A with 43.1 acres of disturbance. Either action alternative would result in surface disturbance of less than 0.01% of the CIAA. Alternative C would result in no impacts to soils.

3.4 VEGETATION

The analysis area for vegetation-related issues consists of the Salt Wash-Green River, Moonshine Wash, Taylor Canyon-Green River, and Horseshoe Canyon HUC-10 watersheds. This area covers 529,837.05 acres and was chosen because it provides a distinct, natural topographic boundary in which to analyze potential impacts to vegetation, because vegetative connectivity is linked to watersheds, and because it encompasses the proposed Project.

3.4.1 Affected Environment

3.4.1.1 *Existing Setting*

Vegetation communities in the analysis area were identified and described using land cover data developed by the Southwest Regional Gap Analysis Project (SWReGAP), which provides spatial reference and descriptive data for characteristics of the land surface. A total of 23 land cover classes are in the analysis area, and four of these land cover classes are specifically affected by the proposed surface facilities. Affected vegetation is characterized as salt desert shrub with a high percentage (50%–75%) of bare ground. Common plant species include Mormon tea (*Ephedra* sp.) and blackbrush (*Coleogyne ramosissima*), often with green Mormon tea (*Ephedra viridis*), Torrey's Mormon tea (*Ephedra torreyana*), or spiny hopsage (*Grayia spinosa*). Sand sagebrush (*Artemisia filifolia*) is codominant.

Past and present actions that have affected and will continue to affect vegetation in the analysis area include surface disturbance from oil and gas development and associated infrastructure, geophysical exploration, livestock grazing, range improvements, OHV use, ROW authorizations, and recreation. These activities could result in short-term and long-term impacts to vegetation by contributing to reduced soil productivity, soil compaction, loss of biological soil crusts, soil erosion, vegetation loss and destruction, and surface runoff. Development activities would also modify the composition and structure of vegetation communities and increase the potential for the introduction or spread of invasive, nonnative plant species and noxious weeds, especially in disturbed areas and along travel corridors. These changes, along with ongoing landscape-scale phenomena including climate change and drought, would lead to an increased distribution of altered and degraded vegetation communities in the analysis area over time.

3.4.2 Environmental Consequences

3.4.2.1 *Analysis Methods and Assumptions*

Analysis assumptions are as follows:

- Localized vegetation communities are naturally affected by non-human-caused factors such as climate, natural predation, disease outbreaks, natural fire regimes, and competition for available habitat from other native and invasive species.
- Climatic fluctuation (e.g., drought) would continue to influence the health and productivity of vegetation communities annually.

- Though some temporary and permanent impacts within the analysis area would be constructed within existing disturbance, this fails to address the regeneration that has taken place since previous disturbance was implemented. Documentation from on-site visits and descriptions within the San Rafael Desert Lands with Wilderness Characteristics Inventory (BLM 2016e) confirm that native vegetation regeneration has taken place within the previously disturbed areas. Most impacts to vegetation have since been remediated by physical acts and the passage of time. The impacts of new surface disturbing activities in this area would be similar to disturbance of untouched vegetation communities. Therefore, disturbance calculations include these previously disturbed areas.
- Changes in air, water, and habitat quality could lead to direct impacts and could have cumulative impacts on vegetation communities.
- In disturbed areas, reestablishment of a vegetative landscape and plant composition similar to adjacent undisturbed lands, including trees and shrubs, has taken more than 50 years and in some areas could take more than 100 years (BLM 2016e). Habitats such as biological soil crusts and mature shrub habitats will take the longest to reestablish, and habitats dominated by grasses and forbs will regenerate more quickly.

3.4.2.2 ***Environmental Impacts – Alternative A***

Implementation of Alternative A would cause disturbance to vegetation in the analysis area. The proposed well pad would cause 5.4 acres of temporary disturbance (2.4 acres of permanent disturbance after initial reclamation, 0.0001% of the analysis area), and the proposed pipeline ROW would cause 17.8 acres of temporary disturbance (0.00003% of the analysis area). The proposed gas plant would cause 10.0 acres of permanent disturbance (0.00001% of the analysis area). There would also be permanent long-term disturbance to vegetation from approximately 9.9 acres of road upgrades during pipeline construction. The Project would cause 22.3 acres of permanent disturbance (0.00004% of the analysis area) and 20.8 acres temporary disturbance (0.00003% of the analysis area), for a total of 43.1 acres of vegetation disturbance in the analysis area.

Effects to vegetation from the Project would consist of damage to or loss of individual plants and could, as a result, include changes to community composition (species composition and plant density) on a localized basis. Clearing would remove protective vegetative cover in a sparsely vegetated landscape and could increase soil erosion and the transport of sediment. Grading, excavation, and backfilling could result in the mixing of topsoil with subsoil and in loss and alteration of seed banks, which could result in long-term reduction of productivity and introduction of noxious and invasive weeds. Improving restoration outcomes may require selecting species to match site conditions and ameliorating environmental stressors (Fick et al. 2016). Avoiding treatments that cause soil disturbance can also assist the restoration processes (Duniway et al. 2015). The land cover class that would experience the largest acreage of disturbance would be Colorado Plateau blackbrush Mormon tea shrubland because of its abundance in the area (36.26 acres of disturbance, or 0.00006% of this land cover class in the analysis area). Colorado Plateau mixed bedrock canyon tableland would experience 4.2 acres of disturbance (0.000007% of the analysis area), and the active and stabilized dune class would experience 2.50 acres of disturbance (0.000004% of the analysis area). Restoration treatments for soils and vegetation in the drylands of the southwestern United States can be time-consuming and expensive with low success (Lovich and Bainbridge 1999). This is because drylands exist within fragile soils and are particularly susceptible to degradation (Copeland et al. 2018).

The total proposed disturbance of 43.1 acres, including temporary disturbance areas, of vegetation represents a loss of this resource in terms of structure and function. Because of the highly saline and erodible nature of the soil, combined with the arid climate, successful reclamation would be difficult, and

the acres of vegetation loss may essentially be permanent, even with the proposed reclamation. However, the analysis area is generally undeveloped, and a permanent loss of vegetation would be small (0.00008%) when compared with the total amount of vegetation types present in the analysis area.

3.4.2.3 Environmental Impacts – Alternative B

Implementation of Alternative B would cause both temporary and permanent disturbance to vegetation in the analysis area. The proposed well pad would cause 7.3 acres of temporary disturbance (3.4 acres of permanent disturbance after initial reclamation) (0.0001% of the analysis area), and the proposed pipeline ROW would cause 20.5 acres of temporary disturbance (0.00003% of the analysis area) in the analysis area. The proposed gas plant would cause 10.0 acres of permanent disturbance (0.00001% of the analysis area). There would also be permanent long-term disturbance to vegetation from approximately 14.5 acres of road upgrades during pipeline construction. Implementation of the Project would cause 27.9 acres of permanent disturbance (0.00005% of the analysis area) and 24.4 acres of temporary disturbance (0.00004% of the analysis area), for a total of 52.3 acres of vegetation disturbance in the analysis area.

Effects to vegetation from the Project would consist of damage to or loss of individual plants and could, as a result, include changes to community composition (species composition and plant density) on a localized basis. Clearing would remove protective vegetative cover in a sparsely vegetated landscape and could increase soil erosion and the transport of sediment. Grading, excavation, and backfilling could result in the mixing of topsoil with subsoil and in loss and alteration of seed banks, which could result in long-term reduction of productivity and introduction of noxious and invasive weeds. Improving restoration outcomes may require selecting species to match site conditions and ameliorating environmental stressors (Fick et al. 2016). Avoiding treatments that cause soil disturbance can also assist the restoration process (Duniway et al. 2015). The land cover class that would experience the largest acreage of disturbance would be intermountain basins active and stabilized dunes (23.06 acres, or 0.00004% of the analysis area). Colorado Plateau blackbrush Mormon tea shrubland (21.99 acres, or 0.00004% of the analysis area) would also experience these impacts.

The disturbance of 52.3 acres, permanent and temporary use areas, of vegetation represents a loss of this resource in terms of structure and function. Because of the highly saline and erodible nature of the soil, combined with the arid climate, successful reclamation would be difficult, and the acres of vegetation loss may essentially be permanent, even with the proposed reclamation. However, the analysis area is generally undeveloped, and a permanent loss of vegetation would be relatively small (0.0001%) when compared with the total amount of vegetation types present in the analysis area.

3.4.2.4 Environmental Impacts – Alternative C: No Action Alternative

Under the No Action Alternative, Twin Bridges would not be permitted to construct the well pad and pipeline ROW, nor would it make road improvements. No surface disturbance to vegetation would occur, and there would be no permanent or temporary loss of vegetation. Existing, approved uses (e.g., recreation) would continue to occur that could potentially impact vegetation.

3.4.2.5 Cumulative Effects

The CIAA used to analyze cumulative impacts to vegetation consists of the following HUC-10 watersheds: Salt Wash-Green River, Moonshine Wash, Taylor Canyon-Green River, and Horseshoe Canyon. This area covers 529,838 acres.

Past and present actions that have affected and will continue to affect vegetation in the CIAA are described in EA Section 3.1.2 and impacts from those actions are captured through the description of the affected environment for vegetation.

RFD within the CIAA for vegetation includes oil and gas development, potash mining, travel management, recreation, livestock grazing, and river restoration RFFAs (totaling approximately 2,981 acres of surface disturbance and 0.6% of the CIAA). For a detailed explanation of RFFAs and the associated surface disturbance for each RFFA, refer to the cumulative scenario in EA Section 3.1.2. Oil and gas development and associated infrastructure are anticipated to cause the greatest amount of reasonably foreseeable future surface disturbance and impacts to vegetation in the CIAA through construction of well pads, roads, pipelines, and other infrastructure. The impacts would likely be greater where mineral development is more intense, in areas where development overlaps with more sensitive or more difficult to reestablish vegetation (e.g., sandy soils in desert vegetation communities). Increased mineral development could lead to an increase in the potential for vegetation loss and the introduction of invasive, non-native plant species. Past and present cumulative effects to vegetation from travel and recreation within the analysis area include ongoing disturbance of dusting, crushing or damage of plants from vehicles, travel or bedding and roadside camping or parking, and spread of noxious weeds and invasive species from OHV-open vehicle travel. The recently approved San Rafael Desert TMP designated route networks that could result in new disturbance and increased risk for noxious weed spread as described above.

Under both Alternatives A and B, the proposed Project would result in surface disturbance, which would contribute to cumulative impacts to vegetation. Alternative B is anticipated to result in the most surface disturbance and contribution of adverse impact to vegetation in the CIAA with 52.3 acres of disturbance followed by Alternative A with 43.1 acres of disturbance. Either action alternative would result in surface disturbance of less than 0.01% of the CIAA. Alternative C would result in no impacts to vegetation.

3.5 SPECIAL-STATUS PLANT SPECIES

The analysis area for special-status plant species (SSPS) includes the Project footprint and a 1-mile buffer from the edge of the proposed Project footprint for the purposes of analysis of direct and indirect effects to special-status plants and/or their habitat. The analysis areas for Alternative A and Alternative B are approximately 7,901.7 acres and 9,326.4 acres, respectively.

3.5.1 Existing Setting

The BLM Price FO ID Team reviewed the action alternatives and the habitat requirements for SSPS and determined that four BLM sensitive species—flat-top buckwheat (*Eriogonum corymbosum* var. *smithii*), Utah spurge (*Euphorbia nephradenia*), entrada rushpink (*Lygodesmia grandiflora* var. *entrada*), and Trotter's oreoxis (*Oreoxis trotteri*)—have the potential to occur on the affected surface lands (see Appendix B and Appendix H). Federally listed species—Jones cycladenia (*Cycladenia humilis* var. *jonesii*) and Navajo sedge (*Carex specuicola*)—were also evaluated and were found to be not present; suitable habitat for these species does not occur on the affected surface lands.

3.5.1.1 Regulatory Framework

The special-status species evaluated in this EA consist of 1) all federally protected (i.e., endangered and threatened) species, 2) additional species listed by the USFWS as candidate and proposed and species under review (USFWS 2020b) and 3) BLM sensitive species (BLM 2018). The BLM manages certain sensitive species that are not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. The authority for this policy and guidance is

established by the Endangered Species Act (ESA) of 1973, as amended; Title II of the Sikes Act of 1960, as amended; FLPMA; USDOJ Manual 235.1.1A (USDOJ 2009); and BLM Manual 6840, *Special Status Species Management* (BLM 2008c).

3.5.1.2 ***Affected Environment***

At the request of BLM, SWCA Environmental Consultants (SWCA) conducted general biological resources surveys and SSPS surveys on May 25 through 29, June 10 and 24, and July 13 through 17, 2020, on behalf of Twin Bridges. The purpose of the SSPS surveys was to evaluate the potential for SSPS to occur and to identify habitat communities for SSPS regulated by the USFWS under the ESA, as well as for BLM sensitive species. The surveys also documented observed plant species for impact analysis related to habitat for game and nongame species (see Section 3.4 for vegetation analysis). SSPS surveys were conducted in accordance with BLM Price FO protocol requirements (BLM 2020a). Full survey results and protocol parameters are documented in the biological survey report on file with the BLM Price FO (SWCA 2020a).

Table H-6 in Appendix H describes the special-status species considered for analysis, general results of the SSPS surveys, habitat and range description, and potential occurrence under each alternative. The potential for occurrence of a species was identified using the following categories:

- ***Known to occur***—the species was documented in the analysis either during or before the survey by a reliable observer.
- ***May occur***—the analysis area is within the species' currently known range, and vegetation communities, soils, water quality conditions, etc., resemble those known to be used by the species.
- ***Unlikely to occur***—the analysis area is within the species' currently known range, but vegetation communities, soils, water quality conditions, etc., do not resemble those known to be used by the species, or the analysis area is clearly outside the species' currently known range.

Three BLM sensitive species—flat-top buckwheat, Utah spurge, and Trotter's oreoxis—may occur in the analysis area under both action alternatives; entrada rushpink has the potential to occur under Alternative B and is known to occur in the analysis area of Alternative A. These four species are analyzed in detail in Section 3.5.2.

3.5.2 **Environmental Consequences**

3.5.2.1 ***Analysis Methods and Assumptions***

The SSPS analysis area for each alternative is 1 mile (1,609 m) buffered from the edge of disturbance of the proposed Project footprint. The analysis areas for Alternative A and Alternative B are approximately 7,901.7 acres and 9,326.38 acres, respectively. As described above, the cumulative impact analysis area as defined by relevant watershed boundaries is approximately 529,837 acres. Impact-causing elements are vegetation clearing, surface disturbance, and fugitive dust related to construction and vehicle use.

SSPS analysis is stratified by known occupied habitat and potential habitat for each species. For the purposes of this analysis, known occupied habitat is defined as habitat within 100 m of a documented SSPS occurrence, and potential habitat is defined as suitable habitat that meets all or most of a species habitat and range requirements.

Due to the identification of a SSPS (entrada rushpink) occurrence during species-specific surveys, BLM and SWCA conducted a detailed analysis to identify potential habitat of entrada rushpink and its distribution within each analysis area. The habitat analysis was based on the subspecies life history and physical parameters of known occupied habitat of previously recorded occurrences, which included association with specific vegetation land cover types and an elevation range of 4,400 feet (1,341.2 m) to 4,800 feet (1,463 m) (SWCA 2020b). Further reference to entrada rushpink potential habitat is based on this analysis, which identified approximately 85,792.9 acres of habitat suitable for the subspecies within the cumulative impact analysis area. Detailed analysis is included in Sections 3.5.2.2.2 and 3.5.2.3.2.

Assumptions:

- Localized populations are naturally affected by non-human-caused factors such as climate, natural predation, disease outbreaks, natural fire regimes, and competition for available habitat from other native species.
- Climatic fluctuation (e.g., drought) would continue to influence the health and productivity of special-status species habitat annually.
- Actions affecting one analyzed species would have similar impacts on other species that use the same habitats or areas.
- Surface-disturbing activities could lead to modification (positive or negative), loss (short or long term), or fragmentation of species habitat and/or the loss or gain of individuals, depending on the amount of area disturbed, species affected, and location of the disturbance.
- Changes in air, water, and habitat quality could lead to direct impacts and could have cumulative impacts on species survival.
- In disturbed areas, reestablishment of a vegetative landscape and plant composition similar to adjacent undisturbed lands, including trees and shrubs, has taken more than 50 years and in some areas could take more than 100 years (BLM 2016e). Habitats such as biological soil crusts and mature shrub habitats will take the longest to reestablish, and habitats dominated by grasses and forbs will regenerate more quickly.
- Plant populations counts are estimates based on best-available data and informed by a presence/absence level survey protocol; undetected individuals may exist in the analysis area.
- SSPS occupied habitat (occurrences) may occur within un-surveyed identified potential habitat.
- Entrada rushpink occupied habitat estimates are based on the results of the 2020 species-specific surveys, BLM acknowledges that the occurrence likely extends into un-surveyed potential habitat. However, analysis is based on best available data related to known locations of the plants.
- A 1-mile analysis area is appropriate for the SSPS analysis to allow for consideration of the extent of adjacent potential habitat for the species analyzed in detail and consider other factors that may be impacting populations; however, the BLM does not expect indirect impacts under the action alternative to occur over the full range of the analysis area. It is anticipated that indirect impacts would reach no further than 100 to 200 m from surface disturbance associated with the proposed Project.
- All protective measures, whether Applicant-committed environmental protection measures or BLM-applied conditions of approval, will be implemented to mitigate impacts to general wildlife species. See Appendix G and Appendix K for further information.

3.5.2.2 **Environmental Impacts – Alternative A**

3.5.2.2.1 **FLAT-TOP BUCKWHEAT (*ERIOGONUM CORYMBOSUM* VAR. *SMITHII*), UTAH SPURGE (*EUPHORBIA NEPHRADENIA*) AND TROTTER'S OREOXIS (*OREOXIS TROTTERI*)**

During the 2020 SSPS surveys, no individuals of flat-top buckwheat, Utah spurge, or Trotter's oreoxis were detected. However, potential habitat for these species occurs within the 7,901.7-acre analysis area and occupied habitat may exist within the analysis area outside of the boundary of the biological and SSPS surveys. Direct impacts to potential habitat and loss associated with surface disturbance for this species' habitat would be expected on 42.7 acres (0.54% of the analysis area). The remaining 7,859.0 acres may be subject to indirect impacts such as increased fugitive dust, increased soil erosion, and a potential for establishment of nonnative or invasive species (or both). Indirect impacts would be more concentrated directly adjacent to the proposed action, dissipating over distance and are likely to affect only individuals within 100 to 200 m of the proposed development (approximately 431.7 to 836.4 acres). Direct and indirect impacts to species' potential habitat may lead to the loss of suitability of available habitat.

3.5.2.2.2 **ENTRADA RUSHPINK (*LYGODESMIA GRANDIFLORA* VAR. *ENTRADA*)**

During the 2020 SSPS surveys, approximately 837 individuals of a previously unknown entrada rushpink occurrence were identified as both individuals and denser "clusters" in the Alternative A biological survey area (SWCA 2020a). The subspecies entrada rushpink is endemic to Utah and is found in disjunct locations in Emery, Grand, and San Juan Counties, including three occurrences within Arches National Park (NatureServe 2020b). Species-specific analysis of habitat requirements and distribution concluded that there are approximately 85,792.9 acres of potential habitat in the larger Project vicinity (SWCA 2020b). See the discussion of cumulative impacts below for analysis within the larger the cumulative analysis area (see Section 3.5.2.5) (SWCA 2020b).

In the Alternative A analysis area (7,901.7 acres), approximately 100.0 acres of occupied habitat and 5,699.3 acres of potential habitat exist for this species (SWCA 2020a, 2020b). Approximately 7.7 acres (0.09% of the analysis area; 0.13% of available occupied and potential habitat) of known occupied habitat and 27.42 acres of potential habitat are within the proposed pipeline and access road ROW disturbance area where direct impacts are anticipated.

Direct impacts to habitat and loss of individuals due to surface disturbance, vegetation clearing, and loss of seed bank would occur in up to 7.7 acres of the recorded occupied habitat in the ROW corridor. Under an assumption of even plant distribution within the known occupied habitat, it is estimated that up to 64 (7.7%) of the 837 identified entrada rushpink would be removed in association with the proposed surface disturbance. Indirect impacts to known occupied habitat outside the areas of proposed surface disturbance (92.3 acres, or 92.3% of known occupied habitat in the analysis area) may include, but are not limited to, fragmentation of suitable habitat, increased fugitive dust from construction and vehicular traffic, impacts to associated pollinator communities, introduction of nonnative or invasive species (or both), increased soil erosion, and changes in vegetation structure or composition.

Additionally, 5,699.3 acres of potential habitat for this subspecies, which includes areas suitable for occupancy if populations were to expand and may contain unrecorded occupied habitat outside of previously recorded habitat, would be expected to have 27.4 acres of direct impacts and loss due to surface disturbance associated with the proposed Project (SWCA 2020b). The additional 5,671.9 acres of potential habitat may be subject to indirect impacts such as increased fugitive dust, increase soil erosion,

impacts to pollinator habitat and a potential for establishment of nonnative or invasive species (or both). Indirect impacts are expected to occur within 100 to 200 m of the proposed Project area and will dissipate over distance. Direct and indirect impacts to potential habitat may result in degradation and loss of suitability characteristics of habitat surrounding known populations or occurrences of this species.

As required by BLM Manual 6840, direct and indirect impacts to known occupied and potential habitat would be mitigated through the application of the Applicant-committed environmental protection measures as well as BLM required mitigation measures (see Appendix G and Appendix K). The applicant has committed to close coordination with the BLM authorized officer as well as the application of dust abatement methods to reduce impacts related to fugitive dust (see Appendix G). BLM would require mitigation measures to prevent and reduce impacts to SSPS known occupied and potential habitat as detailed in Appendix K and summarized below. Under Alternative A, BLM would require that final routing of the access road and buried infrastructure within the ROW be approved by the BLM authorized officer in coordination with a BLM botanist prior to the initiation of construction. Twin Bridges would also be required to co-locate access road and buried pipeline infrastructure, which could include either locating buried infrastructure underneath the road travel surface itself, or in an adjacent ditch. Additionally, BLM would require that access road turnouts avoid sensitive plant occupied habitat areas unless absolutely necessary for safety concerns and approved by the BLM authorized officer in coordination with the BLM botanist. Because of these measures and because only 0.13% of the available occupied and potential habitat are within the areas that would be disturbed, Alternative A is not anticipated to reduce the viability of the species or a distinct population segment of the species across all or a significant portion of the species range, consistent with policy outlined in BLM Manual 6840.

3.5.2.3 Environmental Impacts – Alternative B

3.5.2.3.1 FLAT-TOP BUCKWHEAT (*ERIOGONUM CORYMBOSUM* VAR. *SMITHII*), UTAH SPURGE (*EUPHORBIA NEPHRADENIA*) AND TROTTER'S OREOXIS (*OREOXIS TROTTERI*)

SSPS surveys in the Alternative B biological survey area were negative for all target species. However, the Alternative B analysis area (9,326.3 acres) can be characterized as potential habitat for flat-top buckwheat, Utah spurge, and Trotter's oreoxis. Direct impacts to potential habitat and loss associated with surface disturbance would be expected on 52.3 acres (0.66% of the analysis area) under this Alternative. The remaining 9,274 acres may be subject to indirect impacts such as increased fugitive dust, increased soil erosion, impacts to pollinator habitat, and potential for establishment of nonnative or invasive species (or both). Indirect impacts would be more concentrated directly adjacent to the proposed action, dissipating over distance and are likely to affect only individuals within 100 to 200 m of the proposed development (approximately 433.6–1,672 acres). This equates to approximately a 18.3% larger area subject to direct surface disturbance and related direct impacts and a 15.3% larger area of potential habitat subject to indirect impacts as compared to Alternative A. Direct and indirect adverse impacts to potential habitat may reduce the suitability of available habitat.

3.5.2.3.2 ENTRADA RUSHPINK (*LYGODESMIA GRANDIFLORA* VAR. *ENTRADA*)

Alternative B would have fewer impacts to known occupied habitat of entrada rushpink, compared with Alternative A, because this species is not known to exist in the analysis area (SWCA 2020a). Analysis of potential habitat for the subspecies determined that approximately 128.8 acres occurs within the analysis area. However, the nearest mapped-potential habitat occurs approximately 1,282 m from proposed surface disturbance. The 128.8 acres would therefore be subject to distant indirect impacts related to the proposed

action such as increased fugitive dust, increased soil erosion, impacts to pollinator habitat and potential for establishment of nonnative or invasive species (or both).

3.5.2.4 Environmental Impacts – Alternative C: No Action Alternative

Under the No Action Alternative, the Twin Bridges' APDs and ROW applications would be denied, and the surface disturbance and other impacts associated with the development proposed under the action alternatives would not occur. The No Action Alternative would have no impacts on SSPS in the analysis area.

3.5.2.5 Cumulative Effects

The CIAA for SSPS consists of the Salt Wash-Green River, Moonshine Wash, Taylor Canyon-Green River, and Horseshoe Canyon HUC-10 watersheds. This area covers 529,838 acres and was chosen because it provides a distinct, natural topographic boundary in which to analyze potential impacts to vegetation including special-status plant species, because vegetative connectivity and associated habitat characteristics are linked to watersheds, and because it encompasses the proposed Project.

Past and present actions that have affected and will continue to affect SSPS species and their associated habitat in the CIAA are described in EA Section 3.1.2 and impacts from those actions are captured through the description of the affected environment for SSPS.

RFD within the CIAA for SSPS includes oil and gas development, potash mining, travel management, recreation, livestock grazing, and river restoration RFFAs (totaling approximately 2,981 acres of surface disturbance and 0.6% of the CIAA). For a detailed explanation of RFFAs and the associated surface disturbance for each RFFA, refer to the cumulative scenario in EA Section 3.1.2. Oil and gas development and associated infrastructure are anticipated to cause the greatest amount of reasonably foreseeable future surface disturbance and impacts to SSPS in the CIAA through construction of well pads, roads, pipelines, and other infrastructure. The impacts would likely be greater where mineral development is more concentrated or in areas where development overlaps occupied SSPS habitat. Increased mineral development could lead to an increase in the potential for mortality of SSPS, reduction of suitable habitat, decreased suitability of potential habitat, and increased habitat fragmentation. Cumulative effects to SSPS from travel management under the recently approved San Rafael Desert TMP within the analysis area include ongoing disturbance of fugitive dust, crushing or damage of plants from vehicles, travel or bedding and roadside camping or parking, and spread of noxious weeds and invasive species from vehicle travel. Recreational use and other actions within the CIAA would also result in cumulative effects to SSPS, similar to those impacts described above for mineral development and travel management.

Under both Alternatives A and B, the proposed Project would result in surface disturbance, which would contribute to cumulative impacts to SSPS and their habitat. In reference to cumulative impacts, Alternative B is anticipated to result in the most surface disturbance and contribution of adverse impact to SSPS habitat in the CIAA with 52.3 acres of disturbance, followed by Alternative A with 43.1 acres of disturbance. However, as Alternative A contains a known occurrence of Entrada rushpink which would be in part disturbed, the cumulative impacts under Alternative A are greater than those under Alternative B. Either action alternative would result in surface disturbance of less than 0.01% of the CIAA. Alternative C would result in no additional impacts to SSPS.

For flat-top buckwheat, Utah spurge, and Trotter's oreoxis, cumulative impacts would equate to less than a 1% loss of available potential habitat due to the generalist nature of their habitat requirements. Within

the CIAA, habitat analysis for entrada rushpink determined there are approximately 85,792.8 acres of potential habitat that meet suitability criteria (16.2% of the CIAA). In the unlikely event that all 3,720 acres of surface disturbance under the cumulative impact scenario occurred within the distribution of potential habitat for this species, this would equate to a 4.3% reduction of available habitat.

3.6 GENERAL WILDLIFE

The analysis area for general wildlife-related issues consists of the Salt Wash-Green River, Moonshine Wash, Taylor Canyon-Green River, and Horseshoe Canyon HUC-10 watersheds. This area covers 529,838 acres and was chosen because it provides a distinct, natural topographic boundary in which to analyze potential impacts to species and/or their habitat and because it encompasses the proposed Project.

3.6.1 Existing Setting

The BLM Price FO ID Team reviewed the action alternatives and potential impacts to wildlife species and determined that pronghorn (*Antilocapra americana*) are known to occur, and desert bighorn sheep (*Ovis canadensis nelsoni*) have the potential to occur in and around the affected surface lands.

3.6.1.1 Regulatory Framework

The BLM Price FO manages habitat for wildlife, in conjunction with the Utah Division of Wildlife Resources (UDWR). UDWR, which was established as the state wildlife authority under Section 23-14-1 of the Utah Code, operates under the authority granted by the Utah Legislature in Title 23 of the Utah Code.

3.6.1.2 Affected Environment

SWCA conducted general biological resources surveys and SSPS surveys on May 25 through 29, June 10 and 24, and July 13 through 17, 2020, as required by the BLM Price FO. The purpose of the biological surveys was to evaluate the potential for wildlife, including special-status species, to occur and to identify habitat communities for special-status species regulated by the USFWS under Section 7 of the ESA and to identify migratory bird nests protected by the Migratory Bird Treaty Act (MBTA) of 1918 (see Section 3.7 for survey results and analysis of special-status wildlife species, including migratory birds). The surveys also documented all observed wildlife and plant species for impact analysis related to game and nongame species.

The 2020 biological surveys documented that wildlife habitat present in the biological survey areas (SWCA 2020a) primarily consists of salt desert shrub with a high percentage of bare ground dominated by Mormon tea and blackbrush (*Coleogyne ramosissima*) with sand sagebrush (*Artemisia filifolia*) as a significant codominant species (see Section 3.4). The San Rafael Desert, in which the proposed Project occurs, also provides habitat for a diverse range of pollinator species (Griswold et al. 1998). Sand dune substrates found within the area (see Section 3.3-3.4) also provide habitat for predatory burrowing Sphecid wasps (*Philanthus* spp.) and ground nesting bee species (Griswold et al. 1998). Specific wildlife species observed during the 2020 biological surveys are listed in Table 3-9.

Table 3-9. Wildlife Species Observed During the 2020 Biological Surveys

Common Name	Scientific Name
Mammals	
Bat species	Unidentified
Black-tailed jackrabbit	<i>Lepus californicus</i>
Coyote (scat)	<i>Canis latrans</i>
Desert cottontail	<i>Sylvilagus nuttallii</i>
Kangaroo rat	<i>Dipodomys deserti</i>
Pack rat (burrow)	<i>Neotoma</i> sp.
Pronghorn	<i>Antilocapra americana</i>
Striped skunk	<i>Mephitis</i>
Reptiles	
Long-nosed leopard lizard	<i>Gambelia wislizenii</i>
Birds	
Common raven	<i>Corvus corax</i>
Turkey vulture	<i>Cathartes aura</i>
Horned lark	<i>Eremophila alpestris</i>
Scrub jay	<i>Aphelocoma californica</i>

During the biological and raptor-specific surveys, no passerine or raptor nests, inactive or active, were observed on the affected surface lands. See Section 3.7.2 for further analysis regarding potential impacts to migratory birds.

3.6.1.2.1 BIG GAME

Pronghorn (*Antilocapra americana*)

Pronghorn can be found throughout the United States, west of the Mississippi River. In Utah, management efforts have resulted in a distribution of year-round populations throughout most of Utah's suitable desert habitat, with a statewide population estimated to be 15,695. Generally, pronghorn populations in Utah are year-round residents and do not participate in large seasonal migratory movements (UDWR 2017). UDWR (2017) estimates the current pronghorn population to be approximately 1,040 within the San Rafael North Game Management Unit (GMU 12), which encompasses approximately 1,077,239 acres in the state and encompasses the analysis area. Both action alternatives would be within year-round habitat, as mapped by UDWR (2017, 2020).

In Utah, this species is primarily associated with shrub-steppe habitat and prefers large open areas and rolling or flat terrain due to its reliance on keen eyesight and swift movement to avoid predators (UDWR 2017; BLM 2008a). Habitat requirements of this species are primarily based on the availability of forb and grass forage, as well as the presence of water sources (UDWR 2017; NatureServe 2020a). During the desert wet season when forage is readily available, pronghorn have been observed to occupy habitat greater than 4 miles from their primary water source. However, during the dry season, pronghorn require approximately 3 liters of water or greater for survival (UDWR 2017). This species' breeding season is from mid-September to early October, with births occurring primarily in May to early June (NatureServe 2020a).

Stability of Utah's pronghorn populations greatly depends on the size and quality of available habitats to meet nutritional needs. Pronghorn habitat fragmentation and degradation in Utah is related to increased frequency of wildfire exacerbated by invasive species, including cheatgrass (*Bromus tectorum*); encroachment of shrubland plant communities into grasslands; vegetation community changes due to drought; overgrazing; fencing; and anthropogenic development (UDWR 2017).

Habitats for big-game and nongame species in the analysis area are delineated by UDWR. In developing and mapping big-game habitats, UDWR designates season of use (e.g., summer, winter, fawning) and habitat importance (i.e., substantial or crucial). Crucial habitat is defined as habitat essential to the life-history requirements of the species for which it was designated. UDWR periodically reviews these habitat areas through coordination with the various land management agencies and revises habitat boundaries as needed.

Desert Bighorn Sheep (*Ovis canadensis nelsoni*)

Bighorn sheep are native to western North America and inhabit some of the most remote and rugged parts of the Colorado Plateau (UDWR 2018). Both subspecies of bighorn sheep are native to Utah and are found within their respective suitable habitat throughout the state.

Desert bighorn sheep are uniquely adapted to inhabit remote and rugged parts of the Colorado Plateau. Suitable habitat for this species is characterized by rugged terrain, including canyons, gulches, talus cliffs, steep slopes, mountaintops, and river benches (Shackleton et. al. 1999; UDWR 2018). Desert bighorn populations are found primarily in the southern half of the state and are generally year-round residents without distinct seasonal migratory patterns (UDWR 2018). This subspecies' breeding season is from August to November, with calving occurring from February to May (UDWR 2018).

UDWR (2018) estimates that the current population of desert bighorn sheep in Utah is approximately 2,900. Within the San Rafael North GMU, the population was last estimated to be 124 individuals, as of 2015 (UDWR 2018).

UDWR has identified areas of bighorn sheep year-long crucial and substantial habitat. These areas are generally related to the steep canyons associated with Labyrinth Canyon along the Green River and various side canyons, including Horseshoe, Keg Spring, and Three Canyons (UDWR).

3.6.2 Environmental Consequences

3.6.2.1 Analysis Methods and Assumptions

Noise disturbance, increased vehicle traffic, and loss of available habitat are the impact-causing elements that could deter wildlife populations, including populations of desert bighorn sheep and pronghorn, to use suitable habitat in the analysis area. The analysis area is the 529,838-acre watershed boundary. Although the majority of the analysis area is on BLM land, the UDWR manages these species populations in coordination with Federal agencies. The analysis discusses the potential impacts to general wildlife habitat, as well as populations of desert bighorn sheep and pronghorn populations.

Assumptions:

- Localized populations are naturally affected by non-human-caused factors such as climate, natural predation, disease outbreaks, natural fire regimes, and competition for available habitat from other native species.
- Climatic fluctuation (e.g., drought) would continue to influence the health and productivity of special-status species habitat annually.

- Actions affecting one analyzed species would have similar impacts on other species that use the same habitats or areas.
- Surface-disturbing activities could lead to modification (positive or negative), loss (short or long term), or fragmentation of species habitat and/or the loss or gain of individuals, depending on the amount of area disturbed, species affected, and location of the disturbance.
- Changes in air, water, and habitat quality could lead to direct impacts and could have cumulative impacts on species survival.
- The total amount of new surface disturbance allowed by an alternative is a good index of potential impacts to wildlife species. Success of reclamation measures prescribed as a condition of development is unknown, and the potential impact of surface disturbance on special-status species populations could be underestimated.
- In disturbed areas, reestablishment of a vegetative landscape and plant composition similar to adjacent undisturbed lands, including trees and shrubs, has taken more than 50 years and in some areas could take more than 100 years (BLM 2016e). Habitats such as biological soil crusts and mature shrub habitats will take the longest to reestablish, and habitats dominated by grasses and forbs will regenerate more quickly.
- In recognition of the importance of plants to pollinators and pollinators to plants, this EA assumes that the presence of and impacts to endemic pollinator habitat are equivalent to the presence of and impacts to the vegetation, including special-status plants, and their habitats described below.
- All protective measures whether Applicant-committed environmental protection measures or BLM-applied conditions of approval will be implemented to mitigate impacts to general wildlife species. See Appendix G and Appendix K for further information.

3.6.2.2 Environmental Impacts – Alternative A

3.6.2.2.1 GENERAL WILDLIFE

Impacts to plant communities and wildlife habitats from the construction of the proposed Project would include 47.2 acres of direct impacts (less than 0.001% of the analysis area) from vegetation removal on BLM-managed surface lands. But, as described in Section 3.4, a portion of the proposed Project area consists of bare ground. Direct impacts related to vegetation removal would occur during site preparation and would continue until revegetation of the affected surface lands is achieved following reclamation efforts and natural re-establishment of desert plant communities (see Appendix G of this document for reclamation details; see also Figure F-2 in Appendix F).

Direct impacts to wildlife (including pollinator species) would include the removal or crushing of existing vegetation, increased risk of mortality related to increased vehicular traffic, loss or degradation of native habitat, and displacement of wildlife species from birthing/roosting and foraging areas. The aforementioned direct impacts are attributed to activity higher than baseline levels due to construction and operation of the proposed Project, increased human activity including vehicle use, and associated noise disturbance (see Appendix G). Noise disturbance could impact wildlife by interfering with animals' abilities to detect important sounds or by posing an artificial threat to animals (Clinton and Barber 2013). Construction equipment associated with the proposed Project would result in short-term elevated noise levels up to 100 decibels (dB). However, standard operation activities of the well pad and facility site would result in an estimated 68 dB and 75 dB, respectively, at the source location and dissipate over distance. Currently, the noise profile of the surrounding area is characterized by the wilderness area and the existing recreational access road and is not proximal to existing mineral development infrastructure, which would change with development of the proposed Project.

Indirect impacts on vegetation and habitat would occur from deposition of fugitive dust generated during vegetation clearing and grading activities, from the use of access roads, and from wind and water erosion of exposed soils. This could reduce photosynthesis and productivity, increase water loss in plants near the affected surface lands (Eveling and Bataille 1984), and result in injury to leaves. Localized fugitive dust could be generated from the large areas of disturbed soil from blading associated with construction and vehicular traffic.

Additionally, BLM assessed the proposed Project area for its potential to provide habitat for pollinator species and determined that the plant communities identified during the biological survey do not contain abundant flowering plants that would serve as prime pollinator habitat. However, the San Rafael Desert's unique sand dune landscape provides valuable habitat for pollinators such as ground-nesting bees and wasps (Griswold et al. 1998). In accordance with IM-2016-013, "Managing for Pollinators on Public Lands, and Pollinator-Friendly Best Management Practices for Federal Lands," regardless of the location of the surface facilities, the BLM would apply a mitigation measure which would include dust suppression along the proposed ROW (see Appendix G and Appendix K). The required mitigation measures would reduce the indirect impacts to pollinator species (and plants adjacent to surface disturbance) related to fugitive dust and limit impacts to those proportional to the aforementioned surface disturbance and vegetation removal for general wildlife.

Plant community composition would be altered proportionally to the proposed vegetation removal on 42.7 acres. Additionally, any surface disturbance could increase the establishment of new populations of invasive, nonnative species. Noxious weed seed could be carried to and from the affected surface lands by construction equipment and transport vehicles. Mitigation measures to control the spread of weeds would be negotiated with the Price FO. Changes to plant populations and community composition, including establishment of nonnative or noxious weeds, may lead to a variation in availability of suitable habitat.

Disturbance of 42.7 acres associated with the proposed action would result in direct loss of vegetation and available habitat and may contribute to habitat fragmentation and mortalities for present wildlife species. However, the 42.7 acres accounts for less than 0.001% of the available habitat in the analysis area and is not likely to result in significant loss of suitable habitat or available forage for general wildlife species due to the availability of adjacent suitable habitat.

3.6.2.2.2 BIG GAME

Primary direct impact concerns related to big-game species are associated with reduction of suitable habitat, behavior changes due to noise disturbance, and mortality related to vehicular collisions.

The affected surface lands are located in UDWR-designated year-long crucial habitat for pronghorn and desert bighorn sheep (UDWR 2017, 2018, 2020). The Alternative A proposed Project area is considered to be known occupied habitat for pronghorn because this species was observed during the 2020 biological survey (see Table 3-9). The affected surface lands also contain suitable foraging habitat for desert bighorn sheep; however, preferred canyon and cliff habitat that is considered occupied by UDWR occurs approximately 416 m southeast of the proposed well pad location in Keg Spring Canyon (UDWR 2020). Under Alternative A, approximately 42.7 acres (less than 0.001% of the analysis area) of new surface disturbance would result in a proportionate reduction to available foraging habitat for big game species.

In the southwestern United States, bighorn sheep and pronghorn have been evaluated for impacts and behavioral change from anthropogenic noise activities (Berger et al. 2007; Jansen et al. 2009). In the presence of mineral development activities, bighorn sheep have been known to habituate to predictable anthropogenic activities (such as vehicular traffic, construction, and consistent increased noise); however, when immediately proximal to disturbance, they have exhibited, in some cases, increased "vigilance time" but were not deterred from foraging locations (Berger et al. 2007; Jansen et al. 2009). While

acclimation to anthropogenic activities would decrease potential long-term displacement and loss of habitat, the potential for indirect impacts of vehicular collision mortality would increase with increased traffic and activity related to the Project.

While the BLM has not established specific wildlife management noise disturbance tolerance thresholds for big game species such as desert bighorn sheep and pronghorn, increased noise disturbance above ambient levels could impact ungulate wildlife species, at least until the point at which adjacent populations acclimate to increased anthropogenic disturbance such as vehicular traffic, construction noise, and drilling activities (Berger et al. 2007; Jansen et al. 2009).

Under this alternative, construction activities would be conducted between September 1 and February 28, unless otherwise authorized by the BLM (see Appendix G). The application of the timing restriction would reduce the period during which impacts related to construction activities, such as noise and increased vehicular traffic, would occur. Construction and operational noise may occur during the respective breeding season for either species. For each of these species, breeding season increases the vulnerability to impacts associated with displacement in suitable and crucial habitat because that is when dispersed males congregate and compete to establish dominance and breeding rights with nearby females (UDWR 2017, 2018). Due to the Applicant-committed environmental protection measures designed around Mexican spotted owl (*Strix occidentalis lucida*) (MSO) breeding season, the initial proposed Project construction period (September 1–February 28) would occur outside of the pronghorn calving period and during only 25% (February) of the desert bighorn sheep calving season. The timing restriction placed on construction activities would reduce the potential for noise impacts to affect big-game species during reproductive seasons following initial establishment of the proposed Project. If the MSO timing restriction per the terms of the Applicant-committed protection measure is lifted following negative surveys for that species, construction activities may occur during reproductive efforts for desert bighorn and pronghorn (see Appendix H for details related to the MSO timing restriction). Operational activities associated with the proposed Project may lead to avoidance of the immediate vicinity until localized populations become accustomed to the activity and noise levels (Jansen et al. 2009; Berger et al. 2007). However, the level of disturbance is not likely to lead to a loss of viability of populations due to the availability of adjacent suitable habitat, distance from proposed development to Keg Spring canyon, and likelihood for acclimation of localized populations to long-term operational activities.

3.6.2.3 Environmental Impacts – Alternative B

3.6.2.3.1 GENERAL WILDLIFE

Impacts to plant communities and wildlife habitats from the construction of the proposed Project would include 52.3 acres of direct impacts from vegetation removal on BLM-managed surface lands. Direct impacts would occur during site preparation and would continue until revegetation of the affected surface lands is achieved following reclamation efforts and natural re-establishment of desert plant communities. Under Alternative B, approximately 3.9 acres of the proposed well pad location would be reclaimed during interim reclamation (Appendix G) for reclamation details; see also Appendix F, Figure F-3). Direct and indirect impacts to general wildlife from Alternative B would be similar to those described under Alternative A (see Section 3.6.2.2.) However, under Alternative B, the increased footprint size required to access and construct infrastructure would result in more surface disturbance (approximately 9.6 acres or 18.3% larger), compared with that under Alternative A (see Appendix F, Figure F-2). Because of increased surface disturbance under Alternative B, the proposed Project would result in proportionally (18.3%) more direct and indirect impacts to wildlife species, compared with those described under Alternative A.

3.6.2.3.2 BIG GAME

The affected surface lands are located in UDWR-designated crucial year-long habitat for pronghorn and desert bighorn sheep (UDWR 2017, 2018, 2020). The area is considered to be known occupied habitat for pronghorn because this species was observed during the 2020 biological survey of the analysis area (see Table 3-9). The area also contains suitable foraging habitat for both species; however, preferred canyon and cliff habitat occurs approximately 470 m east of the proposed well pad location, with Keg Spring Canyon occurring approximately 1,251 m east. Under Alternative B, approximately 52.3 acres of new surface disturbance (less than 0.01% of the analysis area) would result in a reduction to available foraging habitat for big-game species, as well as a reduction in crucial desert bighorn sheep habitat, which has been modeled in association with Keg Spring Canyon.

The type of noise impacts would be similar to those described under Alternative A; however, because the proposed Project footprint would result in approximately 18.3% greater surface disturbance, and approximately the same geographic extent of noise impacts related to construction activities and noise disturbance due to the same amount of required infrastructure and access would be expected (see Sections 2.2–2.3).

The primary difference in direct and indirect impacts analyzed for big-game species under Alternative B is the lack of Applicant-committed timing restrictions related to MSO habitat. Due to the increased distance from suitable modeled nesting habitat, measures related to MSO breeding season are not necessary under this alternative and thus do not provide the same secondary protection to big-game breeding seasons during the initial year of development. Under this alternative, construction and drilling operations have the potential to occur year-round following approval of Twin Bridges' APDs and ROW applications. Thus, impacts from noise disturbance and increased vehicle traffic from Project activities could occur during pronghorn and desert bighorn sheep reproductive seasons. This would increase the likelihood of adverse impacts to these species' reproductive success, compared with that under Alternative A. However, this level of disturbance is not likely to lead to a loss of viability of populations due to the availability of adjacent suitable habitat and likelihood for acclimation of localized populations to long-term operational activities.

3.6.2.4 *Environmental Impacts – Alternative C: No Action Alternative*

Under the No Action Alternative, the Twin Bridges' APDs and ROW applications would be denied, and the surface disturbance and other impacts associated with the development proposed under the action alternatives would not occur. The No Action Alternative would have no impacts on wildlife, including big game in the analysis area.

3.6.2.5 *Cumulative Effects*

The CIAA used to analyze cumulative impacts to wildlife consists of the following HUC-10 watersheds: Salt Wash-Green River, Moonshine Wash, Taylor Canyon-Green River, and Horseshoe Canyon. This area covers 529,838 acres. Past and present actions that have affected and will continue to affect wildlife in the CIAA are described in EA Section 3.1.2 and impacts from those actions are captured through the description of the affected environment for wildlife.

RFD within the CIAA for wildlife includes oil and gas development, potash mining, travel management, recreation, livestock grazing, and river restoration RFFAs (totaling approximately 2,981 acres of surface disturbance and 0.6% of the CIAA). For a detailed explanation of RFFAs and the associated surface disturbance for each RFFA, refer to the cumulative scenario in EA Section 3.1.2. Oil and gas development

and associated infrastructure are anticipated to cause the greatest amount of reasonably foreseeable future surface disturbance and impacts to wildlife in the CIAA through construction of well pads, roads, pipelines, and other infrastructure. The impacts would likely be greater where mineral development is more concentrated or in areas where development occurs in habitats that are limited, especially important for wildlife survival, or difficult to reclaim. The degree of impact would depend on the timing of development activities and whether the amount of activity outpaces the successful reclamation and revegetation efforts in disturbed areas. As development occurs, displacement of wildlife could result in increased competition for resources and stresses on wildlife occupying undeveloped lands. Cumulative effects to general wildlife and migratory birds from travel management under the recently approved San Rafael Desert TMP include behavioral changes that result in disrupted or displaced breeding; changes in nesting behavior that result in reduced reproductive success; spatial and temporal changes in foraging activities that result in decreased fitness; altered species richness and community composition; damage, loss of, fragmentation, or alteration to nesting, burrowing, brooding, and foraging habitat; and mortality. Recreational use and other actions within the CIAA would also result in cumulative effects to wildlife, similar to those impacts described above for mineral development and travel management.

Under both Alternatives A and B, the proposed Project would result in surface disturbance, which would contribute to the incremental loss, degradation, and fragmentation of wildlife habitats and to impacts on wildlife populations in the CIAA. Alternative B is anticipated to result in the most surface disturbance and contribution of adverse impact to vegetation in the CIAA with 52.3 acres of disturbance followed by Alternative A with 42.7 acres of disturbance. Either action alternative would result in surface disturbance of less than 0.01% of the CIAA. Alternative C would result in no contribution of impacts to general wildlife.

3.7 SPECIAL-STATUS WILDLIFE SPECIES

The analysis areas for special-status wildlife species is dependent on the habitat requirements and/or management concerns of the species (or group thereof) analyzed in this section. A description of the analysis areas associated with the species analyzed in detail are provided in EA Section 3.7.2.

3.7.1 Existing Setting

The Price FO ID Team reviewed the action alternatives locations and habitat requirements for special-status wildlife species included in Appendix H, and determined that one USFWS threatened species, MSO, and five BLM sensitive species had the potential to occur within the species' respective analysis areas. BLM also determined that detailed analysis of potential impacts to migratory birds and raptor species would be required (BLM 2020d).

Under all action alternatives, the proposed Project would source water from existing water rights entities and does not propose any action that would further deplete water in the Colorado River or its tributaries. Thus, the BLM determined that all alternatives would result in an effects determination of **No Effect** due to lack of suitable habitat for aquatic species within proximity of the proposed Project location and no impacts to water availability. Because of this determination no further consultation with USFWS regarding aquatic species is required. Therefore, the BLM determined that detailed analysis of potential impacts to aquatic species within the Colorado River Basin would not be required (refer to ID Team Checklist in Appendix B).

3.7.1.1 Regulatory Framework

The special-status species evaluated in this EA consist of 1) all federally protected (i.e., endangered and threatened) species, 2) additional species listed by the USFWS as candidate and proposed and species under review (USFWS 2020), and 3) BLM sensitive species (BLM 2018). The BLM manages certain

sensitive species that are not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. The authority for this policy and guidance is established by the ESA, as amended; Title II of the Sikes Act, as amended; FLPMA; USDOJ Manual 235.1.1A (USDOJ 2009), and BLM Manual 6840 (BLM 2008c).

3.7.1.1.1 MIGRATORY BIRD TREATY ACT

Most bird species are protected by the MBTA, which implements various treaties and conventions between the United States and other countries for the protection of migratory birds. Under the MBTA, unless permitted by regulations, it is unlawful to 1) pursue, hunt, take, capture, or kill; 2) attempt to take, capture, or kill; and 3) possess, offer to sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received, any migratory bird, part, nest, egg, or product, manufactured or not. USFWS regulations broadly define “take” under the MBTA to mean “pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.” Under the MBTA, “take” does not include habitat loss or alteration.

3.7.1.1.2 BALD AND GOLDEN EAGLE PROTECTION ACT

In addition to protection under the MBTA, bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are also protected under the Bald and Golden Eagle Protection Act (BGEPA). The BGEPA prohibits anyone from taking, possessing, or transporting any eagle or eagle parts (including nests, eggs, feathers, etc.) without prior authorization. This includes both active nests and inactive nests. Activities that directly or indirectly lead to take are prohibited without a permit.

3.7.1.2 Affected Environment

Table H-7 in Appendix H of this document describes the special-status species considered for analysis, general results of the species-specific surveys, habitat and range description, and potential occurrence under each alternative. The potential for occurrence of a species was identified using the following categories:

- **Known to occur**—the species was documented in the analysis either during or before the survey by a reliable observer.
- **May occur**—the analysis area is within the species’ currently known range, and vegetation communities, soils, water quality conditions, etc., resemble those known to be used by the species.
- **Unlikely to occur**—the analysis area is within the species’ currently known range, but vegetation communities, soils, water quality conditions, etc., do not resemble those known to be used by the species, or the analysis area is clearly outside the species’ currently known range.

3.7.1.2.1 MIGRATORY BIRDS

Suitable nesting habitat for migratory birds is present throughout the affected surface lands, as evidenced by avian activity and the presence of passerine, corvid, and raptor species. During biological surveys that were completed to support the Project, no active or inactive passerine, corvid or raptor nests were identified within the biological survey area (SWCA 2020a).

3.7.1.2.2 RAPTORS

Bald eagles and golden eagles are protected under the MBTA and the BGEPA. Bald eagles are found typically in association with water and nest and breed from October to July throughout the Southwest. Golden eagles nest primarily on rock ledges or cliffs and occasionally in large trees at elevations ranging from 4,000 to 10,000 feet above mean sea level. Golden eagles are typically found in mountainous regions of open country, prairies, arctic and alpine tundra, open wooded areas, and barren areas. Both

bald and golden eagles are carnivores. Bald eagles prey on fish but also on mammals, especially prairie dogs (*Cynomys* sp.). Golden eagles feed mainly on small mammals, as well as invertebrates, carrion, and other wildlife (Stahlecker and Walker 2010). During biological surveys completed to support the Project, no active or inactive raptor nests were identified within the analysis area; however raptors were determined to have the potential to occur due to the presence of suitable foraging habitat within the affected surface lands (BLM 2020d; SWCA 2020a).

3.7.1.2.3 BAT SPECIES

Four additional BLM sensitive species—fringed myotis (*Myotis thysanodes*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western red bat (*Lasiurus blossevillei*)—have the potential to occur on the affected surface lands due to the presence of suitable foraging habitat (BLM 2020d).

3.7.1.2.4 KIT FOX

The kit fox, listed as a BLM sensitive species, most often occurs in open prairie, plains, and desert habitats with a home range of approximately 11km² (4.2 mi²). This species is a meso-carnivore which opportunistically eats small mammals (primarily rabbits and hares), small birds, invertebrates, and plant matter (List and MacDonald 2006). The species is primarily nocturnal, but individuals may be found outside their dens during the day. This species was determined to have the potential to occur on the affected surface lands due to the presence of suitable den and foraging habitat (BLM 2020d).

3.7.1.2.5 MEXICAN SPOTTED OWL

The MSO, protected under the Endangered Species Act, is one of the largest owl species of North America and one of three subspecies of spotted owl that are geographically delineated. The species habitat range covers the southwestern states of Arizona, Utah, Colorado, New Mexico, and Texas, and south to central Mexico (USFWS 2004). MSO is found in the southern and eastern parts of Utah on the Colorado Plateau, where it is a rare permanent resident.

Across the species' range, the MSO normally occupies old-growth forest in mixed conifer, pine-oak woodland, deciduous riparian, or a combination of these habitats that will support a home range of 1,400 to 4,500 acres (USFWS 2012). Habitat also typically has a structured canopy, a perennial water source, and a rodent-dominated prey base of adequate size. In Utah, however, breeding owls primarily inhabit deep, steep-walled canyons and hanging canyons. These canyons typically are surrounded by terrain that does not appear to provide nest/roost habitat but may provide foraging habitat for owls (USFWS 2012). MSO home ranges include activity centers that represent concentrated use areas for nesting, roosting, and foraging. Proximal areas to roosting must provide extensive foraging opportunities with dietary preferences relying on small mammals such as mice, woodrats, and voles (NPS 2010). Adult birds are faithful to their nesting sites and return year after year to breed in the same location.

The MSO was listed as threatened under the ESA on March 16, 1993 (*Federal Register* 58:14248). Critical habitat originally was designated on March 16, 1993 (*Federal Register* 58:14248), and subsequently revoked on March 25, 1998 (*Federal Register* 63:14378). Critical habitat was designated again on February 1, 2001 (*Federal Register* 66:8530) and further revised to its current extent on August 31, 2004 (*Federal Register* 69:53181). Designated critical habitat is located in Utah, Colorado, Arizona, and New Mexico.

The primary threat to MSOs in the United States is the risk of stand-replacing wildfire (USFWS 2012). However, fire is not a landscape-scale threat to MSO habitat on the Colorado Plateau, as the cliff and canyon habitat experiences a very low incidence and extent of stand-replacing fire (USFWS 2012).

3.7.2 Environmental Consequences

3.7.2.1 Analysis Methods and Assumptions

Noise disturbance, increased vehicle traffic, and surface disturbing activities are the impact-causing elements that could deter special-status wildlife populations from inhabiting or using suitable habitat in the analysis area. Because of the uniqueness of each species' habitat and range requirements, the analysis areas are specific to the species or management concern.

Assumptions:

- Localized populations are naturally affected by non-human-caused factors such as climate, natural predation, disease outbreaks, natural fire regimes, and competition for available habitat from other native species.
- Climatic fluctuation (e.g., drought) would continue to influence the health and productivity of special-status species habitat annually.
- Actions affecting one analyzed species would have similar impacts on other species that use the same habitats or areas.
- Surface-disturbing activities could lead to modification (positive or negative), loss (short or long term), or fragmentation of species habitat and/or the loss or gain of individuals, depending on the amount of area disturbed, species affected, and location of the disturbance.
- Changes in air, water, and habitat quality could lead to direct impacts and could have cumulative impacts on species survival.
- Impacts to special-status species could be more significant than impacts to non-special-status species.
- The USFWS would be consulted on any action that could affect any listed plant, fish, or wildlife species or their habitat. Consultation with the USFWS, as required by the ESA, would ensure additional protection for special-status species and mitigation of impact from the proposed Project. The USFWS would have jurisdiction over the management of federally listed plant, fish, and wildlife populations, critical habitat, and migratory birds.
- The total amount of new surface disturbance allowed by an alternative is a good index of potential impacts to special-status species. Success of reclamation measures prescribed as a condition of development is unknown, and the potential impact of surface disturbance on special-status species populations could be underestimated.
- In disturbed areas, reestablishment of a vegetative landscape and plant composition similar to adjacent undisturbed lands, including trees and shrubs, has taken more than 50 years and in some areas could take more than 100 years (BLM 2016e). Habitats such as biological soil crusts and mature shrub habitats will take the longest to reestablish, and habitats dominated by grasses and forbs will regenerate more quickly.
- Noise levels in the analysis area could be impacted by noise from mineral development, including equipment use and vehicle noise associated with well pad and associated infrastructure construction, well drilling and completion, wellhead operation, and operation and maintenance activities.
- Noise level analysis utilizes estimated dB levels for construction and operation activities provide by Twin Bridges and are based on anticipated equipment.
- Noise level analysis assumes single point source location noise levels. Interaction of multiple source locations was not modeled.

- Noise-level analysis does not account for changes in topography within the vicinity of the Project location.
- All protective measures whether Applicant-committed environmental protection measures or BLM-applied conditions of approval will be implemented to mitigate impacts to general wildlife species. See Appendix G and Appendix K for further information.

3.7.2.2 Environmental Impacts – Alternative A

3.7.2.2.1 MIGRATORY BIRDS

The analysis area for migratory birds is the biological survey area (431.7 acres). In general, no major or long-term effects on migratory birds are anticipated from the implementation of the proposed Project. Construction disturbance within 42.7 acres (9.8% of the analysis area) is not likely to lead to incidental mortality or displacement of migratory birds as no active or inactive nests were found during the 2020 biological survey. If migratory birds did occur during later Project phases, they would likely move into adjacent habitat in response to vegetation removal. Adult migratory birds would not likely be directly harmed by the proposed Project because of their mobility and ability to avoid areas of human activity. If feasible, vegetation removal associated with the proposed Project would occur outside the migratory bird breeding season (March 1–August 31). Any vegetation removal during the breeding bird season would be preceded by preconstruction nesting surveys up to 7 days prior to vegetation removal to identify any occupied nests. If active nests are located during pre-construction nest surveys, avoidance buffers (as determined by the BLM authorized officer) would be established around occupied nests or construction would not begin until young birds have fledged. If preconstruction nesting surveys are conducted and do not find any active nests, it is assumed that construction could begin without directly harming eggs, nestlings, or active nests.

3.7.2.2.2 RAPTOR SPECIES

The analysis area for raptor species is a 0.5-mile buffer on the proposed Project area, approximately 3,603.9 acres. Activities on the affected surface lands are not expected to impact bald or golden eagles because the area lacks suitable nesting habitat for these two species (SWCA 2020a). Adult eagles would not likely be directly harmed by the proposed Project because of their mobility and ability to avoid areas of human activity. During the 2020 raptor surveys, no raptor species or active/inactive nests were observed within a 0.5-mile buffer of the affected surface lands and one turkey vulture was observed in flight (SWCA 2020a). Thus, no impacts to raptor species, other than a general reduction of available foraging habitat proportional to the 42.7 acres (1.1% of the analysis area) of new surface disturbance, would be expected under Alternative A.

3.7.2.2.3 BAT SPECIES

The analysis area for bat species is a 0.5-mile buffer (804.7 m) on the proposed Project area, approximately 3603.9 acres. The proposed Project is located approximately 416 m northwest from the edge of Keg Spring Canyon where suitable cliff and canyon roosting habitat is present. At the base of Keg Spring Canyon riparian vegetation is present and may provide suitable roosting habitat for Western Red bats, a tree roosting species. The affected surface lands and biological survey area does not provide roosting habitat and proposed Project activities are not expected to impact availability or likelihood of use of this habitat in proximity to the proposed Project. The affected surface lands does contain vegetation communities in which these species are known to utilize for foraging purposes. However, as these species utilize nocturnal and/or crepuscular foraging periods, daytime activities such as construction, operation, and vehicle use are not expected to interfere with bat behavioral patterns or availability of food sources.

The proposed action is not anticipated to cause long-term impacts to bat species with potential to occur or their habitat due to the availability of adjacent suitable foraging habitat. Alternative A may impact individuals or localized foraging habitat (42.7 acres [1.1% of the analysis area]) but would not likely contribute to a trend toward Federal listing or cause a loss of viability to the populations or species.

3.7.2.2.4 KIT FOX

The analysis area for kit fox is equivalent to the species home range or approximately 11km² (4.2 mi² [2,718 acres]). The proposed Project contains suitable foraging habitat for small mammal prey species for the kit fox due to the presence of desert habitat. During the 2020 biological surveys, no kit fox dens or sign of species occupancy were observed (SWCA 2020a). Similar to general wildlife, direct impacts to kit fox would include the removal or crushing of existing vegetation, burrow collapse, increased risk of mortality related to increased vehicular traffic, loss or degradation of native habitat, and displacement of individuals from burrows, birthing locations, and foraging areas. The aforementioned direct impacts are attributed to activity higher than baseline levels due to construction and operation of the proposed Project, increased human activity including vehicle use, and associated noise disturbance. However, as this species is primarily nocturnal risk of displacement due to increased activity and risk of mortality from vehicular collision is reduced. Additionally, as no dens are present within the biological survey area, no impacts to kit fox reproduction or occupied burrows is expected due to the proposed surface disturbance. Alternative A is not anticipated to cause long-term impacts to the kit fox or its habitat because of the availability of adjacent suitable habitat. The proposed Project may impact individuals or localized reduction of available foraging habitat proportional to the 42.7 acres of new surface disturbance expected under Alternative A, approximately 1.6% of an average kit fox home range (analysis area) (List and MacDonald 2006). The proposed Project is not likely to contribute to a trend toward Federal listing or cause a loss of viability to the population or species as this species home range typically extends.

3.7.2.2.5 MEXICAN SPOTTED OWL

The analysis area for MSO is a 0.5-mile buffer (804.7 m) on the proposed Project area, approximately 3603.9 acres. Under Alternative A, the proposed well pad is located approximately 416 m northwest from the boundary of Keg Spring canyon, which has been previously mapped as potential MSO nesting habitat (Willey 1995, 2002). The desert shrubland surrounding the canyon also meets requirements for foraging habitat for owls by providing populations of small mammal prey species. No MSO protected activity centers have been designated by the USFWS in proximity to the proposed Project.

Due to the well pad's proximity to previously mapped-suitable habitat and considering that the well pad is potentially the most significant source of noise disturbance, a species-specific survey protocol for MSO was initiated in 2020. An initial habitat suitability study was conducted on May 26, 2020, to verify the suitability of modeled habitat in Keg Spring Canyon and within 0.5 miles of the analysis area. The suitability survey confirmed suitable nesting habitat in Keg Spring Canyon and three survey call locations were established following USFWS MSO Recovery Plan Survey Protocol (SWCA 2020a; USFWS 2012). Per the survey protocol, the first year of survey was done by completing four calling sessions at established suitable habitat locations between May–August 2020 (SWCA 2020a). The 2020 species-specific survey results were negative with no detection of owls within the survey area. The Applicant has committed to conducting year two surveys per the USFWS protocol in 2021 to confirm that the suitable habitat is unoccupied. Due to the in-progress survey protocol, the following analysis assumes there is potential for current MSO occupancy of Keg Spring Canyon. Following the execution of the USFWS MSO Recovery Plan Survey Protocol, if surveys are negative and confirm lack of presence of MSO within the Keg Spring Canyon, the following potential impacts would not apply to existing MSO populations.

Noise disturbance was determined to have the greatest potential impact to MSO habitat suitability and is further analyzed in detail below. As there is expansive desert shrubland vegetation available for foraging within the analysis area, the reduction of 42.7 acres (1.1% of the analysis area) of new surface disturbance is not expected to impact available prey populations.

MSOs are sensitive to noise-producing anthropogenic activities because their natural behavior relies heavily on auditory communications during nocturnal breeding and foraging habits (USFWS 2012). MSO utilize calls for pair communication, “territorial defense, feeding nestlings, and post-fledging activities” (USFWS 2012). As described in the 2012 MSO Recovery Plan, infrequent noise-producing activities are assumed to have little long-term adverse impacts to owls, however long-term noise pollution may impact individuals or isolated populations and/or may reduce habitat suitability (USFWS 2012). However, noise disturbance can result in behavioral changes such as flushing from perch locations and altered nesting and roosting activities which may then increase threat to predation and/or heat-related stress (USFWS 2012). Research related to distance and noise levels that may alter owl behavior found that greater distance from the point source location led to less reactionary behavior, with close noise resulting in greater flushing and behavioral change (Pater et al. 2009; USFWS 2012). Quantified level at which owl sensitivity increases has been shown to be approximately 72.3 dB (69 A-weighted decibel [dBA]); however, no studies have been conducted on the influence of habitat type (canyon vs. forest) on level of behavioral response of owls (USFWS 2012). The nature of canyon habitat may also amplify noises and inherently may have less locations suitable for MSO nesting and roosting with adequate thermal protection compared to densely forested habitat.

Due to the remote location of the proposed Project the soundscape is likely similar to that recorded in nearby Canyonlands National Park, with an ambient sound level of 20-28 dB with natural sound predominating and human-caused noise such as aircraft overflights or vehicular traffic creating distinct noise events (Abrose and Burson 2004). The soundscape between the flat desert area of the affected surface lands, which is sparsely vegetated, and Keg Spring Canyon may vary due to an increase in riparian vegetation and topography within the canyon. Proposed activities including concentrated construction activity and operations of the proposed processing plant and well pad would result in point sources of noise. Noise levels from point sources would decrease by 6 dBA for every doubling of the distance away from the source following noise attenuation principles (American National Standards Institute [ANSI] 2018; MAS Environmental 2006). The following noise impact analysis utilized the conservative ambient baseline level of 20 dB due to the remote nature of the analysis area. However, the existing access road, which overlaps a portion of the proposed Project, is known to be utilized by recreationalists and has existing vehicular traffic that would intermittently increase noise levels above the 20 dB baseline value (see Section 3.8 for further information on recreation).

It is estimated that Project construction with standard equipment would produce a short-term level of 100 dB at the construction site reaching the ambient background level (approximately 20 dBA) beyond an approximate distance of 9.1 km (5.65 miles) (ANSI 2018; OMNI Calculator 2020). During construction of the well pad (closest to the canyon), attenuated noise from equipment would be approximately 46.8 dB at the intersection with suitable habitat (OMNI Calculator 2020). The primary point source locations for long-term operational noise would be the well pad and the proposed processing facility (which is an indirect effect of the BLM’s federal actions). It is estimated that operational activities at the facility site would average 75 dBA and the well pad operational activities would average 68 dBA at the point source location. The proposed facility site location is located approximately 5,736 m from the boundary of Keg Spring Canyon MSO habitat. Assuming standard topography noise attenuation, the operational noise would dissipate to 20 dB approximately 514 m from the facility location (ANSI 2018; OMNI Calculator 2020). At the boundary of the canyon, the noise disturbance from the facility site would attenuate to well below the ambient noise levels (ANSI 2018; MAS Environmental 2006). The Alternative A well pad location is located approximately 416 m from the boundary of Keg Spring Canyon. Assuming standard

topography noise attenuation, the operational noise would dissipate from 68 dBA to a baseline noise level of 20 dBA approximately 230 m from the edge of the well pad (ANSI 2018, OMNI Calculator 2020). At the boundary of the canyon, the noise disturbance would be approximately 14.8 dB and below the ambient noise level (ANSI 2018; OMNI Calculator 2020).

The noise disturbance related to the proposed action would occur first during the construction phase of the proposed Project and then during the following operational phases. As the construction noise level of 100 dBA at the point source would be at an impactful level above 69 dBA at the intersection with Keg Spring Canyon. During the operational phases on the proposed Project, two-point locations for long-term noise point source locations are proposed. However, noise from the facility site and well pad would dissipate to the level of ambient sound prior to reaching the edge of Keg Spring Canyon habitat and is not expected to lead to disturbance of present owls or decrease the suitability of the habitat for future nesting/roosting purposes. The level of noise disturbance leading of significant change in MSO behavior is approximately 69 dBA (comparable to noise output from a vacuum cleaner), the level of long-term noise proposed is not likely to lead to an increase in flushing behavior or incremental and general behavior changes of MSO, if present, related to choice of nest locations and success of communication activities between individuals.

To avoid any potential impacts to MSO and their habitat, Alternative A includes species-specific Applicant-committed environmental protection measures. Under the timing restriction environmental protection measure and BLM mitigation measure, construction and operation activities would be conducted between September 1, 2020 and February 28, 2021, outside MSO nesting and breeding season. This timing restriction would be in effect pending the completion of a second year of species-specific surveys per the USFWS MSO Recovery Plan Survey Protocol in spring/summer 2021 survey period (Appendix G) (SWCA 2020a; USFWS 2012). Following completion of the species-specific surveys, a full survey report would be submitted to the BLM and USFWS for review and concurrence of findings. If MSO is found to be not present, the BLM may give the operator written consent for Project construction and operations to be conducted year-round. If surveys detect MSO, then timing restrictions would remain in effect for the life of the Project. When in place, the timing restriction would reduce the period during which impacts related to construction and operation activities, such as noise from machinery and increased vehicular traffic, would occur to outside of higher sensitivity time periods for this species. Additionally, during construction and operation of the proposed Project noise monitoring would be completed at the edge of Keg Spring Canyon per a protocol agree upon by the Applicant, BLM and USFWS to ensure that noise levels do not exceed 69 dBA per the MSO recovery plan (USFWS 2012). If noise levels exceed 69 dBA at the monitoring site(s), operations would be suspended, and the operator would contact the BLM authorized officer. Appropriate measures would then be taken to mitigate noise levels to below 68 dBA before operations would resume.

With the timing restriction and a commitment to complete a second year of surveys pursuant to the USFWS MSO Recovery Plan Survey Protocol, noise impacts from Alternative A are not anticipated to lead to take of the species or a reduction in available suitable nesting/breeding habitat. As there are no direct impacts from surface disturbance to suitable MSO habitat and indirect noise impacts would either occur outside of breeding and nesting season or noise monitoring would occur to ensure disturbance does not exceed limits per the 2012 MSO Recovery Plan, the BLM determined that the proposed action would result in an effects determination of May Affect, Not Likely to Adversely Affect. (USFWS 2020c). Up to five additional development wells may be drilled from the proposed well pad. ESA consultation has not occurred on any wells other than the 36-1 and the 5-2, therefore, Section 7 consultation would have to be completed along with the appropriate NEPA before any additional wells are drilled on this well pad.

3.7.2.3 Environmental Impacts – Alternative B

3.7.2.3.1 MIGRATORY BIRDS

The analysis area for migratory birds is the biological survey area (485.9 acres). In general, no major or long-term effects on migratory birds are anticipated from the implementation of Alternative B. Alternative B shares impact indicators and potential risk of adverse as described under Environmental Impacts— Alternative A (see Section 3.7.2.2). Incidental mortality or displacement of migratory bird species is possible on a local scale due to new surface disturbance of 52.3 acres (10.8% of the analysis area). Alternative B would result in 18.3% more surface disturbance compared to Alternative A, and a proportional increase in risk of adverse impacts related migratory bird habitat removal and incidental mortality.

If feasible, vegetation removal associated with the proposed Project would occur outside the migratory bird breeding season (March 1–August 31). Any vegetation removal during the breeding bird season would be preceded by preconstruction nesting surveys up to 7 days prior to vegetation removal to identify any occupied nests. If active nests are located during the surveys, avoidance buffers (as determined by the BLM Price FO) would be established around occupied nests or construction would not begin until young birds have fledged. If preconstruction nesting surveys are conducted and do not find any active nests, it is assumed that construction could begin without directly harming eggs, nestlings, or active nests.

3.7.2.3.2 RAPTOR SPECIES

The analysis area for raptor species is a 0.5-mile buffer on the proposed Project area, approximately 4,284.5 acres. Activities on the affected surface lands are not expected to impact bald or golden eagles. Because the affected surface lands lacks suitable nesting habitat for these two species, the proposed Project is not anticipated to cause take of individual bald or golden eagles, their nests, or their eggs (SWCA 2020a). Adult eagles would not likely be directly harmed by the proposed Project because of their mobility and ability to avoid areas of human activity. During the 2020 raptor surveys, no active/inactive nests were observed within a 0.5 miles buffer from the affected surface lands and one turkey vulture was observed in flight (SWCA 2020a). Thus, no impacts to raptor species, including golden eagles, outside of general reduction of available foraging habitat proportional to the 52.3 acres (1.2% of the analysis area) of new surface disturbance is expected under Alternative B.

3.7.2.3.3 BAT SPECIES

The analysis area for bat species is a 0.5-mile buffer (804.7 m) on the proposed Project area, approximately 4,284.5 acres. The affected surface lands also contains suitable foraging habitat for both species, however preferred canyon and cliff habitat occurs approximately 470 m east of the proposed well pad location, with Keg Spring Canyon occurring approximately 1,251 m east-northeast (SWCA 2020a).

The Alternative B Project location is located approximately 1,251 m west-southwest from the edge of Keg Spring Canyon and approximately 470 m west of an unnamed cliff band where suitable cliff and canyon roosting habitat is present. At the base of Keg Spring Canyon riparian vegetation is present and may provide suitable roosting habitat for Western Red bats, a tree roosting species. The affected surface lands and biological survey area do not provide roosting habitat and proposed Project activities are not expected to impact availability or likelihood of use of this habitat in proximity to the proposed Project (SWCA 2020a). The affected surface lands do contain vegetation communities in which these species are known to utilize for foraging purposes. However, as these species utilize nocturnal and/or crepuscular foraging periods, daytime activities such as construction, operation, and vehicle use are not expected to interfere with bat behavioral patterns or availability of food sources.

Alternative A is not anticipated to cause long-term impacts to bat species with potential to occur or their habitat because a large portion of proposed Project disturbance would be revegetated and reclaimed following construction. Alternative B may impact individuals or localized foraging habitat proportional to the proposed surface disturbance of 52.3 acres (1.2% of the analysis area) but would not likely contribute to a trend toward Federal listing or cause a loss of viability to the populations or species.

3.7.2.3.4 KIT FOX

The analysis area for kit fox is equivalent to the species home range or approximately 11km² (4.2 mi² [2,718 acres]). The Alternative B affected surface lands contains suitable foraging habitat for small mammal prey species for the kit fox due to the presence of desert habitat. During the 2020 biological surveys, no kit fox dens or sign of species occupancy were observed within the area (SWCA 2020a). For this species, Alternative B shares impact indicators and potential risk of adverse as described in Section 3.7.2.2. Incidental mortality or displacement of kit foxes is possible on a local scale due to surface disturbance of 52.3 acres (1.9% of the analysis area). Alternative B would result in 18.3% more surface disturbance compared to Alternative A, however risk of mortality related to increased vehicular traffic would be comparable. Additionally, as no dens are present within the biological survey area, no impacts to kit fox reproduction or occupied burrows is expected due to the proposed surface disturbance.

Alternative B is not anticipated to cause long-term impacts to the kit fox or its habitat because a large portion of proposed Project disturbance would be revegetated and reclaimed following construction. The proposed Project may impact individuals or localized reduction of available foraging habitat proportional to the 52.3 acres of new surface disturbance expected under Alternative B but would not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species.

3.7.2.3.5 MEXICAN SPOTTED OWL

The analysis area for MSO is a 0.5-mile buffer (804.7 m) on the proposed Project area, approximately 4,284.5 acres. The Alternative B well pad and facility site would be located approximately 1,251 m and 7,742 m, respectively, from Keg Spring Canyon modeled MSO habitat (Willey 1995, 2002). Thus, BLM determined that although suitable foraging habitat may be present within and around the proposed Project location, the proposed action was not within 0.5 miles of mapped suitable nesting/roosting habitat for the species.

The BLM determined that Alternative B would result in an effects determination of **No Effect** due to lack of suitable habitat within proximity of the proposed Project location. Per the proposed action, up to five additional development wells may be drilled from the proposed well pad. ESA consultation has not occurred on any wells other than the 36-1 and the 5-2, therefore, Section 7 consultation would have to be completed along with the appropriate NEPA before any additional wells are drilled on this well pad.

3.7.2.4 Environmental Impacts – Alternative C: No Action Alternative

Under the No Action Alternative, the Twin Bridges' APDs and ROW applications would be denied, and the surface disturbance and other impacts associated with the development proposed under the action alternatives would not occur. The No Action Alternative would have no impacts on special-status wildlife in the species-specific analysis areas.

3.7.2.5 Cumulative Effects

The CIAA used to analyze cumulative impacts to special-status wildlife consists of the following HUC-10 watersheds: Salt Wash-Green River, Moonshine Wash, Taylor Canyon-Green River, and Horseshoe Canyon. This area covers 529,838 acres.

Past and present actions that have affected and will continue to affect special-status wildlife in the CIAA are described in EA Section 3.1.2 and impacts from those actions are captured through the description of the affected environment for special-status wildlife species.

RFD within the CIAA for special-status wildlife includes oil and gas development, potash mining, travel management, recreation, livestock grazing, and river restoration RFFAs (totaling approximately 2,989 acres of surface disturbance and 0.6% of the CIAA). For a detailed explanation of RFFAs and the associated surface disturbance for each RFFA, refer to the cumulative scenario in EA Section 3.1.2. Oil and gas development and associated infrastructure are anticipated to cause the greatest amount of reasonably foreseeable future surface disturbance and impacts to special-status wildlife in the CIAA through construction of well pads, roads, pipelines, and other infrastructure. These activities could result in short-term and long-term habitat loss, degradation, and fragmentation. Individuals could be displaced from otherwise suitable habitats because of human presence or other anthropogenic disturbance factors (e.g., traffic, noise, recreation, livestock grazing activities), especially during sensitive time periods such as winter, birthing, nesting, and early rearing of young. Loss of vegetation from development activities would remove cover and forage and would degrade habitat. Special-status wildlife populations are more sensitive to these types of impacts than are other wildlife and fish species because many of them rely on unique and rare habitat niches. Additionally, many of these species have experienced declines in population, health, and/or habitat resulting in their designation as a special-status species. Over time, these impacts, along with ongoing landscape-scale phenomena including climate change and drought, could reduce the capability of habitats in the CIAA to maintain current special-status species populations. The impacts would likely be greater where mineral development is more intense and in areas where development overlaps with habitats that are limited (especially important for special-status species survival) or difficult to reclaim. The degree of impact would depend on the timing of development activities and whether the amount of activity outpaces the successful reclamation and revegetation efforts in disturbed areas. As development occurs, displacement of special-status wildlife could result in increased competition for resources and stresses on special-status species and other wildlife occupying undeveloped lands.

Cumulative effects to general wildlife and migratory birds from travel management under the recently approved San Rafael Desert TMP include behavioral changes that result in disrupted or displaced breeding; changes in nesting behavior that result in reduced reproductive success; spatial and temporal changes in foraging activities that result in decreased fitness; altered species richness and community composition; damage, loss of, fragmentation, or alteration to nesting, burrowing, brooding, and foraging habitat; and mortality. Recreational use and other actions within the CIAA would also result in cumulative effects to special-status wildlife, similar to those impacts described above for mineral development and travel management.

In addition to surface disturbance, the aforementioned RFFAs (as described in EA Section 3.1.2) would also contribute to an increased anthropogenic noise soundscape in areas proximal to activity. In comparison to the natural soundscape of the San Rafael Desert and CIAA, anthropogenic sound can create distinct noise events and may disrupt wildlife activity or reduce the suitability of habitat similar to those described above related to travel management activities. Under both Alternatives A and B, the proposed Project would contribute to increased noise during construction and operational phases which may contribute to wildlife avoidance of otherwise suitable habitat temporarily, until acclimation to

increased noise or permanently. However, wildlife habitat that occurs in the Labyrinth Canyon Wilderness Area (see Section 3.9), such as occupied and modeled suitable habitat for MSO, would be afforded protections associated with wilderness management and is unlikely to be affected by oil and gas development, potash mining and travel management RFFAs. Therefore, incremental contributions to cumulative impacts from noise to MSO habitat would be limited to those described in Section 3.7.2.2.5.

Under both Alternatives A and B, the proposed Project would result in surface disturbance, which would contribute to the incremental loss, degradation, and fragmentation of special-status wildlife habitats and to impacts on special-status wildlife populations in the CIAA. Alternative B is anticipated to result in the most surface disturbance and contribution of adverse impact to vegetation in the CIAA with 52.3 acres of disturbance followed by Alternative A with 42.7 acres of disturbance. Either action alternative would result in surface disturbance of less than 0.01% of the CIAA. Alternative C would result in no impacts to special-status species wildlife.

3.8 RECREATION

3.8.1 Affected Environment

The analysis area for recreation includes the Project footprint with a 5-mile buffer (115,120 acres). This analysis area was chosen because it includes popular recreational areas that have the potential to be impacted by the visual, noise, and surface disturbances resulting from the proposed Project. As described in Section 3.10.1, a 5-mile buffer encompasses the extent of the BLM foreground/middle ground distance zone. This analysis area is consistent with visual resource studies conducted for utility and infrastructure projects in the region based on this distance being the threshold of where a project of this scale would be noticeable to the casual observer. Recreational areas include the Five Hole Arch Trail, nearby portions of the Green River, and portions of the Labyrinth Canyon and Labyrinth Rims/Gemini Bridges SRMAs (see Appendix F, Figure F-10).²

3.8.1.1 *Regulatory Framework*

The Price FO RMP describes the following management goals for recreation in the analysis area (BLM 2008a:103):

- To establish management that provides necessary public services, authentic recreation experiences, and opportunities within allowable use levels; minimizes user conflicts; and maintains the healthy ecosystems and settings that provide the basis for recreation and experience.
- To provide an environment for and encourage entrepreneurial activities that are supportive of the recreation program goals and objectives.

The RMP provides an extensive list of management actions or decisions for recreation, including general management decisions for recreation and specific management decisions for developed recreation sites, use of the Recreation Opportunity Spectrum (ROS) classification system, SRMAs, extensive recreation management areas, special recreation permitting, and OHV recreation.

² While the 5-mile analysis area does include approximately 6,805 acres of the Dirty Devil/Robber's Roost SRMA, this SRMA is not discussed further because intervening topography is such that this area would not be directly or indirectly affected by the project.

3.8.1.2 Existing Setting

The analysis area is in a remote region of southeastern Utah that is well known for its recreational opportunities. There are no developed recreational facilities within the analysis area, and access is from unpaved roads. The nearest towns are Green River, Hanksville, and Moab, Utah, all of which are within 40 miles of the Project footprint. Two national parks, a national recreation area, the San Rafael Swell, and Goblin Valley State Park are within 30 miles of the analysis area. The analysis area overlaps portions of the Labyrinth Canyon Wilderness Area. It also overlaps the following popular recreation destinations: a northern portion of the Labyrinth Canyon SRMA; a small portion of the western edge of the Labyrinth Rims/Gemini Bridges SRMA; Five Hole Arch Trail (also known as Colonnade Arch Trail); and portions of the Green River, a popular designation for river rafting, which is approximately 2 miles east of the Project footprint. Although the recreation designations in the analysis area are relatively popular (Five Hole Arch receives approximately 800 to 1,200 visitors annually), because of its remote location the analysis area receives much less visitation than the nearby national parks and other more developed recreation areas, which can receive over one million visitors per year. County Roads 1025 and 1026 are used regularly for dispersed recreation in the analysis area.

Recreation is a highly valued use of BLM-administered public land in the analysis area. Because there are no developed recreation sites in the area, all recreation is considered to be dispersed. Visitors engage in a wide variety of motorized and nonmotorized recreational activities. The busiest seasons tend to be spring and fall, although visitation occurs throughout the year. Recreation activities include climbing, hiking, canyoneering, biking, OHV (all-terrain-vehicle and motorcycle) use, driving for pleasure, cultural and paleontological resource viewing, boating on the Green River, camping, hunting, and horseback and mule riding.

An important element of recreation is the visitor experience. Different types of visitors seek different experiences for their chosen recreation activity. The visitor experience depends on factors such as the level of interactions with other people, the presence or lack of infrastructure, the level of risk of the activities, opportunities for solitude and closeness to nature, and the level of physical effort. The BLM seeks to provide multiple visitor experiences meeting different recreation needs and desires while observing resource protection and other management requirements.

3.8.1.2.1 LABYRINTH CANYON SPECIAL RECREATION MANAGEMENT AREA

The Labyrinth Canyon SRMA covers 45,862 acres and is administered by the Price FO. The analysis area overlaps approximately 30,908 acres of the northern portion of the SRMA. The portion of the Labyrinth Canyon SRMA overlapped by the analysis area is managed under the ROS as primitive (16,141 acres), semi-primitive motorized (9,616 acres), and semi-primitive non-motorized (5,150 acres). The portion of the Labyrinth Canyon SRMA overlapped by the analysis area includes a portion of Labyrinth Canyon and some other tributary canyons of the Green River. Portions of the Three Canyon and Keg Knoll recreation focus areas are within the Labyrinth Canyon SRMA in the analysis area. Three Canyon is a side canyon of Labyrinth Canyon that overlaps the northern portion of the analysis area and is often visited by river rafters on a hike. It is also a less technical canyon for canyoneering (although side forks of the canyon have more technical routes). It contains a small intermittent stream and occasional pools. The Keg Knoll recreation focus area overlaps the southern portion of the analysis area and is a popular dispersed camping site. There is also a primitive airstrip (Keg Knoll Airstrip) just north of the proposed Bowknot 5-1 well pad in the Labyrinth Canyon Wilderness Area. This airstrip receives a low level of use by recreational aircraft.

The Green River, a large-volume desert river meandering through the scenic high-walled cliffs of Labyrinth Canyon, is easily accessible to rafters and runs through the Labyrinth Canyon SRMA. It is federally adjudicated as navigable water, and lands below the 1897 high-water line are state owned. The flat water of the canyon attracts numerous recreational users seeking a scenic river float. Impacts occur from concentrated use along the river, primarily in camping areas. Resource damage may also occur because the canyon attracts a large number of novice and first-time river runners (BLM 2008a).

3.8.1.2.2 LABYRINTH RIMS/GEMINI BRIDGES SPECIAL RECREATION MANAGEMENT AREA

The Labyrinth Rims/Gemini Bridges SRMA covers 300,650 acres and is administered by the Moab FO. The analysis area overlaps portions (approximately 6,724 acres) of the western edge of the Labyrinth Rims/Gemini Bridges SRMA, immediately east of the Green River. The Labyrinth Rims/Gemini Bridges SRMA in the analysis area is managed under a nonmechanized recreation focus. There are no paved roads, developed recreation facilities, or developed trails within the portion of the Labyrinth Rims/Gemini Bridges SRMA overlapped by the analysis area, and recreation opportunities are primarily backcountry opportunities associated with the Green River and Labyrinth Canyon.

3.8.1.2.3 FIVE HOLE ARCH TRAIL

Five Hole Arch Trail is entirely within the analysis area. The trail begins in the northeastern portion of the Federal lease area, and the arch is approximately 1 mile to the northeast as the crow flies (i.e., in a direct line). The arch is approximately 1.8 miles southeast of the proposed 36-1 well pad and approximately 1.5 miles northeast of the proposed 5-1 well pad. The trailhead is not signed; it is accessible by an unpaved dirt road that is passable by standard passenger vehicle, but higher-clearance vehicles are preferred. Because of its remoteness and the relative difficulty in accessing the trailhead, the Five Hole Arch Trail receives approximately 800 to 1,200 visitors annually, which is much less use than other, more accessible trails in the region, such as the trails in and around Canyonlands National Park (733,996 visitors in 2019), Arches National Park (1.7 million visitors in 2019), Goblin Valley State Park (301,089 visitors in 2019), and the San Rafael Swell (NPS 2020a, 2020b; Utah Division of Natural Resources [UDNR] 2019). The relatively lower level of visitation provides users with outstanding opportunities for solitude, primitive recreational experiences, and other experiences more associated with wilderness areas than developed recreation areas.

3.8.1.2.4 GREEN RIVER

A designated 49.2-mile scenic river segment of the Green River Wild and Scenic River, established in 2019 under the John D. Dingell, Jr. Conservation, Management and Recreation Act, meanders through Labyrinth Canyon in the eastern portion of the analysis area, approximately 2 miles east of the Project footprint. The analysis area overlaps approximately 4.5 miles of the Green River scenic river corridor, protected under the Wild and Scenic River Act of 1968 out to a distance of 0.25 mile from the high-water mark of the river. Within the analysis area, the Green River is a navigable water, and as such, the river corridor is managed by the State of Utah, and there is a comprehensive management plan developed for the river corridor (UDNR 2020). There are no developed recreational facilities along the portions of the Green River that are overlapped by the analysis area. However, the portion of Labyrinth Canyon that the Green River passes through within the analysis area is a popular river rafting destination, and shorelines within the canyon provide backcountry camping and hiking opportunities for river users almost any time of the year except winter, when there may be ice on the river. More specifically, rafters sometimes hike up from the Green River to Five Hole Arch or hike in along the canyon leading southwest from Trin Alcove. River rafters typically begin their trips through Labyrinth Canyon at either Green River or Ruby Ranch (23 miles downstream from Green River) and end their trips at Mineral Bottom (accessed via State Route 313 north of Moab) (BLM 2020a).

3.8.2 Environmental Consequences

3.8.2.1 Analysis Methods

The analysis of potential impacts to recreational access and experience within the analysis area considers the known recreation sites and activities, the types of recreational user, and the types of recreational experience available in the analysis area. The analysis is organized by the main recreation resources overlapped by the analysis area: Labyrinth Canyon SRMA, Labyrinth Rims/Gemini Bridges SRMA, Five Hole Arch Trail, and Green River. The types of recreation impacts considered in the analysis include the potential impacts from the surface-disturbing activities, human presence, noise, and visual disturbance created by the proposed Project.

Because Project impacts would occur in a remote area near designated wilderness, where recreational users are expecting a more primitive recreational experience in a landscape that has little-to-no evidence of human activity, recreational users may be more sensitive to impacts from the proposed construction, drilling, and production operations activities.

3.8.2.2 Environmental Impacts – Alternative A

3.8.2.2.1 LABYRINTH CANYON SPECIAL RECREATION MANAGEMENT AREA

Under Alternative A, there would be approximately 5.7 acres of surface disturbance in the Labyrinth Canyon SRMA. The surface disturbance in the SRMA would be from proposed improvements to Spur Road 1025, the pipeline ROW, and the well pad and would represent approximately 0.03% of the SRMA that is overlapped by the analysis area³. The proposed disturbance would be entirely within land classified as semi-primitive motorized (approximately 0.1% of this ROS classification in the analysis area). Because this would represent such a small portion of the SRMA and lands classified as semi-primitive motorized, it would represent a negligible loss of lands available for recreation in the SRMA. However, the construction, drilling, and operation of the proposed well pad, pipeline, and processing plant, as well as the proposed road improvements, would represent approximately 43.1 acres of surface disturbance in and adjacent to the SRMA and would result in visual and noise impacts that have the potential to affect the recreation experience of users of the SRMA. Surface disturbance from Spur Road 1025 and other evidence of human activity along Spur Road 1025 (a cattle stock tank and an abandoned tank) represent existing disturbance that already affects recreational visitors' experience in the area. Because of increased human activity and use of construction and drilling equipment, these impacts would be most pronounced during construction and drilling activities. A more detailed discussion of potential visual resources impacts is included in Section 3.10.

The proposed road upgrades would take 10 to 14 days to complete, creating a temporary disruption in recreational access to the area. The road upgrades may increase recreational visitation to the SRMA and surrounding area by making the area more accessible. This increased visitation would impact wilderness characteristics such as sense of solitude. However, because this area experiences less recreational visitation than the Five Hole Arch area, the impacts from increased visitation under Alternative A would not be great as the increased visitation to the Five Hole Arch area expected under Alternative B as a result of road upgrades. The Applicant has included dust abatement methods as Applicant-committed environmental protection measures (see Appendix G).

³ Note that the processing facility proposed on SITLA lands is not subject to SRMA and RMP standards/decisions.

The proposed well pad construction would take 10 to 14 days to complete. Installation of the proposed pipeline would occur over 30 days. Construction of the proposed processing plant would take 25 weeks to complete. It is assumed that construction noise would be approximately 100 dB (ANSI 2018) at the construction site and that the noise level would decrease the farther one is from the construction site. Construction and drilling noise would be a temporary impact on recreational users near the proposed construction and drilling activities. As discussed in Section 3.7.2.2.5, it is estimated that noise from Project construction activities would reach the ambient background level (approximately 20 dBA) beyond an approximate distance of 9.1 km (5.6 miles) from the construction site (ANSI 2018; OMNI Calculator 2020). Impacts to recreational users from construction noise would be moderate and temporary within approximately 9.1 km (5.6 miles) from the construction site and would vary based on intervening topography.

Potential impacts to recreational users from the production operations of the proposed well pad, pipeline, and processing plant would be minor. Standard operation activities of the well pad and facility site would result in an estimated 68 dB and 75 dB, respectively. Assuming standard topography noise attenuation, the operational noise would dissipate from 68 dBA to a baseline noise level of 20 dBA approximately 230 m (754.6 feet) from the edge of the well pad (ANSI 2018, OMNI Calculator 2020). Because the Applicant would use acoustic mitigation on all rotating equipment (generators, compressors, and recycle pumps) to reduce noise impacts, noise from production operations of the well pad and pipeline would be negligible. Because the processing plant would be approximately 3 miles from the SRMA, it would have no noise impacts on recreational users in the SRMA. Permanent equipment would be painted to blend with the natural surroundings and effects on views from the SRMA would be minimal. Specific colors would be determined in coordination with BLM and SITLA. Road base and well pad base material would, to the extent possible, be generated from on-site cut and fill material. Any materials brought in from off-site for the well pad base and road base would be of a similar color. The pipeline would be buried and would not be visible from the SRMA. The processing plant would also be painted to blend in with the natural surroundings and is unlikely to be visible from the SRMA. Appropriate use of down lighting at the plant would reduce impacts on the night skies, reducing potential visual impacts on recreational users who camp in the SRMA. There would be no impacts to the Keg Knoll Airstrip because the closest proposed surface disturbance would be approximately 2 miles north of the airstrip.

One to two semi-truck trips per day to the processing plant would also result in potential visual and noise impacts on the recreational experience, as well as impacts to wilderness characteristics such as sense of solitude. The trucks would be using existing roads that are already used by multiple recreational users and their vehicles, so the one to two truck trips per day would represent an addition to an already existing noise and visual impact on recreational users in the analysis area.

3.8.2.2.2 LABYRINTH RIMS/GEMINI BRIDGES SPECIAL RECREATION MANAGEMENT AREA

Under Alternative A, there would be no surface disturbance in the Labyrinth Rims/Gemini Bridges SRMA. The portion of the SRMA within the analysis area is east of the Green River and approximately 2.5 miles east of the Project footprint. Recreational users along the eastern rim of Labyrinth Canyon may see or hear (or both) construction and drilling activities associated with the proposed well pad, pipeline, processing plant, and road improvements. Assuming construction noise is approximately 100 dB at the construction site, it is estimated that noise from Project construction activities would reach the ambient background level (approximately 20 dBA) beyond an approximate distance of 9.1 km (5.6 miles) from the construction site (ANSI 2018; OMNI Calculator 2020). Impacts to recreational users from construction noise would be moderate and temporary within approximately 9.1 km (5.6 miles) from the construction site and would vary based on intervening topography.

Potential impacts to recreational users from the production operations of the proposed well pad, pipeline, and processing plant would be negligible. Because of the distance between these proposed facilities and the SRMA, there would be no noise impacts from production operations. Because the pipeline would be buried, the processing plant and well pad facilities would be painted to blend in with the natural surroundings, and because of intervening topography, the visual impacts on recreational users in the SRMA would be negligible.

3.8.2.2.3 FIVE HOLE ARCH TRAIL

Under Alternative A, the proposed surface disturbance closest to the Five Hole Arch trailhead, trail, and the arch itself would be the proposed well pad, which would be approximately 2 miles northwest of the trail and arch. The construction, drilling, and operation of the proposed well pad and pipeline, as well as the proposed road improvements, would result in visual and noise impacts that have the potential to affect the recreation experience of users of the Five Hole Arch Trail. The proposed road improvements may also increase visitation around Five Hole Arch by making the area more accessible.

Assuming construction and drilling noise is approximately 100 dB at the construction site, it is estimated that noise from Project construction activities would reach the ambient background level (approximately 20 dBA) beyond an approximate distance of 9.1 km (5.6 miles) from the construction site (ANSI 2018; OMNI Calculator 2020). Impacts to recreational users from construction noise would be moderate and temporary within approximately 9.1 km (5.6 miles) from the construction site and would vary based on intervening topography. The proposed processing plant would be approximately 5 miles northwest of the trail. Therefore, construction of the plant would result in a temporary and minor noise impact on users of the trail and operation of the processing plant would result in no noise impacts to users of the trail.

Potential impacts from the operation of the proposed well pad, pipeline, and processing plant would be minor. Noise from production operations of the well pad and pipeline would be negligible. Because the processing plant would be approximately 5 miles from the trail, it would have no noise impacts on trail users. Permanent production equipment on the well pad would be painted or buried to blend in with the natural surroundings to reduce impacts on views from the trail. Because the equipment would be painted, and the trail would be approximately 2 miles away with intervening topography helping to obscure the view of the equipment, potential impacts on recreational users' visual experience would be minor. A more detailed discussion of potential visual resources impacts is included in Section 3.10. The pipeline would be buried and would not be visible from the trail. The processing plant would also be painted to blend in with the natural surroundings and is unlikely to be visible from the trail. Appropriate use of down lighting at the plant would reduce impacts on the night skies, reducing potential visual impacts on recreational users who camp near the trail.

3.8.2.2.4 GREEN RIVER

Under Alternative A, the proposed surface disturbance closest to the Green River would be the proposed well pad, which would be approximately 2 miles west of the river. Because of the topography of the canyon, none of the proposed surface disturbance would be visible to recreational users on the river. Because of distance and topography, it is unlikely that recreational users on the river would be affected by noise from construction and drilling activities. Assuming construction and drilling noise is approximately 100 dB at the construction site, it is estimated that noise from Project construction activities would reach the ambient background level (approximately 20 dBA) beyond an approximate distance of 9.1 km (5.6 miles) from the construction site (ANSI 2018; OMNI Calculator 2020). However, because of the sound of the flowing river and intervening topography, the noise from construction and drilling would likely be inaudible to recreational users floating in this section of the river. Because noise from operations would not be as loud as noise from construction activities, recreational users on the Green River would not be affected by noise from operations.

3.8.2.3 Environmental Impacts – Alternative B

3.8.2.3.1 LABYRINTH CANYON SPECIAL RECREATION MANAGEMENT AREA

Under Alternative B, all surface-disturbing activities would occur outside the Labyrinth Canyon SRMA. However, construction, drilling, and operation of the proposed well pad, pipeline, and processing plant, as well as the proposed road improvements, would represent approximately 52.3 acres of surface disturbance near the Labyrinth Canyon SRMA. The proposed surface disturbance related to the well pad and road improvements would be closest to the Labyrinth Canyon SRMA, within approximately 1 mile. Recreational users in the portions of the SRMA nearest the proposed surface-disturbing activities could be affected by the noise and visual disturbance associated with the proposed construction, drilling, and operation of the well pad and road improvements. The proposed road improvements may also increase recreational visitation to the SRMA and surrounding area by making the area more accessible. These impacts would be similar to those discussed for the SRMA in Section 3.8.2.2 but would be less pronounced because the surface disturbance under Alternative B would occur entirely outside the SRMA. There would be no impacts to the Keg Knoll Airstrip because the proposed surface disturbance would not overlap or interfere with operation of the airstrip. Recreation at Keg Knoll/Keg Spring Canyon would not be impacted by the proposed operations because the proposed well pad would be over 2 miles from Keg Knoll/Keg Spring Canyon and operations activities would be neither audible nor visible because of distance and intervening topography.

One to two semi-truck trips per day to the processing plant would also result in potential visual and noise impacts on the recreational experience, as well as impacts to wilderness characteristics such as sense of solitude. The trucks would be using existing roads that are already used by multiple recreational users and their vehicles, so the one to two truck trips per day would represent an addition to an already existing noise and visual impact on recreational users in the analysis area. The Applicant has included dust abatement methods as Applicant-committed environmental protection measures (see Appendix G).

3.8.2.3.2 LABYRINTH RIMS/GEMINI BRIDGES SPECIAL RECREATION MANAGEMENT AREA

Under Alternative B, there would be no surface disturbance in the Labyrinth Rims/Gemini Bridges SRMA. The portion of the SRMA within the analysis area is east of the Green River and approximately 2.2 miles east of the Project footprint. Because proposed surface-disturbing activities under Alternative B would be approximately the same distance from the Labyrinth Rims/Gemini Bridges SRMA as under Alternative A, potential impacts to recreational users in the SRMA would be similar to those discussed for the SRMA in Section 3.8.2.2.

3.8.2.3.3 FIVE HOLE ARCH TRAIL

Under Alternative B, the proposed surface disturbance closest to the Five Hole Arch trailhead, trail, and the arch itself would be the proposed well pad, which would be approximately 0.5 mile southwest of the trailhead and approximately 1.5 miles southwest of the arch. The construction, drilling, and operation of the proposed well pad and pipeline, as well as the proposed road improvements, would result in visual and noise impacts that have the potential to affect the recreation experience of users of the Five Hole Arch Trail. Because County Road 1026 would be closed during construction activities, the road improvements would result in a temporary disruption to recreational access to the Five Hole Arch Trail. Once construction is complete, the road would be open to both operations traffic and recreational traffic. Recreational users would pass the well pad when accessing the Five Hole Arch trailhead. The proposed road improvements may also increase visitation to Five Hole Arch by making the trailhead more

accessible. This increased visitation would impact wilderness characteristics such as sense of solitude. Because this area is the most popular recreational area near the Project area, increased visitation from road upgrades would likely have a greater impact on recreational users than the road upgrades in lesser used areas of the Labyrinth Canyon SRMA described under Alternative A in Section 3.8.8.2.1.

Assuming construction and drilling noise is approximately 100 dB at the construction site, it is estimated that noise from Project construction activities would reach the ambient background level (approximately 20 dBA) beyond an approximate distance of 9.1 km (5.6 miles) from the construction site (ANSI 2018; OMNI Calculator 2020). Impacts to recreational users from construction noise would be moderate and temporary within approximately 9.1 km (5.6 miles) from the construction site and would vary based on intervening topography.

Visitors to the arch would have to drive past the proposed developments to access the trailhead. The elevation of the road drops shortly before and after the proposed well pad location, limiting the viewshed of this alternative. The proposed developments would not be seen from the Five Hole Arch trailhead, the arch itself, or the dispersed camping areas. Visual disturbance and noise from construction and drilling at the well pad could have a temporary impact on recreational users of the Five Hole Arch Trail who are seeking a more primitive, wilderness-oriented recreational experience. A more detailed discussion of potential visual resources impacts is included in Section 3.10. The proposed processing plant would be approximately 5 miles southwest of the trail; therefore, construction and operation of the plant would not result in visual or noise impacts that affect users of the trail.

Potential impacts to recreational users from the production operations of the proposed well pad, pipeline, and processing plant would be minor. Because the Applicant would use acoustic mitigation on all rotating equipment (generators, compressors, and recycle pumps) to reduce noise impacts, noise from production operations of the well pad and pipeline would be negligible. Because the processing plant would be approximately 5 miles from the trail, it would have no noise impacts on trail users. Permanent production equipment on the well pad would be painted or buried to blend in with the natural surroundings, and effects on views from the trail, which would be approximately 0.5 mile away, would be minimal. The pipeline would be buried and would not be visible from the trail. The processing plant would also be painted to blend in with the natural surroundings and is unlikely to be visible from the trail. Appropriate use of down lighting at the plant would reduce impacts on the night skies, reducing potential visual impacts on recreational users who camp near the trail.

3.8.2.3.4 GREEN RIVER

Under Alternative B, the proposed surface disturbance closest to the Green River would be the proposed well pad, which would be approximately 2 miles west of the river. Because the proposed surface-disturbing activities under Alternative B would be approximately the same distance from the Green River as those under Alternative A, potential impacts to recreational users on the Green River would be similar to those discussed for the river in Section 3.8.2.2.

3.8.2.4 *Environmental Impacts – Alternative C: No Action Alternative*

Under the No Action Alternative, the Twin Bridges would not be permitted to construct the well pad and pipeline ROW, nor would it make road improvements; therefore, the surface disturbance and other impacts associated with the proposed Project would not occur. The No Action Alternative would have no impacts on recreation within or at the Labyrinth Canyon SRMA, Labyrinth Rims/Gemini Bridges SRMA, Five Hole Arch Trail, or the Green River.

3.8.2.5 **Cumulative Effects**

The CIAA used to analyze cumulative impacts to recreation resources consists of the 5-mile buffer from the Project components, which is consistent with the visual resource CIAA. This area covers 66,086 acres.

Past and present actions that have affected and will continue to affect recreation in the CIAA are described in EA Section 3.1.2 and impacts from those actions are captured through the description of the affected environment for recreation.

RFD within the CIAA for recreation includes oil and gas development, potash mining, travel management, recreation, livestock grazing, and river restoration RFFAs (totaling approximately 208 acres of surface disturbance and 0.2% of the CIAA). For a detailed explanation of RFFAs and the associated surface disturbance for each RFFA, refer to the cumulative scenario in EA Section 3.1.2. Oil and gas development and associated infrastructure are anticipated to cause the greatest amount of reasonably foreseeable future surface disturbance and impacts to recreation in the CIAA through construction of well pads, roads, pipelines, and other infrastructure. Surface disturbance, the presence of oil and gas infrastructure, and vehicles from oil and gas development would increase road traffic, noise, nighttime lighting, and dust for recreation visitors, while creating a negative visual impact in otherwise natural areas. Visual impacts and noise would reduce the naturalness of the CIAA for backcountry users and reduce opportunities for solitude. The increase in noise associated with oil and gas equipment and changes in night skies from lighting associated with oil and gas development would affect recreation settings. Oil and gas development impacts would likely be greater where mineral development is more intense and in areas where development overlaps areas of concentrated recreation such as recreation focus areas. Increased mineral development could lead to an increased potential for negative impacts to the quality of the recreation experience and the naturalness of the recreation setting. However, as described in Section 3.9, approximately 54,643 acres in the CIAA are managed as wilderness, which would help prevent potential disturbance from oil and gas development and other mineral development.

Cumulative effects to recreation from travel management under the recently approved San Rafael Desert TMP within the analysis area include potential conflicts with other routes users on a single route among recreationists, grazing permittees, mineral lessees or permittees, and landowners. Cumulative conflicts from other authorized users of the cumulative impact area can intensify these conflicts given that some of the users (for example, grazing permittees and mineral lessees or permittees) may be driving larger vehicles such as livestock semi-trucks; a larger number of vehicles such as rig transport and crew vehicles needed to drill an oil well, which can further crowd the routes which access recreation opportunities; or heavy equipment transportation such as graders or dozers. Cumulative safety impacts include limited sight distance on some routes due to topography (hills or curves), increased traffic, access to hazardous mine sites, and mixed traffic on travel routes (e.g., semi-trucks, equestrian and dirt bike use on the same route).

Recreational use and other actions within the CIAA would also result in cumulative effects to recreation, similar to those impacts described above for mineral development and travel management.

Under both Alternatives A and B, the proposed Project would result in surface disturbance, which would contribute to cumulative impacts to recreation in the CIAA. Alternative B is anticipated to result in the most surface disturbance with 52.3 acres of disturbance (0.08% of the CIAA) followed by Alternative A with 43.1 acres of disturbance (0.07% of the CIAA). Alternative C would result in no impacts to recreation.

3.9 WILDERNESS AREAS AND LANDS WITH WILDERNESS CHARACTERISTICS

The analysis area for LWCs includes the Sweetwater Reef Unit A, Labyrinth Canyon Unit A, and Labyrinth Canyon Unit B LWC units totaling 100,449 acres. In addition, the analysis area includes the Moab FO Labyrinth Canyon Additions LWC Unit, which totals approximately 24,300 acres along the Green River. The wilderness analysis area is the Labyrinth Canyon Wilderness Area in its entirety, which totals 60,069 acres (including 54,643 acres of BLM-administered lands) within the Price FO. The non-Federal lands within the Labyrinth Canyon Wilderness Area are administered by SITLA. These analysis areas were selected because they have the potential to be impacted by the Project. See Figures F-11 and F-12 in Appendix F for maps of these analysis areas.

3.9.1 Affected Environment

This section describes the affected environment for wilderness areas designated by Congress and LWCs.

3.9.1.1 Regulatory Framework

The Wilderness Act of 1964 established the National Wilderness Preservation System, which outlines Federal agency responsibility in administering and managing certain uses and monitoring wilderness characteristics in wilderness areas that may have the potential to impair wilderness characteristics. BLM Manual 6340, *Management of Designated Wilderness Areas* (BLM 2012b), provides guidance on managing lands designated by Congress as part of the National Wilderness Preservation System and National Landscape Conservation System, which applies to the Labyrinth Canyon Wilderness Area designated by the Dingell Act. The objectives outlined in BLM Manual 6340 are as follows (BLM 2012b:1-1):

- Manage and protect BLM wilderness areas in such a manner as to preserve wilderness characteristics.
- Manage wilderness for the public purposes of recreational, scenic, scientific, education, conservation, and historic use while preserving wilderness characteristics.
- Effectively manage uses permitted under Section 4(c) and 4(d) of the Wilderness Act of 1964 while preserving wilderness characteristics.

BLM Manual 6340 Section D.1.iv provides the decision-making process for where boundaries follow an existing vehicle route and establishes that regularly maintained unpaved roads are to be set back 100 feet from the centerline (BLM 2012b).

The BLM's authority to recommend lands for congressional wilderness designation expired in 1991 under FLPMA, Section 603 (43 USC 1782). However, Congress gave the BLM broad authority and discretion under FLPMA, aside from Section 603, to identify LWCs and, if appropriate, to manage lands to protect such characteristics. The LWC inventory authority comes from FLPMA, Title II, Section 201 (43 USC 1711(a)), which states that the BLM is to "prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values." The BLM makes decisions regarding the management of resources present on BLM-administered public lands, including LWCs, through the RMP planning process.

BLM Manual 6310, *Conducting Wilderness Characteristics Inventory on BLM Lands* (BLM 2012a), requires the areas being evaluated to be at least 5,000 acres in size, contiguous to other protected lands

with wilderness characteristics, of sufficient size to be able to preserve and use in an unimpaired condition, or a roadless island.

The other major criteria in evaluating wilderness characteristics is the naturalness of an area; opportunities for solitude or a primitive and unconfined type of recreation; and other supplemental values, including ecological, geological, or other features of scientific, educational, scenic, or historical value. Although the Wilderness Act discusses and mandates these key characteristics of wilderness, the act does not clarify these terms. The BLM has subsequently defined these terms in BLM Manual 6310 and has described how to assess these conditions on parcels. The following are the terms clarified by BLM policy that are used to describe these key wilderness characteristics (BLM 2012a):

- **Naturalness:** The degree to which an area generally appears to have been affected primarily by the forces of nature with the imprint of people's work substantially unnoticeable. It is not synonymous with "natural integrity." The term "untrammeled" is also used in the Wilderness Act, and BLM defines untrammeled as unhindered and free from modern human control or manipulation.
- **Outstanding Opportunities for Solitude or a Primitive and Unconfined Type of Recreation:** A situation or condition favorable for attainment of a goal to participate in non-motorized, non-mechanized (except as provided by law), and undeveloped types of recreational activities, which stand out among others or its kind, or are superior to others of its kind, and provides the opportunity for such activity to be dispersed and undeveloped.
- **Supplemental Values:** Ecological, geological, or other features of scientific, educational, scenic, or historical value. These values may be present in an area with wilderness characteristics, but they are not required.

3.9.1.2 Existing Setting

In 2016, the Price FO conducted a wilderness inventory for portions of the Price FO, including the affected surface lands. The 2016 LWC inventory included 449,394 acres and 20 inventory units (BLM 2016e). The effort was intended to document the presence or absence of wilderness characteristics consistent with BLM Manual 6310 (BLM 2012a). Of the 20 units that were inventoried, 263,705 acres, or 13 units, were determined to have wilderness characteristics. Included in this inventory were the Sweetwater Reef Unit A LWC, Labyrinth Canyon Unit A LWC, and Labyrinth Canyon Unit B LWC. These three LWC units were not carried forward in the approved RMP and therefore are not being managed for the preservation of wilderness character.

In 1999, the Moab FO conducted an inventory of the Moab FO, including the Labyrinth Canyon area that falls within the analysis area. The applicable portion of the Moab FO that falls within the analysis area is referred to as the Moab FO Labyrinth Canyon Additions LWC Unit. In 2003, the BLM made revisions to the 1999 inventory to account for 1) mapping corrections, 2) changes due to state lands along the perimeter boundaries of inventoried areas, 3) changes to vehicle cherry stems, and 4) changes resulting from reevaluations of the wilderness characteristics of certain inventoried lands and vehicle route determinations (BLM 2003). The total acreage Labyrinth Canyon was reduced from 42,500 acres to 24,300 acres during the 2003 inventory revisions.

Acreages for the Labyrinth Canyon Wilderness Area and Labyrinth Canyon and Sweetwater Reef LWC units are shown in Table 3-10. Figure F-12 in Appendix F displays the boundaries of the Labyrinth Canyon Wilderness in context with the Project.

Table 3-10. Wilderness Areas and Lands with Wilderness Characteristics

Name	Total Acres (BLM-administered lands)
Price FO	
Labyrinth Canyon Wilderness Area	54,643
Labyrinth Canyon Unit A LWC	20,023
Labyrinth Canyon Unit B LWC	11,078
Sweetwater Reef Unit A LWC	69,348
Moab FO	
Labyrinth Canyon Additions LWC Unit	24,300
Area Managed as Wilderness	54,643
Total Area of LWC Units	124,749

3.9.1.2.1 WILDERNESS AREAS AND LANDS WITH WILDERNESS CHARACTERISTICS

Appendix H includes a summary of the naturalness, opportunities for solitude and primitive and unconfined recreation, supplemental values, and evidence of human activity for the Labyrinth Canyon Wilderness Area, Labyrinth Canyon Unit A and Unit B LWCs, and Sweetwater Reef Unit A LWC. This information was extracted from the *Utah Wilderness Inventory* (BLM 1999) and the *San Rafael Desert Lands with Wilderness Characteristics Inventory* (BLM 2016e). For more detailed information on each of the units, please refer to the inventories. In addition, details on the boundaries for the Sweetwater Reef Unit A LWC, Labyrinth Canyon Unit A LWC, and Labyrinth Canyon Unit B LWC can be found in Appendix H.

3.9.2 Environmental Consequences

This section presents potential impacts to wilderness characteristics from implementing actions presented in Chapter 2.

3.9.2.1 Environmental Impacts – Alternative A

The proposed Project would be located in the 200-foot-wide area surrounding Spur Road 1025 that is outside of the Labyrinth Canyon Wilderness Area. Spur Road 1025 is currently a simple two-track primitive route that travels through areas of deep sand and slickrock sandstone. A portion of the affected surface lands is in the Labyrinth Canyon Unit A LWC, outside the 200-foot-wide area excluded from the LWC adjacent to Spur Road 1025. The proposed Project would not be located in the Sweetwater Reef Unit A LWC, because no road improvements would occur along Emery County Road 1010. In addition, the proposed pipeline ROW would be outside the Sweetwater Reef Unit A LWC. The proposed road improvements would occur along approximately 2.7 miles adjacent to Spur Road 1025. Approximately 18.7 acres are within the Labyrinth Canyon Unit A LWC.

3.9.2.1.1 LABYRINTH CANYON WILDERNESS AREA

Under Alternative A, no surface development would occur in the Labyrinth Canyon Wilderness Area; however, the alternative would require drilling a well bore through the withdrawn mineral estate and underground occupancy of the Wilderness Area. The upgrades to the road, proposed pipeline ROWs, and the construction of the 5.4-acre well pad would be in areas containing some existing disturbance within an

area excluded from the Labyrinth Canyon Wilderness Area. Before any construction, temporary fencing would be established within the area excluded from the Labyrinth Canyon Wilderness Area (see Appendix G for the Applicant-committed environmental protection measures). The temporary fencing of the boundaries of the Labyrinth Canyon Wilderness Area would prevent any disturbance during construction of the well pad from occurring outside the approved disturbance areas. With the boundary avoidance design feature in place, the proposed Project would not reduce the size of the Labyrinth Canyon Wilderness Area.

Access to Twin Bridges' mineral leases, which are located within the Labyrinth Canyon Wilderness Area from the well pad located outside of the Wilderness Area would require drilling underground well bores in the Wilderness Area. Because the well bores would be underground, they would not reduce the size, naturalness, or outstanding opportunities for solitude or primitive recreation beyond those impacts associated with the surface facilities.

The short-term and long-term indirect effects to the Labyrinth Canyon Wilderness Area are detailed below.

Naturalness

Visual impacts and surface disturbance from the introduction of the road improvements, well pad, stockpile areas, and side cut and fill slopes to the landscape would have direct impacts on areas of the Project that are visible from the Labyrinth Canyon Wilderness Area. Specifically, the introduction of the well pad, pipeline, and road upgrades would increase the levels of trammeling and human development adjacent to and visible from within the wilderness. However, the road improvements and well pad would be in an area of some existing disturbance. The current level of existing disturbance includes a two-track route and range improvement water tank. Installation of the road upgrades and well pad would increase the current level of disturbance at this location.

In particular, Alternative A would double the width and change the road base of Spur Road 1025 in order to provide adequate access to the well pad. These changes would be for the duration of the Project and likely persist for many years after final reclamation. Spur Road 1025 would be made more visible from the Five Hole Arch trailhead and would be roughly perpendicular to the viewshed along the Five Hole Arch Trail. Under Alternative A, Spur Road 1025 and the well pad would increase evidence of human development at the Five Hole Arch trailhead and have an impact on visitors' impressions of human manipulation of the local environment and solitude within the analysis area. Production facilities on the well pad are not expected to be substantially noticeable to visitors at common viewpoints within the wilderness due to measures to bury, hide, or camouflage this infrastructure to maintain a level of expectation to keep the land untrammled and undeveloped. Rehabilitation efforts at the well pad are not expected to have substantial effect on the undeveloped quality since the road upgrades would persist for the life of the Project (BLM Minimum Requirements Decision Guide [MRDG] in Appendix I). Increased impacts from increased access and visitation, such as user-created campsites or trails, are expected to be minimal.

Outstanding Opportunities for Solitude and Primitive and Unconfined Recreation

Outstanding opportunities for solitude would be indirectly impacted by the presence of trucks and heavy equipment during construction and drilling of the well pad. The proposed Project may be visible from the rim of the canyons to the east. Short-term visual contrast created by the proposed pipeline ROW would create a weak contrast at the boundary of the wilderness area and would attract attention from areas within the wilderness area. Long-term impacts from the introduction of the processing plant would create moderate contrast and would attract attention from areas within the wilderness area. Long-term impacts from the introduction of the Project would be minimized through reclamation of a portion of the well pad and through other Applicant-committed environmental protection measures (Appendix G) in order to not attract the attention of the casual observer and not dominate the viewshed. For more detail on visual impacts, see

Section 3.10. Impacts to solitude would occur along approximately 2.7 miles of Spur Road 1025 from Emery County Road 1025 to the proposed well pad during construction and drilling.

Noise from the proposed well pad construction and drilling would impact solitude during construction in proximity to the well pad and during normal facility operations. It is estimated that Project construction with standard equipment would produce a short-term noise level of 100 dB at the construction site reaching the ambient background level (approximately 20 dBA) beyond an approximate distance of 9.1 km (5.6 miles) (ANSI 2018; OMNI Calculator 2020). It is estimated that operational activities at the processing facility site would average 75 dBA and the well pad operational activities would average 68 dBA at the point source location. Assuming standard topography noise attenuation, the operational processing facility and well pad noise would dissipate to 20 dBA from approximately 514 m away from the facility location, and approximately 230 m away from the edge of the well pad (ANSI 2018; OMNI Calculator 2020).

Once construction is complete, the only disturbance along Spur Road 1025 would be from the occasional trucks or workover rig accessing the well pad for maintenance or repairs. Once final reclamation activities are completed, there would be no transportation truck traffic noise or visual impacts along the Labyrinth Canyon Wilderness Area boundary from the proposed Project.

Outstanding opportunities for primitive and unconfined recreation within the Labyrinth Canyon Wilderness Area would not be directly affected by the proposed activities. Access along on Spur Road 1025 and Emery County Road 1025 would be maintained and improved by road upgrades, possible increasing visitation and affecting solitude to this portion of the wilderness area.

Supplemental Values/Special Features

The proposed Project would be located adjacent to and outside the boundaries of the Labyrinth Canyon Wilderness Area. Although the Labyrinth Canyon Wilderness Area provides suitable habitat for several federally listed threatened and endangered plant and animal species (see EA Sections 3.4, 3.5, and 3.6 for more details), none of species were observed during the June 2020 biological surveys; therefore, no direct impacts to ecological qualities that may be attributed to supplemental values are anticipated. The proposed Project would add human disturbance from infrastructure and truck traffic, which would be adjacent to a sandstone canyon. Therefore, there would be indirect impacts to scenic quality that may be attributed to supplemental values from the introduction of infrastructure to the extensive red bluff and sandstone canyon views within the Labyrinth Canyon Wilderness Area.

3.9.2.1.2 LANDS WITH WILDERNESS CHARACTERISTICS

There would be no direct impacts to the Sweetwater Reef Unit A LWC because no road improvements are planned for Emery County Road 1010 and the pipeline would be constructed outside the boundaries of this LWC. This unit was not carried forward in the approved 2008 Price FO RMP and therefore is not being managed for preservation of wilderness character. Alternative A would not remove any acreage from this unit.

There would be direct long-term impacts to wilderness values, including apparent naturalness, outstanding opportunities for solitude, and supplemental values, within the Labyrinth Canyon Unit A LWC from the disturbance of approximately 18.7 acres of land in this LWC. The proposed Project would therefore remove approximately 18.7 acres of inventoried lands within the Labyrinth Canyon Unit A LWC. Access along on Spur Road 1025 and Emery Country Road 1025 would be maintained and improved, possibly increasing levels of visitation and impacting the experience of solitude. Because this LWC unit is largely overlapped by the Labyrinth Canyon Wilderness Area, these impacts would be similar to those described above for the Congressionally-designated wilderness area. This unit was not carried forward in the approved 2008 Price FO RMP and therefore is not being managed for LWC.

The Labyrinth Canyon Unit B is located approximately 1.6 miles south of Alternative A. The Moab FO Labyrinth Canyon Additions LWC Unit is located approximately 1.3 miles east of Alternative A, east of the Green River. All construction, operations, and maintenance would occur outside of the Labyrinth Canyon Unit B and Labyrinth Canyon Additions LWC Unit. Alternative A would not remove any acreage from these LWC units. There would be no direct long-term impacts to wilderness values, including apparent naturalness, outstanding opportunities for solitude, and supplemental values, within the Labyrinth Canyon Unit B and Labyrinth Additions because the proposed Project is located outside of the LWC units.

3.9.2.2 Environmental Impacts – Alternative B

The land surrounding the proposed pipeline ROW and access road improvements are within the 200-foot-wide area surrounding Emery County Road 1026 that is not included in the Labyrinth Canyon Wilderness Area. Emery County Road 1026 is currently a well-established two-track vehicle route that travels over portions of slickrock sandstone and gravelly soil with minimal impediments to regular motor vehicles. A portion of the proposed well pad would be located in the Labyrinth Canyon Wilderness Area and the alternative would also require drilling an underground well bore and in the Wilderness Area. Additionally, a portion of the proposed Project would be located in the Labyrinth Canyon Unit B and Sweetwater Reef Unit A LWCs, outside their 20-foot-wide areas excluded from the LWCs adjacent to Emery County Roads 1010 and 1026. The proposed pipeline ROW and road improvements would be located along approximately 4.0 miles of road along the Labyrinth Canyon Wilderness Area boundary. Approximately 23.3 acres are within the Labyrinth Canyon Unit B LWC. Adjacent to Emery County Road 1010, the proposed pipeline ROW would occupy approximately 2.0 acres in the Sweetwater Reef Unit A LWC. Before any road improvements, the Labyrinth Canyon Wilderness Area boundary would be marked for avoidance.

Similar to Alternative A, access to Twin Bridges' mineral leases would require drilling well bores and underground occupancy of the Wilderness Area. Because the well bores would be underground, they would not reduce the size, naturalness, outstanding opportunities for solitude or primitive recreation beyond those impacts associated with the surface facilities; however, the underground well bores would occupy an underground portion of the Wilderness Area.

3.9.2.2.1 LABYRINTH CANYON WILDERNESS AREA

Under Alternative B, the proposed pipeline ROW and upgrades to the road development would occur outside the Labyrinth Canyon Wilderness Area. Construction of the 7.3-acre well pad would be within an undisturbed area of the Labyrinth Canyon Wilderness Area. The proposed well pad would create 7.3 acres of long-term disturbance, which represents approximately 0.01% of the BLM-administered lands within the wilderness area.

The boundaries of the approved disturbance areas within the wilderness area would be fenced to prevent any disturbance outside the proposed areas of disturbance. The lease for the parcel where the proposed Project would be located predates the designation of the Labyrinth Canyon Wilderness Area; the Dingell Act, signed March 12, 2019, designated the Labyrinth Canyon Wilderness Area, and the Federal lease was issued on February 8, 2019. Because a valid existing right in the form of a mineral lease was issued before the wilderness designation, the terms and conditions of the lease provide the leaseholder the right to develop the lease. Section 4(d) of the Wilderness Act covers special provisions that include exceptions to the 4(c) prohibitions, including existing valid lease claims. In addition, Section 1.6.B.3.b of BLM Manual 6340 explains that a commercial enterprise and structures associated with valid existing rights are allowed in wilderness areas as long as the valid rights were in existence before the designation of the wilderness area (BLM 2012b).

The short-term and long-term indirect effects to wilderness characteristics of the Labyrinth Canyon Wilderness Area are detailed below.

Naturalness

Visual impacts from the surface disturbance and introduction of the road improvements, pipeline, well pad, stockpile areas, and side cut and fill slopes to the landscape would directly impact adjacent areas within the viewshed from the Labyrinth Canyon Wilderness Area. The proposed well pad would remove approximately 7.3 acres of vegetation from the Labyrinth Canyon Wilderness Area. Short-term direct impacts to naturalness would be related to the sights and noise associated with activities, vehicles, and equipment related to the construction of the proposed well pad. Long-term direct impacts on naturalness would be associated with the vegetation removal, road improvements, presence of the well pad, associated infrastructure, and vehicles accessing the well pad for maintenance or repairs. The well pad disturbance would be improved and reduced to 3.4 acres after interim reclamation. Short-term and long-term noise impacts from construction and operation of the proposed Project would be similar to those described for Alternative A in the Naturalness analysis in Section 3.9.2.1.1.

The impacts to naturalness, in regard to untrammelled and undeveloped land, from the surface disturbance and new human development along Emery County Road 1026 would be visible to visitors traveling to the Five Hole Arch trailhead, and from locations within the wilderness area to the south and east of Emery County Road 1026. 7.3 acres of the Labyrinth Canyon Wilderness Area would be disturbed at the well pad location and would be noticeable to visitors traveling to the Five Hole Arch trailhead on Emery County Road 1026. Although the impacts would be temporary, and occur partially adjacent to the wilderness boundaries within the 200-foot-wide corridor excluded from the wilderness area, these construction activities would nevertheless be observable to wilderness visitors and have an impact on their impression of human manipulation of the local environment.

The new surface disturbance under Alternative B would not be visible to visitors from the Five Hole Arch trailhead, camping area, or trail once they have moved northeast over the crest of the ridge from the well pad location. The Five Hole Arch Trail, camping area, the Bowknot Bend, Horseshoe Canyon, and the Green River areas to the east and south are the main visitor destinations in this portion of the Labyrinth Canyon Wilderness Area, and would be topographically screened from most of the new surface disturbance and human developments proposed under Alternative B at the Bowknot 5-1 location. Additional well pad infrastructure associated with multiple wells is not expected to substantially alter visitors' impressions of the undeveloped quality of the wilderness. Rehabilitation efforts at the well pad are not expected to have substantial effect on the undeveloped quality since the road upgrades would be permanent and contribute to the landscape appearing developed. Potential indirect impacts from the proposed Project would include improved access and increased visitation within this portion of the wilderness may result in more human impacts to natural conditions from camping, trash, and user-created trails (Appendix I). In addition, the visibility of the processing plant would have indirect impacts on the Labyrinth Canyon Wilderness Area by introducing infrastructure to the landscape visible from the boundaries of the wilderness area. However, this infrastructure would be outside the Labyrinth Canyon Wilderness Area on lands owned and administered by SITLA. Therefore, there would be no direct impacts to naturalness within the Labyrinth Canyon Wilderness Area from the processing plant.

Outstanding Opportunities for Solitude and Primitive and Unconfined Recreation

Outstanding opportunities for solitude within the Labyrinth Canyon Wilderness Area would have long-term direct impacts from the presence of the well pad, associated infrastructure, and vehicles accessing the well pad for maintenance or repairs. The proposed Project would not be visible from the Five Hole Arch trailhead. In addition, the proposed Project may be visible from the rim of the canyons to the east located within the Moab FO Labyrinth Additions LWC Unit. Short-term visual contrast created by the proposed pipeline ROW would create a weak contrast at the boundary of the wilderness area and would attract attention from areas within the wilderness area. Long-term impacts from the introduction of the

processing plant would create moderate contrast and would attract attention from areas within the wilderness area. Long-term impacts from the introduction of the Project would be minimized through reclamation of a portion of the well pad and through other Applicant-committed environmental protection measures in order to not attract the attention of the casual observer and not dominate the viewshed. For more detail on visual impacts, see Section 3.10.2. Direct short-term impacts to solitude and primitive/unconfined recreation would be related to the sights and sounds associated with construction and drilling activities, noise (including potential blasting along 3,000 feet of existing road), and dust along approximately 4 miles of the two-track access road, Emery County Road 1010, and Emery County Road 1026, in addition to potential road access restrictions during construction of the proposed Project for public health and safety. Long-term indirect effects would also occur along the proposed access roads outside and along the boundary of the Labyrinth Canyon Wilderness Area from vehicles accessing the well pad for maintenance or repairs. Additionally, improvements along Emery County Road 1026 will improve access and possibly increase visitation to Five Hole Arch and the surrounding parts of the Labyrinth Canyon Wilderness Area, thereby increasing contact with the sights and sounds of other visitors and decreasing the experience of solitude. See Section 3.8 for more information regarding recreational access to Five Hole Arch. Once final reclamation activities are completed, there would be no transportation truck traffic noise or visual impacts within or along the boundary of the Labyrinth Canyon Wilderness Area.

Supplemental Values/Special Features

Although the Labyrinth Canyon Wilderness Area provides suitable habitat for several federally listed threatened and endangered plant and animal species (see Sections 3.4, 3.5, and 3.6 for more details), none of species were observed during the June 2020 biological surveys; therefore, no direct impacts to ecological qualities that may be attributed to supplemental values are anticipated. There may be indirect impacts to ecological qualities that may be attributed to supplemental values and special features from the removal of 7.3 acres of potential habitat for plant and animal species. In addition, the proposed well pad would directly impact scenic qualities, including the extensive views of red, buff, and purple sandstone canyons within the Labyrinth Canyon Wilderness Area. For more detail on visual impacts, see Section 3.10. However, as previously stated, impacts to scenic values from Alternative B would not be present at the more popular scenic locations of the wilderness area, such as Five Hole Arch trailhead, Five Hole Arch Trail, the Keg Knoll dispersed camping area, the Bowknot, or the Green River. For more detail on visual impacts or recreation impacts, see Section 3.10 and Section 3.8, respectively.

3.9.2.2 LANDS WITH WILDERNESS CHARACTERISTICS

Alternative B would be located within the Labyrinth Canyon Unit B and Sweetwater Reef Unit A LWCs. Both of these units were not carried forward in the approved 2008 Price FO RMP and therefore are not being managed for LWC. The proposed Project would remove approximately 23.3 acres from the Labyrinth Canyon Unit B LWC due to the construction of the well pad, proposed pipeline ROW, and access road improvements. Because the Labyrinth Canyon Unit B LWC overlaps the Labyrinth Canyon Wilderness Area, the direct and indirect impacts to wilderness characteristics associated with Alternative B are expected to be similar to those described for the wilderness area.

The proposed Project would remove approximately 2.0 acres from the Sweetwater Reef Unit A LWC due to the construction of the proposed pipeline ROW. The proposed pipeline ROW would remove approximately 2.0 acres of vegetation from this LWC. Short-term direct impacts to naturalness would be related to the sights and noise associated with activities, vehicles, and equipment related to the construction of the proposed pipeline. There may be indirect impacts from the removal of 2.0 acres of potential habitat to plant and animal species discussed above. However, these species were not observed during the June 2020 biological surveys; therefore, no direct impacts to listed species would be anticipated.

The Labyrinth Canyon Unit A is located approximately 0.9 miles north of Alternative B. The Moab FO Labyrinth Canyon Additions LWC Unit is located approximately 2.1 miles east of the proposed Project, east of the Green River. All construction, operations, and maintenance would occur outside of Labyrinth Canyon Unit A and the Labyrinth Canyon Additions LWC Unit. Alternative A would not remove any acreage from these units. There would be no direct long-term impacts to wilderness values, including apparent naturalness, outstanding opportunities for solitude, and supplemental values, within the Labyrinth Canyon Unit A and the Labyrinth Canyon Additions LWC Unit because the proposed Project is located outside of the LWC units.

3.9.2.3 *Environmental Impacts – Alternative C: No Action Alternative*

Under the No Action Alternative, Twin Bridges would not be permitted to construct the well pad and pipeline ROW, nor would it make road improvements. Therefore, no additional activities would be conducted that could diminish wilderness characteristics within the Labyrinth Canyon Wilderness Area, Labyrinth Canyon Unit A and Unit B LWCs, the Sweetwater Reef Unit A LWC, of the Moab FO Labyrinth Additions.

3.9.2.4 *Cumulative Effects*

3.9.2.4.1 LABYRINTH CANYON WILDERNESS

The CIAA used to analyze cumulative impacts to wilderness consists of the entirety of Labyrinth Canyon Wilderness Area, which covers 60,029 acres (54,643 acres of BLM-administered land).

Past and present actions that have affected and will continue to affect wilderness characteristics in the CIAA are described in EA Section 3.1.2 and impacts from those actions are captured through the description of the affected environment for wilderness.

For a detailed explanation of RFFAs and the associated surface disturbance for each RFFA, refer to the cumulative scenario in Section 3.1.2. RFD within the wilderness CIAA includes recreation activities and mineral development with valid existing rights. Although 53% of the wilderness CIAA was included in the area to which the RFD for the San Rafael MLP (which was not completed by the BLM) applies, wilderness has been closed to oil and gas development (subject to valid existing rights). Any future mineral development is assumed to occur outside of designated wilderness, or if mineral development is considered within wilderness to satisfy valid existing rights, the activity would be required to meet the minimum requirements outlined in BLM Manual 6340. For any potential activities within wilderness, BLM would use the MRDG to determine the minimum requirements necessary for activities that could impair wilderness characteristics. RFFAs occurring outside of wilderness, but adjacent to wilderness boundaries, and those actions that could occur within wilderness could introduce sights, noises, and infrastructure in or adjacent to wilderness, which could impair the feeling of solitude and degrade naturalness. Increasing visitor use in the CIAA would likely intensify use of BLM-administered lands, potentially impacting wilderness characteristics by reducing opportunities for solitude.

Under both Alternatives A and B, the proposed Project would result in surface disturbance, sights, noises, and infrastructure which would contribute to cumulative impacts to wilderness characteristics in the CIAA. Alternative B is anticipated to result in the greatest amount of surface disturbance and visual resource impacts that would contribute adverse impacts to wilderness characteristics of naturalness and outstanding opportunities for solitude in the CIAA with 7.3 acres of surface disturbance located within the wilderness boundary and visual resource impacts from the Project being in closer proximity to sensitive areas compared to Alternative A. Alternative A would contribute adverse impacts to wilderness

characteristics of naturalness and outstanding opportunities for solitude in the CIAA resulting from Project infrastructure located adjacent to the wilderness boundary (no surface disturbance would occur within wilderness) and visual resource impacts from Alternative A would be located farther from sensitive areas compared to Alternative B. Both Alternatives A and B would result in the same level of adverse noise impacts resulting in adverse impacts to wilderness characteristics. Alternative C would result in no impacts to wilderness characteristics.

3.9.2.4.2 LANDS WITH WILDERNESS CHARACTERISTICS

The analysis area for LWCs includes the Sweetwater Reef Unit A, Labyrinth Canyon Unit A, and Labyrinth Canyon Unit B LWC units totaling 100,449 acres.

Past and present actions that have affected and will continue to affect wilderness characteristics in the CIAA are described in EA Section 3.1.2 and impacts from those actions are captured through the description of the affected environment for LWCs.

RFD within the CIAA for LWCs includes oil and gas development, travel management, recreation, livestock grazing, and river restoration RFFAs (totaling approximately 175 acres of surface disturbance and 0.2% of the CIAA). For a detailed explanation of RFFAs and the associated surface disturbance for each RFFA, refer to the cumulative scenario in Section 3.1.2. These activities could introduce sights, noises, and infrastructure in or adjacent to LWCs, which could impair the feeling of solitude and degrade naturalness. Oil and gas development and associated infrastructure are anticipated to cause the greatest amount of reasonably foreseeable future impacts to wilderness characteristics in the CIAA through construction of well pads, roads, pipelines, and other infrastructure. Surface disturbance, the presence of oil and gas infrastructure, and vehicles from oil and gas development would increase road traffic, noise, nighttime lighting, and dust for visitors seeking naturalness, solitude, and/or primitive or unconfined recreation experiences, while creating an adverse visual impact in otherwise natural areas. Oil and gas development impacts would likely be greater where mineral development is more intense and in areas where development overlaps LWCs. The recently approved San Rafael Desert TMP designated 93.0 miles of road as OHV-open and 20.8 miles of road as OHV-limited within the CIAA (BLM 2020g). Impacts to LWCs from travel management include degradation or loss of solitude, or primitive recreation as more users access these areas resulting in more frequent human encounters, more noise, and loss of opportunity to experience primitive recreation during the duration of the travel-related activity (BLM 2020g). Limiting OHV use to open routes or limiting them by OHV type would confine soil and vegetation disturbance caused by OHVs to existing routes, and result in no additional change to the natural character of the LWC lands (BLM 2020g). Recreational use and other actions within the CIAA would also result in cumulative effects to LWCs, similar to those impacts described above for mineral development and travel management.

Under both Alternatives A and B, the proposed Project would result in surface disturbance, sights, noises, and infrastructure which would contribute to cumulative impacts to wilderness characteristics in the CIAA. Alternative B is anticipated to result in the greatest amount of surface disturbance and visual resource impacts that would contribute adverse impacts to wilderness characteristics of naturalness and outstanding opportunities for solitude in the CIAA with 25.3 acres (0.03% of CIAA) of surface disturbance located within the Labyrinth Canyon Unit B and Sweetwater Reef Unit A LWCs and visual resource impacts from the Project being in closer proximity to sensitive areas compared to Alternative A. Alternative A would contribute adverse impacts to wilderness characteristics of naturalness and outstanding opportunities for solitude in the CIAA with 18.7 acres (0.02% of CIAA) of surface disturbance located within the Labyrinth Canyon Unit A LWC and visual resource impacts from the proposed action located farther from sensitive areas compared to Alternative B. Both Alternatives A and B would result in the same level of adverse noise impacts resulting in adverse impacts to wilderness characteristics. Alternative C would result in no impacts to wilderness characteristics.

3.10 VISUAL RESOURCES

The following section describes the inventory of visual resource values in proximity to the Project.

3.10.1 Affected Environment

The visual resources analysis area for this EA was determined to be a 5-mile buffer from the Project components, which encompasses the extent of the BLM foreground/middle ground distance zone. This analysis area is consistent with other visual resources studies conducted for utility and infrastructure projects in the region based on this distance being the threshold of where a project of this scale would be noticeable to the casual observer.

3.10.1.1 Regulatory Framework

As directed by FLPMA, the BLM is required to consider scenic values of public land as a resource that merits management and preservation, where determined through the land use planning process.

BLM Manual 8410-1, *Visual Resource Inventory* (VRI) (BLM 1986a), was developed to address this requirement. BLM Manual 8410-1 first focuses on developing an inventory of scenic values based on the following factors: 1) diversity of landscape features that define and characterize landscapes in a given planning area (scenic quality rating units [SQRUs]), 2) public concern for the landscapes that make up a planning area (sensitivity level rating units [SLRUs]), and 3) landscape visibility from public viewing locations (distance zones). These factors are collectively described as the VRI and are referred to as the VRI specifically for BLM-administered lands. Combined, these three factors determine VRI classes, which indicate the existing scenic values of BLM-administered lands. The BLM has identified VRI classes for both BLM-administered lands and non-BLM lands within the analysis area. Through the BLM's land use planning process, as described in BLM Manual 8410-1, VRM classes are established to provide management objectives in terms of allowable levels of disturbance (visual contrast) and noticeability. The definitions of the four VRM class objectives from BLM Manual 8410-1 are described in Table D-1 of Appendix D.

Compliance with these objectives is assessed using BLM Form 8400-4 (Visual Contrast Rating Worksheet), as directed by BLM Manual 8431, *Visual Resource Contrast Rating*, from selected key observation points (KOPs), which, in addition to determining compliance with VRM class objectives, also include the identification of additional visual mitigation to further reduce visual contrast (BLM 1986b). BLM Manual 8400 defines KOPs as "one or a series of points on a travel route or at a use area or potential use area, where the view of a management activity would be most revealing" (BLM 1984).

3.10.1.1.1 BUREAU OF LAND MANAGEMENT PRICE FIELD OFFICE RESOURCE MANAGEMENT PLAN VISUAL RESOURCE DIRECTION

The BLM Price FO RMP has the following Project-associated direction regarding the management of visual resources (BLM 2008a:77):

- Use proper design techniques and mitigation measures, future projects and use authorizations under this plan to minimize contrast with the characteristic landscape and not exceed the VRM Management Class Standards.

3.10.1.1.2 COMPLIANCE WITH VISUAL RESOURCE MANAGEMENT CLASS OBJECTIVES

As described in Section 3.10.1.1, the BLM assigns VRM classes through the land use planning process to guide planning and project-level decisions. Compliance with the VRM class objectives and conformance with the BLM Price FO RMP are a FLPMA requirement. To determine compliance with the VRM class objectives, a contrast analysis is conducted from KOP locations as directed by BLM Manual 8431 (BLM 1986b).

3.10.1.2 Scenery

Scenery is defined as a continuous unit of land comprising harmonizing features that result in and exhibit a particular character. The BLM Price FO conducted its VRI in 2011 to identify existing scenic values, including the delineation of SQRUs and SLRUs (BLM 2011). The rating of SQRUs is based on the diversity of seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications to assign a scenic quality rating (Class A [most diverse], Class B, and Class C). SLRUs are inventoried to define the level of concern the public would express toward the visible modification of a particular landscape. The BLM assigns either a high, medium, or low sensitivity level that corresponds to the level of public concern. When reviewed together, SQRUs and SLRUs identify a landscape's visual appeal, as well as the public concern to modification of these landscapes.

The Project analysis area is in the Canyon Lands section of the Colorado Plateau physiographic province. This landscape is defined by the tributary rivers and streams of the Colorado River that have created numerous formations of visual interest, including plateaus, mesas, buttes, and canyons. The analysis area is largely undeveloped, with few human-made structures or other developments, and is a mostly natural landscape. Existing development includes a stock water tank and associated infrastructure, including a pipeline, near the end of Spur Road 1025. There is also a primitive airstrip (Keg Knoll Airstrip) just north of the proposed Bowknot 5-1 well pad in the Labyrinth Canyon Wilderness Area. This airstrip receives a low level of use by recreational aircraft. OHV use and other recreational activities have contributed to existing surface disturbance within the analysis area.

The immediate landscape is stippled with smooth, fine-textured shrubland. The topography is characterized as a flat plateau with incised valleys and canyons; buttes and red rock outcrops dot the landscape. Soil colors range from tans to oranges and reds that contrast with the scattered silver and dark green vegetation. The San Rafael River runs to the east of the Project. From the surface of the plateau and elevated areas, many distant peaks—including the La Sal Mountains, which are approximately 45 miles from the area—are visible on clear days. Elevated locations in the vicinity of the Project offer 360-degree views of southeastern Utah.

3.10.1.2.1 ALTERNATIVE A

Project components proposed under Alternative A would be on VRI Class II, III, and IV lands. The proposed processing plant would be located on SITLA land, which was identified as VRI Class IV in the BLM VRI. The proposed well pad would be located on VRI Class II land, and the access road improvements and pipeline ROW would be on VRI Class II, III, and IV lands.

Specifically, Alternative A could potentially influence the SQRUs and associated SLRUs within the analysis area that are listed in Table 3-11 and Table 3-12.

Table 3-11. Bureau of Land Management Scenic Quality Rating Units Potentially Influenced by Alternative A

Unit Name	Class
Horseshoe Canyon	Class A
San Rafael Desert	Class C
San Rafael Desert Transition	Class C

Source: BLM (2011).

Table 3-12. Bureau of Land Management Sensitivity Level Rating Units Potentially Influenced by Alternative A

Unit Name	Sensitivity Level
Horseshoe	High
San Rafael Desert	Low

Source: BLM (2011).

3.10.1.2.2 ALTERNATIVE B

Project components proposed under Alternative B would be on VRI Class III and IV lands. The proposed processing plant would be located on SITLA land, which was identified as VRI Class IV in the BLM VRI. The proposed well pad would be located on VRI Class III land, and the access road improvements and pipeline ROW would be on VRI Class III and IV lands.

Specifically, Alternative B could influence the SQRUs and associated SLRUs within the analysis area that are listed in Table 3-13 and Table 3-14.

Table 3-13. Bureau of Land Management Scenic Quality Rating Units Potentially Influenced by Alternative B

Unit Name	Class
San Rafael Desert	Class C
San Rafael Desert Transition	Class C

Source: BLM (2011).

Table 3-14. Bureau of Land Management Sensitivity Level Rating Units Potentially Influenced by Alternative B

Unit Name	Sensitivity Level
San Rafael Desert	Low

Source: BLM (2011).

3.10.1.3 Viewing Locations

Viewing locations represent places where the public would have potential views of the Project. The analysis area receives use from recreational users, including Five Hole Arch, as well as visitors passing through to Canyonlands National Park. This range of individuals defines the casual observer.

In the development of the BLM Price FO VRI, distance zones were identified in accordance with BLM Manual 8410-1, which identify public viewing locations at a broad planning scale. As described in BLM Manual 8431, KOPs are used to assess the level of change (contrast) introduced by a proposed project within a specific viewshed (BLM 1986b).

Five KOP locations were identified to assess both impacts on views and to determine compliance with BLM VRM class objectives (Table 3-15). Maps displaying the location of these KOP locations, in context with BLM VRM class objectives, are in Appendix D (Maps D-1 and D-2). Additionally, two viewshed analyses were run with one based on the design heights of the different long-term Project components (i.e., well pad with equipment, road improvements, pipelines, and helium processing plant) and the other focusing on short-term impacts from the drill rig during 20-day drilling periods outlined in Appendix G. The resulting analyses identify the areas in the landscape where the Project would or would not be visible, regardless of whether there is a KOP location, but instead depicts the extent of Project visibility in the analysis area. Maps displaying both viewshed analyses in context with landownership are included in Appendix D (Maps D-3 and D-4).

Table 3-15. Key Observation Points by Alternatives

KOP Number	KOP Name	Alternative A	Alternative B
1	San Rafael Desert Recreation Destination Route (Emery County Road 1010)	X	
2	Five Hole Arch Trail	X	X
3	Five Hole Arch Trailhead	X	X
4	Five Hole Arch Destination Route (Emery County Road 1026)		X
5	Horseshoe Canyon Recreation Destination Route (Emery County Road 1010)		X

These KOPs were identified through a combination of geographic information system (GIS) analysis and field observation. The KOPs were selected to encompass all major travel routes and observation points and to target specific views from recreational users within the foreground/middle ground distance zone. Visual Contrast Rating Worksheets were completed for the KOPs. The findings of the visual contrast rating process are detailed in Appendix D (Exhibit D-2).

The analysis area and surrounding sensitive viewing areas afford users opportunities for nighttime sky viewing. Opportunities to view night skies are an important component of the overall recreational experiences for BLM and NPS visitors.

Under Alternative A, potential views from the portions of Canyonlands National Park and Glen Canyon National Recreation Area (NRA) closest to the Project would be along the Green River and its adjacent canyons. These areas include Horseshoe Canyon in Canyonlands National Park and Horsethief Canyon in Glen Canyon NRA, where views occur in highly enclosed landscapes with limited views of the higher-elevation plateau lands. Table 3-16 identifies the approximate distance from each Project component to the boundary of Canyonland National Park and Glen Canyon NRA units under Alternative A.

Table 3-16. Alternative A: National Park Service Unit Distance to Project Components

Project Component	Canyonlands National Park (Island in the Sky District) (miles)	Canyonlands National Park (Horseshoe Canyon) (miles)	Glen Canyon NRA (miles)
Road improvements	8.5	9.0	7.4
Well pad	8.4	8.9	7.3
Pipeline ROW	8.5	9.0	7.4
Gas plant	11.9	10.6	10.5

Potential views from Canyonlands National Park and Glen Canyon NRA associated with Alternative B are similar to those described for Alternative A, except that Alternative B would be closer to these areas. Table 3-17 identifies the approximate distance from each Project component to the boundary of Canyonland National Park and Glen Canyon NRA units under Alternative B.

Table 3-17. Alternative B: National Park Service Unit Distance to Project Components

Project Component	Canyonlands National Park (Island in the Sky District) (miles)	Canyonlands National Park (Horseshoe Canyon) (miles)	Glen Canyon NRA (miles)
Road improvements	6.3	5.4	4.5
Well pad	6.3	7.4	5.0
Pipeline ROW	6.3	4.7	4.5
Gas plant	9.3	4.8	7.0

3.10.1.4 Compliance with Visual Resource Management Class Objectives

Current management objectives for visual resources in the vicinity of the Project are prescribed in the Price FO RMP (BLM 2008a). The proposed Project is located on VRM Class I (associated with the Labyrinth Canyon Wilderness Area), II, and III lands. The definitions of the VRM class objectives are detailed in Table D-1 of Appendix D. VRM classes are designated on BLM-administered lands only. To determine Project compliance with these VRM class objectives and conformance with the Price FO RMP, BLM Contrast Rating Worksheets were completed for the five identified KOP locations (Appendix D, Exhibit D-2).

3.10.1.4.1 ALTERNATIVE A

Project components proposed under Alternative A would be on BLM VRM Class II and Class III lands. The proposed processing plant would be located on SITLA land and is therefore not subject to BLM VRM compliance. The proposed well pad would be located on VRM Class II land, and the access road improvements and pipeline ROW would be on VRM Class II and Class III lands.

3.10.1.4.2 ALTERNATIVE B

Project components proposed under Alternative B would be on BLM VRM Class I (associated with the Labyrinth Canyon Wilderness Area), II, and III lands. The proposed processing plant is located on SITLA lands and is, therefore, not subject to VRM compliance. The proposed well pad is located in VRM Class I and III, while the access road improvements and pipeline ROW would be located in VRM Class II and III lands.

3.10.2 Environmental Consequences

This section presents potential impacts to visual resources from implementing management actions presented in Chapter 2. Existing conditions concerning visual resources management are described in Section 3.10.1.

3.10.2.1 *Analysis Methods and Assumptions*

As described in Section 3.10.1, the BLM assigns VRM classes through the land use planning process to guide planning and project-level decisions. Compliance with the VRM class objectives and conformance with the Price FO RMP are a FLPMA requirement. To determine compliance with the VRM class objectives, a contrast analysis is conducted from KOP locations, as directed by BLM Manual 8431.

An analysis of visual dominance, scale, and contrast was used in determining to what degree the proposed alternatives would attract attention and in determining the relative change in character compared with the existing characteristic landscape and its inherent scenic quality. The amount of visual contrast created by a project is directly related to the amount of attention that is drawn to a project feature in the landscape. Potential changes in the viewshed from sensitive viewing locations (KOPs) were also evaluated and characterized. The analysis of visual impacts was used in the determination of conformance of the BLM VRM objectives where the Project would occur on BLM-administered lands. Finally, impacts to night skies were assessed by alternative including the application of potential mitigation measures.

3.10.2.2 *Environmental Impacts – Alternative A*

3.10.2.2.1 SCENERY

Horseshoe Canyon (Class A)—The Project would begin to dominate the character of the Horseshoe Canyon landscape within the immediate viewshed of the well pad and pipeline ROW. These impacts would occur in a high sensitivity area with limited existing cultural modifications. Short-term impacts associated with construction activities, including the presence of construction vehicles and areas of exposed soil from grading activities, would generate increased visual contrast that would diminish after construction and initial site reclamation has been completed. The drill rig would, in the short term, dominate the local setting during drilling activities due to its tall, vertical form. These impacts would be limited to 20-day drilling periods as described in Appendix G. The portion of the landscape on the canyon rim associated with Keg Spring Canyon would be the area most modified by the introduction of the well pad and associated infrastructure. Because the topography of the steep canyon walls provides screening of Project components, the Project would not dominate the landscape's overall character.

San Rafael Desert (Class C)—The Project would begin to dominate the character of the San Rafael Desert within the immediate viewshed of the processing plant and pipeline ROW. Short-term impacts during construction activities would generate increased visual contrast that would diminish after construction and initial site reclamation has been completed. These impacts would occur in an area with limited existing cultural modifications and truck traffic. The presence of semi-trucks accessing the processing plant, one to two trips per day, would introduce additional motion into this remote landscape. Given the size and low sensitivity of the SQRU, the majority of the San Rafael Desert landscape would not be affected by the Project.

San Rafael Desert Transition (Class C)—The Project would only occupy a small area within this landscape. Short-term impacts during construction activities would generate increased visual contrast that would diminish after construction and initial site reclamation has been completed. These impacts would occur in an area with limited existing cultural modifications, but given topographic screening, the low-profile nature of the pipeline ROW, and low sensitivity of the SQRU, the San Rafael Desert Transition landscape would be minimally affected by the Project.

3.10.2.2.2 VIEWING LOCATIONS

KOP 1—San Rafael Desert Recreation Destination Route (Emery County Road 1010). Impacts on views from this location would result from the introduction of vertical and geometric processing plant structures and surface disturbance related to the pipeline ROW. This KOP has an unobstructed view of the Project, with views of the processing plant occurring approximately 0.8 mile away. The processing plant components would introduce elements/patterns not common in the landscape that would be visually prominent and create moderate contrast, compared with other features in the landscape. Equipment would be painted to blend in with the natural surroundings to decrease visual contrast. Weak contrast would be introduced by the proposed pipeline ROW adjacent to Emery County Road 1010. Short-term impacts during construction activities would generate increased visual contrast that would diminish after construction and initial site reclamation has been completed. The presence of semi-trucks accessing the processing plant, one to two trips per day, would introduce additional motion increasing visual contrast when present.

KOP 2—Five Hole Arch Trail. Impacts on views from this location would result from the introduction of vertical and geometric well pad structures and surface disturbance related to the road improvements and pipeline ROW clearing. Views of the Project would occur approximately 1.6 miles away. Project components would create a weak contrast after the application of mitigating measures outlined in the KOP contrast rating worksheet. A visual simulation conducted for this location is included in Appendix D (Exhibit D-2). Short-term impacts during construction activities would generate increased visual contrast that would diminish after construction and initial site reclamation has been completed. The drill rig (estimated at 150 feet in height) would, in the short term, generate increased visual contrast during drilling activities due to its tall, vertical form. These impacts would be limited to 20-day drilling periods as described in Appendix G.

KOP 3—Five Hole Arch Trailhead. Impacts on views from this location would result from the introduction of vertical and geometric well pad structures and surface disturbance related to the road improvements and pipeline clearing. Views of the Project would be approximately 1.9 miles away. Project components would create a weak contrast after the application of mitigating measures outlined in the KOP contrast rating worksheet. A visual simulation conducted for this trailhead is included in Appendix D (Exhibit D-2). Short-term impacts during construction activities would generate increased visual contrast that would diminish after construction and initial site reclamation has been completed. The drill rig would, in the short term, generate increased visual contrast during drilling activities due to its tall, vertical form. These impacts would be limited to 20-day drilling periods as described in Appendix G.

Night Skies – Artificial lighting during nighttime well pad activities would have a short-term, adverse impact to night skies within the analysis area. Lighting of well pad activities and drilling operations would occur 24 hours per day for approximately 20 days and up to 7 times during the life of the Project. Temporary flaring of gas would be performed, as needed, during a 30-day well testing period. Potential glare introduced by flaring operations would contribute to short-term light pollution, but these impacts would be reduced through use of an enclosed portable vapor combustion system. There would be no flaring or venting of methane during long-term operations. Long-term impacts to night skies could result from the use of artificial lighting at the processing plant (no long-term artificial lighting proposed at the well pad location). Viewsheds of visually sensitive areas outside the planning area may be affected by the use of artificial lighting during nighttime helium production activities; those impacts would fade over distance. Appropriate use of down lighting at the plant would reduce impacts on night skies. The implementation of these mitigation measures would reduce the potential adverse impacts the Project would have on night skies in the analysis area and sensitive areas adjacent to the analysis area.

3.10.2.2.3 COMPLIANCE WITH VISUAL RESOURCE MANAGEMENT CLASS OBJECTIVES

On the basis of the contrast rating analysis conducted from three identified KOP locations, the Project under Alternative A would meet objectives associated with BLM VRM Class II and III lands (see Table D-1 for definitions of BLM VRM class objectives) where these classes are crossed and would therefore be compliant with visual resource direction in the Price FO RMP. A summary of the visual contrast assessed from each KOP follows, with the completed contrast rating worksheets provided in Appendix D (Exhibit D-2).

KOP 1—San Rafael Desert Recreation Destination Route (Emery County Road 1010). Visual contrast introduced by the Project (pipeline ROW) would be weak as the ROW becomes revegetated; it would begin to repeat the form, line, color, and texture found in the existing setting. Therefore, the Project would meet the objectives associated with BLM VRM Class III land. The processing plant would not be located on BLM-managed lands; therefore, VRM compliance is not required.

KOP 2—Five Hole Arch Trail. Visual contrast introduced by the Project on views from this KOP would be weak, given the distance, topographic screening between this viewpoint and the Project, and mitigating measures outlined in the KOP contrast rating worksheet. Therefore, the Project would meet the objectives associated with BLM VRM Class II and Class III lands.

KOP 3—Five Hole Arch Trailhead. Visual contrast introduced by the Project on views from this KOP would be weak, given the distance, topographic screening between this viewpoint and the Project, and mitigating measures outlined in the KOP contrast rating worksheet. Therefore, the Project would meet the objectives associated with BLM VRM Class II and Class III lands.

3.10.2.3 *Environmental Impacts – Alternative B*

3.10.2.3.1 SCENERY

San Rafael Desert (Class C)—The Project would begin to dominate the character of the San Rafael Desert within the immediate viewshed of the processing plant and pipeline ROW. Short-term impacts during construction activities would generate increased visual contrast that would diminish after construction and initial site reclamation has been completed. These impacts would occur in an area with limited existing cultural modifications and truck traffic. The presence of semi-trucks accessing the processing plant, one to two trips per day, would introduce additional motion into this remote landscape. Given the size and low sensitivity of the SQRU, the majority of the San Rafael Desert landscape would not be affected by the Project.

San Rafael Desert Transition (Class C)—The Project would begin to dominate the character of the San Rafael Desert Transition within the immediate viewshed of the well pad, road improvements, and pipeline ROW. These impacts would occur in an area with limited existing cultural modifications. Short-term impacts associated with construction activities, including the presence of construction vehicles and areas of exposed soil from grading activities, would generate increased visual contrast which would diminish after construction and initial site reclamation has been completed. The drill rig would, in the short term, dominate the local setting during drilling activities due to its tall, vertical form. These impacts would be limited to 20-day drilling periods as described in Appendix G. This landscape was identified as a low sensitivity area in the Price FO VRI, with topography that intermittently screens Project components; therefore, the Project would modify the existing character within the immediate viewshed but not dominate the landscape.

3.10.2.3.2 VIEWING LOCATIONS

KOP 2—Five Hole Arch Trail. Because the level of topographic screening adjacent to this viewpoint and through the use of low-profile tanks, views of the Project would be mostly screened from this location. The drill rig would, in the short term, due to its tall, vertical form, be visible and dominate views during drilling activities due to its tall, vertical form. These impacts would be limited to 20-day drilling periods as described in Appendix G.

KOP 3—Five Hole Arch Trailhead. Because of the level of topographic screening adjacent to this viewpoint and through the use of low-profile tanks, views of the Project would be screened from this location. The drill rig would, in the short term, due to its tall, vertical form, be visible and dominate views during drilling activities due to its tall, vertical form. These impacts would be limited to 20-day drilling periods as described in Appendix G.

KOP 4—Five Hole Arch Destination Route (Emery County Road 1026). Impacts on views from this location would result from the surface disturbance related to the road improvements and pipeline ROW clearing. This view toward Keg Knoll is adjacent to the proposed location of Project components. Impacts during construction activities would generate increased visual contrast due to re-grading the road and blasting rock adjacent to Keg Knoll. The effects from re-grading the road would diminish after construction and initial site reclamation has been completed. Blasting of rock may expose lighter colored rock compared to the existing weathered rock color. By siting the pipelines and conduit within the ROW, where less rock blasting would be required and avoiding creating geometric rock forms where blasting would occur, visual contrast would be further reduced. After application of mitigation measures, the proposed surface disturbance and road improvements would repeat the form, line, color, and texture elements associated with the existing road. Some intermittent topographic screening would minimize the dominance of views of the Project and would create a weak contrast in the existing setting. A visual simulation conducted for this location is included in Appendix D (Exhibit D-2).

KOP 5—Horseshoe Canyon Recreation Destination Route (Emery County Road 1010). Impacts on views from this location would result from the introduction of vertical and geometric processing plant structures and surface disturbance related to the road improvements and pipeline ROW clearing. This KOP has an unobstructed view of the proposed processing plant location that is approximately 1.2 miles away. The processing plant components would introduce elements/patterns not common in the landscape that would be visually prominent and create moderate contrast, compared with other features in the landscape. Equipment would be painted to blend in with the natural surroundings to decrease visual impacts. Weak contrast would be introduced by the proposed pipeline ROW adjacent to Emery County Road 1010. The presence of semi-trucks accessing the processing plant, one-to-two trips per day, would introduce additional motion increasing visual contrast when present.

Night Skies – Short-term and long-term impacts to night skies would be similar to those anticipated under Alternative A. However, because Alternative B is located in closer proximity to sensitive areas, the night sky viewsheds of those visually sensitive areas would experience greater impacts than Alternative A.

3.10.2.3.3 COMPLIANCE WITH VISUAL RESOURCE MANAGEMENT CLASS OBJECTIVES

On the basis of the contrast rating analysis conducted from four identified KOP locations, the Project under Alternative B would meet objectives associated with BLM VRM Classes I (associated with the Labyrinth Canyon Wilderness Area), II, and III lands (see Table D-1 for definitions of BLM VRM class objectives) where these classes are crossed and would therefore be compliant with visual resource direction in the Price FO RMP. A summary of the visual contrast assessed from each KOP follows, with the completed contrast rating worksheets provided in Exhibit D-2 of Appendix D.

KOP 2—Five Hole Arch Trail. Given the level of topographic screening adjacent to this viewpoint and through the use of low-profile tanks, views of the Project would be mostly screened from this location; therefore, the Project would meet the objectives associated with BLM VRM Class I and Class III lands.

KOP 3—Five Hole Arch Trailhead. Given the level of topographic screening adjacent to this viewpoint and through the use of low-profile tanks, views of the Project would be mostly screened from this location; therefore, the Project would meet the objectives associated with BLM VRM Class I and Class III lands.

KOP 4—Five Hole Arch Destination Route (Emery County Road 1026). The Project, where visible, would repeat the form, line, color, and texture elements associated with the existing road after application of mitigating measures as outlined in the KOP worksheet. Because of partial intermittent topographic screening of the Project, the overall visual contrast was identified as weak. Therefore, the Project would meet the objectives associated with BLM VRM Class II land.

KOP 5—Horseshoe Canyon Recreation Destination Route (Emery County Road 1010). Visual contrast introduced by the Project (pipeline ROW) would be weak as the ROW becomes revegetated; it would begin to repeat the form, line, color, and texture found in the existing setting. Therefore, the Project would meet the objectives associated with BLM VRM Class III land. The processing plant would not be located on BLM-managed lands; therefore, VRM compliance is not required.

3.10.2.4 *Environmental Impacts – Alternative C: No Action Alternative*

Under the No Action Alternative, Twin Bridges would not be permitted to construct the well pad and pipeline ROW, nor would it make road improvements. Therefore, impacts on scenery and views would be avoided, and because there would be no noticeable change introduced by the No Action Alternative on BLM-administered lands, this alternative would be compliant with BLM VRM class objectives.

3.10.2.5 *Cumulative Effects*

The CIAA used to analyze cumulative impacts to visual resources consists of the 5-mile buffer from the Project components, which encompasses the extent of the BLM foreground/middle ground distance zone. This area covers 115,120 acres.

Past and present actions that have affected and will continue to affect visual resources in the CIAA are described in EA Section 3.1.2 and impacts from those actions are captured through the description of the affected environment for visual resources.

RFFD within the CIAA for visual resources includes oil and gas development, potash mining, travel management, recreation, livestock grazing, and river restoration RFFAs (totaling approximately 208 acres of surface disturbance and 0.2% of the CIAA). For a detailed explanation of RFFAs and the associated surface disturbance for each RFFA, refer to the cumulative scenario in EA Section 3.1.2. Oil and gas development and associated infrastructure are anticipated to cause the greatest amount of reasonably foreseeable future surface disturbance and impacts to visual resources in the CIAA through construction of well pads, roads, pipelines, and other infrastructure. Visual resources would be impacted because of the incremental increase in visual contrast with the existing landscape's form, line, color, and texture created by well pads, drill rigs, and other surface structures. Oil and gas development would also cause an incremental impact to night skies in the CIAA as a result of artificial lighting and flaring that occur during nighttime operations. However, as described in Section 3.9, approximately 54,643 acres in the CIAA are managed as wilderness, which would help prevent potential disturbance from oil and gas development and other mineral development.

Cumulative effects to visual resources from travel management under the recently approved San Rafael Desert TMP within the analysis area include changes to the existing landscape's form, line, color, and texture from maintenance and use of existing routes for OHV travel and related activities and other authorized access. Eroded hillsides from travel in highly erosive soils and weed spread or introduction are anticipated and would create contrast that impairs visual quality. Recreational use and other actions within the CIAA would result in cumulative effects to visual resources, similar to those impacts described above for mineral development and travel management.

The introduction of the Project in context with past, present, and RFFAs would result in additive cumulative effects. Under both Alternatives A and B, the proposed Project would result in additional surface disturbance, which would contribute to cumulative impacts to visual resources. Alternative B is anticipated to result in the most additive surface disturbance with 52.3 acres of disturbance (0.08% of the CIAA) followed by Alternative A with 43.1 acres of disturbance (0.07% of the CIAA). Alternative B is anticipated to result in greater impacts to visual resources in the CIAA because Alternative B is located in closer proximity to sensitive areas compared to Alternative A. Both Alternatives A and B include mitigation measures that would reduce the incremental contribution of cumulative visual resource impacts within the CIAA. Alternative C would result in no impacts to visual resources.

3.11 SOCIOECONOMICS

3.11.1 Affected Environment

The analysis area for potential direct, indirect, and cumulative socioeconomics effects is Emery County and communities within Emery County that are located near the Project (i.e., Green River). This analysis area was chosen because it is the area where potential impacts from employment, taxes, and revenue resulting from the development of the proposed lease areas would occur. This includes direct employment and income from jobs; indirect employment and income from product transportation; the purchasing of equipment, fuel, and other vendor services and products; and royalties and tax revenues from helium production and sales.

3.11.1.1 Existing Setting

The analysis area is in a remote region of southeastern Utah. In 2017, total employment in Emery County was approximately 3,052 jobs (Utah Department of Workforce Services [UDWS] 2018). Trade, transportation, and utilities was the largest employment sector of Emery County, representing approximately 941 jobs (UDWS 2018). The second- and third-largest employment sectors in the county were government (approximately 884 jobs) and construction (approximately 299 jobs). Mining (which includes oil and gas production and other mineral activities) accounted for approximately 224 jobs in Emery County in 2017, or approximately 7% of total employment (UDWS 2018). According to UDWS, the average monthly wage in Emery County in the mining sector was \$6,446 in 2017 (UDWS 2018). The average monthly wage for all employment sectors in the county was \$3,594 in 2017.

Fiscal effects from mining industry activities come in the form of various taxes and revenues paid by companies and the federal government to state and local governments where mineral production occurs. Income taxes from mineral wages are one of these fiscal effects because income taxes from jobs in the sector are collected by and paid to counties.

Visitors to the analysis area and surrounding region currently engage in a wide variety of recreational activities. The busiest seasons tend to be spring and fall, although visitation occurs throughout the year. All recreation activities provide socioeconomic value. The value may be as simple as increased quality of life for the participants. In addition, recreational users often spend money to recreate (e.g., fuel, meals,

guide services), which generates local economic activity. Expenditures by non-local recreational users are particularly important as they represent new income in the region.

3.11.2 Environmental Consequences

3.11.2.1 *Environmental Impacts – Alternative A: Proposed Action*

3.11.2.1.1 EMPLOYMENT

The Project is expected to directly utilize 400 contractors. Typically, 80% of these contractors would be utilized in the first 2 to 4 years during construction, during construction and drilling phases, and 20% would likely continue for the life of the Project. After construction and drilling of the wells are completed, and if the evaluation concludes that adequate gas is present and recoverable, helium extraction and employment levels at the Project would be consistent for 20 years. 14 full-time workers would be employed over the life of the Project. The creation of direct employment effects would be relatively minor over the extended life of the Project because it would represent an estimated 0.4% increase in jobs in the county and a 6.25% increase to mining jobs. An indirect effect to the local economy would continue through the purchase and use of goods and services needed for operations, vehicles, and employees. However, geographies with economies that focus narrowly on resource extraction, particularly on fossil-fuel development, can be subject to boom-and-bust cycles, as well as other economic challenges, such as slower long-term economic growth. Because of changes in external market pressures, natural resource economies are often vulnerable to unpredictable cycles of economic growth and recession. This can present challenges to communities in the form of fluctuating tax bases, demands for public infrastructure and social services, employment numbers, housing prices, and migration of workers into and out of a particular area.

3.11.2.1.2 TAXES AND REVENUES

Taxes and royalty payments from the production of helium in the proposed lease areas would provide direct revenue to the State of Utah and Federal government. The expected helium price for Utah helium is between \$250 to \$350 per million cubic feet. Assuming the helium produced from the proposed lease area would be priced similarly, the estimated 7 to 12 billion cubic feet of total helium produced could result between approximately \$1,750,000,000 and \$4,200,000,000 in total revenue. While the leases held by Twin Bridges have variable royalty rates depending on a number of factors, at a royalty rate of 10% for helium removed (assuming liquid helium production, the royalty rate is higher for production of gaseous helium), this would result in between approximately \$175,000,000 and \$420,000,000 in total Federal and state royalty revenues. The royalty rate for gaseous production is 12.5%, which would result in a higher royalty number. A portion of these royalties would be distributed to Emery County and is generally used for community impacts resulting from mineral extraction. The disbursement is commonly used for road maintenance, utility maintenance, and so forth. The royalty disbursement to Emery County would continue for the 20-year anticipated life of the Project.

3.11.2.1.3 TOURISM AND RECREATIONAL IMPACTS

Although individual visitors may be affected, under all alternatives the BLM assumes that recreation visitor days to the analysis area would not be impacted. This is due to the small-scale nature of the operation and the limited number of visitors to this area as compared to the surrounding popular destinations such as national parks. The primary recreational use of the area is dispersed, self-guided recreation. Dispersed refers to all recreation occurring outside of developed recreation sites. Popular dispersed uses include hiking, backpacking, OHV riding, rock climbing, photography, automobile touring/sightseeing, bird watching, camping, rock hounding, and visiting archeological sites. Because of the dispersed nature of recreation in the area, most visitors to the area make relatively low economic contributions to the local economy as a result of their trips.

The economic impacts of recreationists who use local lodging are significantly higher than the impacts of those who camp, largely due to the higher cost of a night in lodging versus a camping site, and the additional expenditures (e.g., restaurant meals) of most lodgers compared to most campers. The economic impacts of visitors who use developed recreation, which includes infrastructure such as roads, parking areas, and facilities to protect the resource and support recreational users in their pursuit of activities, experiences, and benefits are higher than the impacts of those who camp. Special Recreation Permits (SRPs) are issued to manage visitor use, protect natural and cultural resources, and accommodate commercial recreational uses and may be issued. Commercial SRPs are issued to outfitters, guides, vendors, recreation clubs, and commercial competitive event organizers providing recreational opportunities or services without employing permanent facilities. Because of the dispersed nature of recreation, SRPs in the Project area do not have a substantial economic impact.

3.11.2.2 *Environmental Impacts – Alternative B*

The type of impacts on socioeconomics from employment, taxes and revenues, and tourism and recreation for Alternative B would be similar to those from Alternative A.

3.11.2.3 *Environmental Impacts – Alternative C: No Action*

Under the No Action Alternative, the BLM would not approve the Project and there would be no extraction of recoverable helium from Twin Bridges' leases. Therefore, there would be no direct or indirect impacts to the social and economic conditions of the analysis area. The local population, employment, and mineral royalty revenue would remain similar to current conditions. However, changes in other local industries could impact the socioeconomics of the analysis area.

3.11.2.4 *Cumulative Effects*

The analysis area for cumulative socioeconomics effects is Emery County and communities within Emery County that are located near the Project (i.e., Green River, Utah).

Under Alternatives A and B, the proposed development would result in socioeconomic impacts that would contribute new employment, taxes and mineral royalties, and impacts on recreation and tourism economics to the Emery County economy. The magnitude of these socioeconomic impacts would not differ by alternative. The new jobs would contribute to growing employment in Emery County's mining sector, though the contribution would be relatively minor compared to the employment in larger oil and gas fields and coal mines in the county. New jobs would result in an estimated 0.4% increase in jobs in the county and a 6.25% increase to mining jobs. Similarly, the Project would contribute new mineral royalties to Emery County.

Revenue from tourism and recreation is generally growing in Emery County as the population in communities that are within driving distance to the area and associated recreational use increases. Recreation and tourism revenue associated with the Project area is still relatively minor compared to tourism and recreation "hot spots" such as Moab. While Alternative B would have a greater impact on the recreational experience compared to Alternative A, neither alternative is anticipated to reduce the overall growth of recreational use in the Project area and the overall growth of Emery County's recreation and tourism economy.

Alternative C would result in no impacts to socioeconomics in Emery County.

CHAPTER 4. CONSULTATION AND COORDINATION AND LIST OF PREPARERS

4.1 TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED

Table 4-1 lists the agencies and other entities that have been consulted or coordinated with regarding the development of this EA for the proposed Project.

Table 4-1. Coordination and Consultation

Name	Purpose and Authorities for Consultation or Coordination	Findings and Conclusions
Utah State Historic Preservation Office (SHPO)	Consultation for undertakings, as required by the National Historic Preservation Act (NHPA) (16 USC 470)	The Bowknot #5-1 well pad location, gathering facility, associated pipeline, and access were surveyed on July 26 and August 13, 2019 (U19MQ0464). The BLM determined the proposed undertaking to result in No Historic Properties Affected, pursuant to 36 CFR 800.4(d). The Utah SHPO concurred with these findings on September 12, 2019. A second cultural resources Class III intensive field survey was required for the proposed Bowknot 36-1 well pad, pipeline, access road, and helium plant to identify any historic properties that may be affected by the undertaking. The survey was conducted on May 22 and 23, 2020. There were six sites recorded in the area of potential effects, none of which are eligible for inclusion in the National Register of Historic Places. A second BLM determination of No Historic Properties Affected has been made for this undertaking. SITLA reviewed and approved the Class III results August 27, 2020, and Utah SHPO concurred with the eligibilities and undertaking effect determination on September 17, 2020.
Native American Tribes	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 1531) EO 13007	Tribal letters were sent on August 26, 2020, to 16 tribal governments to initiate tribal consultation. The Navajo Nation responded on September 8, 2020, saying there are no Navajo Nation TCPs in the area and the BLM may proceed with the Project without further consultation. The Paiute Indian Tribe of Utah responded on September 8, 2020, saying they are currently not aware of any tribal locations of religious or cultural significance and they have no objections to the Project. The Santa Clara Pueblo responded on September 25, 2020, with a request for Section 106 information. The Price FO archaeologist responded on September 28, 2020, with the results of the Class III surveys, determinations of No Historic Properties Affected, and SHPO concurrence dates.
U.S. Fish and Wildlife Service (USFWS)	Consult with USFWS as the agency with expertise on impacts.	The BLM coordinated with the USFWS regarding the potential for the actions analyzed in the EA to impact threatened or endangered species and designated critical habitats. The BLM sent a formal request to USFWS to concur with the BLM's may affect, not likely to adversely affect determination for MSO (Alternative A); no effect determination for Jones cycladenia, and no effect determination for impacts on endangered Colorado River fishes on November 5, 2020. The USFWS concurred with the BLM's effect determinations on November 5, 2020, concluding the Section 7 consultation process.

4.2 PUBLIC INVOLVMENT

The Draft EA was posted on the BLM website and available for public review and comment on October 22, 2020. A 19-day public comment period was held from October 22, 2020 through November 9, 2020. A total of 20,042 comment submissions were received by the BLM during the public comment period. All comment letters received are retained in the Project's decision file.

The BLM read and considered each comment letter submitted on the Draft EA, and identified potentially substantive comments from the letters that would prompt the BLM to revisit the analysis, assumptions, accuracy, and other information contained in the Draft EA. This subset of comments was then sorted into categories (e.g., air quality, wildlife, recreation, and other resource concerns) and individually reviewed as either substantive or non-substantive. The substantive comments and responses can be found in Appendix J. Where appropriate, the EA has been updated to address issues raised in the comments.

4.3 LIST OF PREPARERS

Table 4-2 identifies BLM and non-BLM staff who prepared and reviewed this EA.

Table 4-2. List of Bureau of Land Management and Non-Bureau of Land Management Preparers and Reviewers

Name	Title	EA Document Responsibility
BLM Preparers and Reviewers		
David Gordon	Natural Resource Specialist	Project management, document review
Joseph Rodarme	Planning and Environmental Specialist	NEPA compliance, document review
Gerald Kenczka	Assistant Field Office Manager	Document review
Rebecca Anderson	Natural Resource Specialist	Water resources
Blake Baker	Outdoor Recreation Planner	Recreation, visual resources, wilderness
Stephanie Bauer	Rangeland Management Specialist	Soils
Robin Naeve	Wildlife Biologist	General wildlife, special-status plants and wildlife
Natalie Fewings	Archaeologist	Cultural resources
Veronica Kratman	Lands and Realty Specialist	Lands and Access
Mike Tweddell	Rangeland Management Specialist	Vegetation
Erik Vernon	Air Quality Specialist, Utah State Office	Air quality and GHG emissions

Name	Title	EA Document Responsibility
Non-BLM Preparers and Reviewers		
SWCA		
Kevin Rauhe	Environmental Planner	Chapters 1 and 2, Visual Resources
Nathan Jones	Project Manager	Project Management
Reid Persing	Natural Resources Director	Quality assurance/quality control
Coleman Burnett	Environmental Planner	Public comment response, quality control
Janet Guinn	Environmental Planner	Public comment response, quality control
Jeff Stovall	Regional Air Quality Manager	Air quality and GHG emissions
Carlos M. Ituarte-Villarreal	Air Quality Specialist	Air quality and GHG emissions
KayLee Lavery	Environmental Planner	Soils and vegetation, socioeconomics, public comment response
Chad Incorvia	Ecologist	Special-status plants
Jennifer Clayton	Environmental Planner and Scientist	General wildlife, special-status plants and wildlife
Kelly Beck	Principal Investigator	Cultural resources
Jeremy Eyre	Environmental Planner	Recreation, lands, and access
Alex Simons	Environmental Planner	Wilderness and LWCs
Laren Cyphers	Environmental Planner	Visual resources, public comment response
Debbi Smith	Desktop Publisher	Formatting and Section 508 Accessibility
Kimberly Proa	Document Formatter	Formatting

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APPENDIX A

Federal, State, and Local Approvals

The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The Bureau of Land Management has made every effort to ensure that the information in this document is accessible. If you have any problems accessing information, please contact Joe Rodarme at jrodarme@blm.gov or 435.636.3660.

Table A-1. Federal, State, and Local Approvals

Issuing Agency	Nature of Permit and Approval	Regulatory Authority (if appropriate)	Applicable Project Component
Federal Agencies			
BLM	Permit to Drill, Deepen, or Plug Back; Plugging and Abandonment; Venting; or Flaring. Controls drilling for helium on Federal onshore lands	MLA (30 USC 181 et seq.); 43 CFR 3162; National Mining and Minerals Policy Act of 1970; Federal Onshore Oil and Gas Leasing Reform Act of 1987 (Onshore Oil and Gas Order Nos.1 and 2 (43 CFR 3164))	Well drilling, flaring, and abandonment
	ROW grants, underground authorization and temporary-use permit	FLPMA (Public Law 94-579); 43 USC 1761 et seq.; 43 CFR 2800; BLM 2930 Regulations	Off-lease well pad, pipeline ROW, and access road
	Antiquities, Cultural, and Historic Resource Permits. Antiquities and cultural resources use permits to inventory, excavate, or remove cultural or historic resources from Federal lands	Antiquities Act of 1906 (16 USC 431–433); Archaeological Resources Protection Act of 1979 (16 USC 470aa–47011); 43 CFR 3; National Historic Preservation Act (NHPA) of 1966, Section 106	All surface-disturbing activities on BLM-managed lands
	Approval to dispose of produced water; controls disposal of produced water from Federal leases	MLA (30 USC 181 et seq.); 43 CFR 3164; Onshore Oil and Gas Order No. 7	All surface-disturbing activities on BLM-managed lands
	Pesticide Use Permit and Daily Pesticide Application Record	BLM Authorization for Herbicide Applications on Federal Lands	Well, pipeline ROW, and access road
	Federal Noxious Weed Act compliance. Control of noxious weeds	Plant Protection Act of 2000 (Public Law 106-224, 7 USC 7701); Federal Noxious Weed Act of 1974, as amended (7 USC 2801–2814); EO 13112 (February 3, 1999)	Any occurrence of noxious weeds on or near Project components
	Paleontological Resource Use Permit. Approval for surveys and potential data collection at well pad, pipeline ROW, and access road	FLPMA (Section 302(b))	All surface-disturbing activities on BLM-managed lands

Issuing Agency	Nature of Permit and Approval	Regulatory Authority (if appropriate)	Applicable Project Component
USFWS	ESA Section 7 consultation	ESA, Section 7, as amended (16 USC 1531 et seq.)	Potential Project-related impacts to federally listed threatened and endangered species
	MBTA	MBTA of 1918, as amended (15 USC 703–712); EO 13186	Potential Project-related impacts to migratory birds
	BGEPA	BGEPA of 1940, as amended (16 USC 668–668d)	Potential Project-related impacts to bald and golden eagles
Advisory Council on Historic Preservation	Cultural resources compliance (Section 106); coordinated with the Utah State Historic Preservation Office	NHPA, Section 106	Potential Project-related impacts to prehistoric and historic archaeological resources
State of Utah			
Utah Division of State History, Utah State Historic Preservation Office	Consult on Section 106 compliance process; approve cultural resource clearances; provide for protection of cultural resources	NHPA, Section 106	All surface-disturbing activities with potential to affect archaeological resources
UDOGM	Regulates activities associated with drilling of helium wells in state, well spacing, and flaring or venting of gas	Permitting of Wells, Utah R649-3-4 et seq.	APD, well drilling, flaring, and abandonment
Utah Division of Water Rights	Approval to Appropriate Water or Change in Nature of Use Application. Grants permit to appropriate water; authorization of change of use on water rights	Utah Code 73-3-2	Nonconsumptive and consumptive water uses
Utah Division of Water Resources	Determination of adequate water supply and cumulative impacts on water supply. Clean Water Act Section 401, Water Quality Certification	Clean Water Act, as it pertains to state government (Section 401)	Nonconsumptive and consumptive water uses
Utah Division of Wildlife Resources	Protection and management of state wildlife and fish resources. Consultation and input on fish and wildlife habitat	Utah Code 23-13 through 23-21	All surface-disturbing activities

Issuing Agency	Nature of Permit and Approval	Regulatory Authority (if appropriate)	Applicable Project Component
Utah Division of Air Quality	Fugitive Dust Control	Fugitive Dust Rules, Utah R307-205	All surface-disturbing activities
	Air Quality Permit	Permit: New and Modified Sources, Utah R307-401	Helium gas processing plant
	Oil and Gas Well permit by rule	Oil and natural gas exploration and production operations, Utah R307-501 to R307-511	Exploration, production, and transmission operations
SITLA	Special Use Lease	Utah Code R850-30	Processing plant
	Oil and Gas Leases	Utah Code R850-21	Oil and Gas Leases on SITLA
	Easement	Utah Code R850-40	Pipeline ROW and plant access road
Utah Department of Transportation	Transport Permit. Authorizes oversize, over length, and overweight load transportation on state highways	Motor Carrier Rules, Utah R909-1	Transportation of equipment and materials on state highways
Local Government			
Emery County	County zoning/land use plan consultation	Emery County Code; Emery County General Plan (revised 2016)	Well, pipeline ROW, and access road
	Road use permit	Emery County Code	Transportation of equipment and materials on county roads
	Noxious Weed Act enforcement	Emery County Code	All surface-disturbing activities
	Solid waste disposal permits	Emery County Code	Disposal of waste materials

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APPENDIX B

Bureau of Land Management Interdisciplinary Team Checklist

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INTERDISCIPLINARY TEAM CHECKLIST

RESOURCES AND ISSUES CONSIDERED (INCLUDES SUPPLEMENTAL AUTHORITIES APPENDIX 1 H-1790-1)

Project Title: Bowknot Helium Project

NEPA Log Number:

File/Serial Number:

Project Leader: Marc Johnson

Determination of Staff: (Choose one of the following abbreviated options for the left column)

NP = not present in the area impacted by the proposed or alternative actions

NI = present, but not affected to a degree that detailed analysis is required

PI = present with potential for relevant impacts that need to be analyzed in detail in the EA

NC = (Documentation of NEPA Adequacy only) actions and impacts not changed from those disclosed in the existing NEPA documents cited in Section D of the Documentation of NEPA Adequacy form. The rationale column may include NI and NP discussions.

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Air Quality and GHG Emissions	Dust and vehicle emissions would be generated during the Project. Emissions from earth-moving equipment, vehicle traffic, drilling and completion activities, separators, flaring, oil storage tanks, dehydration units, and daily tailpipe and fugitive dust emissions could adversely affect air quality and contribute to GHG emissions. Stipulations would be similar to those for oil and gas wells (Tier II, dust suppression, VOC controls, etc.).	Joseph Rodarme	7/24/2020
NP	BLM Natural Areas	There are no BLM natural areas within the proposed Project area, per GIS and RMP review.	Blake Baker	7/1/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
NP	Cultural: Archaeological Resources	Pursuant to Section 106 of the National Historic Preservation Act and its guiding regulations at 36 CFR 800, two Class III cultural resource surveys were conducted by Montgomery Archaeological Consultants, Inc. for this undertaking. The Bowknot 5-1 well pad location, gathering facility, associated pipeline, and access were surveyed on July 26 and August 13, 2019 (U19MQ0464). The BLM determined the proposed undertaking to result in No Historic Properties Affected, pursuant to 36 CFR 800.4(d). The Utah State Historic Preservation Office (SHPO) concurred with these findings on September 12, 2019. The second cultural resources Class III intensive field survey was required for the proposed Bowknot 5-2 and 36-1 well pad, pipeline, access road, and helium plant to identify any historic properties that may be affected by the undertaking. The survey was conducted on May 22 and 23, 2020, by Montgomery Archaeological Consultants, Inc. There were six sites recorded in the area of potential effects, none of which are eligible for inclusion in the National Register of Historic Places. A second BLM determination of No Historic Properties Affected has been made for this undertaking. SITLA reviewed and approved the Class III results August 27, 2020, and Utah SHPO concurred with the eligibilities and undertaking effect determination on September 17, 2020.	Natalie Fewings	9/17/2020
NP	Cultural: Native American Religious Concerns	Pursuant to 36 CFR 800.3(c)(1) and BLM Manual 1780, consultation letters (for both Bowknot 5-1 and 5-2) were mailed on August 26, 2020, to 16 tribal governments who have identified themselves as culturally affiliated with the area. Consulted tribes have 30 calendar days to respond, pursuant to 36 CFR 800.3(c)(4); the consultation period ended September 25, 2020. The Navajo Nation responded on September 8, 2020, saying there are no Navajo Nation TCPs in the Project area and the BLM may proceed with the Project without further consultation. The Paiute Indian Tribe of Utah responded on September 8, 2020, saying they are currently not aware of any tribal locations of religious or cultural significance and they have no objections to the Project. The Santa Clara Pueblo responded on September 25, 2020, with a request for Section 106 information. The Price FO archaeologist responded on September 28, 2020, with the results of the Class III surveys, determinations of No Historic Properties Affected, and SHPO concurrence dates.	Natalie Fewings	9/28/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
NP	Designated Areas: National Historic Trails	There are no national historic trails within the proposed Project area, per GIS and RMP review.	Blake Baker	7/1/2020
NP	Designated Areas: Areas of Critical Environmental Concern	There are no areas of critical environmental concern within the proposed Project area, per GIS and RMP review.	Blake Baker	7/1/2020
NI	Designated Areas: Wild and Scenic Rivers	<p>Portions of the Green River that were designated as wild and scenic rivers in the John D. Dingell Jr. Conservation, Management, and Recreation Act are within the 3-mile buffer that was used to analyze recreation impacts. BLM administers the designated wild and scenic river corridor 0.25 mile from the high-water mark on either side of the river per the Wild and Scenic River Act. The river corridor below the high-water mark is managed by Utah Division of Forestry, Fire, and State Lands.</p> <p>Alternative A, well pad 36-1: The proposed action would occur over 2 miles away from the Green River. The proposed developments would be within 0.5 mile of Keg Spring, which is a tributary to the Green River but not part of the WSR because it is further than 0.25 mile away from the main river.</p> <p>Alternative B, well pad 5-1: The proposed action would occur over 2 miles away from and approximately 670 feet above the Green River.</p>	Blake Baker David Gordon	7/1/2020 10/8/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Designated Areas: Wilderness/ Wilderness Study Areas	<p>The lease sale of the parcel occurring in the NW1/4 NE1/4 of Section 7, T26S, R17E, Emery County, Utah, predates the designation of the Labyrinth Canyon Wilderness. The Dingell Act, signed March 12, 2019, designated the Labyrinth Canyon Wilderness. The lease was issued effective March 1, 2019.</p> <p>Alternative B (Well 5-1): Technical requirements of the Alternative B well pad require it to be larger than the size of the cherry stemmed road so surface disturbance will occur within the wilderness boundary under this alternative. A valid existing right in the form of a mineral lease issued prior to wilderness designation exists. The terms and conditions of the lease provide the leaseholder the right to develop the lease. Section 4(c) of the Wilderness Act describes how valid existing rights are to be managed in wilderness areas.</p> <p>Alternative A (Wells 5-2 and 36-1): The surface disturbance of Alternative A would occur entirely within the cherry stem adjacent to the Labyrinth Canyon Wilderness Area. Alternative A surface disturbance is outside of the wilderness area and would occur in the cherry stemmed road. Only the underground well bores would be located within the designated wilderness.</p> <p>Prior to the passing of the Dingell Act in March 2019, there were no wilderness areas in the Price FO, including the area of the proposed action. The Dingell Act created the Labyrinth Canyon Wilderness Area, which is adjacent to the proposed Project and encompasses the three leases that Twin Bridges proposes to develop for Helium. The wilderness boundary and proposed disturbance boundary were closely reviewed. It has been determined that they do not overlap.</p> <p>Consideration was then given to impacts within the wilderness area from the proposed activity because they are adjacent to each other. The Dingell Act states: "Congress does not intend for the designation of the wilderness areas to create a protective perimeter or buffer zones around the wilderness areas. The fact that non-wilderness activities or uses can be seen or heard from within a wilderness area shall not preclude the conduct of those activities outside the boundary of the wilderness area" (Part II, Subpart B, Section 1232). This makes it clear that the activity as proposed does not impact wilderness even if it may be considered present.</p>	Blake Baker	7/1/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
NI	Environmental Justice	No minority or economically disadvantaged communities or populations would be disproportionately adversely affected (physically or economically) by the proposed action or alternatives because none are present in or adjacent to the Project area.	Marc Johnson	5/4/2020
NP	Farmlands (prime/unique)	According to the NRCS soil survey and knowledge of the area, there are no prime/unique farmlands within the Project area.	Stephanie Bauer	6/12/2020
NI	Fuels/Fire Management	Implementation of the proposed action would have no significant impact on fuels/fire management because the Project is small in scope and fuels and vegetation are sparse. In the event of a wildland fire, the area would not support an active fire.	Blaine Tarbell	7/20/2020
NP	Geology/Minerals/Energy Production	Based on existing GIS data, there are no locatable claims or salable minerals located within the Project area. These locations are also stratigraphically well below any recoverable coal resources.	Rebecca Anderson	5/19/2020
NI	Invasive Plants/Noxious Weeds	Surface-disturbing activities have the potential to introduce/spread invasive species/noxious weeds. There are noxious weeds within the Project area along the main county road. Russian thistle, halogeton, and cheatgrass are invasive species that are present within the Project area along roads and in disturbed areas. Best management practices like washing vehicles to remove mud and vegetative material before entering BLM-administered lands would be part of the permit. Applicant would be responsible for any noxious weed infestations due to Project implementation.	Stephanie Bauer	6/12/2020
NI	Lands/Access	A review of the Master Title Plat and LR2000 showed that the proposed action is compatible with the existing land use and authorized ROWs. There are no conflicts with other land use authorizations. A ROW would need to be obtained for the pipeline and road access.	Veronica Kratman	9/2/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Lands with Wilderness Characteristics	<p>Alternative B (Well 5-1): Alternative B is within the UT-020-SRD-Labyrinth Canyon B LWC unit that was determined to possess wilderness characteristics prior to the Labyrinth Canyon Wilderness designation in March 2019. Alternative B is partially within the designated route, which was cherry stemmed from the LWC inventory unit and, therefore, outside the inventoried LWC.</p> <p>Alternative A (Wells 5-2 and 36-1): The proposed action is within the UT-020-SRD-Labyrinth Canyon A and UT-020-SRD-Sweetwater Reef A LWC units.</p> <p>Labyrinth Canyon A and B and Sweetwater Reef A units were determined to possess wilderness characteristics prior to the Labyrinth Canyon Wilderness designation in March 2019. They were not carried forward in the approved RMP and, therefore, are not being managed for LWC; however, analysis will be completed to identify the number of acres that would no longer qualify as LWC if the proposed developments are implemented.</p>	Blake Baker	7/22/2020
NI	Livestock Grazing	The proposed action is within the Saucer Basin grazing allotment, but should not affect livestock grazing, because the Project is small compared to the allotment. Any disturbance of existing range facilities (pipelines, troughs, corrals) would be rebuilt/repared by the applicant to the same condition or better than as found.	Mike Tweddell	7/23/2020
NI	Paleontology	Based on GIS data, the Project area lies within Class 2 and Class 3 areas of the Potential Fossil Yield Classification System. Class 2 has a low probability of impacting paleontological resources, and further assessment is unnecessary. Class 3 has a moderate likelihood of containing paleontological resources, but these occurrences are widely scattered, and potential for an authorized land use to impact a significant paleontological resource is known to be low to moderate. Operations could uncover vertebrate fossils, and if this happens, work should immediately halt in that location and the Price FO should be notified.	Rebecca Anderson	5/19/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Plants: BLM Sensitive	<p>Based on analysis of geology, soils, elevation, surrounding plant communities, and occurrence data, suitable or occupied habitat is recorded, modeled, or expected to be within the Project Area for:</p> <ul style="list-style-type: none"> • <i>Eriogonum corymbosum smithii</i>, • <i>Euphorbia nephradenia</i>, • <i>Lygodesmia grandiflora</i> var. <i>entrada</i>, and • <i>Oreoxis trotteri</i>. <p>Because surface disturbance has the potential to affect the habitat and recorded individuals of these species, impacts will need to be analyzed in detail.</p>	Kegen Benson	7/10/2020
NP	Plants: Threatened, Endangered, Proposed, or Candidate	<p>The USFWS Information for Planning and Conservation (IPaC) official species list indicates potential occurrence for:</p> <ul style="list-style-type: none"> • Jones cycladenia and • Navajo sedge. <p>Analysis of geology, soils, elevation, surrounding plant communities, occurrence data, and a 2020 site visit indicated that neither habitat nor individuals are present at the proposed Project locations, and further analysis is not required.</p>	Kegen Benson	7/10/2020
NI	Rangeland Health Standards	No impact to rangeland health standards are expected due to the proposed Project's small size in relation to ongoing development within the Price FO.	Mike Tweddell	7/23/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Recreation	<p>Alternative B (Well 5-1): Dispersed recreation, such as camping and hiking, currently occurs throughout the year within and around the proposed Project area. The current use would not be considered intensive, but the existing access road would be improved, likely leading to additional vehicle travel and recreation activity within the area. Visitors would have to drive past the proposed developments to access the Five Hole Arch. During production, the developments would only be seen for a short while, as they would only be 6 feet above the landscape. The elevation of the road drops shortly before and after the proposed well-pad location, limiting the viewshed of the proposed action. The proposed developments would not be seen from the Five Hole Arch trailhead, the arch itself, or the dispersed camping areas.</p> <p>Alternative A (Wells 5-2 and 36-1): Dispersed recreation, such as camping and hiking, currently occurs throughout the year within and around the proposed Project area. The current use would not be considered intensive, but the existing access road would be improved, likely leading to additional vehicle travel and recreation activity within the area. The majority of recreation activity occurs 2 miles southeast across the canyon at the Five Hole Arch trailhead, and from the trailhead location, the proposed developments would likely be seen by the casual observer.</p>	Blake Baker	7/1/2020
PI	Socioeconomics	The construction and operation of the facilities would result in increased jobs, tax revenue, and economic benefits. It could also potentially impact tourism in the area.	Joseph Rodarme	11/20/2020
PI	Soils: Physical/ Biological	The soils within the Project area are fairly uniform on a sand sheet landscape called surficial eolian deposits. This is considered sand deposits from parent material and is erodible under high-wind conditions. This soil does not hold water, so all holding pits need to be lined to prevent contamination of the water table. The Project area has some exposed outcrops of bedrock. Mixing of soil in this area is not a concern; however, reclamation of the area would be an issue due to the topsoil being mostly sand, and the area is unlikely to be reclaimed.	Stephanie Bauer	6/12/2020
PI	Vegetation	There is relatively minimal vegetation in the Project area due to the type of soil present. The Project would displace vegetation over the long term, and reclamation success is unlikely due to the soil type.	Mike Tweddell	7/23/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Visual Resources	<p>Alternative B (Well 5-1): The proposed action is found to be located within VRM Class I and VRM Class III. Based on the level of development proposed at the site, impacts to visual resources are expected. For this Project, a visual contrast rating analysis would be completed.</p> <p>Design features to reduce visual contrast would be incorporated in the site development. Infrastructure would be painted neutral colors to make the infrastructure less noticeable. Additional mitigation measures would be needed for the developments to remain in conformance with the VRM class objectives.</p> <p>Potential impacts to visual resources will be analyzed in detail in the EA.</p> <p>Alternative A (Wells 5-2 and 36-1): The proposed action is found to be located within VRM Class II and VRM Class III. Based on the level of development proposed at the site, impacts to visual resources are expected. For this Project, a visual contrast rating analysis would be completed.</p> <p>Design features to reduce visual contrast would be incorporated in the site development. Infrastructure would be painted neutral colors to make the infrastructure less noticeable. Additional mitigation measures may be needed for the developments to remain in conformance with the VRM class objectives.</p> <p>Potential impacts to visual resources will be analyzed in detail in the EA.</p>	Blake Baker	7/20/2020
NI	Wastes (hazardous/solid)	<p>No chemicals subject to Superfund Amendments and Reauthorization Act (SARA) Title III in amounts greater than 10,000 pounds would be used. No hazardous substances defined in 40 CFR 355 and threshold planning quantities should be used. Trash containers and portable toilets would be located on construction sites during drilling and pipeline installation.</p>	Marc Johnson	5/4/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
NI	Water: Groundwater Quality	<p>Maintenance and refueling of equipment could impact water quality, but standard protocols would minimize possibility of releases. Drill holes would be cased to an elevation below 5,800 feet or when groundwater is encountered. No surface disturbance or occupancy would be maintained within 660 feet of any natural springs to protect the water quality of the spring. No new disturbance would be allowed in areas equal to the 100-year floodplain or 100 meters on either side of the center line of any stream, stream reach, or riparian area. At the time of development, drilling operators would conform to the provisions of the operational regulations and Onshore Oil and Gas Order No. 2, which requires the protection and isolation of all usable quality waters. High-country watershed areas would be closed seasonally from December 1 to April 15 to surface-disturbing activity at elevations above 7,000 feet.</p> <p>All soils with high erosion potential need care to prevent accelerated erosion that could be transported to streams that are already listed on the 303d list. This would be accomplished by careful placement of drill pads and access routes. Regular maintenance on roads and pads in highly erosive soils would be required.</p>	Rebecca Anderson	5/19/2020
NI	Water: Hydrologic Conditions (stormwater)	<p>There are intermittent streams near the Project area. The proposed Project area would drain into these zones. The applicant would apply the mitigation measures, construction methods, and stabilization/reclamation measures outlined in the plan of development for the proposed action and best management practices. Hydrologic conditions are not expected to be impacted as a result of the proposed action; therefore, detailed analysis is not required. The proposed action is exempt from stormwater requirements under the Clean Water Act Section 402(l). It states that the Environmental Protection Agency shall not require, nor force a state to require, a Clean Water Act Section 402 permit for discharges of stormwater runoff from oil and gas exploration, production, processing, or treatment operations. This includes well sites, drill pads, access, and maintenance roads.</p>	Rebecca Anderson	5/19/2020
NI	Water: Municipal Watershed/ Drinking Water Source Protection	<p>There are no municipal watersheds or drinking water source protection zones within or near the Project area, per GIS review.</p>	Rebecca Anderson	5/19/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
NI	Water: Streams, Riparian Wetlands, Floodplains	Due to the limited surface disturbance and following best management practices outlined in proposed plan of development, the proposed action is not expected to significantly impact these resources lower in the watershed; therefore, detailed analysis is not required.	Rebecca Anderson	5/19/2020
NI	Water: Surface Water Quality	Intermittent streams are present just north of the Project area. Due to the limited surface disturbance and following best management practices outlined in proposed plan of development, the proposed action is not expected to significantly impact surface water quality; therefore, detailed analysis is not required.	Rebecca Anderson	5/19/2020
NI	Water: Water Rights	Changes in water quality or quantity in the watershed can affect the ability to use and develop water rights. Due to the limited surface disturbance and following best management practices outlined in the proposed plan of development, the proposed action is not expected to significantly impact water quality or quantity; therefore, no significant impacts to water rights are expected and detailed analysis is not required.	Rebecca Anderson	5/19/2020
NI	Water: Waters of the U.S.	Waters of the U.S. include tributaries to navigable waters. There are intermittent streams near the Project area that flow into the Green River. Due to the limited new surface disturbance, and if the applicant applies the mitigation measures, construction methods, and stabilization/reclamation measures outlined in the plan of development for the proposed action and follows the best management practices outlined in the BLM Goldbook, the proposed action is not expected to significantly impact this resource; therefore, detailed analysis is not required.	Rebecca Anderson	5/19/2020
NP	Wild Horses and Burros	The proposed Project is not within a wild horse or burro herd management area.	Mike Tweddell	7/23/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Wildlife: Migratory Birds (including raptors)	<p>Based on review of observation records, habitat requirements, GIS, modeled habitat and 2020 site visit, the Project area and nearby Keg Spring Canyon contain suitable foraging and nesting habitat for raptor species, and high-value migratory bird habitat is mapped along the canyon bottom, within 0.25 mile of the Project site.</p> <p>Because the proposed Project would necessitate increased vehicle traffic, construction, increased noise, and increased human presence in the area, all of which has the potential to impact these species, detailed analysis is required.</p> <p>Surveys would be required within 0.5 mile of Project area; depending on results, "PI" could change to "NP."</p>	Kegen Benson	7/10/2020
NI	Wildlife: Fish (designated or non-designated)	<p>Designated: The project is using a very small amount of water (4 acre-feet per year) from historical water rights. No new groundwater withdrawals will occur. Water used for this Project is considered historical, as the water right was put into use prior to 1988. In 1988, the Upper Colorado River Endangered Fish Recovery Program (UCRRP) was created. In 1993, the UCRRP participants implemented a Section 7 agreement. This agreement established the UCRRP and its activities as the reasonable and prudent alternative to avoid jeopardy for the endangered fishes from impacts caused by depletions from the Upper Colorado River Basin. No impacts beyond what was analyzed in the 1993 Section 7 agreement are expected; therefore, detailed analysis is not required.</p> <p>All fish species: No fish are within or near the Project area. Due to the limited surface disturbance and following best management practices outlined in the proposed plan of development, the Project is not expected to significantly impact downstream populations; therefore, detailed analysis is not required. Impacts to habitat are addressed in the streams, floodplains portion of this document.</p>	Jerrad Goodell	7/28/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Wildlife: Non-USFWS Designated	<p>Based on review of observation records, habitat requirements, GIS, and modeled habitat, there is potential for the following habitats:</p> <ul style="list-style-type: none"> • Desert bighorn sheep – year-long crucial • Pronghorn – year-long crucial <p>Because proposed Project would necessitate increased vehicle traffic, construction, increased noise, and increased human presence in the area, all of which has the potential to impact these species, detailed analysis is required.</p> <p>The San Rafael Desert's unique sand dune landscape provides valuable habitat for pollinators, such as ground-nesting bees. In accordance with IM-2016-013 Managing for Pollinators on Public Lands, and Pollinator-Friendly Best Management Practices for Federal Lands (2015), the avoidance, minimization, and mitigation measures spelled out in stipulation UT-LN-156 would apply to this Project. The actions outlined in the stipulation, along with dust-suppression measures, would ensure impacts to pollinators are confined to the established route of travel.</p>	Kegen Benson	11/19/2020
PI	Wildlife: BLM Sensitive	<p>Based on review of observation records, habitat requirements, GIS, and modeled habitat, there is potential for several BLM sensitive species' habitats to occur in or around the Project area:</p> <ul style="list-style-type: none"> • Kit fox • Great Plains toad • Monarch butterfly • Western bumblebee • Great Plains rat snake <p>Bats: Townsend's big-eared bat, spotted bat, fringed myotis, and western red bat.</p> <p>Because the habitat most suitable for the non-volant species (excluding kit fox) is primarily separated from direct disturbance, being within the adjacent canyon, detailed analysis for these species is not required.</p> <p>Because of increased construction, increased traffic, increased human presence, and uncertainties regarding the proposed action (i.e., location and description of route upgrades, possible gas flaring, etc.), the extent of disturbance cannot be determined so, without more information, detailed analysis is required for the following species:</p> <ul style="list-style-type: none"> • Kit fox • Bat species 	Kegen Benson	7/10/2020

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Wildlife: Threatened, Endangered, Proposed, or Candidate	<p>The USFWS IPaC official species list indicates potential occurrence for:</p> <ul style="list-style-type: none"> • Mexican spotted owl, • southwestern willow flycatcher, and • yellow-billed cuckoo. <p>Based on review of observation records, habitat requirements, modeled habitat, and 2020 site visit, canyon habitat adjacent to the Project area contains the necessary habitat elements to support Mexican spotted owl and southwestern willow flycatcher.</p> <p>Biological surveys are ongoing, and “PI” could be changed to “NP” depending on the results.</p>	Kegen Benson	7/10/2020
NP	Woodlands/ Forestry	There are no woodland/forestry products within the Project area.	Stephanie Bauer	6/12/2020

FINAL REVIEW:

Reviewer Title	Signature	Date	Comments
Environmental Coordinator	Stephanie Howard	12/23/2020	
Authorized Officer	<i>Roger Bankert</i>	12/23/2020	

APPENDIX C

Bureau of Land management–Recommended Seed Mixture

The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The Bureau of Land Management has made every effort to ensure that the information in this document is accessible. If you have any problems accessing information, please contact Joe Rodarme at jrodarme@blm.gov or 435.636.3660.

Table C-1. Proposed Bureau of Land Management–Recommended Seed Mixture

Species Type	Species Scientific Name	Species Common Name	Pounds per Acre (PLS)
Shrub	<i>Sphaeralcea coccinea</i>	Scarlet globemallow	3
Shrub	<i>Atriplex nuttallii</i>	Nuttall's saltbush	3
Shrub	<i>Atriplex corrugata</i>	Mat saltbush	2
Perennial grass	<i>Achnatherum hymenoides</i>	Indian ricegrass	2
Perennial grass	<i>Hilaria jamesii</i>	Galleta grass	3

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APPENDIX D

Visual Resources Supporting Information

The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The Bureau of Land Management has made every effort to ensure that the information in this document is accessible. If you have any problems accessing information, please contact Joe Rodarme at jrodarme@blm.gov or 435.636.3660.

Table D-1. Bureau of Land Management Visual Resource Management Classes

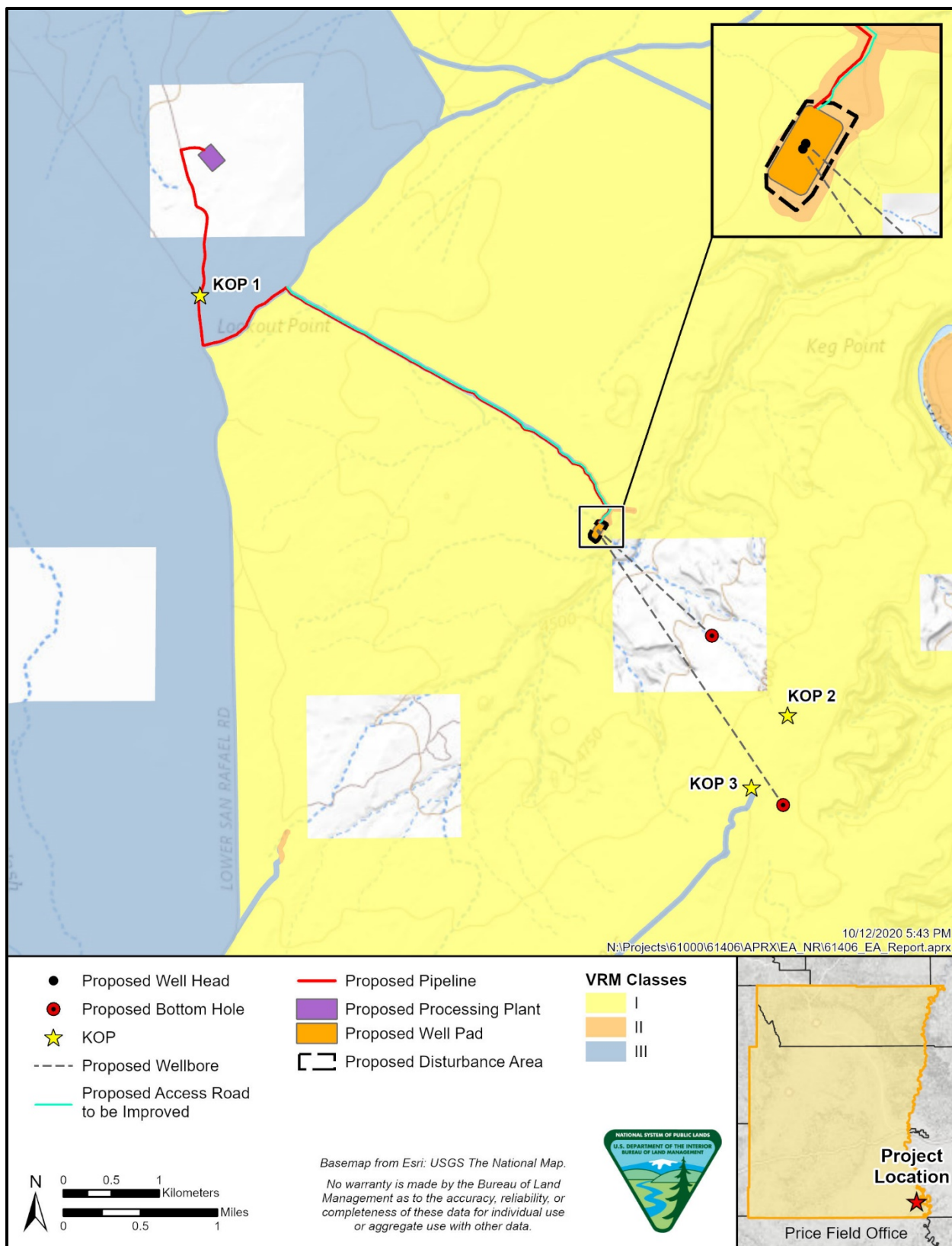
VRM Class	Objective
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention; however, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

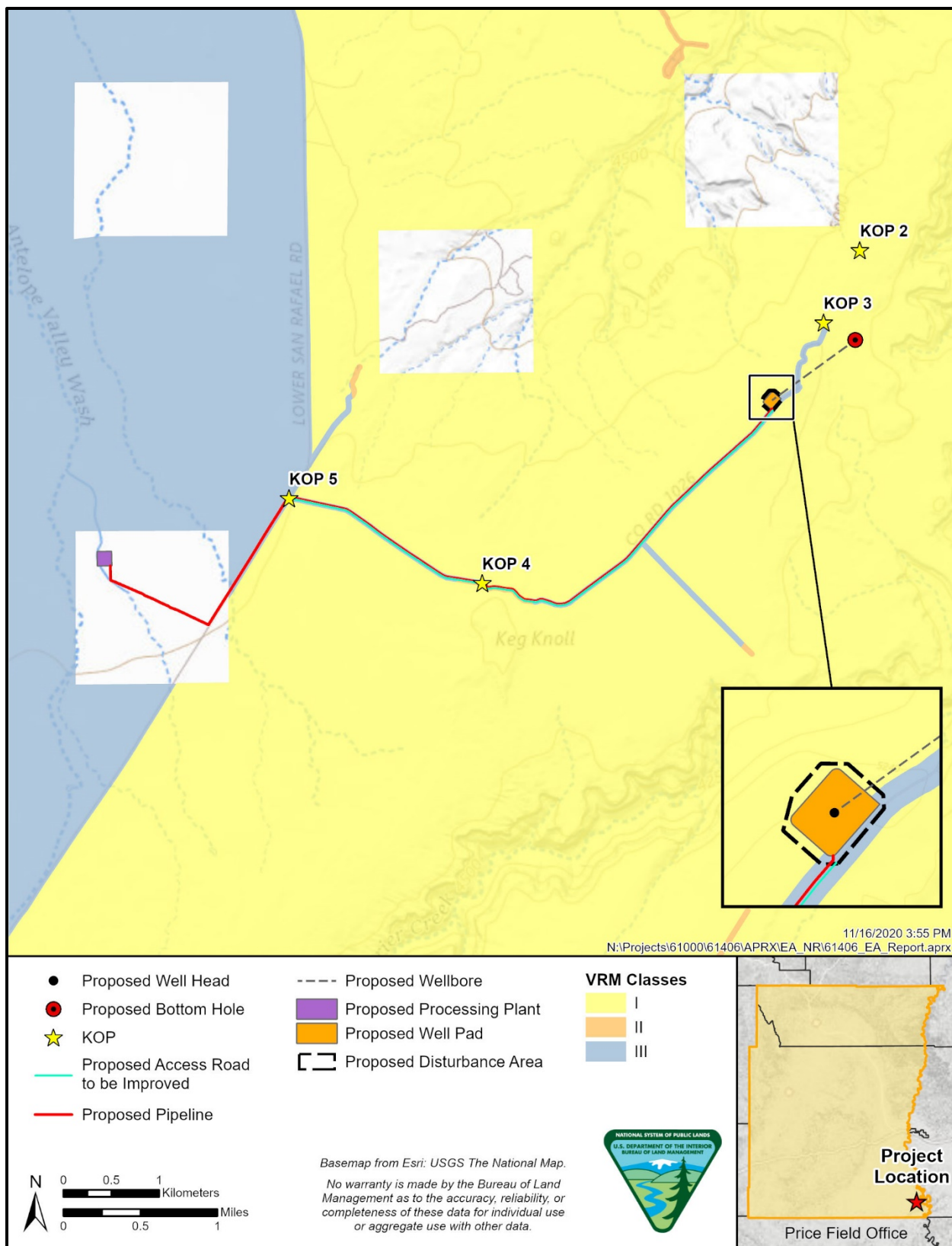
Source: BLM (1986a).

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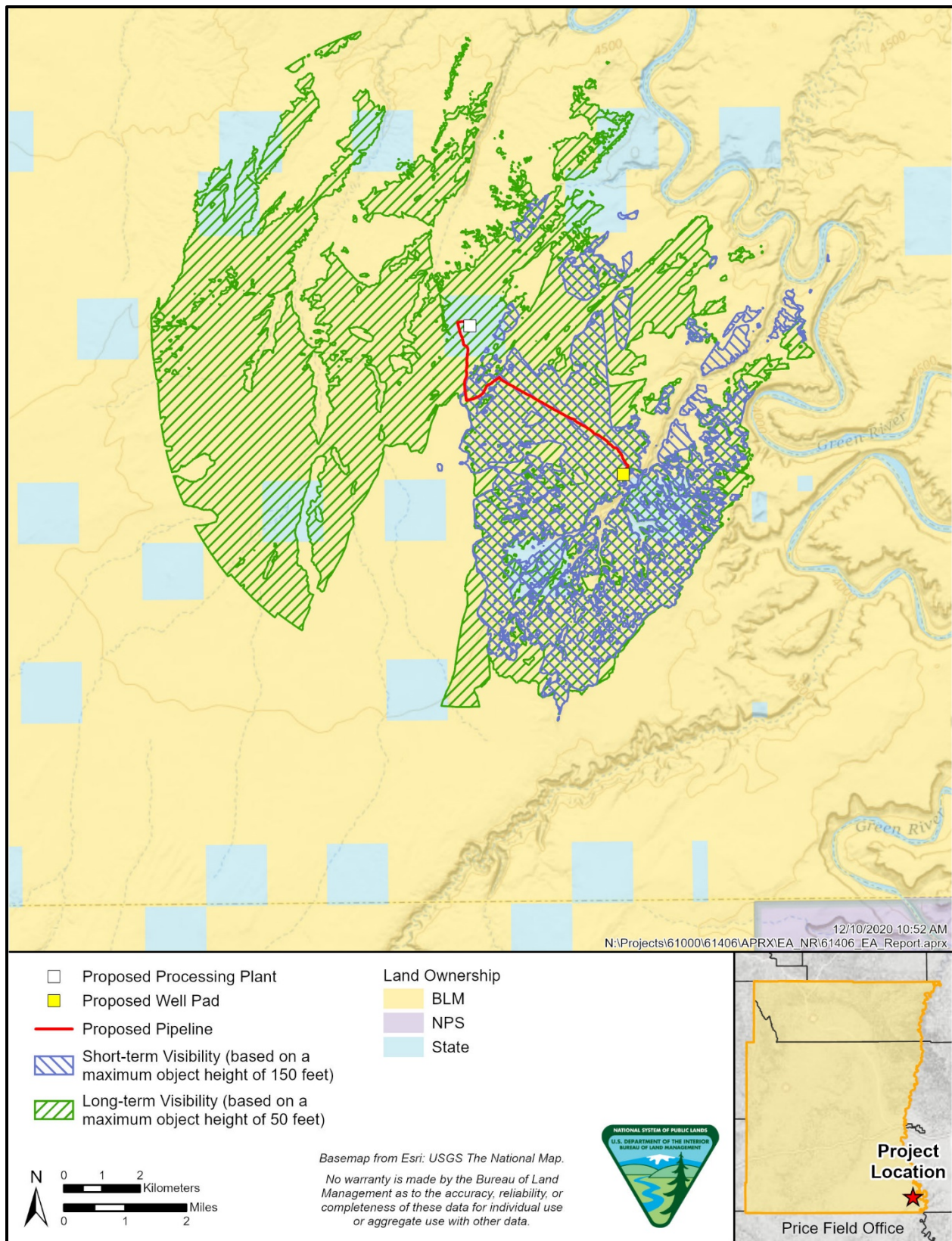
EXHIBIT D-1

Visual Resources Maps

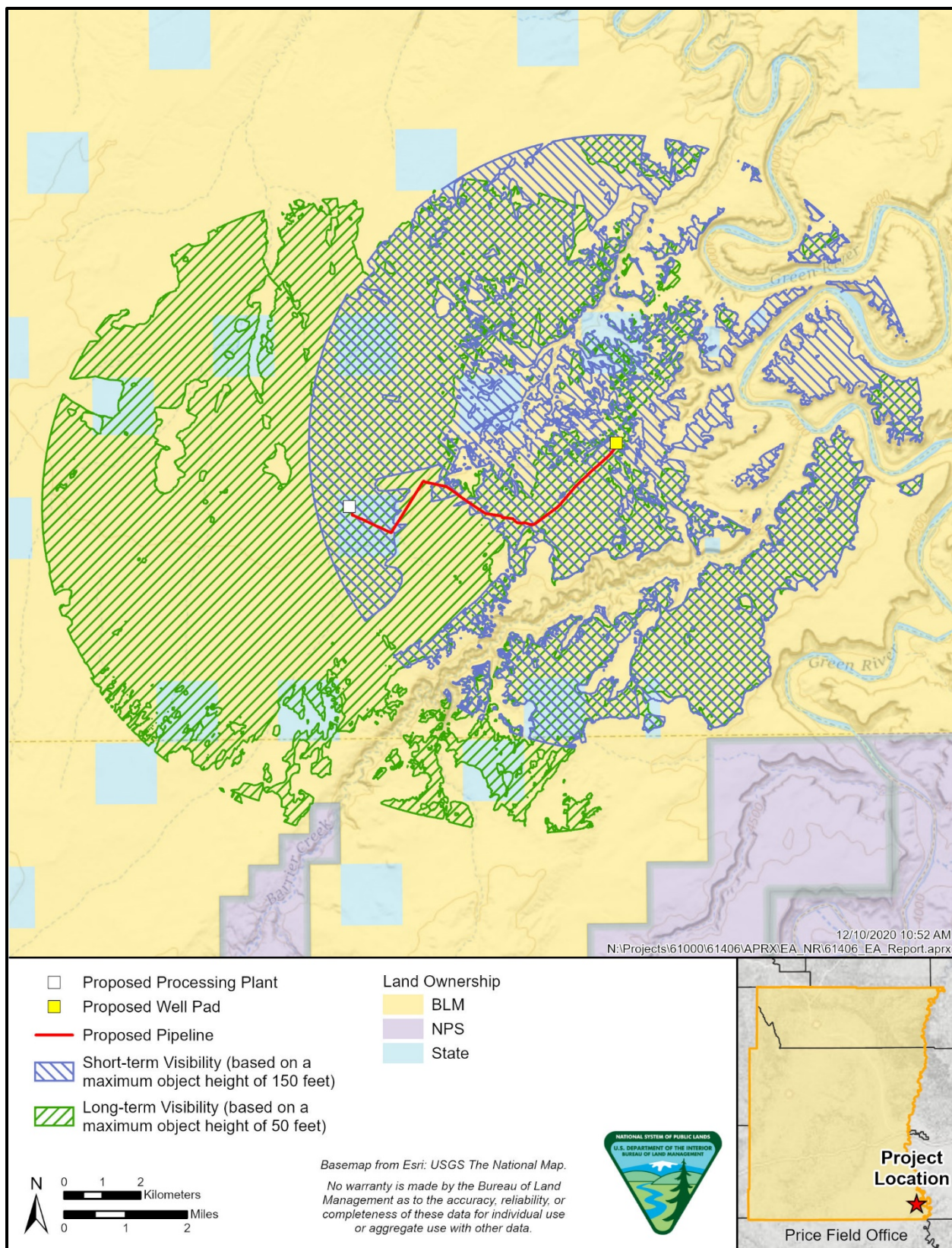




Map D-2. Visual resources map: Alternative B.



Map D-3. Viewshed map: Alternative A.



Map D-4. Viewshed map: Alternative B.

EXHIBIT D-2

Key Observation Point Worksheets and Simulation

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name: Twin Bridges Bowknot Helium EA	4. Location	5. Location Sketch
2. Key Observation Point: #1 – San Rafael Desert Recreation Destination Route	Township _____ Range _____ Section _____	See Map D-1
3. VRM Class III (pipeline only), N/A (processing plant)		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LANDWATER		2. VEGETATION	3. STRUCTURES
FORM	Flat foreground with subtle undulation; rounded hills in background	Low shrubs cover the landscape	None present
LINE	Flat, linear foreground; curvilinear road and cuts	Amorphic lines created by a dense covering of the land with shrubs	None present
COLOR	Light reds and brown-tan soil and exposed rock	Brown, yellow-green, and gray-green shrubs	None present
TEXTURE	Mostly uniform with a distinct road cut	Uniform, fine vegetation	None present

SECTION C. PROPOSED ACTIVITY DESCRIPTION

1. LANDWATER		2. VEGETATION	3. STRUCTURES
FORM	No perceived change	No perceived change	Geometric, industrial towers, tanks, and other components of the processing plant
LINE	No perceived change	Distinct and continuous line between surface disturbance and existing vegetation.	Tall, vertical, fine lines of towers
COLOR	No perceived change	No perceived change	Silver, industrial components
TEXTURE	No perceived change	Fine, scattered vegetation	Organized, vertical elements creating rough texture

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A (Explain on reverse side)			
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)							
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None				
ELEMENTS	Form				X				X		X			3. Additional mitigating measures recommended? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverse side) Evaluator's Names _____ Date _____			
	Line				X			X			X						
	Color				X				X		X						
	Texture				X			X			X						

Comments from item 2.

No structures in this view would be located on BLM VRM Class III lands. Compliance with VRM Class III objectives was based on landform and vegetation contrast from the introduction of the pipeline ROW. The processing plant was sited at a lower elevation, compared to Alternative B, to reduce visibility in the landscape as depicted in Map D-3.

Additional Mitigating Measures (See item 3)

Design features to reduce visual contrast would be incorporated in the site development. Infrastructure would be painted neutral colors (like shadow gray) to make the infrastructure less noticeable.



View facing north toward processing plant and pipeline ROW

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name: Twin Bridges Bowknot Helium EA	4. Location	5. Location Sketch
2. Key Observation Point: #2 – Five Hole Arch Trail (Alternative A)	Township _____	See Map D-1
3. VRM Class II and III	Range _____ Section _____	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Rounded, undulating rocky top giving way to lower flat valley; exposed roadway	Irregular, sparse, low shrubs	Smaller cylindrical form of stock tank
LINE	Distinct horizontal horizon in distance and landform break in foreground; curvilinear, diffuse roadway	Amorphic lines created by inconsistent vegetation	Weak, vertical and horizontal lines
COLOR	Light red to tan sandstone	Gray-green sage; green to light green shrubs	Tan stock tank
TEXTURE	Smooth, fine sandstone; fine roadway	Fine, low, inconsistent vegetation	Medium textured single stock tank

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Flat access road and pipeline disturbance	No perceived change	Conical pumps; geometric well-pad components
LINE	Linear pipeline and road improvements extending from well pad	No perceived change	Vertical, rigid components of well pad (pumps and tanks)
COLOR	Darker red exposed rock and soil	No perceived change	Shadow gray well-pad components
TEXTURE	Linear continuous smooth surface disturbance from pipeline and access road	No perceived change	Organized, rough texture of well-pad components

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side)		
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)						
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side)		
ELEMENTS	Form			X					X				X			
	Line			X					X				X			
	Color			X					X				X			
	Texture			X					X				X			
														Evaluator's Names		Date

Comments from item 2.

Additional Mitigating Measures (See item 3)

Design features to reduce visual contrast would be incorporated in the site development. Infrastructure would be painted neutral colors (like shadow gray) to make the infrastructure less noticeable. Storage tanks would be low profile at 10 feet tall. The edge of the well pad facing this view would be regraded and revegetated.



View facing northwest toward Alternative A



Proposed Project

Simulated view facing northwest toward Alternative A

Simulation Information

Time of photograph:
3:03 pm

Date of photograph:
7/24/2020

Location:
38.5831°N, 110.0857°W

Camera:
Nikon D5000

Lens:
AF-S Nikkor 18-105 mm

Focal Length:
24 mm (adjusted for the
crop sensor to be 45 mm)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name: Twin Bridges Bowknot Helium EA	4. Location	5. Location Sketch
2. Key Observation Point: #2 – Five Hole Arch Trail (Alternative B)	Township _____	See Map D-2
3. VRM Class I and III	Range _____ Section _____	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LANDWATER		2. VEGETATION	3. STRUCTURES
FORM	Flat foreground to rounded hill in middleground; exposed roadway	Irregular, sparse, low shrubs	Not present
LINE	Distinct linear horizon; curvilinear indistinct roadway	Amorphic lines created by inconsistent vegetation type and density	Not present
COLOR	Light red to tan to dark red sandstone and exposed soil	Yellow-green to green shrubs; gray to brown vegetation	Not present
TEXTURE	Smooth, fine sandstone and soil; small coarse band of rock in foreground	Fine, low, inconsistent vegetation	Not present

SECTION C. PROPOSED ACTIVITY DESCRIPTION

1. LANDWATER		2. VEGETATION	3. STRUCTURES
FORM	No perceived change	No perceived change	No perceived change
LINE	No perceived change	No perceived change	No perceived change
COLOR	No perceived change	No perceived change	No perceived change
TEXTURE	No perceived change	No perceived change	No perceived change

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side)			
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)							
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None				
ELEMENTS	Form				X				X				X	3. Additional mitigating measures recommended? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side) Evaluator's Names _____ Date _____			
	Line				X				X				X				
	Color				X				X				X				
	Texture				X				X				X				

Comments from item 2.

Views would be mostly screened, with no perceivable change in landform, vegetation, or structures.

Additional Mitigating Measures (See item 3)

Design features to reduce visual contrast would be incorporated in the site development. Infrastructure would be painted neutral colors (like shadow gray) to make the infrastructure less noticeable. Storage tanks would be low profile at 10 feet tall. Edges of the well pad would be regraded and revegetated.



View facing southwest toward Alternative B

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name: Twin Bridges Bowknot Helium EA	4. Location	5. Location Sketch
2. Key Observation Point: #3 – Five Hole Arch Trailhead (Alternative A)	Township _____	See Map D-1
3. VRM Class II and III	Range _____ Section _____	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Rounded, undulating rocky top gives way to lower flat valley; exposed roadway	Irregular, sparse, low shrubs	Smaller cylindrical form of stock tank
LINE	Distinct horizontal horizon in distance and landform break in foreground; curvilinear, diffuse roadway	Amorphic lines created by inconsistent vegetation	Weak, vertical and horizontal lines
COLOR	Light red to tan sandstone	Gray-green sage; green to light green shrubs	Tan color of stock tank
TEXTURE	Smooth, fine sandstone; fine roadway	Fine, low, inconsistent vegetation	Medium textured single stock tank

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Flat access road and pipeline disturbance	No perceived change	Conical pumps; geometric well-pad components
LINE	Linear pipeline and road improvements extending from well pad	No perceived change	Vertical, rigid components of well pad (pumps and tanks)
COLOR	Darker red exposed rock and soil	No perceived change	Shadow gray well-pad components
TEXTURE	Linear continuous smooth surface disturbance from pipeline and access road	No perceived change	Organized, rough texture of well-pad components

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side)		
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)						
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side)		
ELEMENTS	Form			X					X				X			
	Line			X					X				X			
	Color			X					X				X			
	Texture			X					X				X			
														Evaluator's Names		Date

Comments from item 2.

Additional Mitigating Measures (See item 3)

Design features to reduce visual contrast would be incorporated in the site development. Infrastructure would be painted neutral colors (like shadow gray) to make the infrastructure less noticeable. Storage tanks would be low profile at 10 feet tall. The edge of the well pad facing this view would be regraded and revegetated.



Existing view facing northwest toward Alternative A



Proposed Project

Simulated view facing northwest toward Alternative A

Simulation Information

Time of photograph:
2:45 pm

Date of photograph:
7/24/2020

Location:
38.5763°N, 110.0901°W

Camera:
Nikon D5000

Lens:
AF-S Nikkor 18-105 mm

Focal Length:
24 mm (adjusted for the
crop sensor to be 45 mm)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name: Twin Bridges Bowknot Helium EA	4. Location Township _____ Range _____ Section _____	5. Location Sketch See Map D-2
2. Key Observation Point: #3 – Five Hole Arch Trailhead (Alternative B)		
3. VRM Class I and III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	Flat foreground transitions abruptly to trapezoidal hill	Irregular, sparse, low shrubs	Not present
LINE	Flat sandstone with distinct angled hill with horizontal top	Amorphic lines created by inconsistent vegetation type and density	Not present
COLOR	Light red to tan sandstone; dark red exposed soil and rock of hill	Yellow-green to green shrubs	Not present
TEXTURE	Smooth, fine sandstone and soil; abrupt, gradational hill	Fine, low, inconsistent vegetation	Not present

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	No perceived change	No perceived change	No perceived change
LINE	No perceived change	No perceived change	No perceived change
COLOR	No perceived change	No perceived change	No perceived change
TEXTURE	No perceived change	No perceived change	No perceived change

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side)	
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side) Evaluator's Names _____ Date _____	
ELEMENTS	Form				X				X				X		
	Line				X				X				X		
	Color				X				X				X		
	Texture				X				X				X		

SECTION D. (Continued)

Comments from item 2.

Views would be screened with no perceivable change in landform, vegetation, or structures.

Additional Mitigating Measures (See item 3)

Design features to reduce visual contrast would be incorporated in the site development. Infrastructure would be painted neutral colors (like shadow gray) to make the infrastructure less noticeable. Storage tanks would be low profile at 10 feet tall. Edges of the well pad would be regraded and revegetated.



View facing southwest toward Alternative B

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name: Twin Bridges Bowknot Helium EA	4. Location	5. Location Sketch
2. Key Observation Point: #4 – Five Hole Arch Destination Route	Township _____ Range _____ Section _____	See Map D-2
3. VRM Class: II		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LANDWATER		2. VEGETATION	3. STRUCTURES
FORM	Flat foreground to rocky outcrop; exposed roadway	Irregular, sparse, low shrubs	Not present
LINE	Distinct linear horizon; curvilinear indistinct roadway; jagged rock outcrop	Amorphic lines created by inconsistent vegetation type and density	Not present
COLOR	Light red to tan sandstone and soil	Yellow-green to green shrubs; gray to brown dead vegetation	Not present
TEXTURE	Smooth, fine sandstone transitions to jagged, coarse rock outcrop	Fine, low, inconsistent vegetation	Not present

SECTION C. PROPOSED ACTIVITY DESCRIPTION

1. LANDWATER		2. VEGETATION	3. STRUCTURES
FORM	Distinct, abrupt transition from flat roadway and pipeline disturbance to the existing rocky outcrop	Band of cleared vegetation associated with pipeline disturbance, reclamation to reintroduce irregular, sparse, low shrubs	None
LINE	Curvilinear access road and pipeline; distinct and continuous line between cut slope and flat road and pipeline disturbance	Distinct and continuous line between surface disturbance and existing vegetation	None
COLOR	Darker red exposed soil and lighter colored rock from surface disturbance	No perceived change	None
TEXTURE	Smooth, continuous dirt road and pipeline disturbance	Uniform cleared area, reclamation to reintroduce fine textured, scattered vegetation	None

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side)			
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)							
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None				
														3. Additional mitigating measures recommended? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side)			
ELEMENTS	Form		X					X									
	Line			X				X									
	Color		X					X									
	Texture			X				X									
Evaluator's Names														Date			

Comments from item 2.

Additional Mitigating Measures (See item 3)

By siting the pipelines and conduit within the ROW, where less rock blasting would be required and avoiding creating geometric rock forms where blasting would occur, visual contrast would be further reduced. After application of mitigation measures, the proposed surface disturbance and road improvements would repeat the form, line, color, and texture elements associated with the existing road. Some intermittent topographic screening would minimize the dominance of views of the Project and would create a weak contrast in the existing setting.



View facing east toward road improvements and pipeline ROW



Simulated view facing east toward Alternative B

Simulation Information

<u>Time of photograph:</u> 2:13 pm	<u>Date of photograph:</u> 7/24/2020
<u>Location:</u> 38.5521°N, 110.1314°W	<u>Camera:</u> Nikon D5000
<u>Lens:</u> AF-S Nikkor 18-105 mm	<u>Focal Length:</u> 24 mm (adjusted for the crop sensor to be 45 mm)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name: Twin Bridges Bowknot Helium EA	4. Location	5. Location Sketch
2. Key Observation Point: #5 – Horseshoe Canyon Recreation Destination Route	Township _____	See Map D-2
3. VRM Class: III (pipeline only), N/A (processing plant)	Range _____ Section _____	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LANDWATER		2. VEGETATION	3. STRUCTURES
FORM	Flat foreground with exposed roadway; rounded hills in background	Low shrubs covering the landscape; geometric clearing adjacent to the roadway	Not present
LINE	Flat, linear foreground; angular roadway intersection	Distinct line between vegetation and exposed roadway	Not present
COLOR	Light reds and brown-tan soil and exposed rock	Brown, yellow-green; and gray-green shrubs	Not present
TEXTURE	Mostly uniform with a distinct road cut	Uniform, fine vegetation	Not present

SECTION C. PROPOSED ACTIVITY DESCRIPTION

1. LANDWATER		2. VEGETATION	3. STRUCTURES
FORM	No perceived change	No perceived change	Geometric, industrial towers, tanks, and other components of the processing plant
LINE	No perceived change	Distinct and continuous line between surface disturbance and existing vegetation	Tall, vertical, fine lines of towers
COLOR	No perceived change	No perceived change	Silver, industrial components
TEXTURE	No perceived change	Fine, scattered vegetation	Organized, vertical elements creating rough texture

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A (Explain on reverse side)			
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)							
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None				
														3. Additional mitigating measures recommended? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverse side) Evaluator's Names _____ Date _____			
ELEMENTS	Form				X				X		X						
	Line				X			X			X						
	Color				X				X		X						
	Texture				X			X			X						

SECTION D. (Continued)

Comments from item 2.

No structures in this view would be located on BLM VRM Class III lands. Compliance with VRM Class III objectives was based on landform and vegetation contrast from the introduction of the pipeline ROW.

Additional Mitigating Measures (See item 3)

Design features to reduce visual contrast would be incorporated in the site development. Infrastructure would be painted neutral colors (like shadow gray) to make the infrastructure less noticeable.



View facing southwest toward processing plant and pipeline ROW

APPENDIX E

References

The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The Bureau of Land Management has made every effort to ensure that the information in this document is accessible. If you have any problems accessing information, please contact Joe Rodarme at jrodarme@blm.gov or 435.636.3660.

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APPENDIX F

Maps and Figures

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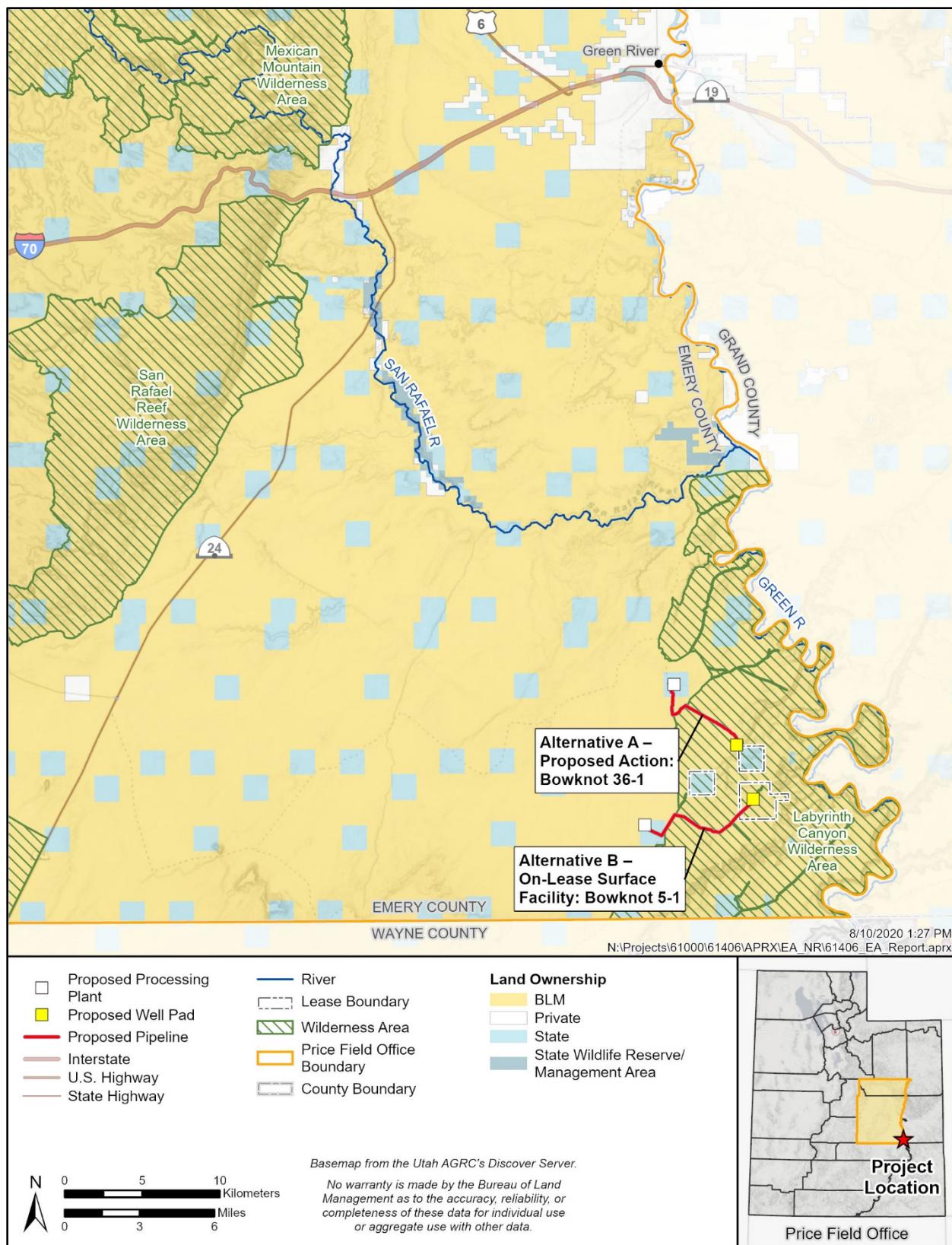


Figure F-1. General location map.

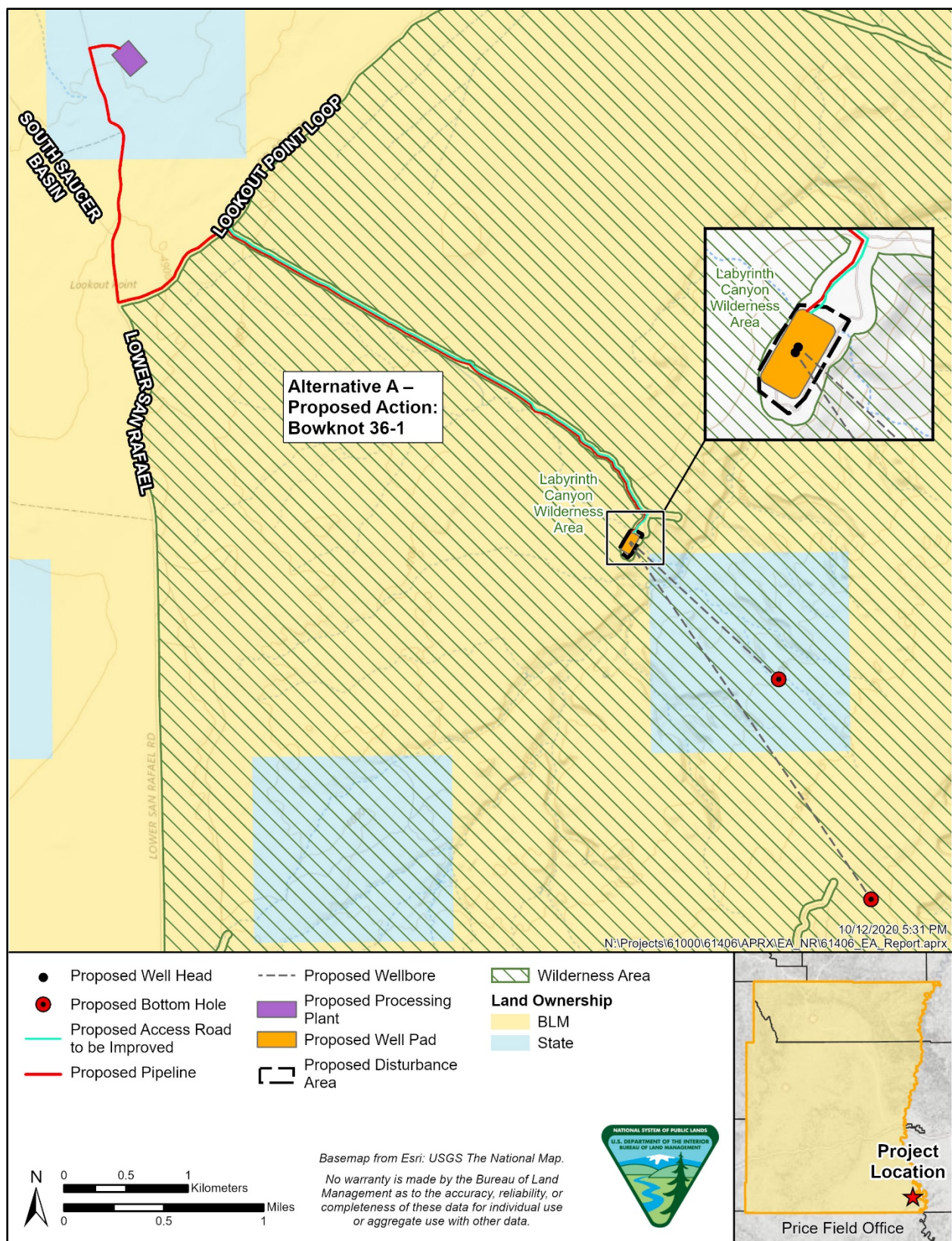


Figure F-2. Alternative A: proposed action (Bowknot 36-1).

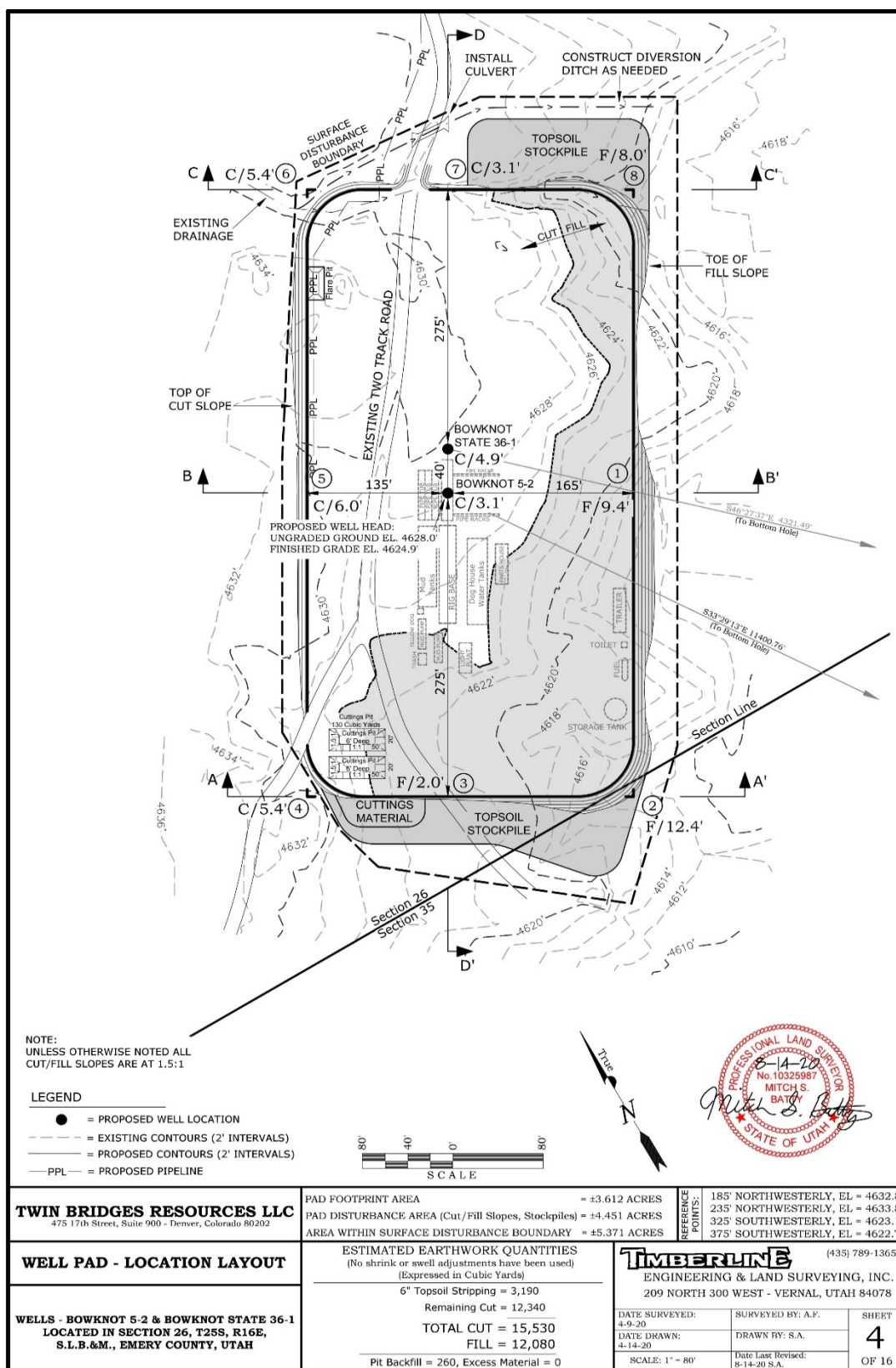


Figure F-3. Bowknot 36-1 well pad layout.

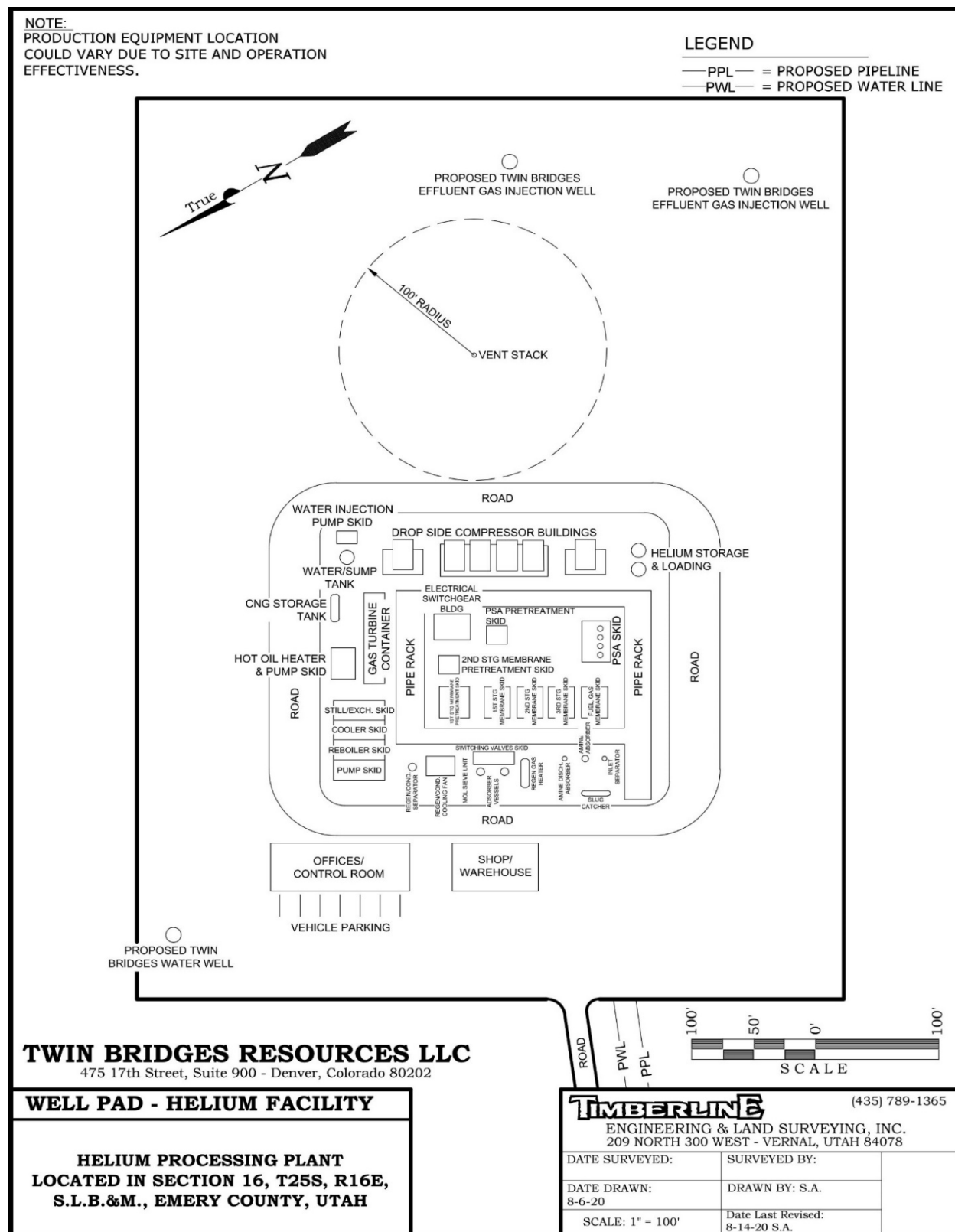


Figure F-4. Helium processing plant layout.

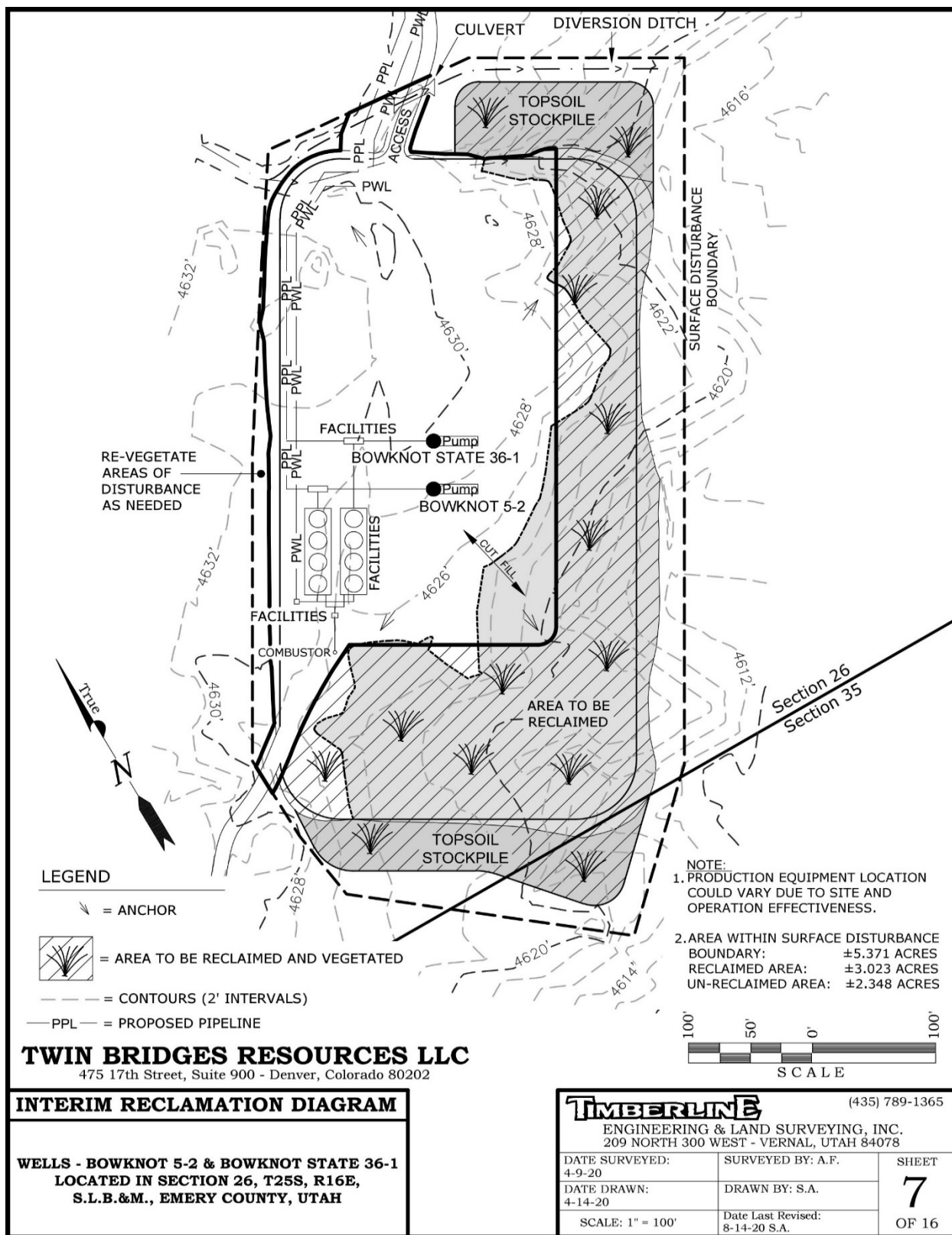


Figure F-5. Bowknot 36-1 well pad interim reclamation diagram.

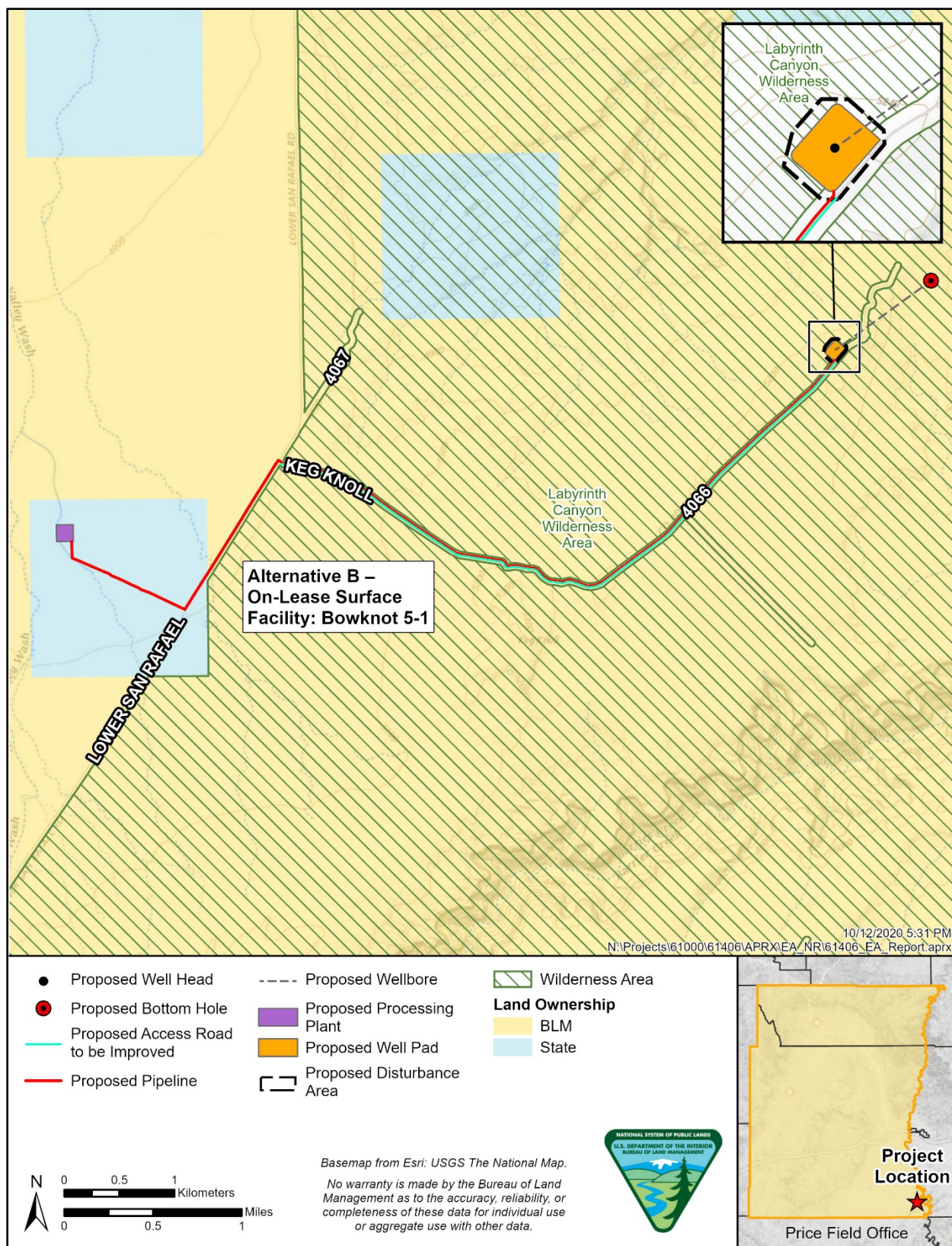


Figure F-6. Alternative B: on-lease surface facility (Bowknot 5-1).

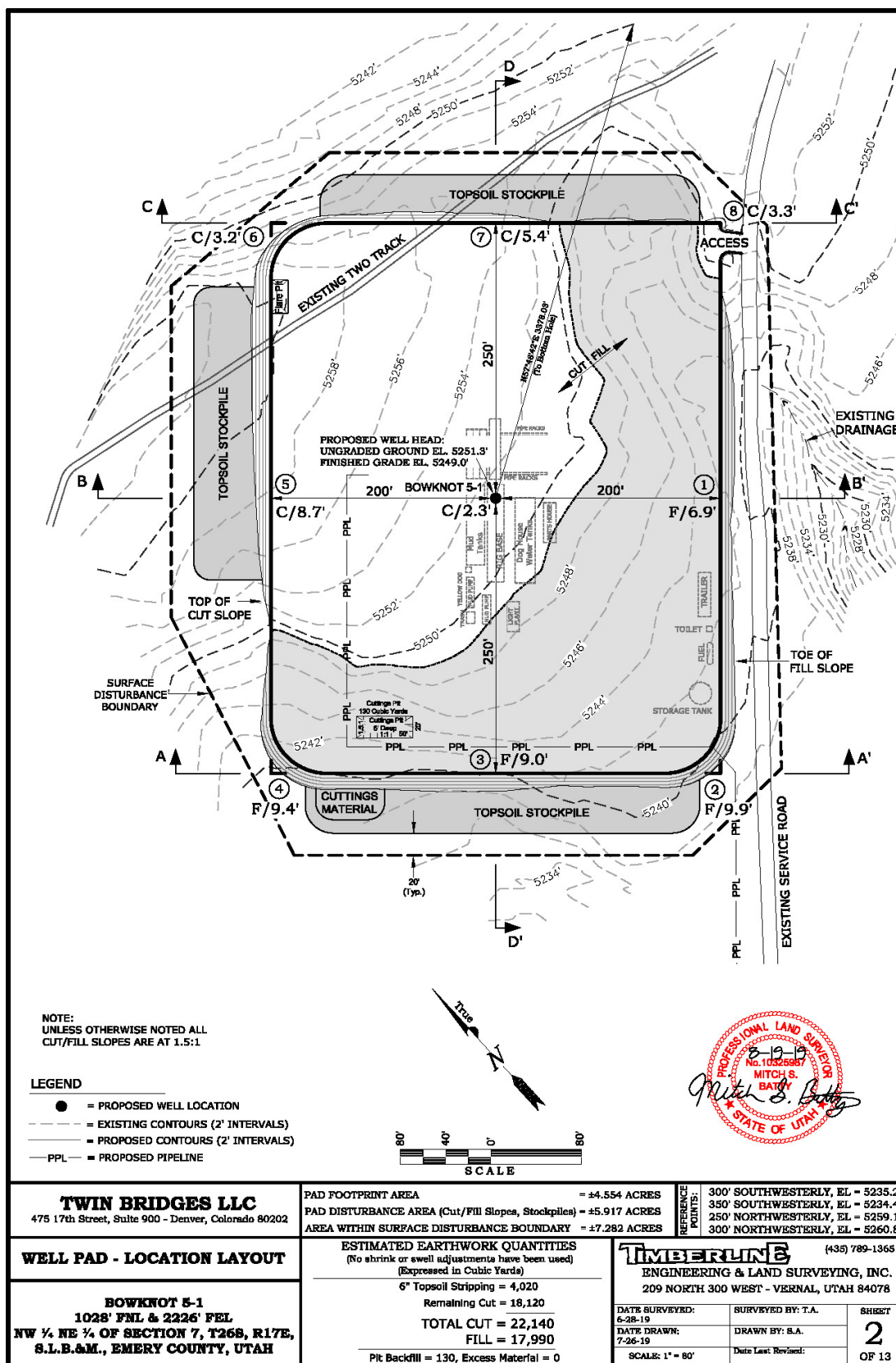


Figure F-7. Bowknot 5-1 well pad layout.

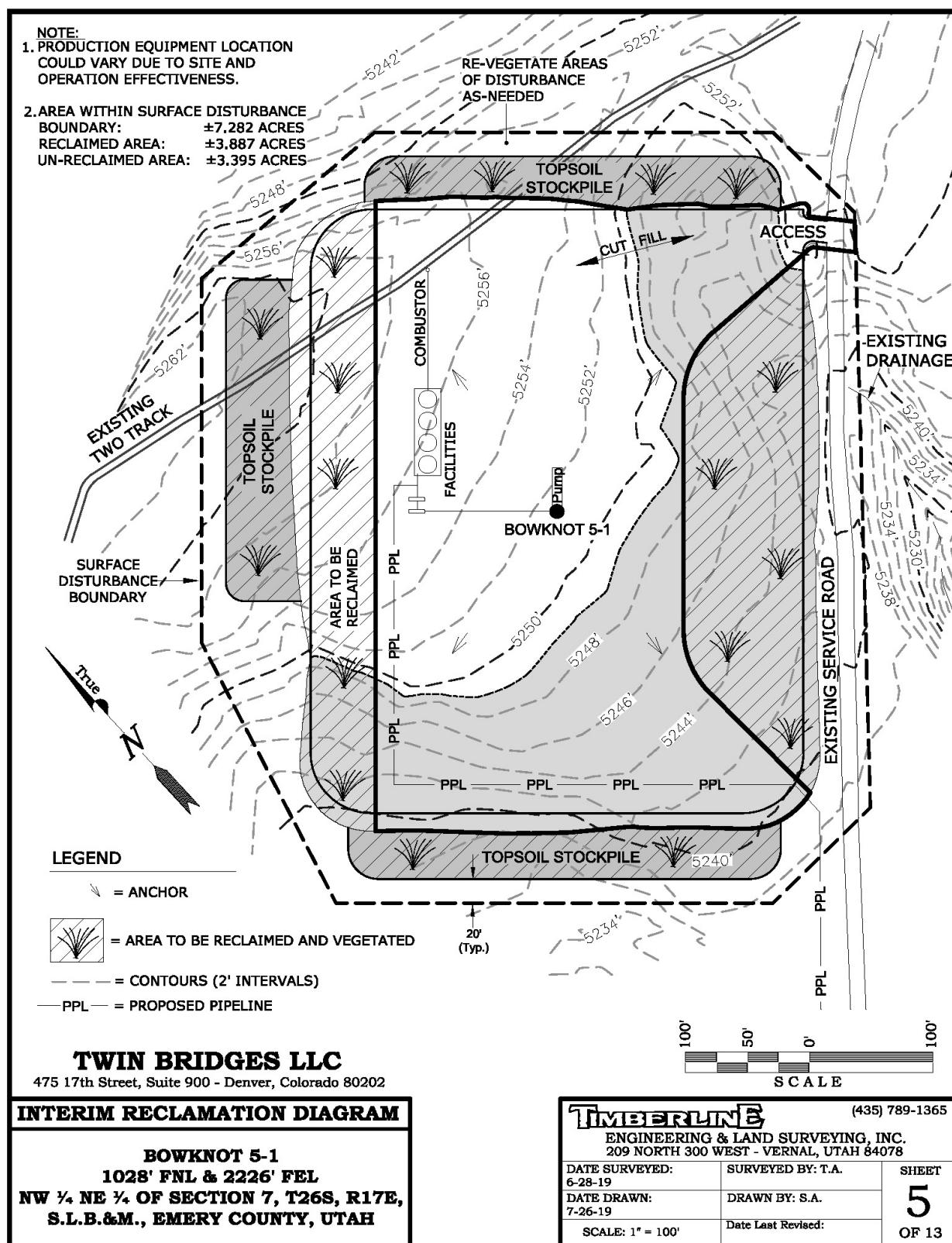


Figure F-8. Bowknot 5-1 well pad interim reclamation diagram.

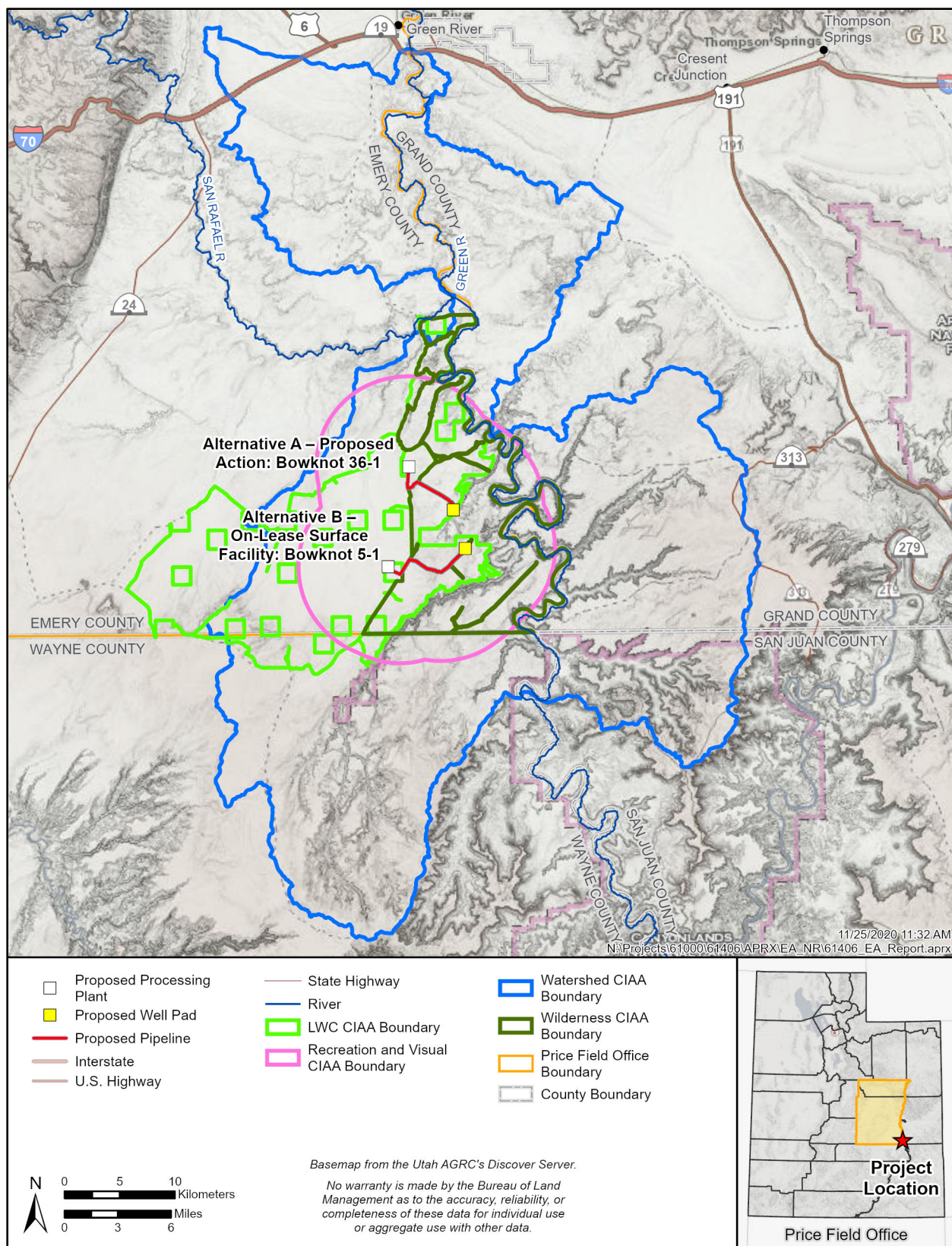


Figure F-9. Cumulative impact analysis areas.

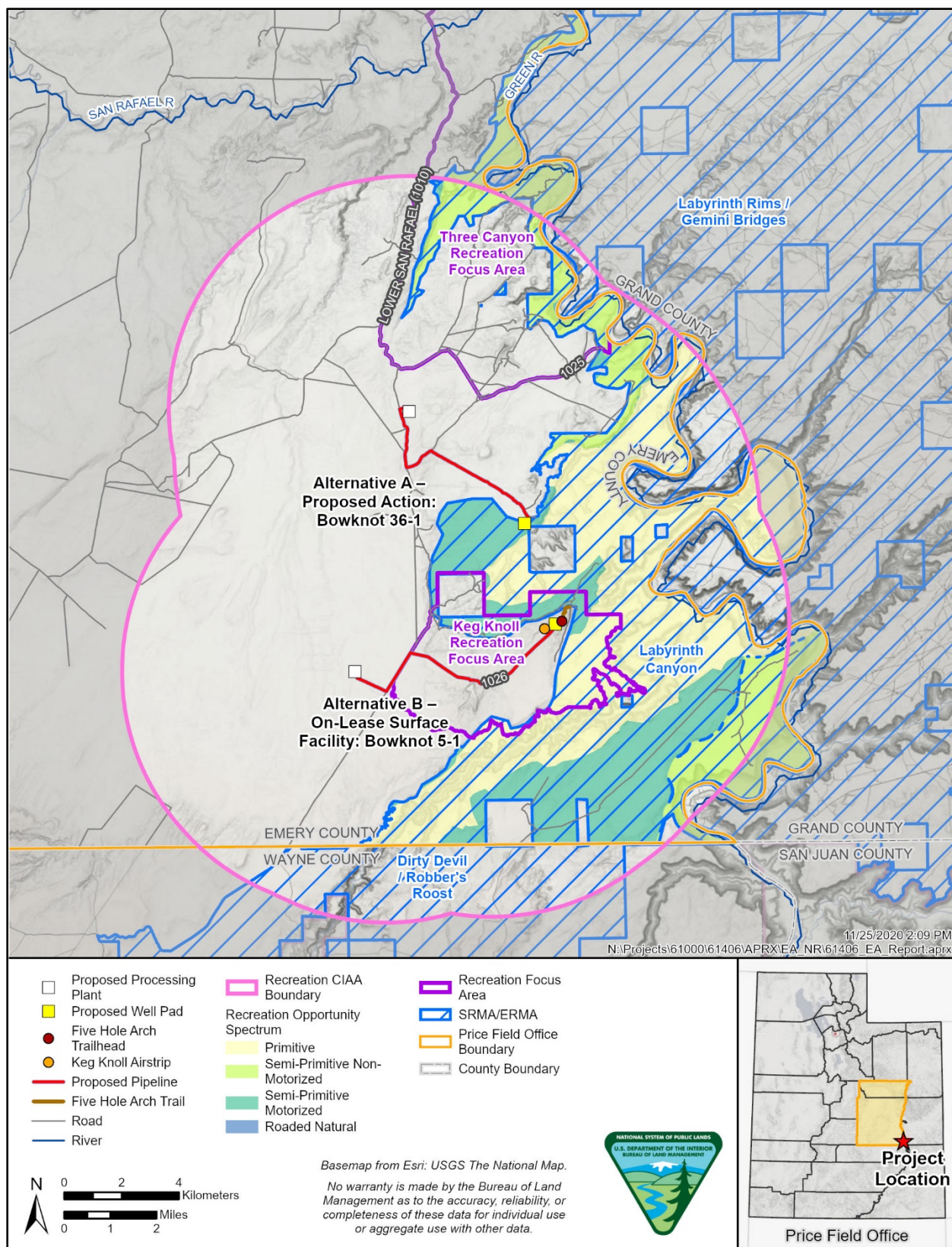


Figure F-10. Analysis area for recreation.

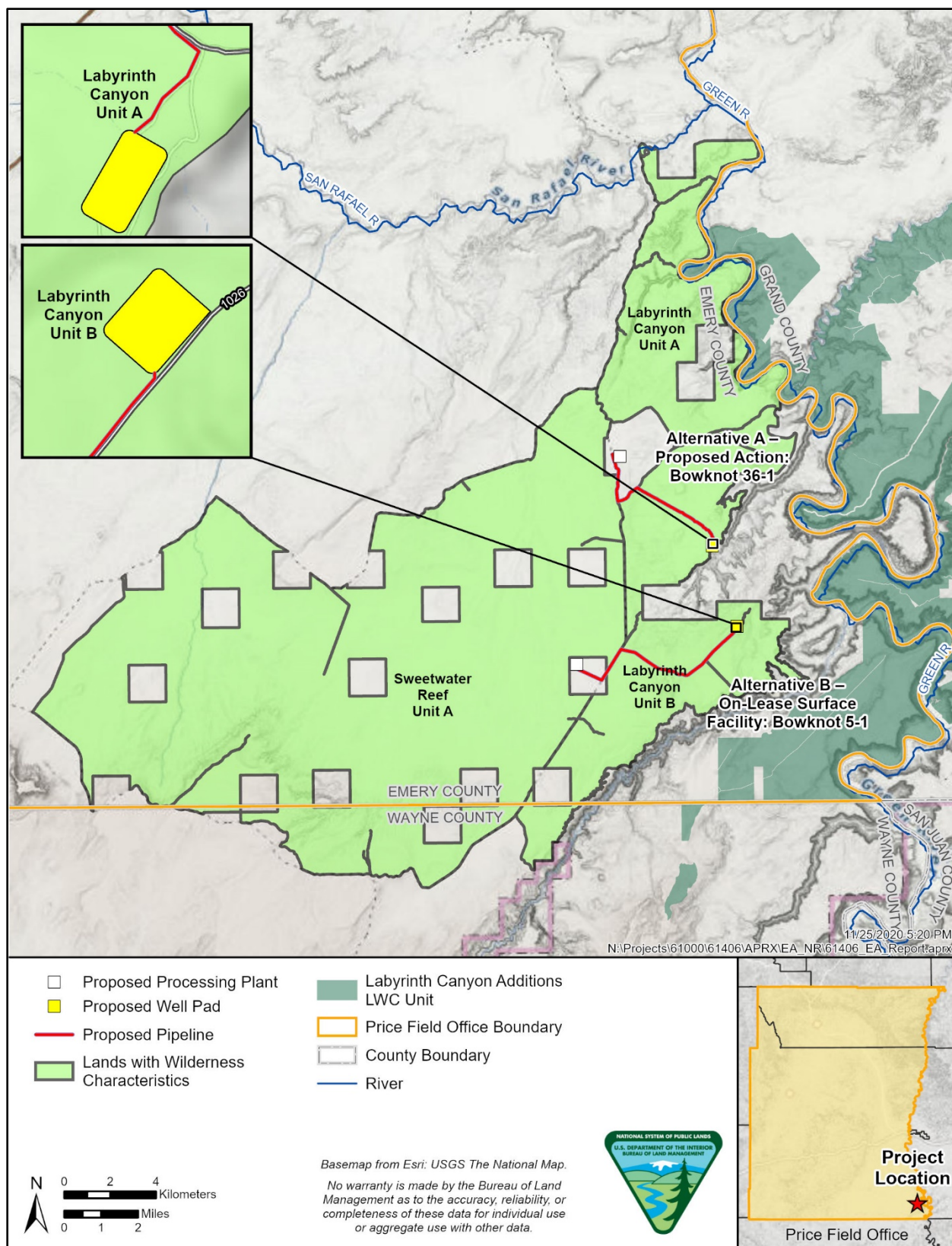


Figure F-11. Analysis area for lands with wilderness characteristics.

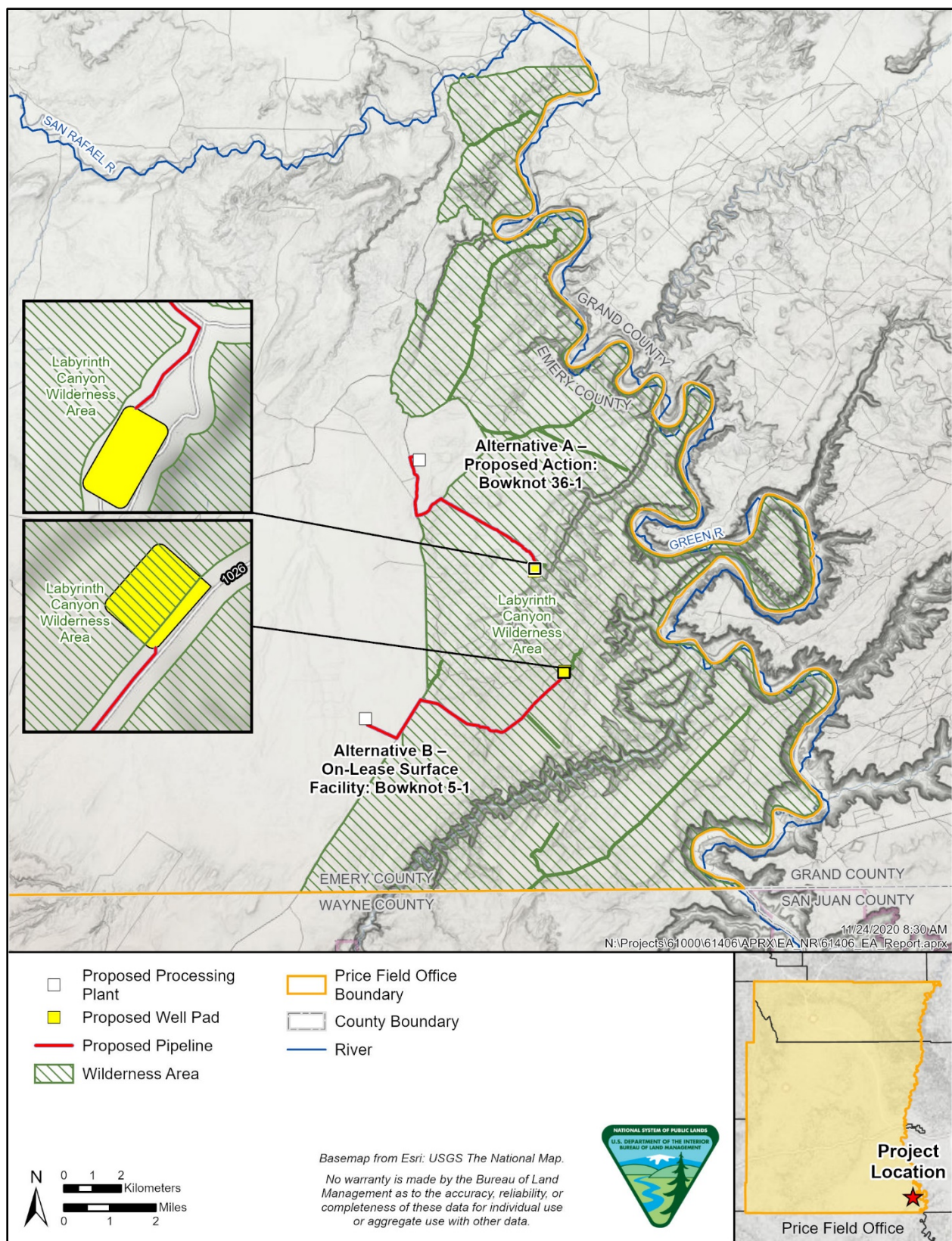


Figure F-12. Analysis area for wilderness.

APPENDIX G

Applicant's Detailed Project Description

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ALTERNATIVE A – PROPOSED ACTION: BOWKNOT 36-1

Access Route and Road Improvements

General access to the Project area would occur via Emery County Road 1010. Before using the road, Twin Bridges would secure a road use agreement with Emery County. From Emery County Road 1010, Twin Bridges would use existing Emery County Road 1025 and Spur Road 1025 to access the proposed well pad location. Both roads are currently functional for general vehicle access, but minor improvements would be needed to allow equipment to access the site for well drilling. These improvements for the Bowknot 5-2 and 36-1 wells would require road improvements on approximately 2.7 miles (14,445 feet), which would result in 9.9 acres of surface disturbance. All surface disturbance would occur within the approved road ROW.

To minimize surface disturbance, road construction methodologies would be conducted in two phases. To support the initial drilling and testing of the Bowknot 36-1, road improvements would be limited to grading, leveling, and curve reduction efforts. During this phase, the road design would allow for natural and existing drainage to occur. Installation of culverts is not anticipated. In the event culverts or diversions are needed, they would be designed to limit any changes to existing drainage patterns and to facilitate reclamation back to natural conditions in the event the well is “dry.” No unnecessary side-casting of material would occur on steep slopes, and actions would be taken to minimize visual impacts. A maximum grade of 10% would be maintained throughout the Project, with minimum cuts and fills anticipated, as necessary, to access the well pad. The road would be maintained at an 18-foot-wide travel surface within a 30-foot-wide disturbed area and would include gravel application to provide access over several sandy spots along the road upgrade. The surface would consist of gravel (6-inch cobble to road base equivalent) and would come from a permitted private source, not Federal lands. Front-end loaders, graders, and bulldozers would be used to make these improvements using standard cut-and-fill construction techniques. Due to the current condition of the existing access road, blasting is not anticipated. A water hauling and spreading truck would be used to keep dust minimized and support better packing of any fill material. Road upgrades would occur during daylight hours (10 hours per day) and would take 10 to 14 days to complete.

Should the exploratory well prove to be successful, additional base material would be hauled in, leveled, watered, and compacted to provide a long-term stable access road. In addition, road turnouts would be installed as necessary to facilitate safe bi-directional travel along the single lane access road. These turnouts would be 24 feet wide and would be staggered as appropriate depending upon the existing line of site along the access road. Culverts, berms, and ditches would be installed to minimize erosion while not impacting the natural drainage of stormwater. The road would be designed to handle light, medium, and heavy-duty loads required for well production. A yearly maintenance program would be implemented to keep the access road in sound operating condition and to ensure proper drainage.

Well Pad Construction

To reduce potential impacts from seeking to gain access to the existing lease surface rights, Twin Bridges proposes to directionally drill from a single proposed well pad located on BLM land in Section 26, T25S, R16E, Emery County, Utah. The well pad would be located at the terminus of the west prong of Spur Road 1025, 2.7 miles from the intersection of Emery County Road 1025 and Spur Road 1025.

The terminus of the western prong contains existing disturbance and measures 1,200 feet long and 400 feet wide. The well pad initially would have as small of a footprint as necessary to drill, complete, and test the exploration well. The exact size would be determined following final decisions on rig selection. At its largest dimension, the well pad would be approximately 300 × 590 feet with a total

surface disturbance to include cut and fill being approximately 5.4 acres. The entire pad would be constructed within the area of existing disturbance. This size includes the pad surface, stockpile areas, and side cut and fill slopes.

During construction, the proposed well pad would be cleared of vegetation and topsoil (up to a depth of 6 inches, or as specified by the APD conditions of approval). Topsoil would be stockpiled adjacent to the well pad, with cutting materials stockpiled in a separate area adjacent to the well pad (Appendix F, Figure F-3). Construction would require a front-end loader for roadbed improvements and a small bulldozer and a dump truck (large axle) for dirt moving and rock hauling. Some areas of the pad would have native base material set to provide support for the rig footprint and substructure. Use of erosion and sediment control measures, including proper grading to minimize slopes, diversion terraces and ditches, mulching, terracing, riprap, fiber matting, temporary sediment traps, broad-based drainage dips, or low-water crossings, would be employed as appropriate to minimize erosion and surface runoff during well pad construction and operation. Cut and fill slopes would be constructed such that stability would be maintained for the life of the operation. Diversion ditches would be constructed, if necessary, around the pad to prevent surface waters from entering the pad area. Well pad construction would occur during daylight hours (10 hours per day) and would take 10 to 14 days to complete.

Drilling Activities

Following site clearing and grading of the proposed well pad and improvements to the access route, a drilling rig and associated equipment would be transported to the well site. Wells would be drilled using a conventional, mechanical, or electric-powered mobile drilling rig. The exact type and size of drilling rig would depend on rig availability at the time of Project implementation. Given the depth of the target formation, up to a 400-ton drilling rig is anticipated, with an estimated derrick height of up to 150 feet. Rig mobilization and demobilization would occur over a 10- to 14-day period. Drilling operations would occur 24 hours per day for approximately 20 days. Temporary housing would be provided on location and would include up to five single-wide mobile homes or fifth-wheel campers/trailers.

The proposed exploratory well would be a directional well targeting intervals within the Leadville Formation, and the anticipated depth of the well would be approximately 6,500 feet. Any shallow water zones encountered during drilling would be isolated by both casing and cement. The casing and cementing program would be designed to isolate and protect the shallower formations encountered in the wellbore and to prohibit pressure communication or fluid migration between zones. The surface section of the wellbore would be drilled using a freshwater-based mud system to clean and lubricate the drilled hole. Surface casing would be installed to protect near-surface aquifers. The intermediate and production intervals of the wellbore would be drilled with an oil-based mud system to aid in drilling torque, stabilization of formations, and protection of reservoir rock properties. A closed-loop drilling fluids system would be used to clean and maintain the mud system during operations. No chromate additives would be used in the mud system on Federal lands without prior agency approval to ensure the protection of freshwater aquifers. All drill cuttings would be removed from the wellbore and contained in a closed-loop drilling system. All cuttings would be centrifuged, dried, and then transported to commercial disposal; there would be no on-site disposal.

Well Completion and Testing

Upon reaching target depth, a series of formation evaluation logging tools would be run in the well to evaluate the potential gas resource. A series of Quad Combo and Formation Micro Imaging tools may be selected to assess the reservoir rock and fluid properties of the target interval. If the evaluation concludes

that adequate, quality gas is present in a quantity that is commercially recoverable, production equipment would be put in place in accordance with the well design, as approved in the APD.

This helium reservoir would be developed using conventional completion methods—no hydraulic fracturing (e.g., high-pressure injection of water, chemicals, and proppant) would be used. Completion of a well generally consists of perforating the productive interval if casing is run and cemented, running production tubing and packers, testing the flow to determine productivity, and installing production equipment. Testing of zones from the bottom of the wellbore to the top could be completed to assess the quantity and quality of the bearing reservoir. Well completions would be conducted using a truck-mounted work-over rig and would take approximately 10 days, depending on site-specific conditions.

During flow testing, the well may produce a large volume of gas and water. During well testing, equipment located on the well pad would include a temporary manifold, temporary surface flowline, separator, and an enclosed vapor combustion system. It is estimated that temporary flaring of gas would be performed, as needed, at a safe distance from the wellhead during a 30-day well testing period via use of an enclosed portable vapor combustion system.

If the evaluation concludes that adequate gas is present and recoverable, the well would be temporarily abandoned or shut in while permanent production facilities are constructed both on the pad and at a plant site. On the pad, production equipment could consist of holding tanks, transfer pumps, separators, vessels, flowlines, and safety equipment if the reservoir performance dictates. Permanent production equipment (i.e., any equipment that would be present on the well pad for 6 months or more) located on the pad would be painted or buried to blend in with the natural surroundings and would be kept to the lowest visual profile as possible. If the zone is deemed not to be commercially productive, the well would be plugged in accordance with UDOGM requirements; surface reclamation (if the second well is not drilled) would be done in accordance with BLM requirements. A Well Completion or Recompletion Report and Log, UDOGM Form 8, would be filed within 30 days after completion of a well for either abandonment or production. Any hole conditions encountered during drilling that may necessitate changes in drilling plans would be submitted to the appropriate authorizing agency for approval via Sundry Notices.

Water Supply

It is estimated that 4 acre-feet of water would be needed to improve the existing disturbed road, to drill the proposed exploratory well, and to suppress dust. If the well is successful and further development is warranted, it is estimated that 3 acre-feet per year would be used for operations (including development of additional wells) and 1 acre-foot per year for road maintenance. Water for these activities would be obtained through a direct purchase agreement with Green River City and obtained from a loading facility designated by Green River City. The water rights pursued by the Project proponent include WR 91-336, WR 91-1902, and WR 91-102. If other water sources are found, they would be properly permitted private sources and would not result in the depletion of the Colorado River Watershed (including the San Rafael River). The proponent would be required to notify the BLM in the event that additional water use is required or different water sources are to be used to ensure all appropriate regulations are followed. No water wells would be drilled on Twin Bridges leases or in proposed ROWs.

Pipeline

If a sufficient quality and quantity of helium-bearing gas is confirmed through flow testing of the exploratory well, Twin Bridges would use a 30-foot-wide pipeline ROW that would be located directly adjacent to the well pad access route (Emery County Road 1025 and Spur Road 1025) and adjacent to Emery County Road 1010. This pipeline ROW would be approximately 4.9 miles (25,880 feet) long and

would travel from the well pad to a gas processing plant located on lands administered by SITLA in Section 16, T25S, R16E. The ROW would be used to install three pipelines and one conduit: 1) up to 14-inch-diameter steel or fiber-reinforced polyethylene gathering pipeline, 2) up to 8-inch-diameter polyethylene fluid transfer pipeline, 3) an 8-inch diameter polyethylene produced water pipeline, and 4) up to 6-inch-diameter conduit for running control and power cables. Existing roads and the proposed well pad would be used for pipeline construction staging, with no additional staging areas proposed. The pipelines would be buried (3–4 feet) to lower the visual impact and improve safety. Trenching would be done with a Vermeer-type trencher, a percussion drilling/rock hammer where rock is an impediment, and a front-end loader and a Cat-style dozer to remove the rock. Following installation of the pipeline, the disturbed area would be reclaimed/revegetated. Construction along the 4.9-mile-long ROW would result in 17.8 acres of surface disturbance. Pipeline installation activities would occur during daylight hours (10 hours per day) over a 30-day period. It is estimated that it would require 30 trips for personnel to reach the site.

Processing Plant on Non-Federal Lands

The proposed processing plant would be located on lands owned and administered by SITLA in Section 16, T25S, R16E. The plant would occupy a 10-acre footprint, not including the access road. Figure F-4 in Appendix F depicts the expected design and footprint of the processing plant. The purpose of the plant is to remove waste gas to concentrate the helium for trucking to market.

Residual low British thermal unit (BTU) gas from the helium concentration process would be used to run specialized low-BTU generators (approximately 533 BTUs) to power the entire facility. Any unused gas would then be compressed and reinjected at a disposal well located on the constructed site immediately adjacent to the plant facility. Associated water would be reinjected into an authorized disposal zone of a wastewater injection well in compliance with state and Federal laws. There would be no flaring or venting of methane during long-term operations, and the equipment would be monitored for leak detection and repair. The site would also include storage tanks, an amine system, a compressor for production and processing, and waste gas and water reinjection equipment. Acoustic mitigation and the appropriate use of down lighting would reduce impacts on the auditory environment and night skies. Equipment would be painted to blend in with the natural surroundings to decrease visual impacts.

Product Transportation

Once the helium from the pipeline has been processed, specialized semitruck tank trailers would transport the helium to market via Interstate 70. The proposed trucking route uses Emery County Road 1010 to reach Interstate 70. The trucks transporting the helium resource would travel approximately 35 miles to reach Green River and Interstate 70. According to current volumetric estimates of anticipated helium recoveries, one to two industrial gas semitruck trailers would arrive to collect gas from the processing facility every day.

Methods for Handling Waste

A variety of components, including lubricants, and additives would be used to drill and complete the proposed well. Some of these components contain constituents that are hazardous. Hazardous materials that could be used in well drilling and interim reclamation include but are not limited to greases or lubricants, solvents, acids, and herbicides. These materials would be kept in limited quantities on the well pad for short periods of time. Safety Data Sheets (formerly known as Material Safety Data Sheets) would be maintained by Twin Bridges or its contractors for all materials used. The transport, use, storage, and handling of hazardous materials would follow procedures specified by Federal and state regulations.

Transportation of the materials to the well location is regulated by the USDOT under 49 CFR 171–180. USDOT regulations pertain to the packing, container handling, labeling, vehicle placarding, and other safety aspects.

Chemicals meeting the criteria for being an acutely hazardous material/substance or meeting the quantities criteria stipulated by BLM Instruction Memorandum No. 93-344 would not be used. In addition, no extremely hazardous substance, as defined in 40 CFR 355, in threshold planning quantities, would be used, produced, stored, transported, or disposed of while drilling and completing the well.

Except for used motor oil and associated oil filters, hazardous waste would not be generated in association with drilling the proposed well. Most wastes that would be generated at the Project site are excluded from regulation by the Resources Conservation and Recovery Act under the exploration and production exemption in Subtitle C (40 CFR 261.4(b)(5)) and are considered solid wastes. These wastes include those generated at the wellhead and through the production stream. Exempt wastes include produced water, production fluids such as drilling mud, and flowback fluids.

Trash containers and portable toilets would be located on the well site during well pad construction, drilling and completion operations, and site restoration. Toilet holding tanks would be pumped as needed, and their contents would be disposed of at a municipal sewage treatment facility in accordance with applicable rules and regulations regarding sewage treatment and disposal. Garbage, trash, and other nonhazardous waste material would be collected in a portable, self-contained, fully enclosed trash cage during operations. Trash would not be burned on location. The collected material would be hauled to an approved landfill.

Additional Delineation Well

If a sufficient quality and quantity of helium-bearing gas is produced from the original exploratory well, Twin Bridges would drill a subsequent delineation well (Bowknot 5-2) under the terms and stipulations of its Federal lease UTU-93713 located in Section 7 and portions of Sections 5, 6, and 8, T26S, R17E, Emery County, Utah. Drilling and completion procedures would be similar to those described above, and no new surface disturbance would occur (the well would be drilled from the existing Bowknot 36-1 well pad). Additional surface facilities would be limited to an additional wellhead and flowlines to connect to the existing pipeline network. All other existing infrastructure would be used for the subsequent well. Drilling of any additional well would occur in accordance with the Applicant Committed Environmental Protection Measures below.

Interim Reclamation

Assuming the wells are productive, interim reclamation would consist of reclaiming all areas not needed for helium production operations and would occur as soon as possible. This would include recontouring these areas to match existing undisturbed topography, redistributing stockpiled topsoil, and revegetating with a BLM-recommend seed mixture (Appendix C). Approximately 3 acres would be recontoured and reseeded during interim reclamation, leaving a long-term disturbance footprint of 2.4 acres during well operations (Appendix F, Figure F-5).

Following the Green River District Reclamation Guidelines (Instruction Memorandum No. UT-G000-2011-003) (BLM 2014a) and in accordance with Onshore Oil and Gas Order No.1, interim reclamation would be completed within 6 months of completion of the well to reestablish vegetation, reduce dust and erosion, and reduce visual impacts. All equipment and debris would be removed from the area proposed for interim reclamation. The well pad would be reduced to the minimum area necessary to safely conduct

production operations. All other areas would be subject to interim reclamation, which would include recontouring, spreading of topsoil, seedbed preparation, and seeding.

Recontouring would use excess cut and well pad fill material to achieve the original contour and grade, or a contour that blends with the surrounding topography. Salvaged topsoil would be spread and seeded with a BLM-recommended seed mixture (Appendix C). Final seedbed preparation would depend on the condition of the soil surface and would include scarifying a crusted soil surface or roller packing an excessively loose soil surface. Seed would be broadcast or drilled after August 15 but before winter freezing of the soil, as outlined in BLM Instruction Memorandum No. UT-G000-2011-003, or at a time specified by the BLM. The BLM-recommended seed mix presented in Appendix C would be used for revegetating the interim (and final) reclamation areas. The seed would be certified pure-live and weed-free. Any trees cleared during site preparation and large rocks excavated during construction would be scattered across the interim reclamation area. Reclaimed areas receiving incidental disturbance during the life of the producing well would be recontoured and reseeded as soon as practical.

Well Abandonment and Final Reclamation

If the exploratory well is not successful, Twin Bridges would return the well site to its current condition, cutting off the casing at the base of the collar or 3 feet below the final graded ground level, whichever is deeper, and capping the casing with a metal plate with a minimum thickness of 0.25 inch. The cap would be welded in place with the location, lease number, operator name, and well name engraved on the top. The cap would be constructed with a weep hole. All surface facilities associated with the well would be removed from the site, and the remaining disturbed surface would be returned to the approximate original contours of the land before being reseeded. Topsoil would be distributed on the former well location to blend the appearance of the site with its natural surroundings before reseeding with the BLM-recommended seed mix presented in Appendix C. Reclamation activities would be considered complete when vegetation has reached a minimum of 75% of background vegetation (undisturbed areas), or as approved by the BLM authorized officer (AO) in accordance with BLM Instruction Memorandum No. UT-G000-2011-003.

Applicant-Committed Environmental Protection Measures

Twin Bridges proposes to adhere to the terms, conditions, and stipulations to be outlined by the BLM in its Decision Record. The Project design includes best management practices from the Gold Book (BLM 2007a), BLM Instruction Memorandum No. UT-G000-2011-003, and the Price FO RMP (BLM 2008a). To offset additional impacts resulting from the proposed action, Twin Bridges would commit to additional environmental protection measures:

Wildlife

- The applicant has committed to performing the complete Mexican Spotted Owl (MSO) survey protocol per the 2012 MSO Recovery Plan including second year surveys in Spring 2021. No disruptive activities such as surface disturbing activities or those that create noise disturbance including drilling, completion, or well testing activities would occur within 0.5 mile of MSO habitat during the nesting season (March 1–August 31). These activities would be conducted between September 1 and February 28 unless and until a complete survey has been conducted, no owls have been documented, and permission is granted by the BLM AO following consultation with the USFWS.
- Prior to the completion of the second year of MSO surveys and potential granting of permission by the BLM AO to operate during the nesting season (March 1–August 31) or in the event MSOs are detected in Keg Spring Canyon habitat, noise monitoring would be conducted during

construction and operation activities at the boundary of Keg Spring Canyon (MSO modeled habitat), per agreed upon Applicant, BLM, and USFWS monitoring protocol to ensure disturbance does not exceed 68 dBA per the MSO Recovery Plan. If noise levels exceed 68 dBA at the monitoring site(s), operations would be suspended, and the operator would contact the BLM AO. Appropriate measures would then be taken to mitigate noise to below 68 dBA. The noise monitoring protocol would be in effect unless and until the species-specific survey protocol is completed, until no owls have been documented, and permission is granted by the BLM AO following consultation with the USFWS.

Sensitive Plant Species

- Twin Bridges will alter road expansions and pipeline installation methods to minimize direct impacts to known locations of special-status plant species in coordination with the BLM AO. Refer to *Appendix K Bureau of Land Management Mitigation Measures* for additional detail.
 - If additional special status plants are identified within the proposed road and pipeline ROWs during monitoring efforts, Twin Bridges would continue to coordinate with the BLM AO to alter surface disturbing activities to mitigate impacts to special status plant species occupied habitat.

Noise

- Twin Bridges agrees to use acoustic mitigation on all rotating equipment (gensets, compressors, and recycle pumps) to reduce auditory impacts.

Visual Resources

- Twin Bridges would paint all permanent equipment to blend in with the natural surroundings. Specific colors would be determined in coordination with BLM and SITLA, as appropriate.
- Twin Bridges would minimize the use of lighting and would apply down lighting to reduce visual impacts from the plant site, unless otherwise required by the Occupational Safety and Health Administration or Federal Aviation Administration.

Wilderness Areas

- Twin Bridges would clearly mark the wilderness area boundaries with temporary fencing or flagging, which would be placed outside of the Congressionally designated wilderness area. Construction activities would be monitored to ensure that all surface disturbance occurs within the approved ROWs.

Dust Control

- During the initial construction, drilling, and testing of the initial well, dust suppression would be implemented when needed using water applied with a water truck.
 - Dust would be considered as controlled when 1) no dust is generated above the cab of the vehicle, or 2) there are no hanging dust plumes.
 - All of the dust suppressant technologies require ongoing maintenance applications. Because of this requirement, a threshold for the reapplication of dust suppressant is necessary. The proponent would be responsible for determining when additional dust treatment or road repairs are necessary according to the agreed standards. BLM and state officials also have the ability to monitor dust levels and prescribe dust treatment if the applicable thresholds are exceeded.

- If the any well is determined to be economically viable and would be put into production, more permanent dust mitigation would be implemented. To reduce potential impacts to BLM sensitive plant species, pollinators and visual impacts, a dust suppressant would be applied on the adjacent sections of the roadway where these resources could be affected, to include the well pad and access road. The final locations where dust suppressants would be required would be determined in coordination with the BLM AO.
 - Prior to use, the dust suppressant would need to be approved by the BLM AO. The approved suppressant would 1) be of a natural or organic material, 2) not result in any other environmental effects, 3) be readily available within the United States, and 4) be applied according to manufacturer instructions.
 - Liquids can be applied with a common water truck. While a spreader bar is recommended, it is not required unless specified by the manufacturer. It is recommended that a meter or other means be used to accurately measure the volume of suppressant product being used.
 - Applications would occur only when wind speed is below 10 miles per hour or in accordance with manufacturer instructions, whichever is more restrictive.
 - Dust would be considered as controlled when 1) no dust is generated above the cab of the vehicle, or 2) there are no hanging dust plumes.
 - All of the dust suppressant technologies require ongoing maintenance applications. Because of this requirement, a threshold for the reapplication of dust suppressant is necessary. The proponent would be responsible for determining when additional dust treatment or road repairs are necessary according to the agreed standards. BLM and state officials also have the ability to monitor dust levels and prescribe dust treatment if the applicable thresholds are exceeded.

Construction Activities

- All construction activities to included construction of the exploratory well, well pad, road upgrade, and pipeline will occur outside of Mexican Spotted Owl breeding and nesting seasons (March 1st – August 31st). If the second year of MSO surveys do not show MSO in occupied habitat and USFWS and BLM concur the proponent with authorization from a BLM officer may construct the Project with no construction timing restrictions.

ALTERNATIVE B – ON-LEASE SURFACE FACILITY: BOWKNOT 5-1

Access Route and Road Improvements

General access to the Project area would occur via Emery County Road 1010. Before using the road, Twin Bridges would secure a road use agreement with Emery County. From Emery County Road 1010, Twin Bridges would use existing Emery County Road 1026 to access the proposed well pad. Although Emery County Road 1026 is currently used for recreational traffic, portions of this road would require extensive improvement to allow drilling equipment to access the site. Currently approximately 0.6 miles (3,000 feet) of the existing road traverses an expansive rock outcrop and blasting would be required prior to any grading or leveling activities in these areas. Road improvements along this 3,000-foot area would be permanent. Similar to Alternative A, access road upgrades would be conducted in two phases with initial activity focused on road grading, leveling, and curve reduction. Should the Bowknot 5-1 well prove to be successful, additional road improvements would be implemented similar to those described for Alternative A. For Bowknot 5-1, road improvements would occur on approximately 4.0 miles (21,140 feet) of the existing road, which would result in 14.5 acres of surface disturbance. All surface disturbance would occur within the proposed road ROW. Road upgrades would occur during daylight hours (10 hours per day) and would take 21 days to complete.

Well Pad Construction

Under Alternative B, Twin Bridges would construct a new well pad located on BLM land in Section 7, T26S, R17E, Emery County, Utah. The well pad would be constructed immediately adjacent to Emery County Road 1026, and portions of the proposed pad would be developed in an undisturbed area outside the existing road footprint. The initial size of the well pad would be 400 × 500 feet, and total disturbance (cut and fill) of the site would be approximately 7.3 acres. (Appendix F, Figure F-7). This size includes the pad surface, stockpile areas, and side cut and fill slopes. Well pad construction would occur during daylight hours (10 hours per day) and would take 21 days to complete.

Drilling Activities

All drilling procedures would be similar to those described under the proposed action; however, under Alternative B, all portions on the wellbore, including the surface hole and bottom hole, would be on existing Federal lease UTU-93713. Additionally, due to the location of the surface well pad and depth of the target formation, Twin Bridges does not anticipate that there would be opportunities to use smaller than a 400-ton drilling rig.

Well Completion and Testing

All well completion and testing procedures would be similar to those described under Alternative A.

Water Supply

Water sources would be similar to those described under Alternative A.

Pipeline

If a sufficient quality and quantity of helium-bearing gas is confirmed through flow testing of the exploratory well, Twin Bridges would use a 30-foot-wide pipeline ROW that would be located directly adjacent to the well pad access route (Emery County Road 1026) and adjacent to Emery County Road 1010. This pipeline ROW would be approximately 5.6 miles (29,780 feet) long and would travel from the well pad to a gas processing plant located on lands administered by SITLA in Section 16, T26S, R16E. The ROW would be used to install three pipelines and one conduit: 1) up to 14-inch-diameter steel or fiber-reinforced polyethylene gathering pipeline, 2) up to 8-inch-diameter polyethylene fluid transfer pipeline, 3) an 8-inch-diameter polyethylene produced water pipeline, and 4) up to 6-inch-diameter conduit for running control and power cables. Existing roads and the proposed well pad would be used for pipeline construction staging, with no additional staging areas proposed. The pipelines would be buried (3–4 feet) to minimize visual impacts and for safety precautions. Trenching would be done with a Vermeer-type trencher, a percussion drilling/rock hammer where rock is an impediment, and a front-end loader and a Cat-style dozer to remove the rock. Following installation of the pipeline, the disturbed area would be reclaimed/revegetated. Construction along the 5.6-mile-long ROW would result in 20.5 acres of surface disturbance, which would all be contained within the existing road footprint. Pipeline installation activities would occur during daylight hours (10 hours per day) over a 40-day period. Pipeline-laying activities would require 40 trips for personnel to reach the site.

Processing Plant on Non-Federal Lands

The parameters, components, and construction procedures for the proposed processing plant would be similar to those described under Alternative A; however, under Alternative B, the plant would be located on lands owned and administered by SITLA in Section 16, T26S, R16E.

Product Transportation

All product transportation procedures would be the same as those described under Alternative A.

Methods for Handling Waste

All waste-handling procedures would be the same as those described under Alternative A.

Interim Reclamation

All interim reclamation procedures would be similar to those described under Alternative A; however, 3.9 acres would be recontoured and reseeded during interim reclamation, leaving a long-term disturbance footprint of 3.4 acres during well operations (Appendix F, Figure F-8).

Well Abandonment and Final Reclamation

All well abandonment and final reclamation procedures would be similar to those described under Alternative A.

Applicant-Committed Environmental Protection Measures

Twin Bridges proposes to adhere to the terms, conditions, and stipulations to be outlined by the BLM in its Decision Record. The Project design includes best management practices from the Gold Book (BLM

2007a), BLM Instruction Memorandum No. UT-G000-2011-003, and the Price FO RMP (BLM 2008a). To offset additional impacts resulting from the proposed action, Twin Bridges would commit to the following additional environmental protection measures under Alternative B:

Sensitive Plant Species

- If BLM sensitive plant species are identified within the proposed road and pipeline ROWs, Twin Bridges would alter road expansions and pipeline installation methods to minimize direct impacts.

Dust Control

- During the initial construction, drilling, and testing of the initial well, dust suppression would be implemented when needed using water applied with a water truck.
 - Dust would be considered as controlled when 1) no dust is generated above the cab of the vehicle, or 2) there are no hanging dust plumes.
 - All of the dust suppressant technologies require ongoing maintenance applications. Because of this requirement, a threshold for the reapplication of dust suppressant is necessary. The proponent would be responsible for determining when additional dust treatment or road repairs are necessary according to the agreed standards. BLM and State officials also have the ability to monitor dust levels and prescribe dust treatment if the applicable thresholds are exceeded.
- If the any well is determined to be economically viable and would be put into production, more permanent dust mitigation would be implemented. To reduce potential impacts to BLM sensitive plant species, pollinators and visual impacts, a dust suppressant would be applied on the adjacent sections of the roadway where these resources could be affected, to include the well pad and access road. The final locations where dust suppressants would be required would be determined in coordination with the BLM AO.
 - Prior to use, the dust suppressant would need to be approved by the BLM AO. The approved suppressant would 1) be of a natural or organic material, 2) not result in any other environmental effects, 3) be readily available within the United States, and 4) be applied according to manufacturer instructions.
 - Liquids can be applied with a common water truck. While a spreader bar is recommended, it is not required unless specified by the manufacturer. It is recommended that a meter or other means be used to accurately measure the volume of suppressant product being used.
 - Applications would occur only when wind speed is below 10 miles per hour or in accordance with manufacturer instructions, whichever is more restrictive.
 - Dust would be considered as controlled when 1) no dust is generated above the cab of the vehicle, or 2) there are no hanging dust plumes.
 - All of the dust suppressant technologies require ongoing maintenance applications. Because of this requirement, a threshold for the reapplication of dust suppressant is necessary. The proponent would be responsible for determining when additional dust treatment or road repairs are necessary according to the agreed standards. BLM and State officials also have the ability to monitor dust levels and prescribe dust treatment if the applicable thresholds are exceeded.

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APPENDIX H

Resource Supporting Information

The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The Bureau of Land Management has made every effort to ensure that the information in this document is accessible. If you have any problems accessing information, please contact Joe Rodarme at jrodarme@blm.gov or 435.636.3660.

INTRODUCTION

The following sections contain additional information, such as tables and narratives, to support the Chapter 3 resource inventories and analyses.

Air Quality and Greenhouse Gas Emissions

Regulatory Framework

NATIONAL AMBIENT AIR QUALITY STANDARDS

The EPA develops and promulgates regulations that implement provisions of the CAA. To implement Section 109 of the CAA, the EPA is charged with establishing NAAQS. NAAQS limit the amount of air pollutant emissions considered harmful to public health and the environment. NAAQS are expressed in terms of individual pollutant concentration levels for an associated averaging period. NAAQS standards may also include a reference for the year that the specific standard was promulgated.

There are two types of NAAQS. The “primary” standards are designed to protect human health, including the health of sensitive individuals such as children, the elderly, and those with chronic respiratory problems. The “secondary” standards are designed to protect public welfare, including economic interests, visibility, vegetation, animal species, and other concerns. Primary and secondary standards have been set for the following criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter 2.5 micrometers in diameter or less (PM_{2.5}), particulate matter 10 micrometers in diameter or less (PM₁₀), lead (Pb), and sulfur dioxide (SO₂). The NAAQS are summarized in Table H-1.

Under the provisions of the CAA, any state can promulgate ambient air quality standards that are more stringent than those of the national program. The Utah Department of Environmental Quality has adopted the Federal primary and secondary NAAQS for the entire state and has not established any state-level standards.

The EPA assigns classifications to geographic areas according to monitored NAAQS concentrations. Areas of the state that are not in compliance with the NAAQS are considered nonattainment areas. A maintenance area is an area that was previously designated as nonattainment but has subsequently demonstrated to the EPA through a state implementation plan that it would improve the air quality to a specific standard. Emery County, Utah, is in unclassifiable/attainment for all criteria air pollutants, according to the EPA Green Book (EPA 2020a).

Table H-1. National Ambient Air Quality Standards

Pollutant	Averaging Period	Primary*		Secondary†		Format of Standard
		(ppm)	(µg/m ³)	(ppm)	(µg/m ³)	
CO	1 hour	35	40,000	–	–	Not to be exceeded more than once per year
	8 hours	9	10,000	–	–	Not to be exceeded more than once per year
NO ₂	1 hour	0.1	188	–	–	98th percentile of annual 1-hour daily maximum concentrations, averaged over 3 years
	Annual	0.053	100	0.053	100	Annual mean

Pollutant	Averaging Period	Primary*		Secondary†		Format of Standard
		(ppm)	(µg/m³)	(ppm)	(µg/m³)	
O ₃	8 hours	0.07	—	0.07	—	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
PM _{2.5}	24 hours	—	35	—	35	Annual 98th percentile of 24-hour maximum concentrations, averaged over 3 years
	Annual	—	12.0	—	15.0	Annual mean averaged over 3 years
PM ₁₀	24 hours	—	150	—	150	Not to be exceeded more than once per year on average over 3 years
Pb	Rolling 3-month average	—	0.15	—	0.15	Not to be exceeded
SO ₂	1 hour	0.075	196	—	—	99th percentile of annual 1-hour daily maximum concentrations, averaged over 3 years
	3 hours	—	—	0.5	1,300	Not to be exceeded more than once per year

Source: EPA (2018).

Notes: ppm = parts per million, µg/m³ = micrograms per cubic meter.

* Primary standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the EPA.

† Secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Prevention of Significant Deterioration

The Prevention of Significant Deterioration (PSD) is a permitting program for new major sources or major modifications of existing stationary sources of air pollution located in attainment areas.

The program applies to new (or modified) major stationary sources in attainment areas; major sources are defined as those sources that emit 100 tons per year (tpy) or more of any criteria air pollutant for specifically listed source categories in 40 CFR 52.21(b)(1)(i) or that emit 250 tpy of any criteria air pollutant and are not in a specifically listed source category.

If a source is subject to the PSD permitting program, it must perform air quality monitoring and modeling analyses; install best available control technology; allow for public involvement in the permitting process; and consider additional impacts to soils, vegetation, visibility, and associated growth. A proposed source can demonstrate that it does not cause or contribute to a violation of the NAAQS by demonstrating that the ambient air quality impacts resulting from the emissions would be less than the significant deterioration levels.

The proposed Project would not be in a listed source category and does not qualify as a major PSD stationary source based on the emissions inventory in Section 3.2 Air Quality and Greenhouse Gas Emissions.

Class I and Class II Areas

Under PSD regulations, the EPA classifies airsheds as Class I, Class II, or Class III. Class I areas are those areas where the most stringent standards for changes to air quality are in effect. Areas of special national or regional natural, scenic, recreational, or historic value, such as international parks, national parks greater than 6,000 acres, national memorial parks larger than 5,000 acres, and national wilderness

areas larger than 5,000 acres, are granted Class I status and the highest level of air quality protections under Section 162(a) of the CAA. Class II areas are allowed more moderate pollution increases. In Class III areas, air quality may be degraded to levels corresponding to the NAAQS. To date, no Class III areas have been designated; therefore, all areas not established as Class I areas are designated as Class II areas.

In conducting an air quality modeling analysis, PSD increment consumption must also be evaluated for the major source. A PSD increment is the maximum allowable increase in ambient concentrations allowed to occur above a designated baseline concentration. Significant deterioration occurs when the amount of new pollution exceeds the applicable PSD increment. The maximum allowable PSD increments over baseline concentrations are presented in Table H-2.

Table H-2. Prevention of Significant Deterioration of Air Quality Increments and Significant Impact Levels

Pollutant	Averaging Period	PSD Increments		Significant Impact Levels	
		Class I ($\mu\text{g}/\text{m}^3$)	Class II ($\mu\text{g}/\text{m}^3$)	Class I ($\mu\text{g}/\text{m}^3$)	Class II ($\mu\text{g}/\text{m}^3$)
CO	1 hour	—	—	—	2,000
	8 hours	—	—	—	500
NO ₂	1 hour	—	—	—	7.52
	Annual	2.5	25	0.1	1
PM _{2.5}	24 hours	2	9	0.07	1.2
	Annual	1	4	0.06	0.3
PM ₁₀	24 hours	8	30	0.32	5
	Annual	4	17	0.16	1
Pb	Rolling 3-month average	—	—	—	—
SO ₂	1 hour	—	—	—	—
	3 hours	25	512	1	25
	24 hours	5	91	0.2	5
	Annual	2	20	0.08	1

Source: 40 CFR 52.21(c); 61 *Federal Register* 38249; 40 CFR 51.165(b)(2); 40 CFR 52.21(i)(5)(i).

Note: $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.

Areas presently under the protection of Class I designations in Utah are Arches National Park, Bryce Canyon National Park, Canyonlands National Park, Capitol Reef National Park, and Zion National Park. The nearest Class I area to the Project is Canyonlands National Park, which is approximately 6.1 miles (9.8 km) southeast of the proposed Project (under Alternative B).

PSD regulations would not be triggered because the stationary source associated with development would not have the potential to emit 250 tpy of any air pollutant.

Air Quality Related Values

The requirement to assess impacts to AQRVs is established in the PSD rules. A Federal land manager is required under the CAA Amendments of 1977 to “protect the natural and cultural resources of Class I areas from the adverse impacts of air pollution” (40 CFR 51, Appendix W, Section 6.2(a)). To do so,

Federal land managers must identify or define the AQRVs within their jurisdiction. An AQRV is defined as a resource for one or more Federal areas that may be adversely affected by a change in air quality. The resource may include visibility or a specific scenic, cultural, physical, biological, ecological, or recreational resource identified by a Federal land manager for a particular area (Federal Land Managers' Air Quality Related Values Work Group 2010). For each Class I area, the Federal land manager has the responsibility to define and protect the AQRVs at such areas and to consider whether new emissions from proposed major facilities (or modifications to major facilities) would have an adverse impact on those values. For this Project, the BLM included the analysis of impacts on visibility from emissions associated with the Project, due to its proximity to Canyonlands National Park located approximately 6.1 miles (9.8 km) southeast of the proposed Project (under Alternative B).

New Source Performance Standards

The EPA has also promulgated technology-based standards for specific stationary sources of air pollution, known as New Source Performance Standards (NSPS) (40 CFR 60). There are no NSPS regulations applicable to the proposed operations of the well pad. Notably, Subpart OOOOa does not apply since the well would not undergo hydraulic fracturing. Therefore, NSPS regulations do not apply to the direct stationary emissions sources of the Project.

National Emissions Standards for Hazardous Air Pollutants

Section 112 of the CAA requires the EPA to promulgate regulations establishing emission standards for each category or subcategory of major sources and area sources of HAPs; these are known as National Emissions Standards for Hazardous Air Pollutants (NESHAPs). HAPs (e.g., benzene, perchloroethylene, mercury) are known or suspected to cause cancer or other serious health effects. There are no NESHAP regulations that are applicable specifically to the proposed HAP emitting sources at the proposed well pad. Therefore, NESHAPs and maximum achievable control technology regulations do not apply to the direct stationary emissions sources of the Project.

Nonroad Engine Standards

The EPA also sets emissions standards for nonroad diesel engines for hydrocarbons (i.e., VOCs), nitrogen oxides (NO_x), CO, and PM. The emissions standards are implemented in tiers by year, with different standards and start years for various engine power ratings. The new standards do not apply to existing nonroad equipment. Only equipment manufactured after the start date for an engine category (1999–2006, depending on the category) is affected by the rule. Therefore, nonroad engine standards potentially apply to some of the proposed off-road engines (not self-propelled) to be used on the Project.

General Conformity

The General Conformity Rule, established under 40 CFR 51 Subpart W and 40 CFR 93 Subpart B, requires a general conformity analysis for projects that require Federal action. The rule applies to emission units or emission-generating activities resulting from a project that are not already covered by permitting and that are in a nonattainment area. Because Emery County is an unclassifiable/attainment area, the General Conformity Rule does not apply to the Project.

Current Permitting

Stationary pollutant sources at the proposed well pad are regulated by the Utah Division of Air Quality and are subject to Utah Administrative Code R307-505, which requires sources in the oil and gas industry to register (i.e., to be authorized under a permit by rule) 30 days before constructing, installing, establishing, operating, or modifying air pollution-producing sources and to meet certain equipment-based requirements under the permit by rule.

Project Area Climate

The Project area is considered an arid climate influenced by mountain ranges and geographic location. The Sierra Nevada and Wasatch Mountains influence the weather and climate of Utah and the Project area. Pacific storms must cross the Sierra Mountains before reaching Utah. Consequently, most of the moist air condenses and falls as precipitation before reaching the state. These mountains also act as a barricade against intensely cold Arctic air masses.

The climate in the Project area is characterized by hot, dry summers and generally cold winters. Temperatures range from an average low of 10 degrees Fahrenheit (°F) (-12.2 degrees Celsius [°C]) in January to an average high of 97.7°F (36.5°C) in July. The average wind speed is 7 miles per hour (3 m per second) and usually comes from the north-northeast. The Project area has an average annual precipitation of 6.45 inches (16.38 centimeters), with August, September, and October being the wettest months by average precipitation. Like most arid climates, Utah experiences wide ranges in temperature during the course of the day as heat quickly builds during the day and rapidly dissipates at night (Western Regional Climate Center 2020).

Climate data for major airport weather stations across the United States are available from the National Oceanic and Atmospheric Administration's National Centers for Environmental Information (formerly, National Climatic Data Center). Table H-3 summarizes the data collected by the Green River Aviation weather station, located approximately 25 miles (41 km) north of the Project area, that are representative of climatic conditions in the Project area.

Table H-3. Climatic Conditions

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Normal daily max temperature (°F)	38.2	48.4	60.3	70.5	80.7	91.5	97.7	94.8	85.7	71.5	55.0	41.3	69.9
Normal daily min temperature (°F)	10.0	18.8	27.8	36.0	44.9	52.5	60.4	58.2	47.4	35.1	22.4	13.3	35.6
Precipitation (inches)	0.42	0.43	0.49	0.51	0.64	0.33	0.54	0.81	0.70	0.79	0.44	0.36	6.45

Background Air Quality

Background air quality in the Project area is provided in the air technical report for Lila Canyon Mine and was assumed to be representative of the existing conditions in the vicinity of the Project (SWCA 2019). Background levels of criteria air pollutants are provided in Table H-4.

Table H-4. Background Levels of Criteria Air Pollutants

Pollutant*	Averaging Period	Monitoring Station ID	Location	Monitored Concentration		
			City/State	(ppm)	(ppb)	(µg/m ³)
CO	1 hour	08-077-0018	Grand Junction, Colorado	1.50	—	—
	8 hours	08-077-0018	Grand Junction, Colorado	1.30	—	—
NO ₂	1 hour	49-007-1003	Price, Utah	—	18.00 [†]	—
	Annual	49-007-1003	Price, Utah	—	6.40 [‡]	—
O ₃	8 hours	49-007-1003	Price, Utah	0.067	—	—
PM _{2.5}	24 hours	49-013-0002	Roosevelt, Utah	—	—	24.00
	Annual	49-013-0002	Roosevelt, Utah	—	—	6.10
PM ₁₀	24 hours	49-019-0006	Moab, Utah	—	—	42.00
SO ₂	1 hour	49-035-3006	Salt Lake City, Utah	—	7.00	—
	3 hours	49-035-3006	Salt Lake City, Utah	—	6.33	—

Source: SWCA (2019).

Notes: ppm = parts per million; ppb = parts per billion; µg/m³ = micrograms per cubic meter.

* Colorado data from Grand Junction–Pitkin monitor for 2015 to 2017; NO₂ data from monitor on private property in Price, Utah, for 2012 to 2014; O₃ data from monitor on private property in Price, Utah, for 2015 to 2017; PM_{2.5} data from Roosevelt, Utah, monitor for 2015 to 2017; PM₁₀ data from Moab, Utah, monitor for 2000 to 2003; SO₂ data from Hawthorne monitor for 2015 to 2017.

[†] Design value from Air Quality System highest eighth high (H8H) modeled concentration for 2015 to 2017.

[‡] 2-year average of annual mean (2015 did not have complete data).

Emissions Inventory for Emery County, Utah

Emissions inventories are useful in comparing emission source categories to determine which industries or practices are contributing to the general level of pollution in the country where a project is located. Emissions inventories provide an overview of the types of pollution sources in an area, as well as the amount of pollution being emitted on an annual basis by those sources. For the purposes of this assessment, the most recent National Emissions Inventory conducted in 2017 (EPA 2020b) was summarized.

The National Emissions Inventory is a detailed annual estimate of criteria air pollutants and HAPs from air emission sources. Data are collected from state, local and tribal air agencies and supplemented with data from the EPA (2020b). The emissions inventory includes estimates of emissions from many sources, including point sources, nonpoint sources, on-road sources, nonroad sources, and event sources. Point sources are sources of air pollutants located at a fixed point. Point sources include facilities such as power plants and airports, as well as commercial sources. Nonpoint sources are those which are too small to pinpoint as point sources. Nonpoint sources include emission sources such as asphalt paving, solvent use, and residential heating. On-road sources are emissions from on-road vehicles. Nonroad sources are mobile sources of emissions that operate off road, such as construction equipment, lawn and garden equipment, trains, and barges, ships, and other marine vessels. Event sources include emissions from sources such as wildfires. This inventory is a good estimate of how much each county and state is contributing to air pollution for a given year.

The 2017 emissions inventory data for Emery County, Utah, are presented in Table H-5.

Table H-5. Emissions Inventory for Emery County, Utah (tons per year)

Category	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOCs	HAPs	CO ₂ e*
Agriculture	0	0	487	98	0	10	0	0
Biogenics†	3,602	1,279	0	0	0	14,113	3,602	0
Miscellaneous‡	5	0	3	2	0	143	5	0
Dust	0	0	5,763	665	0	0	0	0
Fires	48	1	6	5	0	10	48	572
Fuel combustion	8,289	15,718	567	416	5,793	198	8,289	0
Industrial processes	0	0	450	271	0	19	0	14,830,387
Mobile	2,733	1,118	58	42	4	239	2,733	340,752
Waste disposal	7	0	3	3	0	8	7	0
Total	14,686	18,117	7,336	1,504	5,797	14,740	3,339	15,171,711

Source: EPA (2020b).

* Carbon dioxide equivalent (CO₂e) emissions are in metric tons.

† Biogenic emissions are those emissions derived from natural processes (such as vegetation and soil).

‡ Miscellaneous categories include bulk gasoline terminals, commercial cooking, gas stations, miscellaneous nonindustrial (not elsewhere classified), and solvent use.

Table H-5 shows that fuel combustion and biogenic emissions were the biggest contributors to NO_x and CO pollution and that fugitive dust emissions were the biggest contributors to PM pollution in Emery County. Biogenic emissions contributed the most to VOC pollution in Emery County. Industrial processes and mobile sources contributed the most to carbon dioxide equivalent (CO₂e) pollution, but fuel consumption contributed the most to HAP emissions.

Greenhouse Gases

Natural and anthropogenic sources emit GHGs. GHGs allow high-frequency solar radiation to enter the earth's atmosphere and trap outgoing infrared radiation. This phenomenon is known as the greenhouse effect and plays a critical role in regulating the earth's temperature. While natural sources emit GHGs (e.g., forest fires, volcanic activity, decomposition), elevated concentrations of GHGs generated from anthropogenic activities are thought to be linked to global climate change, such as rising surface temperatures, melting icebergs and snowpack, rising sea levels, and the increasing frequency and magnitude of severe weather.

The U.S. Supreme Court ruled in 2007 that the EPA has the authority to regulate GHGs, such as methane (CH₄) and carbon dioxide (CO₂), as air pollutants under the CAA. However, there are currently no ambient air quality standards for GHGs. Therefore, EPA has incorporated regulation of GHGs into the PSD permitting program for sources already subject to regulation thereunder, certain NSPS, and on-road vehicle emission standards.

Primary anthropogenic sources of GHGs include industrial processes, landfills, and the consumption of fossil fuels for power generation, transportation, heating, and cooking. The primary sources of GHGs associated with well pads and gas processing plants are CO₂, CH₄, and nitrous oxide (N₂O) from fuel combustion in construction and maintenance vehicles and equipment, as well as operations emissions of CH₄ and CO₂ from fuel combustion for power generation. CO₂ is the most abundant GHG. Other GHGs are less abundant but have higher global warming potential (GWP) than CO₂. Thus, emissions of other

GHGs are frequently expressed in the equivalent mass of CO₂, denoted as CO₂e. Based on the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) (2014), CH₄ has a lifetime of 12.4 years and a GWP of 28 over 100 years. N₂O has a lifetime of 121 years and a GWP of 265 over 100 years. Several different time horizons can express GWPs to fully account for the gases' ability to absorb infrared radiation (heat) over their atmospheric lifetime. The BLM uses the 100-year time horizon to facilitate comparison with state and national reporting values and because most of the climate change impacts derived from climate models are expressed toward the end of the century.

Global warming refers to the ongoing rise in global average temperature near the earth's surface. It is caused mostly by increasing concentrations of GHGs in the atmosphere, and it is changing global climate patterns. Climate change refers to any substantial change in the measures of climate (e.g., temperature, precipitation, and wind patterns) lasting for an extended period of time (EPA 2017). Because GHGs circulate freely throughout the earth's atmosphere, climate change is a global issue. The largest component of global anthropogenic GHG emissions is CO₂ (EPA 2016). Fossil fuel use is the primary source of global CO₂ (EPA 2016). Overall, U.S. energy-related emissions from the U.S. energy sector (fossil fuel combustion, natural gas systems, coal mining, mobile combustion, waste incineration, and other sources) accounted for a combined 84.0% of total U.S. greenhouse gas emissions in 2017 (EPA 2020c).

The Global Change Research Act of 1990 mandates that the U.S. Global Change Research Program deliver a report to Congress and the president every 4 years that analyzes the effects of global change on the natural environment and other systems, as well as provides current trends in global change. The recently released second volume of the Fourth National Climate Assessment focuses on the human welfare, societal, and environmental elements of climate change and variability for 10 regions of the United States (U.S. Global Change Research Program 2018). Global climate is changing rapidly compared with the pace of natural climate variations that have occurred throughout Earth's history. Evidence for these changes consistently points to human activities, especially emission of GHGs, as the dominant cause. Global average temperature has increased by approximately 1.8°F from 1901 to 2016. Without substantial emission reductions, annual average global temperatures could increase by 9°F or more by the end of this century (compared with preindustrial temperatures) (Hayhoe et al. 2018).

A recent study identified climate change issues relevant to resource management in all of Utah and Nevada, a small part of eastern California, a small part of western Colorado, southern Idaho, and western Wyoming (the Intermountain Region) (Halofsky et al. 2018). In the Plateaus subregion of the Intermountain Region (which covers the southern half of Utah and a small portion of western Colorado and includes the proposed lease modification areas), median maximum temperature and median minimum temperature are projected to rise between 5°F to 10°F and 5°F to 12°F by 2100, respectively, depending on the climate model scenario (Halofsky et al. 2018). The greatest departure from historical temperatures by 2100 is projected to occur in summer.

Median maximum temperatures for winter, spring, and autumn are also projected to move outside of historical ranges by 2100. Precipitation projections in the Plateaus subregion are highly variable with no discernible trend (Halofsky et al. 2018).

Environmental Consequences

Analysis Methods and Assumptions

Air Resources

ISSUE INDICATORS

The following indicators were used to analyze impacts to air quality:

- Emission estimates for regulated pollutants and GHGs
- Comparison of Project emission estimates to county emissions inventories
- Exceedance of Federal Land Managers' Air Quality Related Values Work Group screening-level criteria
- Distance to Federal Class I areas

Emissions calculations for the Project were subdivided into construction-related emissions (those emissions that are expected to be temporary in nature) and operations-related emissions (those emissions that are expected to occur throughout the operational lifetime of the Project).

The following assumptions were used to complete the air quality impact analysis for the Project:

- Emissions associated with heavy-duty on-road construction equipment were estimated using EPA's Motor Vehicle Emissions Simulator (MOVES) emission factors for combination long-haul trucks for the 2020 vehicle fleet (EPA 2018).
- Emissions from off-road construction equipment and vehicles were estimated using composite off-road emission factors for the 2020 vehicle fleet from MOVES (EPA 2018). The type of equipment used for construction and the quantity of each type were based on similar projects. The appropriate emission factor, equipment type, quantity of equipment needed, and duration of use during construction of the Project were used in determining emissions from construction equipment.
- Exhaust emissions from construction worker commute, some on-road construction equipment, and equipment delivery were calculated using MOVES emission factors for on-road passenger vehicles and light commercial trucks for the 2020 vehicle fleet (EPA 2018).
- Fugitive dust emissions from vehicle travel on paved and unpaved roads were estimated using emission factors from Sections 3.2.1 and 3.2.2 of the *Compilation of Air Pollutant Emission Factors* (EPA 2006, 2011).
- Fugitive dust emissions from earthmoving were estimated using the Western Regional Air Partnership's 2006 *Fugitive Dust Handbook* (2006).
- Worker commuter vehicles and construction material and equipment delivery vehicles were assumed to travel from Green River, Utah.
- All compressors and pumps were assumed to have electric motors.
- HAP emissions were assumed to equate to 10% of VOC emissions.
- Exhaust emissions from the operation of the gas turbine power generation would be controlled by a selective catalytic reduction. Emission rates were based on manufacturer's specification sheets and an annual operation of 8,640 hours.

- All waste streams at the processing facility, excluding the exhaust emissions from the power generation equipment and the sump tank emissions, would be reinjected in a gas disposal injection well. The gas stream to be reinjected is a combination of the dry, high-N₂ (dinitrogen) content membrane residue streams after helium recovery and after turbine fuel gas generation, and the wet acid gas (CO₂/hydrogen sulfide [H₂S]) that comes off the top of the amine unit regeneration still. This combined stream contains approximately 82.98% of N₂; 3.04% of CO₂; 2,238 parts per million of H₂S; 11.22% of CH₄; and less than 5.6 pounds of water per million standard cubic feet.

CONSTRUCTION EMISSIONS

Construction-related emissions would include the following:

- Exhaust from on- and off-road construction vehicles and equipment
- Exhaust from on-road construction worker commuter vehicles
- Exhaust from on-road construction material and equipment delivery vehicles
- Fugitive dust from vehicle travel on paved and unpaved roads
- Emissions from industrial wind erosion
- Fugitive dust from earthmoving and general construction activities

Off-Lease Well Pad

The wells would be located on a new well pad with a total area of disturbance of 5.4 acres for Alternative A. Construction would require a front-end loader for roadbed improvements, a small Cat-style dozer, and a dump truck (large axle) for dirt moving and rock hauling. Well pad construction would occur during daylight hours (10 hours per day) and would take approximately 10 to 14 days to complete.

The helium reservoir would be developed using conventional drilling and completion methods; no hydraulic fracturing would be used. Given the depth of the target formation, a 400-ton drilling rig is anticipated, with a projected derrick height of up to 150 feet. Drilling operations would occur 24 hours per day for approximately 20 days. Flaring and venting would be required during initial production testing, but no long-term flaring or venting would be required for the Project after the well is found to be productive.

Road Improvements

The road to access the proposed well pad, Spur Road 1025, would need to be improved to allow equipment, including the drill rig, to access the site. Alternative A would require road improvements on approximately 2.7 miles of Spur Road 1025 from Emery Country Road 1025 to the proposed well pad. Improvements would include erosion control, curve reduction, culvert installation, dust control, and safety signage while minimizing visual impacts where practical. Front-end loaders and bulldozers would be used to make these improvements using standard cut-and-fill construction techniques.

Pipeline

A 30-foot-wide pipeline ROW, connecting the proposed well pad to the proposed helium processing plant, would be located directly adjacent to the well pad access route. This pipeline corridor would be approximately 4.9 miles long.

Processing Plant on Non-Federal Lands

A plant to remove waste gas to concentrate the helium for trucking to market would be constructed. Impacts associated with the construction of the processing plant have been analyzed as a non-Federal indirect effect of the Federal actions. The plant would occupy a 10-acre footprint, not including the access road. A complete description of the processing plant operation is included in Appendix G. Construction duration for the processing plant is estimated to be approximately 25 weeks.

OPERATIONS EMISSIONS

Operations-related emissions would include the following:

- Emissions from inspection activities, such as exhaust from on-road inspection vehicles, and fugitive dust from travel on paved and unpaved roads
- Emissions from maintenance activities, including exhaust from worker vehicles and any needed equipment, as well as fugitive dust from travel on paved and unpaved roads
- Piping fugitive emissions
- Working and breathing emissions from holding tanks
- Gas turbine power generator exhaust emissions at the processing plant
- Exhaust from on- and off-road construction vehicles and equipment for well recompletions

Off-Lease Well Pad

On the pad, production equipment could consist of holding tanks, transfer pumps, separators, vessels, flowlines, and safety equipment. Emission sources would include exhaust emissions from on-road inspection and maintenance vehicles, piping fugitives, emissions from storage tanks, and emissions associated with well recompletions.

Road Improvements

Criteria pollutant, HAPs, and GHG emissions would occur from activities associated with the maintenance of the access road.

Pipeline

Emissions associated with the operation of the pipeline would include quarterly inspections.

Processing Plant on Non-Federal Lands

Emissions associated with the operation of the processing plant would include the following:

- Emissions from inspection activities, such as exhaust from on-road inspection vehicles, and fugitive dust from travel on paved and unpaved roads
- Emissions from maintenance activities, including exhaust from worker vehicles and any needed equipment, as well as fugitive dust from travel on paved and unpaved roads
- Piping fugitive emissions
- Working emissions from a sump tank
- Gas turbine power generator exhaust emissions

GREENHOUSE GAS IMPACTS ANALYSIS METHODS

The BLM has considered various ways to meet the requirements of NEPA with respect to disclosing and analyzing impacts of project GHG emissions to climate change. The BLM has concluded that the most clear and concise way to disclose impacts from a project is to quantify project direct and indirect GHG emissions to the extent feasible and compare these GHG emissions to emission totals at various geographic scales as necessary (regional, state, federal, global) to provide context regarding the relative magnitude of the GHG emissions. This approach, together with a qualitative summary discussion of the effects of GHG emissions based on an appropriate literature review is used to provide a summary of potential impacts from climate change while providing context to the relative contribution of a project. Additionally, the BLM includes discussion and/or incorporates by reference, historical state and federal lease sale emission estimates as well as future projected lease sale emissions estimates to provide information on the BLM's potential cumulative contribution to climate change impacts. This method of analysis provides sufficient information for the BLM to make a reasoned choice between alternatives and discloses the relative magnitude of potential direct, indirect, and cumulative climate change impacts.

The BLM considered several additional tools for analyzing climate change impacts, including the social cost of carbon (SCC) analysis and global carbon budget analysis. These methods are further explained below along with the BLM's rationale for using the methodology described above in lieu of these other methods of analysis. Additionally, a discussion of the United States' Nationally Determined Contribution (NDC) goals to meet Paris Climate Agreement initiatives is included below. This discussion further supports the BLM's current method of impacts assessment.

Social Cost of Carbon

A protocol to estimate what is referenced as the SCC associated with GHG emissions was developed by a Federal Interagency Working Group (IWG), to assist agencies in addressing EO 12866, which requires Federal agencies to assess the cost and the benefits of proposed regulations as part of their regulatory impact analyses. The SCC is an estimate of the economic damages associated with an increase in carbon dioxide emissions and is intended to be used as part of a cost-benefit analysis for proposed rules. As explained in the Executive Summary of the 2010 SCC Technical Support Document "the purpose of the [SCC] estimates...is to allow agencies to incorporate the social benefits of reducing carbon dioxide (CO₂) emissions into cost-benefit analyses of regulatory actions that have small, or 'marginal,' impacts on cumulative global emissions" (IWG 2010; withdrawn by EO 13783). While the SCC protocol was created to meet the requirements for regulatory impact analyses during rulemakings, there have been requests by public commenters or project applicants to expand the use of SCC estimates to project-level NEPA analyses.

The decision was made not to expand the use of the SCC protocol for lease sale NEPA analysis for a number of reasons. NEPA does not require a cost-benefit analysis (40 CFR 1502.23), although NEPA does require consideration of "effects" that include "economic" and "social" effects (40 CFR 1508.8(b)), without a complete monetary cost-benefit analysis, which would include the social benefits of the Proposed Action to society as a whole and other potential positive benefits, inclusion solely of an SCC cost analysis would be unbalanced, potentially inaccurate, and not useful in facilitating an AO's decision. Any increased economic activity, in terms of revenue, employment, labor income, total value added, and output, that is expected to occur with the Proposed Action is simply an economic impact, rather than an economic benefit. Economic impact is distinct from "economic benefit" as defined in economic theory and methodology, and the socioeconomic impact analysis required under NEPA is distinct from cost-benefit analysis, which is not required.

Additionally, the SCC protocol does not measure the actual incremental impacts of a project on the environment and does not include all damages or benefits from carbon emissions. The SCC protocol estimates economic damages associated with an increase in carbon dioxide emissions—typically expressed as a 1 metric ton increase in a single year—and includes, but is not limited to, potential changes in net agricultural productivity, human health, and property damages from increased flood risk over hundreds of years. The estimate is developed by aggregating results “across models, over time, across regions and impact categories, and across 150,000 scenarios” (Rose et al. 2014). The dollar cost figure arrived at based on the SCC calculation represents the value of damages avoided if, ultimately, there is no increase in carbon emissions. But the dollar cost figure is generated in a range and provides little benefit in assisting the AO’s decision for project-level analyses. Given the uncertainties associated with assigning a specific and accurate SCC resulting from federal mineral production that could occur once the lease is issued, and that the SCC protocol and similar models were developed to estimate impacts of regulations over long time frames, the level of uncertainty was deemed to be too great to provide meaningful context of potential project impacts. Instead, the BLM considers presentation of the relative magnitude of GHG emissions from a project to contextualize impacts the more straightforward and informative approach.

To summarize, this EA does not undertake an analysis of SCC because 1) it is not engaged in a rulemaking for which the protocol was originally developed; 2) the IWG, technical supporting documents, and associated guidance have been withdrawn; 3) NEPA does not require cost-benefit analysis; and 4) the full social benefits of oil and gas production have not been monetized, and quantifying only the costs of GHG emissions but not the benefits would yield information that is both potentially inaccurate and not useful.

Carbon Budget Analysis

A carbon budget is the remaining allowable carbon dioxide emissions associated with remaining below a specific global average temperature. In 2018 the IPCC published a special report that included an estimated remaining carbon budget from the start of 2018 which includes the probability of limiting warming below a 2°C threshold by the end of the century given a certain level of GHG emissions. These data are presented below:

- 420 gigatonnes of CO₂ (GtCO₂) for a two-thirds chance of limiting warming to 1.5°C
- 580 GtCO₂ for a 50% chance of limiting warming to 1.5°C
- 1170 GtCO₂ for a 66.67% chance of limiting warming to 2°C
- 1500 GtCO₂ for a 50% chance of limiting warming to 2°C

But there are significant uncertainties in these carbon budgets and the IPCC concluded that these estimates would result in uncertainties of plus or minus 50% variation in the remaining carbon budgets for the 1.5°C pathways. As a result, the IPCC assigned a medium confidence to the assessed remaining budget values for 1.5°C and 2.0°C (Rogeli et al. 2018).

The BLM is of the opinion that analysis of project level and cumulative contribution to the depletion of the remaining carbon budget is not necessarily more informative than simply providing the relative magnitude of emissions at different geographic scales. The latter method is straightforward, provides sufficient context for decision making and is easy for the public to understand. Due to the uncertainty inherent to the carbon budget estimates, the level of uncertainty associated with providing a relative contribution to depletion of the remaining carbon budget is also high. Furthermore, given that the carbon budget is based on total cumulative global emissions to limit warming over a century, the discussion of the BLM’s cumulative impacts in this context is more problematic since the uncertainty in the BLM lease sale activity’s overall cumulative contribution over the century would be speculative. Therefore, more near-term projections based on EIA data and other emission calculation methods as described in the

Golder Associates report (Golder Associates 2017) are used to derive an estimate of emission profile of BLM cumulative activities which are then correlated to an RCP scenario. This is a reasonable method and level of analysis to contextualize the BLM's lease sale cumulative impacts. Though these emission estimates and RCP scenario impacts should also be understood to have a degree of uncertainty, the level of speculation is reduced substantially.

The BLM recognizes that uncertainty in and of itself does not preclude the use of an analysis method; however, the BLM also believes that the current method of providing a relative magnitude of emissions from a project meets the disclosure requirements of NEPA and no further analysis would be needed to provide sufficient context for decision makers or the public. To summarize, although both metrics are potentially valuable, the relative magnitude as a proxy for GHG impacts methodology is chosen in lieu of the carbon budget analysis for several reasons: 1) the relative magnitude estimate is easy to understand and is not subject to the same degree of uncertainty as the carbon budget estimates; 2) the latter methodology is more consistent with the 2019 draft NEPA guidance for assessing impacts from GHG and, therefore, is currently the most widely used methodology for the purpose of discussing impacts for NEPA analyses; therefore, 3) the use of relative magnitude of emissions as a proxy for climate change impacts better facilitates comparisons across multiple NEPA projects and BLM FOs; and 4) providing the relative magnitude of emissions in combination with a qualitative discussion of potential climate change impacts based on an appropriate literature review allows for an informed choice between alternatives and adequately informs the public.

National Determined Contribution Discussion

More nuanced metrics such as progress toward NDC targets would better contextualize impacts towards meeting the IPCC's temperature targets. NDCs are submissions by countries that have ratified the Paris Agreement which presents their national efforts to reach the Paris Agreement's long-term temperature goal of limiting warming to well below 2°C (United Nations Environmental Programme [UNEP] 2019). This metric is a more targeted goal per country and more informative to progress towards specific United States GHG reduction goals. Discussion of these more targeted goals is more useful than a simple comparison to a global carbon budget since each country is currently undertaking efforts to reduce emissions contributions in various ways and to varying degrees. New or updated NDCs are to be submitted in 2020 and every 5 years thereafter (UNEP 2019). NDCs, therefore, represent a country's current ambition/target for reducing emissions nationally. The United States is a G20 member. G20 members account for 78% of global GHG emissions. Collectively, the G20 members are on track to meet their limited 2020 Cancun emission pledges; however, the United States is currently projected to be in danger of not achieving the 2020 Cancun pledged emission reductions of 17% below 2005 levels by 2020 (UNEP 2019). The United States' NDC is a reduction of 26 to 28% below 2005 levels by 2025 (United Nations Framework Convention on Climate Change 2020a, 2020b). Projections from the United Nations Environmental Program Report indicate that with additional policy measures or stricter enforcement of existing policies, the United States would be expected to meet its NDC target. The most recent available national GHG emission data indicates that in 2018, GHG emissions were approximately 10.2% below 2005 levels (EPA 2020c). Dramatic strengthening of NDCs is needed to increase the chances of meeting the target temperature increase thresholds of 1.5°C or 2°C. The BLM will cooperate as necessary to assist in meeting the NDC goals set by the United States as described in the following section. It is somewhat speculative to determine to what degree BLM lease sale impacts specifically are contributing to the United States NDC emission reduction targets since the goals are defined in terms of a percent reduction from 2005 levels by 2025. Therefore, the BLM will continue to use the project-level analysis method of comparing the relative magnitude of a project's contribution to emissions at the national scale as a proxy for impacts which will allow the BLM to make a reasoned choice between alternatives.

NATIONAL AND STATE-LEVEL MITIGATION STRATEGIES AND THE BUREAU OF LAND MANAGEMENT'S ROLE

Currently, the recommended actions for the United States to meet as well as strengthen its NDC targets include: Introducing regulations on power plants, clean energy standards, implementing carbon pricing on industrial emissions, strengthening vehicle and fuel economy standards to be in line with zero emissions for new cars in 2030, and implementing clean building standards so that all new buildings are 100% electrified by 2030 (UNEP 2019). The demand-side and supply side mitigation strategies mentioned above generally necessitate rulemaking efforts at the federal or state levels. Given the recommendations for effective GHG reduction policies in the near term, the BLM will continue to act in accordance with national emission reduction goals via assessment of project conformance with applicable state and Federal regulations during the NEPA review process. Additionally, the BLM is currently supporting many states adopted renewable portfolio standard goals through policy, including the Solar and Wind Energy Rule, which facilitates responsible solar and wind energy development on public lands (BLM 2016f). Due to Renewable Portfolio Standards, production tax credits, and decreasing costs there is increasing interest in renewable energy development. The BLM currently manages more than 20 million acres of public lands with wind energy potential in western states and as of March 2018 has approved 35 wind energy projects on public land with 3,284 MW of total installed capacity (BLM 2020h). The BLM currently manages more than 19 million acres of public lands with excellent solar potential in California, Nevada, Arizona, New Mexico, Colorado, and Utah. As of March 2018, the BLM has approved 25 solar projects, totaling 6,319 MW of installed capacity. The Western Solar Plan guides development of utility-scale solar energy development on public lands. The Plan established an initial 17 Solar Energy Zones in 2012 with access to transmission corridors and areas with high solar potential, and two additional Solar Energy Zones were designated in 2013. If fully build-out, projects in these zones could produce as much as 27,000 MW (BLM 2020). Existing federal projects as well as future potential renewable energy development on public lands should be taken into consideration when evaluating the BLM's lease sale cumulative impacts. Often, project-level GHG mitigation strategies are difficult to implement given that it is outside the scope of the BLM to regulate air quality emissions directly. Therefore, the BLM's main focus for mitigation of climate change includes adoption of large-scale land development policies such as the Solar and Wind Energy Rule and the Western Solar Plan which will support the supply side mitigation strategies necessary to meet NDC targets.

Soil Resources

No additional supporting information identified for soil resources.

Vegetation

No additional supporting information identified for vegetation.

Special-Status Plant Species

Table H-6. Potential Occurrence of Special-Status Plant Species

Species Common Name (scientific name)	Conservation Status	Habitat and Range Description	Potential for Occurrence in the Alternative A Analysis Area	Potential for Occurrence in the Alternative B Analysis Area
Entrada rushpink (<i>Lygodesmia grandiflora</i> var. <i>entrada</i>)	BLM sensitive	Endemic to Emery, Grand, and San Juan Counties, Utah. Species typically occurs on the Entrada Formation in mixed desert shrub communities and piñon-juniper woodlands from 4,400 to 4,800 feet (1,340–1,460 m) in elevation.	Known to occur* Species was identified during the 2020 SSPS surveys. Suitable habitat exists in the analysis area. See Section 3.5.2.2 for detailed analysis.	May occur* Suitable habitat for the species exists in the analysis area, including Entrada formation substrate and desert scrub vegetation communities. However, this species was not observed during the 2020 SSPS surveys.
Flat-top buckwheat (<i>Eriogonum corymbosum</i> var. <i>smithii</i>)	BLM sensitive	Endemic to the Colorado Plateau in Emery and Wayne Counties, Utah. Occurs on the Entrada Formation and on seleniferous stabilized dunes. Associated with purple sage, Mormon tea–Indian ricegrass, desert shrub, and rabbitbrush communities from 4,500 to 5,600 feet (1,370–1,700 m) in elevation.	May occur Suitable habitat for the species exists in the analysis area, including stabilized dunes and desert scrub vegetation communities. However, this species was not observed during the 2020 SSPS surveys.	May occur Suitable habitat for the species exists in the analysis area, including stabilized dunes and desert scrub vegetation communities. However, this species was not observed during the 2020 SSPS surveys.

Species Common Name (scientific name)	Conservation Status	Habitat and Range Description	Potential for Occurrence in the Alternative A Analysis Area	Potential for Occurrence in the Alternative B Analysis Area
Jones cycladenia (<i>Cycladenia humilis</i> var. <i>jonesii</i>)	USFWS T	Known from four general areas in Utah: Joe Hutch complex (along the Green River), San Rafael Swell complex (west of the town of Green River), Castle Valley complex (near Moab), and Grand Staircase-Escalante National Monument. It is located in isolated habitats in central and southern Utah, occurring between 4,390 and 6,000 feet (1,338–1,829 m) in elevation in mixed desert scrub, juniper, or wild buckwheat–Mormon tea communities. It is found on gypsiferous, saline soils of Cutler, Summerville, and Chinle Formations (USFWS 2020a).	Unlikely to occur The species is known from Emery County; however, it is unlikely to occur in the analysis area given its preferred substrate, including gypsiferous saline soils and vegetation community associations. The analysis area is also higher in elevation than this species' known occurrences.	Unlikely to occur The species is known from Emery County; however, it is unlikely to occur in the analysis area given its preferred substrate, including gypsiferous saline soils and vegetation community associations. The analysis area is also higher in elevation than this species' known occurrences.
Navajo sedge (<i>Carex specuicola</i>)	USFWS T	A wetland obligate of springs, typically in alcoves associated with eolian sandstone cliffs of varying height and slope (often vertical) from 4,200 to 7,600 feet (1,280–2,300 m) in elevation in piñon-juniper woodland. Adapted to the specialized habitat of seepages on sandstone cliffs in an arid plateau ecoregion it rarely occurs on level terrain. The seep-spring pockets along the Navajo Sandstone Formation bedrock provide this habitat.	Unlikely to occur There is a lack of springs and other wetland habitat, as well as seepages on sandstone cliffs, that are obligate habitat requirements for this species.	Unlikely to occur There is a lack of springs and other wetland habitat, as well as seepages on sandstone cliffs, that are obligate habitat requirements for this species.

Species Common Name (scientific name)	Conservation Status	Habitat and Range Description	Potential for Occurrence in the Alternative A Analysis Area	Potential for Occurrence in the Alternative B Analysis Area
Trotter's oreoxis (<i>Oreoxis trotteri</i>)	BLM sensitive	Endemic to Wayne County, Utah. Found in crevices or in sandy pockets on the Moab Tongue and, less often, on the Slick Rock members of the Entrada Sandstone. Favors open sites (usually with a northern aspect) and, occasionally, alcoves and shaded cliff bases. Associated with warm desert shrub and mixed juniper communities from 4,700 to 6,000 feet (1,430–1,830 m) in elevation.	May occur Suitable habitat for the species exists in the analysis area, including stabilized dunes and desert scrub vegetation communities. However, this species was not observed during the 2020 SSPS surveys.	May occur Suitable habitat for the species exists in the analysis area, including stabilized dunes and desert scrub vegetation communities. However, this species was not observed during the 2020 SSPS surveys.
Utah spurge (<i>Euphorbia nephradenia</i>)	BLM sensitive	Endemic to the Colorado Plateau in Emery, Garfield, Kane, and Wayne Counties in Utah and Colorado. Occurs in dark clay hills, sand, and stabilized dunes primarily from the Tropic Shale and Entrada Formations. Associated with mat-saltbush, blackbrush, Mormon tea, and mixed sandy desert shrub and grassland communities from 3,800 to 4,800 feet (1,160–1,460 m) in elevation.	May occur Suitable habitat for the species exists in the analysis area, including stabilized dunes and desert scrub vegetation communities. However, this species was not observed during the 2020 SSPS surveys.	May occur Suitable habitat for the species exists in the analysis area, including stabilized dunes and desert scrub vegetation communities. However, this species was not observed during the 2020 SSPS surveys.

Sources: Except where otherwise noted, range or habitat information for plant species is taken from the NatureServe (2020) website and the USFWS (2020b) Information for Planning and Consultation tool.

Notes: Federal (USFWS) status: T = threatened; Federal (BLM) status: sensitive = BLM Price FO–determined priority species (BLM 2018).

* Detailed analysis of Entrada rushpink potential for occurrence is included in a Technical Memorandum of potential habitat analysis on file with the BLM Price FO (SWCA 2020b).

General Wildlife

No additional supporting information identified for general wildlife.

Special-Status Wildlife Species

Table H-7. Potential Occurrence of Special-Status Wildlife Species

Species Common Name (scientific name)	Conservation Status	Habitat and Range Description	Potential for Occurrence in the Alternative A Analysis Area	Potential for Occurrence in the Alternative B Analysis Area
Invertebrates				
Monarch butterfly (<i>Danaus plexippus</i>)	BLM sensitive	Widespread in the United States throughout the summer months, wintering in warmer areas in Mexico and California. It inhabits a wide variety of habitat types requiring floral resources for food and milkweed (<i>Asclepias</i> sp.) for breeding, because its young will only eat plants from the milkweed family, deriving protection from the cardiac glycosides produced within the milky latex excreted by the plant.	Unlikely to occur —flowering plants are sparse in the analysis area and are found in greater abundance in nearby Keg Spring Canyon approximately 416 m southeast of proposed surface disturbance. Additionally, no milkweed or individuals of this butterfly species were identified during the 2020 biological surveys.	Unlikely to occur —flowering plants are sparse in the analysis area and are found in greater abundance in nearby Keg Spring Canyon approximately 1,251 m northeast of proposed surface disturbance. Additionally, minimal milkweed and no individuals of this butterfly species were identified during the 2020 biological surveys.
Western bumblebee (<i>Bombus occidentalis</i>)	BLM sensitive	Though much reduced in range and number, this species, like most of the 300-plus bee species in the San Rafael Desert, are ground nesting. The western bumble bee has three basic habitat requirements: suitable nesting sites for the colonies, nectar and pollen from floral resources available throughout the duration of the colony period (spring, summer and fall), and suitable overwintering sites for the queens.	Unlikely to occur —flowering plants are sparse in the analysis area and are found in greater abundance in nearby Keg Spring Canyon approximately 416 m southeast of proposed surface disturbance. Additionally, no individuals of this species were identified during the 2020 biological surveys.	Unlikely to occur —flowering plants are sparse in the analysis area and are found in greater abundance in nearby Keg Spring Canyon approximately 1,251 m northeast of proposed surface disturbance. Additionally, no individuals of this species were identified during the 2020 biological surveys.
Reptiles				
Great plains toad (<i>Anaxyrus cognatus</i>)	BLM sensitive	Occurs throughout the state, where it prefers desert, grassland, and agricultural habitats. In cold winter months, the Great Plains toad burrows underground and becomes inactive.	Unlikely to occur —the Project area is outside the Green River corridor, and suitable riparian habitat is not present in and is topographically separated from the Project area.	Unlikely to occur —the Project area is outside the Green River corridor, and suitable riparian habitat is not present in and is topographically separated from the Project area.

Species Common Name (scientific name)	Conservation Status	Habitat and Range Description	Potential for Occurrence in the Alternative A Analysis Area	Potential for Occurrence in the Alternative B Analysis Area
Great plains rat snake (cornsnake) (<i>Elaphe guttata</i>)	BLM sensitive	This species is found along the Colorado and Green river corridors, generally from Moab, Grand County, and north to Dinosaur National Monument, Uintah County. The distribution of populations in Utah appears to be quite patchy, but this may reflect the secretive behavior of the species. Scarce data are available to describe habitat use in Utah, but collection data imply the importance of riparian habitat.	Unlikely to occur —the Project area is outside the Green River corridor, and suitable riparian habitat is not present in and is topographically separated from the Project area.	Unlikely to occur —the Project area is outside the Green River corridor, and suitable riparian habitat is not present in and is topographically separated from the Project area.
Birds				
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	USFWS T	Found in the southern and eastern parts of Utah on the Colorado Plateau, where it is a rare permanent resident. Prefers mixed coniferous and hardwood forests but occupies a variety of habitats in different parts of its range, including various forest types and steep-walled rocky canyons. The latter habitat is the primary habitat used in Utah. spotted owls are nonmigratory.	May occur —given the proximity of suitable cliff nesting habitat in Keg Spring Canyon, this species has the potential to occur or to be impacted by activity in the proposed Project area. See Section 3.7.2.2 for detailed analysis.	Unlikely to occur —no suitable nesting or foraging habitat, including forested areas or steep-walled rocky canyons, within 0.5 mile of the proposed Project area. Suitable nesting habitat in Keg Spring Canyon is approximately 1,251 m east-northeast of proposed Project area.
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	USFWS E	Inhabits southwestern riparian ecosystems. Breeding in relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands, including lakes. Most of these habitats are classified as forested wetlands or scrub-shrub wetlands. Habitat requirements for wintering are not well known but include brushy savanna edges, second growth, shrubby clearings and pastures, and woodlands near water.	Unlikely to occur —although some riparian habitat exists in Keg Spring Canyon (416 m southeast of the proposed Project area), the canyon and present vegetation do not meet habitat requirements for this species (BLM 2020d).	Unlikely to occur —although some riparian habitat exists in Keg Spring Canyon (416 m southeast of the proposed Project area), the canyon and present vegetation do not meet habitat requirements for this species (BLM 2020d).

Species Common Name (scientific name)	Conservation Status	Habitat and Range Description	Potential for Occurrence in the Alternative A Analysis Area	Potential for Occurrence in the Alternative B Analysis Area
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	USFWS T	Uses lowland riparian areas characterized by a dense subcanopy or shrub layer (regenerating canopy trees, willows, or other riparian shrubs) within 300 feet of water. Overstory in these habitats may be either large, gallery-forming or developing trees, usually cottonwoods. In Utah, nesting habitats are found from 2,500 to 6,000 feet (750–1,820 m) in elevation.	Unlikely to occur —although some riparian habitat exists in Keg Spring Canyon (416 m southeast of the proposed Project area), the canyon and present vegetation do not meet habitat requirements for this species (BLM 2020d).	Unlikely to occur —although some riparian habitat exists in Keg Spring Canyon (416 m southeast of the proposed Project area), the canyon and present vegetation do not meet habitat requirements for this species (BLM 2020d).
Mammals				
Kit fox (<i>Vulpes macrotis</i>)	BLM sensitive	Found in scattered localities throughout Utah but is absent from the higher-elevation, montane portions of the state. Associated with sparsely vegetated arid habitat, primarily greasewood-, shadscale-, or sagebrush-dominated habitat.	May occur —suitable habitat, including arid desert habitat, occurs in the analysis area. See Section 3.7.2.2 for detailed analysis.	May occur —suitable habitat, including arid desert habitat, occurs in the analysis area. See Section 3.7.2.3 for detailed analysis.
Fringed myotis (<i>Myotis thysanodes</i>)	BLM sensitive	The species is widely distributed throughout Utah but occurs primarily in the Colorado Plateau. It inhabits caves, mines, and buildings, most often in desert and woodland areas, but uses varied habitats, including mixed conifer and aspen, desert riparian, and piñon-juniper. Populations tend to be associated with areas having rocky outcroppings, cliffs, and canyons.	May occur —this species may occur in the analysis area due to the presence of adjacent suitable roosting habitat. Suitable roosting habitat of cliff walls, canyons, and rock crevices are not present in the analysis area but are located proximally in Keg Spring Canyon (416 m southeast). Due to the proximity of suitable roosting habitat, the analysis area provides suitable foraging habitat. See Section 3.7.2.2 for detailed analysis.	May occur —this species may occur in the analysis area due to the presence of desert scrub and semidesert shrubland vegetation communities. Suitable roosting habitat of cliff walls and rock crevices are not present in the analysis area but are located proximally in Keg Spring Canyon (470 m east). Due to the proximity of roosting habitat, the analysis area provides suitable foraging habitat. See Section 3.7.2.3 for detailed analysis.

Species Common Name (scientific name)	Conservation Status	Habitat and Range Description	Potential for Occurrence in the Alternative A Analysis Area	Potential for Occurrence in the Alternative B Analysis Area
Spotted bat (<i>Euderma maculatum</i>)	BLM sensitive	Occurs in various habitats from desert to montane coniferous stands, including open ponderosa pine, piñon-juniper woodland, canyon bottoms, riparian and river corridors, meadows, open pasture, and hayfields. Roosts, including maternity roosts, generally are in cracks and crevices in cliffs, sometimes in caves or in buildings near cliffs.	May occur —this species may occur in the analysis area due to the presence of adjacent suitable roosting habitat. Suitable roosting habitat of cliff walls, canyons, and rock crevices are not present in the analysis area but are located proximally in Keg Spring Canyon (416 m southeast). Due to the proximity of suitable roosting habitat, the analysis area provides suitable foraging habitat. See Section 3.7.2.2 for detailed analysis.	May occur —this species may occur in the analysis area due to the presence of desertscrub and semidesert shrubland vegetation communities. Suitable roosting habitat of cliff walls and rock crevices are not present in the analysis area but are located proximally in Keg Spring Canyon (470 m east). Due to the proximity of roosting habitat, the analysis area provides suitable foraging habitat. See Section 3.7.2.3 for detailed analysis.
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	BLM sensitive	Found in a variety of xeric to mesic habitats: scrub-grassland, desertscrub, semidesert shrublands, chaparral, saxicoline brush, tundra, open montane forests, spruce-fir, mixed hardwood-conifer, and oak woodlands and forests. This species is strongly correlated with the availability of caves or cave-like habitat, but it also uses abandoned buildings and rock crevices on cliffs for roosting.	May occur —this species may occur in the analysis area due to the presence of desertscrub and semidesert shrubland vegetation communities. Suitable roosting habitat of cliff walls and rock crevices are not present in the analysis area but are located proximally in Keg Spring Canyon (416 m southeast). Due to the proximity of roosting habitat, the analysis area provides suitable foraging habitat. See Section 3.7.2.2 for detailed analysis.	May occur —this species may occur in the analysis area due to the presence of desertscrub and semidesert shrubland vegetation communities. Suitable roosting habitat of cliff walls and rock crevices are not present in the analysis area but are located proximally in Keg Spring Canyon (470 m east). Due to the proximity of roosting habitat, the analysis area provides suitable foraging habitat. See Section 3.7.2.3 for detailed analysis.

Species Common Name (scientific name)	Conservation Status	Habitat and Range Description	Potential for Occurrence in the Alternative A Analysis Area	Potential for Occurrence in the Alternative B Analysis Area
Western red bat (<i>Lasiurus blossevillii</i>)	BLM sensitive	A tree bat, this species is closely associated with well-developed riparian habitats, most often in lowlands, and most often with cottonwoods and willows that provide suitable roosting sites.	May occur —this species may occur in the analysis area due to the presence of adjacent suitable roosting habitat. Suitable roosting habitat of cliff walls, canyons, and rock crevices are not present in the analysis area but are located proximally in Keg Spring Canyon (416 m southeast). Due to the proximity of suitable roosting habitat, the analysis area provides suitable foraging habitat. See Section 3.7.2.2 for detailed analysis.	May occur —this species may occur in the analysis area due to the presence of desert scrub and semidesert shrubland vegetation communities. Suitable roosting habitat of cliff walls and rock crevices are not present in the analysis area but are located proximally in Keg Spring Canyon (470 m east). Due to the proximity of roosting habitat, the analysis area provides suitable foraging habitat. See Section 3.7.2.3 for detailed analysis.

Sources: Except where otherwise noted, range or habitat information for wildlife species is taken from the NatureServe (2020) website and the USFWS (2020a 2020b) Information for Planning and Consultation tool.

Notes: Federal (USFWS) status: E = endangered, T = threatened; Federal (BLM) status: sensitive = BLM Price FO—determined priority species (BLM 2018).

Recreation

No additional supporting information identified for recreation.

Wilderness Areas and Lands with Wilderness Characteristics

Summary of Wilderness Characteristics

LABYRINTH CANYON WILDERNESS AREA AND LABYRINTH CANYON UNITS A AND B LANDS WITH WILDERNESS CHARACTERISTICS

The Labyrinth Canyon Wilderness Area overlaps the Labyrinth Canyon Unit A, Labyrinth Canyon Unit B, and Labyrinth Additions LWC Units. LWC units overlap one another (BLM 2020). Therefore, the following discussion on the condition of the affected environment is combined.

The Labyrinth Canyon Wilderness Area totals 60,029 acres (54,643 acres of BLM-administered land) and is bounded on the west by Emery County Road 1010, on the north by Road LC-A-001, on the east by the Green River and the Horseshoe Canyon North Wilderness Study Area (WSA), and on the south by Road LC-B-018.

The Labyrinth Canyon Unit A LWC totals 20,023 acres and is bounded on the west by Emery County Road 1010, on the north by Road LC-A-001, on the east by the Green River and the Horseshoe Canyon North WSA, and on the south by an unnamed access road approximately 0.22 mile north of Emery County Road 1026. Labyrinth Canyon Unit B LWC totals 11,078 acres and is bounded on the west by Emery County Road 1010, on the north by an unnamed access road approximately 0.22 mile north of Emery County Road 1026, on the east by Horseshoe Canyon North WSA, and on the south by Horseshoe Canyon (Canyonlands National Park).

In 1999, the Moab FO conducted an inventory of the Moab FO, including the Labyrinth Canyon area that falls within the analysis area. The applicable portion of the Moab FO that falls within the analysis area is referred to as the Moab FO Labyrinth Canyon Additions LWC Unit. The effort was intended to ground-truth areas for wilderness characteristics and determine whether some areas should have been designated for wilderness study as part of the original 1976 FLPMA inventory process (BLM 1999). The 1999 inventory included 299,420 acres on Moab FO lands, of which, approximately 210,070 acres were found to have wilderness characteristics. Included in the 1999 inventory was Labyrinth Canyon, which was found to have 42,500 acres of lands with wilderness characteristics. In 2003, the BLM made revisions to the 1999 inventory to account for 1) mapping corrections, 2) changes due to state lands along the perimeter boundaries of inventoried areas, 3) changes to vehicle cherry stems, and 4) changes resulting from reevaluations of the wilderness characteristics of certain inventoried lands and vehicle route determinations (BLM 2003). The total acreage of Moab FO Labyrinth Canyon Additions LWC Unit was reduced from 42,500 acres to 24,300 acres during the 2003 inventory revisions.

The Labyrinth Canyon Wilderness Area is composed of sagebrush and blackbrush flats along the upper benches and knolls and the incised canyons of the main chasm of Labyrinth Canyon, as well as riverine-influenced zones along the Green and San Rafael Rivers. Portions of the Labyrinth Canyon Wilderness Area range from gently sloping to rugged, broken landscapes of ridges and escarpments cut by side canyons. Spring Canyon and Horseshoe Canyon provide access to the Green River and are two extensive canyon systems in the area.

The predominantly desert landscapes provide views of diverse geological formations, some of which include high desert plateaus that transition to steep canyons that eventually give way to various washes, where drastic elevation transitions are prevalent. Naturalness is enhanced by topographic screening from deep canyons, rugged terrain, and the natural revegetation of disturbed areas, which obscures most intrusions in the predominantly blackbrush communities. Vegetation includes, but is not limited to, native grasses and shrubs, which are sparse in some areas.

Human impacts are present in the form of reclaiming seismic lines and range improvements. Major current human uses also include recreation-based activities due to the remoteness of this area. Activities such as hunting, hiking, exploring, sightseeing, photography, camping, and river rafting access would be most likely to occur within this area.

Steep and rugged topography, as well as the extensive side canyons, cliffs, and other topographical features maintain the area's natural character and also provide outstanding opportunities for solitude. The Labyrinth Canyon Wilderness Area is contiguous with the Horseshoe Canyon North WSA and the Canyonlands National Park Horseshoe Canyon Unit; both provide and are managed for outstanding opportunities for solitude. Due to the remoteness and topography, outstanding opportunities for primitive and unconfined recreation are prevalent. Some of these activities may include hiking, canyoneering, mountain biking, rafting, and primitive camping.

Previous inventories conducted in the Price FO and Moab FO identified qualities within LWCs that could be attributed to the wilderness characteristic of supplemental values. These qualities include scenic value, historical value, and ecological value (BLM 1999). Scenic quality is excellent from the extensive views of red, buff, and purple sandstone canyons, domes, alcoves, multiple arches, and sheer cliff faces of spectacular dimensions. There are several historical features, including sheep access trails to the river. The same types of nationally significant, prehistoric cultural sites and rock art found within the Horseshoe Canyon Unit of Canyonlands National Park occur in the Labyrinth Canyon Wilderness Area. The Labyrinth Canyon Wilderness Area provides exceptionally diverse habitats. Most important are the extensive riparian areas found along the river and major side canyons. An expanding herd of desert bighorn sheep inhabits the rims and canyons. The endangered Colorado pikeminnow, humpback chub, bonytail chub, and razorback sucker are all found in the Green River. Labyrinth Canyon Unit B LWC has an abundant pronghorn population, and one of only a few herds in Utah that was not eliminated by human settlement.

SWEETWATER REEF UNIT A LAND WITH WILDERNESS CHARACTERISTICS

The Sweetwater Reef Unit A totals 69,348 acres and is primarily in Emery County, with a portion of the southern boundary in Wayne County. Emery County Road 1010 and Saucer Basin Road border the unit. This unit covers an area of the San Rafael Desert made up of a variety of geographic features ranging from stabilized sand dunes, incised slick rock canyons, and expanses of brush-grasslands to the uplifted Sweetwater Reef. The unit is bordered by bladed natural surface roads and is east of State Route 24 and west of the Horseshoe Canyon Unit of Canyonlands National Park.

The unique natural desert ecosystem of dry washes, oak brush–stabilized sand dunes, and endemic blackbrush flats offers exemplary opportunities for primitive and unconfined recreation. Additionally, this area offers opportunities for viewing wildlife in a landscape of huge skies, varied geologic forms, and unique isolated riparian systems.

The unit contains extensive undocumented cultural resources in the form of lithic scatters, which appear and disappear as shifting sands expose and then recover them. The unit also contains isolated rock art and historic cabins and corrals located near springs. Some of the earliest petroleum exploration occurred in this part of the San Rafael Desert in the 1920s. The most substantial human activity observed and noted was the existence of roads and berms from historic seismic activity. Mineral exploration, probably during the 1950s and 1960s, left the unit crisscrossed with long stretches of lines and routes, which are in various stages of natural rehabilitation. In some cases, the lines have naturally reclaimed to the point that they are barely visible, and the average visitor would not notice them (BLM 2016e).

APPENDIX I

Minimum Requirements Decision Guide

The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The Bureau of Land Management has made every effort to ensure that the information in this document is accessible. If you have any problems accessing information, please contact Joe Rodarme at jrodarme@blm.gov or 435.636.3660.



ARTHUR CARHART NATIONAL WILDERNESS TRAINING CENTER

MINIMUM REQUIREMENTS DECISION GUIDE WORKBOOK

"...except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act..."

-- The Wilderness Act of 1964

Project Title: Twin Bridges Bowknot Helium Well Project

MRDG Step 1: Determination

*Determine if Administrative Action is **Necessary***

Description of the Situation

What is the situation that may prompt administrative action?

An oil & gas lease sale for Parcel No. UT 1218-257 located in T26S, R17E, Sec. 5 W2SW, unsurveyed, Sec. 6 S2, unsurveyed, Sec. 7 All, unsurveyed, and Sec. 8 N2NE, W2, unsurveyed, SL Meridian, Emery County, Utah, occurred on Dec. 12, 2018, totaling 1410 acres. Based on successful competitive bidding, Lease No. UTU 93713 was issued to Twin Bridges Resources, LLC, Denver, CO (hereafter referred to as Twin Bridges), on Feb. 8, 2019, with an effective date of lease of March 1, 2019. Additionally, Twin Bridges acquired two helium leases (parcels ML-53189 and ML-53420) from the Utah School and Institutional Trust Lands Administration (SITLA). These SITLA leases are described as Section 2, Township 26 South (T26S), Range 16 East (R16E) (596 acres) and Section 36, Township 25 South (T25S), R16E (640 acres).

The John D. Dingell, Jr. Conservation, Management and Recreation Act (P.L. 116-9) was signed into law on March 12, 2019, and designated the Labyrinth Canyon Wilderness in Emery County, Utah, to be managed in accordance with the provisions of the Wilderness Act. As stated in Section 4(d)(c) of the Wilderness Act, "Subject to valid rights then existing, [effective March 12, 2019], the minerals in lands designated by this Act as wilderness areas are withdrawn from all forms of appropriation under the mining laws and from disposition under all laws pertaining to mineral leasing and all amendments thereto.

The Twin Bridges federal lease No. UTU 93713 lies entirely within the new wilderness area with access provided by the cherry-stemmed Emery County Road 1026. The leased SITLA sections are also currently excluded from the Labyrinth Canyon Wilderness. Two existing roads (Emery County Road 1025 and Emery County Road 1026) were excluded from the Labyrinth Canyon Wilderness and provide access to the general vicinity of the parcels leased by Twin Bridges. The terminus of Emery County Road 1025 (Spur Road 1025) includes a disturbed circular roundabout that was also excluded from the Labyrinth Canyon Wilderness. Emery County Road 1026 bisects federal lease UTU 93713. The width of the excluded corridor for each road is 100 feet from centerline of the existing disturbance.

The purpose of this analysis is to determine if management action is necessary to provide reasonable access by Twin Bridges to its helium leases within the Labyrinth Canyon Wilderness (Step 1), and, if so, what minimum required actions are necessary to address proposed well site development (Step 2). In addition to potential surface impacts, the proposed alternatives will also address proposed drilling of cased wells through withdrawn mineral estate in order to access potential helium resources within the federal lease and SITLA inholdings.

Options Outside of Wilderness

Can action be taken outside of wilderness that adequately addresses the situation?

☐ YES

STOP – DO NOT TAKE ACTION IN WILDERNESS

☒ NO

EXPLAIN AND COMPLETE STEP 1 OF THE MRDG

Explain:

Access to the wilderness (subsurface-only at the well pad in the case of Alternative 1; both surface and subsurface at the well pad in the case of Alternative 2) is necessary in order to develop these valid existing rights. The leased area cannot be accessed from outside the wilderness boundary due to limited distance of long reach horizontal wells. The maximum drilling distance of horizontal wells into this type of reservoir rock is 9,500' – 10,500' (depending on cross faulting). The wilderness boundary is 2.47 miles (or 13,050 feet) away from the closest point of contact with Sec. 36. The same distance applies to the Federal Lease making it technically impossible to drill into either of these leases from outside of the Wilderness boundary.

There is an option to put the well pad right on top of the road. However, the technical requirements of the well pad may require it to be larger than the size of the cherry-stem. The cherry-stem in this case is 200 feet wide, so a part of the pad must be in the wilderness, if the pad must be larger than 200 feet.

Under Alternative 1, only subsurface impacts would occur to withdrawn mineral estate inside the wilderness since it would be required to drill cased bore holes to reach the state and federal helium leases. Under Alternative 2, the well pad would be located within Twin Bridges federal lease No. UTU93713; however, the width of the cherry-stemmed County Road 1026 is not sufficient to contain the necessary well pad so 7.3 acres of new surface disturbance would occur within the wilderness. Also, subsurface drilling of cased bore holes through withdrawn federal mineral estate would be required under Alternative 2 in order to reach the state lease in Section 36, Township 25 South (T25S), Range 16 East (R16E).

Criteria for Determining Necessity

Is action necessary to meet any of the criteria below?

A. Valid Existing Rights or Special Provisions of Wilderness Legislation

*Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that **requires** action? Cite law and section.*

☒ YES ☐ NO

Explain:

Twin Bridges federal lease no. UTU 93713 constitutes a valid existing right within the Labyrinth Canyon Wilderness. Mineral leases, permits, or licenses existing prior to the date of an area's designation as wilderness, can be operated under the original terms and conditions. Refer to the lease document attached to the Twin Bridges Bowknot Helium Lease EA for terms, conditions, stipulations, and restrictions. In accordance with BLM Manual 6340, the BLM will grant access to valid mineral rights that are wholly within a designated wilderness, as provided for in Section 5(b) of the Wilderness Act of 1964, in a manner consistent with other areas in the National Wilderness Preservation System similarly situated. In most cases, this means such access will be treated in the same way as access to inholdings, but in some instances applying the regulations found at 43 CFR 6305.30 may result in granting mineral lease holders a greater degree of access than would be granted an inholder.

B. Requirements of Other Legislation

*Is action necessary to meet the requirements of **other federal laws**? Cite law and section.*

☒ YES ☐ NO

Explain:

The need for the action is further established by the BLM's responsibilities under the Mineral Leasing Act (MLA) of 1920, as amended by the Federal Land Policy and Management Act (FLPMA) of 1976; the Federal Onshore Oil and Gas Leasing Act of 1987; and the Helium Privatization Act of 1996, which establishes the BLM's authority to enter into agreements with private parties for the recovery and disposal of helium on federal lands.

C. Wilderness Character

Is action necessary to preserve one or more of the five qualities of wilderness character?

UNTRAMMELED

☐ YES ☒ NO

Explain:

It is not necessary to take action to preserve this quality. The definition of the Untrammeled quality is the lack of manipulation or control of natural processes by humans, which if allowed to occur, would eventually affect wilderness character. This quality is preserved when no manipulation or control of natural processes occurs.

UNDEVELOPED

☐ YES ☒ NO

Explain:

It is not necessary to take action to preserve this quality. Preserving this quality keeps areas free from “expanding settlement and growing mechanization” and “with the imprint of man’s work substantially unnoticeable” and without structures, installations, temporary or permanent roads, or use of motorized equipment, mechanical transport, or landing or aircraft, as required by the Wilderness Act. The Undeveloped quality is preserved when wilderness retains its "primeval character and influence," and is essentially "without permanent improvements" or modern human occupation.

NATURAL

☐ YES ☒ NO

Explain:

It is not necessary to take action to preserve this quality. A wilderness area is to be "protected and managed so as to preserve its natural conditions" meaning that wilderness ecological systems are substantially free from the effects of modern civilization.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

☐ YES ☒ NO

Explain:

It is not necessary to take action to preserve this quality. The Wilderness Act defines wilderness as having “outstanding opportunities for solitude or a primitive and unconfined type of recreation.” This quality is preserved when the *opportunity* for people to experience wilderness in terms of the visitor's ability to avoid the sights and sounds of other human activity, and their expectation for an undeveloped environment with minimal restrictions remains unimpaired.

OTHER FEATURES OF VALUE

☐ YES ☒ NO

Explain:

It is not necessary to take action to preserve this quality. The Wilderness Act indicates that areas “may also contain ecological, geological, or other features of scientific, educational, scenic, or historical use” that reflect the character of wilderness.

Step 1 Determination

Is administrative action **necessary** in wilderness?

Criteria for Determining Necessity

A. Existing Rights or Special Provisions	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
B. Requirements of Other Legislation	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
C. Wilderness Character		
Untrammeled	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Undeveloped	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Natural	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Solitude/Primitive/Unconfined	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
Other Features of Value	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO

Is administrative action **necessary** in wilderness?

☒ YES

EXPLAIN AND COMPLETE STEP 1 OF THE MRDG

☐ NO

STOP – DO NOT TAKE ACTION IN WILDERNESS

Explain:

There is a need to take some type of administrative action in order to allow Twin Bridges reasonable access in order to further explore and develop its federal and state helium leases within the Labyrinth Canyon Wilderness.

MRDG Step 2

Determine the *Minimum* Activity

Other Direction

*Is there "special provisions" language in legislation (or other Congressional direction) that explicitly **allows** consideration of a use otherwise prohibited by Section 4(c)?*

AND/OR

Has the issue been addressed in agency policy, management plans, species recovery plans, or agreements with other agencies or partners?

☐ YES

DESCRIBE OTHER DIRECTION

☒ NO

SKIP AHEAD TO TIME CONSTRAINTS BELOW

Describe Other Direction:

No special provisions in legislation or other Congressional direction affecting the Twin Bridges helium leases currently exist. The BLM Price Field Office Resource Management Plan (2008) does not address management of the project area in the case of wilderness designation.

BLM Manual 6340 - Management of Designated Wilderness Areas states on page 1-64, under Analysis of Impacts to Wilderness Character from Activities Outside of Wilderness Areas, "In general, the BLM does not prohibit uses outside a wilderness on public lands solely to protect the wilderness character of the designated lands. When activities on adjacent public lands are proposed, the potential impacts, if any, of those activities upon the wilderness resource and upon public use of the adjacent wilderness area must be analyzed in the applicable NEPA document. In authorizing new uses, as long as the purpose and need can be met, a reasonable effort must be made to protect the character and values of the nearby wilderness."

Impacts from the construction of the gas plant and transportation of helium from the plant to market is not considered under this analysis since the proposed plant locations are entirely outside the Labyrinth Canyon Wilderness boundaries on State land, and the transportation of helium from the plants will occur entirely on Emery County roads.

Time Constraints

What, if any, are the time constraints that may affect the action?

Season of use and high precipitation events may dictate how and when personnel can access the site. Work would likely need to be done outside the winter season and outside the predicted monsoon season.

Components of the Action

What are the discrete components or phases of the action?

Component 1:	Access road improvements
Component 2:	Well pad construction
Component 3:	Drilling activities
Component 4:	Well pad facilities
Component 5:	Pipeline construction
Component 6:	Additional wells
Component 7:	Interim Reclamation
Component 8:	Well abandonment; Final reclamation
Component 9:	Road access and visitation

Proceed to the alternatives.

Refer to the [MRDG Instructions](#) regarding alternatives and the effects to each of the comparison criteria.

MRDG Step 2: Alternatives

Alternative 1: Bowknot 36-1: Construct well pad on Section 26 & 35, T25S R16E

Description of the Alternative

What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

- Road improvements on approximately 2.7 miles of Spur Road 1025 from Emery County Road 1025 to the proposed well pad. Upgrades to the road would result in 9.9 acres of surface disturbance.
- Construction of a 5.4-acre well pad located in an area of existing disturbance located in Section 26 & 35, T25S, R16E, Emery County, Utah.
- Drilling and testing of one exploratory helium well (Bowknot State 36-1) to state lease ML-53420 located in Section 36, T25S, R16E, Emery County, Utah.
- New disturbance within the wilderness would involve subsurface bore holes drilled across withdrawn federal mineral estate, authorized by BLM permit.

If a sufficient quality and quantity of helium-bearing gas is confirmed through flow testing of the exploratory well, the following actions would also be constructed:

- Construction of a helium processing plant on SITLA-managed lands in Section 16, T25S, R16E, Emery County, Utah.
- Installation of three pipelines and one conduit: 1) up to 14-inch-diameter steel or fiber-reinforced polyethylene gathering pipeline, 2) up to 8-inch-diameter polyethylene fluid transfer pipeline, 3) an 8-inch diameter polyethylene produced water pipeline, and 4) up to 6-inch-diameter conduit for running control and power cables. All infrastructure would be buried (3–4 feet) within a 30-foot-wide ROW parallel to Spur Road 1025, Emery County Road 1025, and Emery County Road 1010. Approximately 4.9 miles of proposed pipeline ROW would result in 17.8 acres of surface disturbance.
- Drilling, testing and production of a second delineation well (Bowknot 5-2) from the same well pad as the State 36-1 well under the terms and stipulations of Twin Bridges' federal lease UTU-93713 located in Section 7 and portions of Sections 5, 6, and 8, T26S, R17E, Emery County, Utah. The drilling of the second delineation well is under terms within federal helium Contract No. 20-02.
- Consideration of the drilling and production of up to 5 additional development wells. The number of wells would be determined based upon the results of the initial test well and subsequent delineation well. The number of development wells needed would largely be dictated by the viability of future horizontal drilling. It is possible that the reservoir could be adequately drained with the two initial wellbores, however up to five additional wells could be needed. All future wells would be drilled from the 5.4 acre well pad and no additional disturbance would occur.
- Currently, the existing disturbance of County Spur Road 1025 and its terminus is barely discernible to the naked eye from the Fivehole Arch trailhead or trail. A white stock tank is the only readily discernible feature and takes some time to locate with the naked eye. Casual observers on the Fivehole Arch trailhead are most likely to not ever notice the disturbances along Spur Road 1025.
- Although occurring adjacent to the wilderness boundaries within the 200-foot wide cherry-stem corridor, the new disturbance and structures such as road upgrades and the well pad will be temporarily more noticeable to wilderness visitors and may have an impact on their impression of human development of the local environment. For interim reclamation, BLM will require Twin Bridges to stain the surface of the remaining well pad and Spur Road 1025 in a random color pattern that will visually camouflage any straight lines and geometric shapes created by these features.

Component Activities*How will each of the components of the action be performed under this alternative?*

Comp #	<u>Component of the Action</u>	Activity for this Alternative
1	Access road improvements	Road upgrade; 30-foot-wide ROW for approximately 2.7 miles (14,445 feet), 9.9 acres disturbed; 10-14 day construction period; adjacent to wilderness
2	Well pad construction	Wellpad: 300 × 590 feet, 5.4 acres disturbance (2.4 after initial reclamation); 10-14 days construction period; adjacent to wilderness
3	Drilling activities	Drilling rig, 150 ft derrick height, up to 5 temporary trailers on site; mobilization & drilling period up to 34 days
4	Well pad facilities	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings
5	Pipeline construction	Pipeline; 30-foot-wide ROW for approximately 4.9 miles (25,880 feet); 17.8 acres disturbed; 30-day construction period; adjacent to wilderness
6	Additional wells	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 days drilling period for each
7	Interim Reclamation	Soil recontouring, redistribution & reseeding; 3.0 acres (2.4 acres disturbance after initial reclamation)
8	Well abandonment; Final reclamation	Well capped below ground level; soil recontouring, redistribution & reseeding; complete when 75% background cover achieved; 43.1 acres total disturbance
9	Road access and visitation	Improved access and increased visitation

Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Activity #	Component Activity for this Alternative	Positive	Negative	No Effect
1	Road upgrade; 30-foot-wide ROW for approximately 2.7 miles (14,445 feet), 9.9 acres disturbed; 10-14 day construction period; Random soil staining on road / pipeline disturbance to visually camouflage straight lines and geometric shapes. adjacent to wilderness.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Wellpad: 300 × 590 feet, 5.4 acres disturbance (2.4 after initial reclamation); 10-14 days construction period; Random soil staining on well pad disturbance to visually camouflage straight lines and geometric shapes. adjacent to wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Drilling rig, 150 ft derrick height, up to 5 temporary trailers on site; mobilization & drilling period up to 34 days	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Pipeline; 30-foot-wide ROW for approximately 4.9 miles (25,880 feet); 17.8 acres disturbed; 30-day construction period; adjacent to wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 days drilling period for each	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Soil recontouring, redistribution & reseeding; 3.0 acres (2.4 acres disturbance after initial reclamation)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Well capped below ground level; soil recontouring, redistribution & reseeding; complete when 75% background cover achieved; 43.1 acres total disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

9	Improved access and increased visitation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Number of Effects			8	NE
<u>Untrammelled Total Rating</u>		-8		

Explain:

Untrammelled quality is defined as unhindered and free from modern human control or manipulation. Construction work on Emery County Road 1025 and the well pad, drilling activities, production infrastructure, pipeline construction, drilling additional wells, and any rehabilitation activities will be observable from numerous locations within the surrounding wilderness area, in particular the Fivehole Arch trailhead and trail which the majority of visitors to this area use to experience the wilderness. Although temporary in nature and occurring adjacent to the wilderness boundaries within the 200 foot wide cherry-stem corridor, these construction activities will nevertheless be observable to wilderness visitors and have an impact on their impression of human manipulation of the local environment. Drilling and casing of wells under this alternative will create a sub-surface impact to the federal mineral estate located outside the boundary of Twin Bridges' federal lease UTU-93713 and withdrawn from mineral entry in accordance with the designation of the Labyrinth Canyon Wilderness.

UNDEVELOPED

Activity #	<u>Component Activity for this Alternative</u>	Positive	Negative	No Effect
1	Road upgrade; 30-foot-wide ROW for approximately 2.7 miles (14,445 feet), 9.9 acres disturbed; 10-14 day construction period; adjacent to wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Wellpad: 300 × 590 feet, 5.4 acres disturbance (2.4 after initial reclamation); 10-14 days construction period; adjacent to wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Drilling rig, 150 ft derrick height, up to 5 temporary trailers on site; mobilization & drilling period up to 34 days	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Pipeline; 30-foot-wide ROW for approximately 4.9 miles (25,880 feet); 17.8 acres disturbed; 30-day construction period; adjacent to wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

6	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 days drilling period for each	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Soil recontouring, redistribution & reseeded; 3.0 acres (2.4 acres disturbance after initial reclamation)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Well capped below ground level; soil recontouring, redistribution & reseeded; complete when 75% background cover achieved; 43.1 acres total disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	Improved access and increased visitation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Number of Effects			5	NE
<u>Undeveloped Total Rating</u>		-5		

Explain:

Undeveloped quality is defined as retaining its primeval character and influence; without permanent improvement or modern human occupation. Construction of the Emery County Road 1025 upgrades, well pad, and pipeline will cause surface disturbances indicative of human development. Until such time as the pipeline disturbance is sufficiently revegetated, it will continue to be visible to observers. In particular, the road improvements will be visible to visitors as they hike on the Fivehole Arch trail. Although occurring adjacent to the wilderness boundaries within the 200 foot wide cherry-stem corridor, these construction activities will nevertheless be observable to wilderness visitors and have an impact on their impression of human development of the local environment. Production facilities on the well pad are not expected to be substantially noticeable to visitors within the wilderness due to measures to bury, hide, or camouflage this infrastructure. Rehabilitation efforts at the well pad are not expected to have substantial effect on the undeveloped quality since the road upgrades will be permanent. Drilling and casing of wells under this alternative will create a sub-surface impact to the federal mineral estate located outside the boundary of Twin Bridges' federal lease UTU-93713 and withdrawn from mineral entry in accordance with the designation of the Labyrinth Canyon Wilderness. Increased impacts from increased access and visitation, such as user-created campsites or trails, are expected to be minimal under this alternative.

NATURAL

Activity #	<u>Component Activity for this Alternative</u>	Positive	Negative	No Effect
1	Road upgrade; 30-foot-wide ROW for approximately 2.7 miles (14,445 feet), 9.9 acres disturbed; 10-14 day construction period; adjacent to wilderness	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

2	Wellpad: 300 × 590 feet, 5.4 acres disturbance (2.4 after initial reclamation); 10-14 days construction period; adjacent to wilderness	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Drilling rig, 150 ft derrick height, up to 5 temporary trailers on site; mobilization & drilling period up to 34 days	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Pipeline; 30-foot-wide ROW for approximately 4.9 miles (25,880 feet); 17.8 acres disturbed; 30-day construction period; adjacent to wilderness	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 days drilling period for each	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Soil recontouring, redistribution & reseeding; 3.0 acres (2.4 acres disturbance after initial reclamation)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Well capped below ground level; soil recontouring, redistribution & reseeding; complete when 75% background cover achieved; 43.1 acres total disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	Improved access and increased visitation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Number of Effects			2	NE
<u>Natural Total Rating</u>		-2		

Explain:

Natural quality is defined as free from the effects of modern civilization and retaining integrity of the native ecosystem. Under this quality, only disturbance within the boundaries of the wilderness area will be considered. Although this alternative will create new impacts that will disturb existing vegetation and soils, these impacts will occur entirely within the 200 foot wide cherry-stem corridor and circular roundabout of Emery County Road 1025 where surface disturbance already exists with the existing road and turnaround. Widening of the existing surface disturbance will occur under this alternative but will likely not be substantially noticeable unless the observer is actually on the road or well pad. Drilling and casing of wells under this alternative will create a sub-surface impact to the federal mineral estate located outside the boundary of Twin Bridges' federal lease UTU-93713 and withdrawn from mineral entry in accordance with the designation of the Labyrinth Canyon Wilderness. Road upgrades will improve access to the Keg Springs Canyon area of the wilderness but are only expected to result in a small increase in visitation due to more attractive destinations nearby. Impacts to natural conditions in the form of user-created campsites and trails may result but are expected to be minimal.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Activity #	Component Activity for this Alternative	Positive	Negative	No Effect
1	Road upgrade; 30-foot-wide ROW for approximately 2.7 miles (14,445 feet), 9.9 acres disturbed; 10-14 day construction period; adjacent to wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Wellpad: 300 × 590 feet, 5.4 acres disturbance (2.4 after initial reclamation); 10-14 days construction period; adjacent to wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Drilling rig, 150 ft derrick height, up to 5 temporary trailers on site; mobilization & drilling period up to 34 days	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Pipeline; 30-foot-wide ROW for approximately 4.9 miles (25,880 feet); 17.8 acres disturbed; 30-day construction period; adjacent to wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 days drilling period for each	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Soil recontouring, redistribution & reseeding; 3.0 acres	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

	(2.4 acres disturbance after initial reclamation)			
8	Well capped below ground level; soil recontouring, redistribution & reseeding; complete when 75% background cover achieved; 43.1 acres total disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	Improved access and increased visitation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Number of Effects			7	NE
<u>Solitude or Primitive & Unconfined Rec. Total Rating</u>		-7		

Explain:

Solitude is defined as the state of being alone or remote from habitations or the sights and sounds of other people; the experience of a lonely, unfrequented, or secluded place.

Construction activities under this alternative for the road upgrades, well pad, drilling wells, well pad facilities, pipeline installation, and site rehabilitation will all involve the presence of other humans, motorized vehicles, and heavy equipment that will produce mechanical noise observable from within the wilderness boundaries for the duration of each particular activity. Noise production may be mitigated by required monitoring and the use of mufflers, but the sights of such activities will still be observable. Production facilities on the well pad are not expected to impact visitors experience of solitude or opportunities for primitive, unconfined recreation. Road upgrades will improve access to the Keg Springs Canyon area of the wilderness but are only expected to result in a small increase in visitation due to more attractive destinations nearby. Under Alternative 1, short-term noise and visual impacts from the road upgrades, drilling, well pad, and pipeline construction are expected to be noticeable for visitors prior to interim reclamation, especially in the more frequently visited area of the Fivehole Arch trail. Impacts to solitude due to increased visitation are expected to be minimal.

OTHER FEATURES OF VALUE

Activity #	<u>Component Activity for this Alternative</u>	Positive	Negative	No Effect
1	Road upgrade; 30-foot-wide ROW for approximately 2.7 miles (14,445 feet), 9.9 acres disturbed; 10-14 day construction period; adjacent to wilderness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Wellpad: 300 × 590 feet, 5.4 acres disturbance (2.4 after initial reclamation); 10-14 days construction period; adjacent to wilderness	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

3	Drilling rig, 150 ft derrick height, up to 5 temporary trailers on site; mobilization & drilling period up to 34 days	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Pipeline; 30-foot-wide ROW for approximately 4.9 miles (25,880 feet); 17.8 acres disturbed; 30-day construction period; adjacent to wilderness	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 days drilling period for each	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Soil recontouring, redistribution & reseeding; 3.0 acres (2.4 acres disturbance after initial reclamation)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Well capped below ground level; soil recontouring, redistribution & reseeding; complete when 75% background cover achieved; 43.1 acres total disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	Improved access and increased visitation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Number of Effects			3	NE
<u>Other Features of Value Total Rating</u>		-3		

Explain:

The outstanding scenery and visual qualities of the Labyrinth Canyon Wilderness viewshed are some of its most important supplemental features of value that would be impacted by this alternative, especially in the vicinity of the Fivehole Arch trail. In particular, the presence of a 150 foot tall drilling derrick and associated facilities on the well pad would be a temporary but noticeable impact to the visual qualities observed by visitors from within the wilderness. The permanent road upgrades will make Emery County Road 1025 more visibly noticeable for wilderness visitors as a man-made linear disturbance at a lower elevation and roughly perpendicular to the Fivehole Arch dispersed camping area, trailhead, and trail. Production facilities on the well pad are not expected to be substantially noticeable to visitors within the wilderness due to measures to bury, hide, or camouflage this infrastructure. Rehabilitation efforts at the well pad are not expected to have substantial effect on the scenic visual quality since the road upgrades will remain and the road existed prior to the proposed project.

Summary Ratings for Alternative 1

Wilderness Character	Rating Summary
Untrammeled	-8
Undeveloped	-5
Natural	-2
Solitude or Primitive & Unconfined Recreation	-7
Other Features of Value	-3
Wilderness Character Summary Rating	-25

MRDG Step 2: Alternatives

Alternative 2:

Bowknot 5-1: Construct well pad on Section 7, T26S R17E

Description of the Alternative

What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

- Road improvements on approximately 4.0 miles of Emery Country Road 1026 to the proposed well pad. Upgrades to the road would result in 14.5 acres of surface disturbance.
- New disturbance within the wilderness would involve subsurface bore holes drilled across withdrawn federal mineral estate to the state lease in Section 36, Township 25 South (T25S), Range 16 East (R16E) and 7.3 acres on the surface where the well pad would exceed the width of the cherry-stemmed corridor for County Road 1026.
- Construction of a 400' x 500' well pad adjacent to Road 1026, to include 7.3 acres of a previously undisturbed area of the Labyrinth Canyon Wilderness.
- Drilling and testing of one exploratory helium well (Bowknot 5-1) on federal lease UTU-93713 located in Section 7 and portions of Sections 5, 6, and 8, T26S, R17E, Emery County, Utah. The subsequent action is under terms within federal helium Contract No. 20-02.

If a sufficient quality and quantity of helium-bearing gas is confirmed through flow testing of the exploratory well, the following actions would also be constructed:

- Construction of a helium processing plant located on SITLA-managed lands in Section 16, T26S, R16E, Emery County, Utah.
- Installation of three pipelines and one conduit: 1) up to 14-inch-diameter steel or fiber-reinforced polyethylene gathering pipeline, 2) up to 8-inch-diameter polyethylene fluid transfer pipeline, 3) an 8-inch diameter polyethylene produced water pipeline, and 4) up to 6-inch-diameter conduit for running control and power cables. All infrastructure would be buried (3–4 feet) within a 30-foot-wide ROW parallel to Emery Country Road 1026 and Emery County Road 1010. Construction and installation along the 5.6-mile-long proposed pipeline ROW would result in 20.5 acres of surface disturbance.
- Drilling, testing and production of a second delineation well (Bowknot State 36-1) to state lease ML-53420 located in Section 36, T25S, R16E, Emery County, Utah.
- Consideration of the drilling and production of up to five additional development wells. The number of wells would be determined based upon the results of the initial test well and subsequent delineation well. The number of development wells needed would largely be dictated by the viability of future horizontal drilling. It is possible that the reservoir could be adequately drained with the two initial wellbores, however up to five additional wells could be needed. All future wells would be drilled from the 7.3 acre well pad and no additional disturbance would occur.

Component Activities*How will each of the components of the action be performed under this alternative?*

Comp #	<u>Component of the Action</u>	Activity for this Alternative
1	Access road improvements	Road upgrade; 30-foot-wide ROW for approximately 4.0 miles (21,140 feet); 21 days construction period
2	Well pad construction	Well pad: 400 × 500 feet; 7.3 acres disturbance within the Labyrinth Canyon Wilderness; 21 days construction period
3	Drilling activities	Drilling rig, 150 ft derrick height, mobilization & drilling period up to 34 days, temporary housing on site
4	Well pad facilities	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings
5	Pipeline construction	Pipeline; 30-foot-wide ROW for approximately 5.6 miles (29,780 feet); 20.5 acres disturbed; 40-day construction period
6	Additional wells	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 day drilling period for each
7	Interim Reclamation	Soil recontouring, redistribution & reseeding; 3.9 acres (3.4 acres disturbance after initial reclamation)
8	Well abandonment; Final reclamation	Well capped below ground level; soil recontouring, redistribution & reseeding; complete when 75% background cover achieved; 52.3 acres total disturbance
9	Road access and visitation	Improved access and increased visitation

Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Activity #	Component Activity for this Alternative	Positive	Negative	No Effect
1	Road upgrade; 30-foot-wide ROW for approximately 4.0 miles (21,140 feet); 21 days construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Well pad: 400 × 500 feet; 7.3 acres disturbance within the Labyrinth Canyon Wilderness; 21 days construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Drilling rig, 150 ft derrick height, mobilization & drilling period up to 34 days, temporary housing on site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Pipeline; 30-foot-wide ROW for approximately 5.6 miles (29,780 feet); 20.5 acres disturbed; 40-day construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 day drilling period for each	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Soil recontouring, redistribution & reseeded; 3.9 acres (3.4 acres disturbance after initial reclamation)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Well capped below ground level; soil recontouring, redistribution & reseeded; complete when 75% background cover achieved; 52.3 acres total disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	Improved access and increased visitation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Number of Effects			7	NE
Untrammeled Total Rating		-7		

Explain:

Untrammeled quality is defined as unhindered and free from modern human control or manipulation. Construction work on Emery County Road 1026 and the well pad, drilling activities, production infrastructure, pipeline construction, drilling additional wells, and any rehabilitation activities will be observable to visitors traveling to the Fivehole Arch trailhead and from locations within the wilderness area to the south and east of Emery County Road 1026. Although temporary in nature and occurring largely adjacent to the wilderness boundaries within the 200 foot wide cherry-stem corridor, these construction activities will nevertheless be observable to wilderness visitors and have an impact on their impression of human manipulation of the local environment. Drilling and casing of wells under this alternative will create a sub-surface impact to the federal mineral estate located outside the boundary of Twin Bridges' federal lease UTU-93713 and withdrawn from mineral entry in accordance with the designation of the Labyrinth Canyon Wilderness.

UNDEVELOPED

Activity #	Component Activity for this Alternative	Positive	Negative	No Effect
1	Road upgrade; 30-foot-wide ROW for approximately 4.0 miles (21,140 feet); 21 days construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Well pad: 400 × 500 feet; 7.3 acres disturbance within the Labyrinth Canyon Wilderness; 21 days construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Drilling rig, 150 ft derrick height, mobilization & drilling period up to 34 days, temporary housing on site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Pipeline; 30-foot-wide ROW for approximately 5.6 miles (29,780 feet); 20.5 acres disturbed; 40-day construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 day drilling period for each	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Soil recontouring, redistribution & reseeding; 3.9 acres (3.4 acres disturbance after initial reclamation)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

8	Well capped below ground level; soil recontouring, redistribution & reseeded; complete when 75% background cover achieved; 52.3 acres total disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	Improved access and increased visitation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Total Number of Effects			7	NE
<u>Undeveloped Total Rating</u>		-7		

Explain:

Undeveloped quality is defined as retaining its primeval character and influence; without permanent improvement or modern human occupation. Construction of the Emery County Road 1026 upgrades, well pad, and pipeline will cause surface disturbances indicative of human development. Until such time as the pipeline disturbance is sufficiently revegetated, it will continue to be visible to observers. In particular, the road improvements will be noticeable to visitors traveling out to the Fivehole Arch trailhead. 7.3 acres of the Labyrinth Canyon Wilderness will be disturbed at the well pad location. Although occurring adjacent to the wilderness boundaries within the 200 foot wide cherry-stem corridor, these construction activities will nevertheless be observable to wilderness visitors and have an impact on their impression of human development of the local environment. Production facilities on the well pad will be noticeable to visitors traveling to the Fivehole Arch trailhead on Road 1026. Additional well pad infrastructure associated with multiple wells is not expected to substantially alter visitors' impressions of the undeveloped quality of the wilderness. Rehabilitation efforts at the well pad are not expected to have substantial effect on the undeveloped quality since the road upgrades will be permanent. Drilling and casing of wells under this alternative will create a sub-surface impact to the federal mineral estate located outside the boundary of Twin Bridges' federal lease UTU-93713 and withdrawn from mineral entry in accordance with the designation of the Labyrinth Canyon Wilderness. Increased access and visitation to the Fivehole Arch trailhead may increase impacts such as user-created campsites and trails within the wilderness.

NATURAL

Activity #	Component Activity for this Alternative	Positive	Negative	No Effect
1	Road upgrade; 30-foot-wide ROW for approximately 4.0 miles (21,140 feet); 21 days construction period	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Well pad: 400 × 500 feet; 7.3 acres disturbance within the Labyrinth Canyon Wilderness; 21 days construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

3	Drilling rig, 150 ft derrick height, mobilization & drilling period up to 34 days, temporary housing on site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Pipeline; 30-foot-wide ROW for approximately 5.6 miles (29,780 feet); 20.5 acres disturbed; 40-day construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 day drilling period for each	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Soil recontouring, redistribution & reseeded; 3.9 acres (3.4 acres disturbance after initial reclamation)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Well capped below ground level; soil recontouring, redistribution & reseeded; complete when 75% background cover achieved; 52.3 acres total disturbance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Improved access and increased visitation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Total Number of Effects		2	5	NE
<u>Natural Total Rating</u>		-3		

Explain:

Natural quality is defined as free from the effects of modern civilization and retaining integrity of the native ecosystem. Under this quality, only disturbance within the boundaries of the wilderness area will be considered. Although this alternative will create new impacts that will disturb existing vegetation and soils, these impacts will occur largely within the 200 foot wide cherry-stem corridor of Emery County Road 1026. However, 7.3 acres of surface disturbance will occur at the well pad within the boundary of the wilderness. The well pad disturbance will be improved and reduced to 3.4 acres after interim reclamation. Well abandonment and final reclamation will eventually remove the well pad surface disturbance within the wilderness although it will take many years to re-establish current conditions. Drilling and casing of wells under this alternative will create a sub-surface impact to the federal mineral estate located outside the boundary of Twin Bridges' federal lease UTU-93713 and withdrawn from mineral entry in accordance with the designation of the Labyrinth Canyon Wilderness. Improved access and increased visitation within this portion of the wilderness may result in more human impacts to natural conditions from camping, trash, and user-created trails.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Activity #	Component Activity for this Alternative	Positive	Negative	No Effect
1	Road upgrade; 30-foot-wide ROW for approximately 4.0 miles (21,140 feet); 21 days construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Well pad: 400 × 500 feet; 7.3 acres disturbance within the Labyrinth Canyon Wilderness; 21 days construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Drilling rig, 150 ft derrick height, mobilization & drilling period up to 34 days, temporary housing on site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Pipeline; 30-foot-wide ROW for approximately 5.6 miles (29,780 feet); 20.5 acres disturbed; 40-day construction period	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 day drilling period for each	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Soil recontouring, redistribution & reseeded; 3.9 acres (3.4 acres disturbance after initial reclamation)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Well capped below ground level; soil recontouring, redistribution & reseeded; complete when 75% background cover achieved; 52.3 acres total disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	Improved access and increased visitation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Total Number of Effects			8	NE
Solitude or Primitive & Unconfined Rec. Total Rating		-8		

Explain:

Solitude is defined as the state of being alone or remote from habitations or the sights and sounds of other people; the experience of a lonely, unfrequented, or secluded place. Construction activities for the road upgrades, well pad, drilling wells, well pad facilities, pipeline installation, and site rehabilitation will involve the presence of other humans, motorized vehicles, and heavy equipment that will produce mechanical noise observable from within the wilderness boundaries for the duration of each activity.

Noise production may be mitigated by required monitoring and use of mufflers, but the sights of such activities will still be observable. Construction along Emery County Road 1026 may temporarily obstruct or hinder visitors' ability to access the Fivehole Arch trailhead and camping area for primitive, unconfined recreation. Improvements made to the road may also increase the amount of visitors access the wilderness at the Fivehole Arch trailhead and reduce the quality of solitude that can be experienced. Production facilities on the well pad are not expected to impact visitors experience of solitude or opportunities for primitive, unconfined recreation. Improved road access may increase visitation to this area of the wilderness, negatively impacting the quality of solitude to be experienced by visitors.

OTHER FEATURES OF VALUE

Activity #	Component Activity for this Alternative	Positive	Negative	No Effect
1	Road upgrade; 30-foot-wide ROW for approximately 4.0 miles (21,140 feet); 21 days construction period	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Well pad: 400 × 500 feet; 7.3 acres disturbance within the Labyrinth Canyon Wilderness; 21 days construction period	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Drilling rig, 150 ft derrick height, mobilization & drilling period up to 34 days, temporary housing on site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Holding tanks, transfer pumps, separators, vessels, flowlines, safety equipment; painted or buried to blend with surroundings	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Pipeline; 30-foot-wide ROW for approximately 5.6 miles (29,780 feet); 20.5 acres disturbed; 40-day construction period	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Drilling additional wellheads, separator, and flow lines to existing well pad facility and pipelines; up to 20 day drilling period for each	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Soil recontouring, redistribution & reseeding; 3.9 acres (3.4 acres disturbance after initial reclamation)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

8	Well capped below ground level; soil recontouring, redistribution & reseeded; complete when 75% background cover achieved; 52.3 acres total disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	Improved access and increased visitation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Number of Effects			2	NE
<u>Other Features of Value Total Rating</u>		-2		

Explain:

The outstanding scenery and visual qualities of the Labyrinth Canyon Wilderness viewshed are some of its most important supplemental features of value that would be impacted by this alternative, especially in the vicinity of the Fivehole Arch trail and Horseshoe Canyon. In particular, the presence of a 150 foot tall drilling derrick and associated facilities on the well pad would be a temporary but noticeable impact to the visual qualities observed by visitors from within the wilderness. The visual impacts from road upgrades, well pad, pipeline, and widening on Emery County Road 1026 are likely to be localized and substantially unnoticeable beyond 1 mile distance due to the roads elevated position and lower visitation within the surrounding viewshed to the east and south. Emery County Road 1026, the pipeline, and the well pad are topographically screened from behind the Fivehole Arch trailhead, trail, and dispersed camping area and from Horseshoe Canyon to the south. Production facilities on the well pad are not expected to be substantially noticeable to visitors within the wilderness due to measures to bury, hide, or camouflage this infrastructure. Rehabilitation efforts at the well pad are not expected to have substantial effect on the scenic visual quality since the road upgrades will remain and the road existed prior to the proposed project.

Summary Ratings for Alternative 2

Wilderness Character	Rating Summary
Untrammeled	-7
Undeveloped	-7
Natural	-3
Solitude or Primitive & Unconfined Recreation	-8
Other Features of Value	-2

Wilderness Character Summary Rating	-27
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MRDG Step 2: Alternatives

Alternative 3:

No Action

Description of the Alternative

What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

Under the No Action Alternative, Twin Bridges' ROW applications and APDs would be denied, and the action alternatives would not be developed. Exploration by Twin Bridges to access its UTU-93713 federal lease and ML-53420 state lease would need to be assessed and conducted in a different manner.

Component Activities

How will each of the components of the action be performed under this alternative?

Comp #	<u>Component of the Action</u>	Activity for this Alternative
1	Access road improvements	N/A
2	Well pad construction	N/A
3	Drilling activities	N/A
4	Well pad facilities	N/A
5	Pipeline construction	N/A
6	Additional wells	N/A
7	Interim Reclamation	N/A
8	Well abandonment; Final reclamation	N/A
9	Road access and visitation	

Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Activity #	<u>Component Activity for this Alternative</u>	Positive	Negative	No Effect
1	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

3	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total Number of Effects			0	NE
<u>Untrammed Total Rating</u>		0		

Explain:

No actions would occur within the Labyrinth Canyon Wilderness. The existing character and qualities of the wilderness area would remain unchanged.

UNDEVELOPED

Activity #	<u>Component Activity for this Alternative</u>	Positive	Negative	No Effect
1	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total Number of Effects			0	NE
<u>Undeveloped Total Rating</u>		0		

Explain:

No actions would occur within the Labyrinth Canyon Wilderness. The existing character and qualities of the wilderness area would remain unchanged.

NATURAL

Activity #	Component Activity for this Alternative	Positive	Negative	No Effect
1	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total Number of Effects			0	NE
Natural Total Rating		0		

Explain:

No actions would occur within the Labyrinth Canyon Wilderness. The existing character and qualities of the wilderness area would remain unchanged.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Activity #	Component Activity for this Alternative	Positive	Negative	No Effect
1	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total Number of Effects			0	NE
Solitude or Primitive & Unconfined Rec. Total Rating		0		

Explain:

No actions would occur within the Labyrinth Canyon Wilderness. The existing character and qualities of the wilderness area would remain unchanged.

OTHER FEATURES OF VALUE

Activity #	Component Activity for this Alternative	Positive	Negative	No Effect
1	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total Number of Effects			0	NE
Other Features of Value Total Rating		0		

Explain:

No actions would occur within the Labyrinth Canyon Wilderness. The existing character and qualities of the wilderness area would remain unchanged.

Summary Ratings for Alternative 3

Wilderness Character	Rating Summary
Untrammeled	0
Undeveloped	0
Natural	0
Solitude or Primitive & Unconfined Recreation	0
Other Features of Value	0
Wilderness Character Summary Rating	0

MRDG Step 2: Alternatives Not Analyzed

Alternatives Not Analyzed

What alternatives were considered but not analyzed? Why were they not analyzed?

No other alternatives were proposed by the applicant for this project.

MRDG Step 2: Alternative Comparison

Alternative 1: Bowknot 36-1: Construct well pad on section 26 & 35, T25S R16E

Alternative 2: Bowknot 5-1: Construct well pad on section 7, T26S R17E

Alternative 3: No Action

	<u>Alternative 1</u>	<u>Alternative 1</u>	<u>Alternative 2</u>	<u>Alternative 2</u>	<u>Alternative 3</u>	<u>Alternative 3</u>
Wilderness Character	+	-	+	-	+	-
Untrammeled	0	8	0	7	0	0
Undeveloped	0	5	0	7	0	0
Natural	0	2	2	5	0	0
Solitude/Primitive/Unconfined	0	7	0	8	0	0
Other Features of Value	0	3	0	2	0	0
Total Number of Effects	0	25	2	29	0	0
Wilderness Character Rating	-25		-27		0	

MRDG Step 2: Determination

Refer to the [MRDG Instructions](#) before identifying the selected alternative and explaining the rationale for the selection.

Selected Alternative

- | | |
|---|--|
| <input type="checkbox"/> Alternative 1: | Bowknot 36-1: Construct well pad on section 26 & 35, T25S R16E |
| <input type="checkbox"/> Alternative 2: | Bowknot 5-1: Construct well pad on section 7, T26S R17E |
| <input type="checkbox"/> Alternative 3: | No Action |

Explain Rationale for Selection:

Based on the analysis in this document, Alternative 1 is predicted to have slightly fewer negative impacts to wilderness character than Alternative 2. Ground disturbance under Alternative 1 only occurs within the wilderness boundary below the surface from drilling through withdrawn federal mineral estate. Under Alternative 2, surface disturbance at the well pad includes 7.3 acres within the wilderness boundary, in addition to sub-surface drilling through withdrawn federal mineral estate. Alternative 2 would cause less visual impact to the supplemental value of high quality scenery due to its more elevated, topographically-screened position within the wilderness area. Visual impacts from the road upgrades, well pad, and pipeline in Alternative 1 are expected to be more persistent and noticeable to visitors from within the wilderness area, especially in the more frequently visited area of the Fivehole Arch trail. However, under Alternative 2, construction along Emery County Road 1026 will temporarily obstruct or hinder visitors ability to access the Fivehole Arch trailhead and camping area for primitive, unconfined recreation. Improvements made to the road may also increase the amount of visitors who access the wilderness area from the Fivehole Arch trailhead and reduce the overall quality of naturalness and solitude that can be experienced. The road widening, pipeline scar, well pad, and production infrastructure observed by visitors traveling to the Fivehole Arch trailhead may also reduce the overall wilderness experience. Although completely outside the wilderness boundaries, semi-trailer truck traffic to and from the gas plant on state lands would have more impact to visitors under Alternative 2 than Alternative 1 due to the total mileage of Emery County roads that would be affected.

Describe Monitoring & Reporting Requirements:

Approvals

Which of the prohibited uses found in Section 4(c) of the Wilderness Act are approved in the selected alternative and for what quantity?

Approved?	Prohibited Use	Quantity
<input type="checkbox"/>	Mechanical Transport:	Number to be determined by construction and drilling requirements.
<input type="checkbox"/>	Motorized Equipment:	Number to be determined by construction and drilling requirements.
<input type="checkbox"/>	Motor Vehicles:	Number to be determined by construction and drilling requirements.
<input type="checkbox"/>	Motorboats:	No.
<input type="checkbox"/>	Landing of Aircraft:	No.
<input type="checkbox"/>	Temporary Roads:	No.
<input type="checkbox"/>	Structures:	Well pad facilities and road improvements.
<input type="checkbox"/>	Installations:	Pipeline.

Record and report any authorizations of Wilderness Act Section 4(c) prohibited uses according to agency policies or guidance.

Refer to agency policies for the following signature authorities:

Prepared:

Name Ray Kelsey

Position Utah NLCS Program Lead

Signature RAYNER
KELSEY

Digitally signed by RAYNER
KELSEY
Date: 2020.12.17 10:32:01
-07'00'

Date _____

Recommended:

Name

Position

Signature _____

Date _____

Recommended:

Name

Position

Signature _____

Date _____

Approved:

Name

Roger L. Bankert

Position

Field Manager

Signature _____

ROGER
BANKERT

 Digitally signed by ROGER
BANKERT
Date: 2020.12.18 07:35:16
-07'00'

Date _____

APPENDIX J

Public Comments on the Draft Environmental Assessment and Bureau of Land Management Responses

The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The Bureau of Land Management has made every effort to ensure that the information in this document is accessible. If you have any problems accessing information, please contact Joe Rodarme at jrodarme@blm.gov or 435.636.3660.



U.S. Department of the Interior Bureau of Land Management

APPENDIX J. PUBLIC COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSMENT AND BLM RESPONSES

The Bureau of Land Management (BLM) Price Field Office provided a 19-day public comment period on the Draft Environmental Assessment (EA). The public comment period started on October 22, 2020 and ended on November 9, 2020. During the public comment period, the BLM accepted comments online using the BLM's ePlanning website as well as by email. A total of 20,042 comment submissions were received by the BLM during the public comment period. All comment letters received are retained in the project's decision file.

The BLM read and considered each comment letter submitted on the Draft EA, and identified potentially substantive comments from the letters that would prompt the BLM to revisit the analysis, assumptions, accuracy, and other information contained in the Draft EA. This subset of comments was then sorted into categories (e.g., air quality, wildlife, recreation, and other resource concerns) and individually reviewed as either substantive or non-substantive.

Non-substantive Comments

Non-substantive comments are those that express an opinion; raise issues that are beyond the scope of, or are irrelevant to, the current project; or take the form of vague, open-ended questions. The BLM reviewed, noted, and recorded non-substantive comments but did not develop a response, nor include those comments in summary responses or the summary table. Common non-substantive comments on the Draft EA included the following:

Alternative Preferences

The BLM received multiple comments recommending that the BLM select a particular alternative. Many of these comments also indicated that the commenter had this alternative preference because of a concern regarding impacts on public land resources and values including wilderness areas, economic considerations and job creation, and concerns regarding domestic helium supply. The BLM appreciates the public's opinions regarding the alternatives analyzed in the EA and will consider all comments in the decision-making process.

Substantive Comments

Substantive public comments formed the basis for much of the revision that occurred between release of the Draft EA and this EA. Substantive comments do one or more of the following: 1) Question, with reasonable basis, the accuracy of information in the EA; 2) Question, with reasonable basis, the adequacy of, methodology for, or assumptions used for the EA; 3) Present new information relevant to the analysis; 4) Present reasonable alternatives other than those analyzed in the EA; and 5) Cause changes or revisions in one or more of the alternatives. As substantive comments were identified, they were organized into groups that were useful to the editing and revision process. Some substantive comments were made multiple times in one letter, were made in multiple letters by multiple commenters, or included details that were not relevant to the issue raised or the BLM's response. These comments were grouped together and are addressed in the comment summaries and responses below. Other comments that resulted in changes to the text are addressed in the following Table J.1.

Air Quality

Comments noted that the air analysis in the EA estimates emissions from completion flaring (a method which will not be used) instead of the enclosed vapor combustion system described in Appendix G of the EA. In response to this comment, the BLM revised emissions from the disposal of well completion gases to represent the estimated combustion emissions from the use of a vapor combustion system with a Volatile Organic Compound (VOC) destruction efficiency of greater than 98%.

The BLM received comments that stated the EA had no discussion of the regional visual haze or ozone impacts and stated impacts should be addressed at a regional scale, not just merely near field. Comments also requested that the EA be revised to include a summary of visibility results for Alternative B as is provided for Alternative A. The BLM has defined direct emissions for this project as those emissions related to the construction and operation of the proposed well pad. Impacts from indirect effects of the Federal action have been included in the air quality analysis, specifically the operation and construction of the helium processing plant. Section 3.2.2.5 discusses the potential cumulative impacts to National Ambient Air Quality Standards (NAAQS) by tiering to the Moab Master Leasing Plan (MLP) far-field modeling analysis. This analysis used CALMET/CALPUFF dispersion modeling to assess impacts to NAAQS and to Air Quality Related Values (AQRVs) in the planning area. This analysis serves as an impact analysis with respect to regional haze. The EA has been revised to further discuss potential far-field cumulative impacts to visibility at the nearest Class I areas as estimated from the Moab MLP far-field dispersion modeling. Results for the modeling of Alternative B have been included in the EA Section 3.2.2.3.4. Regional haze is a cumulative issue that the direct and indirect emissions from the construction and operation of the helium well and processing facilities, as minor sources of emissions, would have very little influence on. As such, the BLM can rely on the Utah Department of Air Quality regional haze State Implementation Plan (SIP) to ensure there is no adverse impact from regional haze. The most recent regional haze SIP is supported by new technical information and a modeling analysis indicating that the SIP will achieve greater visibility benefits in Arches, Canyonlands, and seven other Class I areas (EPA 2020). The impacts of the SIP will reduce overall air quality emissions by an estimated 1,879 tons per year relative to the previous plan. Thus, the proposed action is not anticipated to contribute to degradation with respect to regional haze.

Comments requested that the EA clarify how commuting vehicle emissions during construction were calculated in Table 3-3, noting that commuting vehicle emissions for Alternative B were noted to be lower than those for Alternative A, despite a longer access road. Comments also requested that the EA explain the emissions factor source for on-road and off-road mobile sources to clarify the conservative nature of using these factors. Comments further stated that the analysis should be updated to reflect different regulatory standards and atmospheric conditions between the Project area and the South Coast Air Quality Management District (whose factors were used to estimate on-road and off-road emissions for mobile sources) and requested that the EA include a discussion of the methodology choice and representative and/or conservative nature of using these emissions factors. In response to these comments, the EA has been revised to reflect use of the EPA MOVES 2014b model which uses meteorology data specific to Emery County, Utah. Appendix H has been revised to more clearly define how commuting vehicle emissions during construction and operation were calculated. Individual distances to the well pad, processing plant, pipeline and access road were estimated for each alternative. Estimated commuting vehicle emissions have been also revised in Tables 3-1, 3-2, 3-3 and 3-4, based on the revised commuting distances and emission factors and associated conclusions in the EA have been revised where appropriate (e.g., the EA now notes that commuting vehicle emissions for Alternative B are slightly higher than Alternative A).

Comments stated long term impacts fugitive dust are not addressed sufficiently, noting that the EA indicates that road improvements will lead to an increase in recreation visitation, and that improved roads will allow for increased travel speeds, both of which would increase dust emissions. The Draft EA discloses emissions from the operational phase (long-term impacts) of the proposed action in Tables 3-2, and Table 3-4 for Alternatives A and B, respectively. The methods used to calculate emissions from vehicle fugitive dust emissions are based on EPA's AP-42 emission calculation methodology. The impacts of fugitive dust to the NAAQS and to near field visibility are adequately discussed in section 3.2.2.2.3 and 3.2.2.2.4 given the relative magnitude of emissions from the project. Additionally, the impacts of road dust under the cumulative impacts scenario used for the analysis (the Moab MLP CALPUFF far-field air quality analysis) includes road dust contribution to ambient air quality impacts. Section 3.2.2.5 of the EA includes discussion of the Moab MLP far field modeling which included a high development scenario, medium development scenario, and low development scenario within the model domain. No exceedances of NAAQS standards were anticipated based on this study. As explained in the EA, because the low development scenario is most similar to the level of development in the project area, the cumulative impacts to air quality are expected to be within the range evaluated in the Moab MLP's modeling results. This method of tiering off of an existing modeling analysis to evaluate cumulative impacts for this project is reasonable in this circumstance due to the limited size of the project and, given that no significant impacts were determined in the Moab MLP analysis, it stands to reason that the cumulative impacts from the proposed action will not be significant. Note that while EA has been revised to include dust abatement measures included by the Applicant in revised Appendix G, the air analysis takes a conservative approach and does not incorporate dust control measures into the vehicle travel calculations. Thus, actual fugitive dust emissions from project operations are likely to be lower than those disclosed in Section 3.2.2.

Alternatives Considered in the Environmental Assessment

The BLM received comments suggesting improvements or clarifications to the BLM's descriptions of Alternatives A and B. These comments included suggestions from the Applicant to more clearly define the technical benefits of and Applicant's preference for Alternative A and to add information better explaining the rationale for differences between Alternatives A and B (e.g., the differences of the well pad sizes). The BLM reviewed the Draft EA and added additional information to the description of Alternatives A and B in Chapter 2 and Appendix G where information provided by the Applicant in their comments was not previously provided in the Draft EA.

The BLM received comments from the Applicant suggesting changes to the description of alternatives considered but eliminated from detailed analysis in the EA. These comments included the Applicant's rationale for Alternative A being preferable over Alternative B as described in the EA, as well as information about other surface well pad locations considered by the Applicant prior to submitting an APD. The BLM added additional information to Section 2.6 of the EA regarding the Applicant's consideration of other well pad locations prior to submitting APDs. The BLM determined that the other information provided in the comments was already described in the EA's description of Alternative A and B and was not appropriate for inclusion in Section 2.6 of the EA.

The BLM received comments suggesting that the BLM consider other less sensitive locations for helium production and noted that helium is produced as a byproduct but not captured from many natural gas wells on BLM-administered lands. The BLM did not consider this alternative in detail because it would not meet the BLM's purpose and need to respond to Twin Bridges' applications for APDs/ROWs to access their Federal and SITLA mineral leases.

Consistency with Price Field Office Resource Management Plan Oil and Gas Leasing Stipulations

The BLM received comments noting that the well pad location for Alternative A is located in an area that has been identified in the 2008 Price RMP as open to oil and gas leasing subject to No Surface Occupancy (NSO) stipulations and questioned the BLM's rationale for evaluating this location for the well pad facilities.

NSO stipulations apply to on-lease actions. The well pad and other facilities proposed by the applicant under Alternative A are off-lease actions. As described in Chapter 2 of the EA, the surface facilities for Alternative A would be authorized with ROWs. Oil and gas leasing NSO stipulations do not apply to the issuance of new ROWs. Instead, the project area for Alternative A is a ROW avoidance area (Price RMP page 40). A ROW avoidance area is defined in the Price RMP as "areas with sensitive resource values where rights-of-way leases and easements will be strongly discouraged. Authorization made in avoidance areas will have to be compatible with the purpose for which the area was designated and is not otherwise feasible on lands outside the avoidance area" (Price RMP page 155). The compatibility of the ROWs with wilderness values are discussed in Section 3.9 of the EA. BLM issuing a ROW in the avoidance area is in conformance with the RMP because locations outside the avoidance area are either located in a designated wilderness area or are too far away to provide access via directional drilling to the valid existing leases. Furthermore, the area is identified as an avoidance area to protect visual resources (the area is identified as Visual Resource Management [VRM] Class II in the Price RMP). The analysis contained in this EA determined that the facilities located on the well pad would be designed in conformance with the VRM Class II designation. The ROW would also provide reasonable access to SITLA lands and minerals, so it is also subject to Price RMP decision LAR-10 which states "In accordance with the State of Utah v. Andrus, Oct. 1, 1979 (Cotter Decision), the BLM will grant the State of Utah reasonable access to State lands for economic purposes, on a case-by-case basis. The Wilderness Act also acknowledges that owners of inholdings must be granted adequate access. 16 U.S.C. § 1134(a).

Cultural Resources

The BLM received comments expressing concerns regarding potential impacts to cultural resources, such as rock art sites, as a result of the proposed Project and a potential increase in vehicle traffic that they felt could lead to damage to cultural sites and illegal OHV use. These comments also expressed concern about potential adverse impacts to visitor experience at the Dry Lake Area of Critical Environmental Concern (ACEC), which was designated by the BLM for the research of Paleo-Indian archaeological sites, and at the Horseshoe Canyon Unit of Canyonlands National Park because the Great Gallery in Horseshoe Canyon attracts over 8,000 visitors annually who are drawn to the rock art and the remote and scenic nature of the area.

The BLM established an Area of Potential Effects (APE) for cultural resources pursuant to Section 106 of the National Historic Preservation Act (NHPA) for each of the alternatives. The APE was surveyed by a qualified archaeologist. The surveys did not identify historic properties (i.e., properties that are listed on or eligible for listing on the National Register of Historic Places). Because no historic properties are present BLM, in consultation with the Utah State Historic Preservation Office, has determined that the undertaking will have no adverse effect to historic properties. The APE does not include the Dry Lake ACEC nor the Horseshoe Canyon Unit of Canyonlands National Park and the BLM does not believe that impacts on cultural resources would occur outside of the APE. Commenters are referred to EA Section 3.8 for analysis regarding visitation to the analysis area as a result of the proposed road improvements. Additional information regarding the cultural resource surveys completed is included in the ID Team checklist included in Appendix B of the EA.

Cumulative Impacts Analysis

For multiple resources, comments questioned the BLM's rationale for selecting cumulative impact analysis areas, suggested deficiencies in the BLM's selection of cumulative impacts analysis areas, or suggested additional reasonably foreseeable future actions that should be included in the cumulative impacts analysis. With regard to other reasonably foreseeable future actions, comments suggested that the BLM should include impacts associated with the developments described in the Reasonably Foreseeable Development Scenarios (RFDs) prepared for the Price Field Office, San Rafael Desert MLP (for which a RFD was completed but the BLM never completed the MLP and amended the Price or Richfield RMPs), Moab Field Office, Moab MLP, and Richfield Field Office and the recently completed San Rafael Desert Travel Management Plan (TMP). The cumulative impacts analysis contained in the EA for all resources has been revised. For some resources, this revision included identification of a revised cumulative impacts analysis area. For all resources, the BLM has included additional reasonably foreseeable future actions, including developments disclosed in the applicable RFDs, the BLM's management of travel routes associated with the San Rafael Desert TMP, and other actions. This revised cumulative impacts scenario is presented in Section 3.1.2 of the EA, and the corresponding analysis is contained in the relevant environmental consequences sections of Chapter 3. The EA has also been revised to include a map of all cumulative analysis areas in Appendix F.

The BLM received comments suggesting that the BLM has not analyzed and disclosed the cumulative impacts of drilling either 1,540 (the number of wells predicted in the RFD prepared to support the 2008 Price RMP) or the 30 wells (the number of wells predicted in the RFD prepared to support the San Rafael Desert MLP, which was not completed by the BLM) on the resource values discussed in the Draft EA. As described in the comment summary above, the BLM has revised the EA to include additional cumulative impacts analysis, including analysis of the potential

impacts of developments disclosed in the applicable RFDs. Additionally, the potential impacts of developing 1,540 wells was analyzed in the 2008 Price Field Office RMP/EIS. With the exception of the portions of the San Rafael Desert MLP area that extended into the Richfield Field Office, the Price Field Office RMP/EIS analysis included the 30 wells that were predicted by the RFD prepared for the San Rafael Desert MLP (which BLM did not complete).

Decision Process

The BLM received comments questioning the use of “underground authorizations” as a valid legal tool, suggesting that such an action would be a direct violation of the requirements of the Mineral Leasing Act of 1920, as amended. Commenters acknowledged that while the regulations at 43 CFR 2920 allow BLM to authorize activities not specifically authorized elsewhere, there are limits to this authority, and the regulation is clear that BLM cannot use the 43 CFR 2920 regulations to authorize uses that are prohibited by other laws.

The commenters state that using 43 CFR 2920 to authorize drilling through unleased Federal mineral estate would violate the Mineral Leasing Act, as well as the language of the 43 CFR 2920 regulations. Therefore, the “underground authorizations” contemplated as part of both Alternatives A and B in this EA are not legal options available to the BLM, and consequently, the Twin Bridges Bowknot Helium Project cannot be considered for approval by BLM as it is currently proposed.

The BLM considered the use of underground authorizations to grant Twin Bridges access to the valid existing mineral rights under its Federal and SITLA leases, which requires access through withdrawn (therefore unleased) Federal minerals. The BLM must consider both the agency’s legal requirements to grant access to the valid existing rights with the requirement to minimize impacts to wilderness character of the Labyrinth Canyon Wilderness Area. This authorization would be granted utilizing the 43 CFR 2920 regulations. If approved by the BLM, the Project would be implemented in accordance with the Wilderness Act, which requires the minimization of impacts to wilderness character, allowing reasonable access, and honoring valid existing rights. Beyond the valid existing mineral rights described in the EA, no other Federal minerals will be produced by the Project. The Applicant will abide by minimum setbacks for lease boundaries established by the State of Utah under Utah Division of Oil, Gas, and Mining Rule R649-3-2#3 to ensure no unleased or withdrawn Federal minerals are produced.

Effects of Non-Federal Actions

The BLM received comments noting that some of the potential areas of surface disturbance are located on non-Federal (SITLA) lands and suggested that the EA either clarify which surface disturbances take place on Federal and non-Federal land or only disclose impacts to BLM-managed surface lands. Sections 2.2. and 2.3 of the EA correctly identify the processing plant as being located on SITLA lands. The processing plant locations are included as part of the facilities proposed by the Applicant and would not be constructed unless the BLM approves the Federal authorizations for well pads, pipelines, and other infrastructure. Accordingly, the processing plant is considered an indirect effect of the Federal decisions and it is appropriate to include impacts related to development of the plant in the analysis. The BLM is not required to separate those impacts occurring on BLM-administered lands from those impacts occurring on lands managed by other entities.

Greenhouse Gas Emissions

Comments asserted that the EA did not define its cumulative impact analysis areas for greenhouse gas (GHG) emissions and climate change and stated the BLM did not consider RFDs prepared to support the San Rafael Desert MLP and Moab MLP projects; recent and future BLM and SITLA oil and gas lease sales within and outside of Utah; recent and ongoing oil and gas development projects; and nearby coal lease modification and Lease by Application projects in its cumulative GHG impact analysis. Comments also stated BLM did not explain what global warming potential (GWP) it has relied on for GHG emissions, including methane and expressed concern that the EA failed to disclose the true magnitude of methane pollution by using relying on the 100-year GWP of methane, without considering the 20-year GWP, even though it acknowledges that methane emissions have a lifetime of 12.4 years. Comments stated that in order to disclose both the long- and short-term impacts of its decision, as required by NEPA, BLM must analyze the warming potential of methane emissions using both the Intergovernmental Panel on Climate Change's (IPCC's) current 100-year GWP for fossil methane of 36, and the IPCC's current 20-year GWP for fossil methane of 87.8. Comments requested that BLM provide additional analysis and disclose GWP values utilized so the public can easily follow how BLM calculated the direct emissions. Comments also stated the BLM failed to analyze the impacts of the Project on carbon sequestration, including the elimination or degradation of carbon sinks, resulting loss of carbon storage, and related climate change impacts, including a consideration of the time lag between leasing and any reclamation. The comments also requested consideration of the significance of the loss of carbon sinks on GHG emissions and climate change during the time lag between leasing and any reclamation. Comments also stated that BLM failed to adequately analyze and disclose indirect impacts indirect or "downstream" emissions associated for the entire supply chain, including emissions from exploration, development, drilling, completion, production, gathering, boosting, processing, transportation, transmission, storage, distribution, refining, and end use. Finally, comments stated that the BLM failed to require the use of any Best Management Practice to mitigate the impacts of GHG emissions and stated BLM must analyze the GHG emissions and include mandatory mitigation measures to address them.

As stated in Section 3.2.2.5 of the EA, GHG impacts to climate change are cumulative in nature. The GHG emissions from helium development (both direct emissions from the development itself and downstream emissions from product use) are substantially lower than those emissions associated with fossil fuel development and should not be directly compared as such. The EA presents information related to projected GHG emission trends within the state of Utah and the United States for context, as well as discussion of four different potential global scenarios (Representative Concentration Pathway scenarios). Additionally, the EA has been revised to incorporate discussion of BLM's GHG emission contribution from mineral leasing at the state and Federal level. This information serves to provide "a basis for comparing the current and reasonably foreseeable future state of the environment as affected by the proposed action and its reasonable alternatives" as suggested by the CEQ's 2019 Draft NEPA Guidance on Consideration of GHG Emissions. Because this broader context at a larger geographic scale is included and climate change impacts are driven by global cumulative emissions, the BLM need not analyze impacts from other BLM oil and gas or coal development projects in Utah, since the data sufficiently presents the anticipated reasonably foreseeable future effects as required by NEPA. Additionally, BLM has used the methodology suggested in the CEQ 2019 Draft Guidance which includes:

1. Projecting a proposed action's direct and reasonably foreseeable indirect GHG emissions, which may be used as a proxy for assessing potential climate effects.

2. Referencing local, regional, national, or sector-wide emission estimates to provide context for understanding the relative magnitude of a proposed actions GHG emissions.
3. Providing a qualitative summary discussion of the effects of GHG emissions based on an appropriate literature review.

CEQ 2019 Draft Guidance states that this approach “allows an agency to present the environmental impacts of a proposed action in clear terms and with sufficient information to make a reasoned choice among the alternatives. Such a discussion satisfies NEPA’s requirement that agencies analyze the cumulative effects of a proposed action because the potential effects of GHG emissions are inherently a global cumulative effect. Therefore, a separate cumulative effects analysis is not required.”

The EPA uses the 100-year time horizon in its Inventory of Greenhouse Gas Emissions and Sinks: 1990-2018 (EPA 2020c) and Mandatory Greenhouse Gas Reporting rule. Therefore, project-related emissions are shown based on the 100-year GWP values for comparison to state, national, and global GHG emissions. The GWPs used to calculate CO₂e emissions are based on the IPCC’s Fifth Assessment Report. The 20-year GWP would not provide additional meaningful context because, the 20-year GWP is primarily used to provide better context to the climate impacts from methane emissions. However, for this project, CO₂ emissions represent the majority of GHG emissions associated with this Project and the Project emits very little methane. The majority of GHG emissions from the proposed action are a result of combustion processes (heavy equipment, generators, vehicles, and flares), wherein methane is converted to CO₂. Gas helium wells either have no methane or very little methane, and waste gas is being reinjected so there would be no methane emissions from the gas stream. Therefore, the difference between the 100-year and 20-year GWP emissions would be very similar since the GWP value for CO₂ is 1 under both scenarios. For this reason, BLM determined that the use of the 20-year GWP to present impacts is not warranted. The EA has been revised to discuss the proposed action’s potential to impact carbon storage and sequestration. However, though the ability to quantify this impact is limited, the impact due to this specific project is likely to be minor due to the relatively small amount of surface area disturbance (52.3 acres or less). Additionally, at least some portion of the 52.3 acres of disturbance has already experienced some level of disturbance prior to implementation of the proposed action (e.g., presence of two-track roads). While the currently disturbed area is generally small compared to the overall anticipated disturbance area, the effects on carbon sequestration would be nominally lower than if these areas were completely undisturbed. Finally, reclamation of the project area requires that land be restored to approximately the condition it was prior to the surface disturbance, and as such, the impacts to sequestration would be limited based on the life of the project and the timeframe needed to fully reclaim the area. Therefore, the impacts of the proposed action on sequestration is discussed in proportion to its significance and the anticipated timeline for reclamation. Appendix H of the document describes both the methodologies used to conduct the analysis including details related to calculation methodology and GWP values used. As stated in Section 3.2.2.2.2, operations and maintenance emissions reported in Table 3-2 include indirect (downstream) emissions from transportation and processing. The analysis does not consider additional transport from the processing to locations for final use because those destinations would be speculative. BLM does not have the authority to mandate mitigation of GHG emissions since it is beyond the scope of the duties of the Bureau of Land Management to regulate air emissions. This interpretation is supported by the recent Federal court ruling to vacate the 2016 Waste Prevention Rule which argued that regulation of air emissions went beyond the scope of the BLM.

Labyrinth Canyon Wilderness Area

The Wilderness Act defines wilderness as follows: “A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.” It is BLM’s policy (Manual 6340) that all BLM wilderness areas, if not already withdrawn, are withdrawn from mineral entry, on the date of wilderness designation subject to valid existing rights.

The BLM received comments urging the BLM to deny the APD/ROW request to protect the recently designated Labyrinth Canyon Wilderness Area and the segment of the Green River protected under the Wild and Scenic Rivers Act. Commenters also requested the EA contain analysis for how the proposed Project could impact wilderness characteristics, as defined by the Wilderness Act. Commenters are referred to EA Section 3.9 for the impact analysis for wilderness characteristics. Commenters are referred to EA Section 3.8 for a discussion of impacts to the Green River.

Commenters suggested the EA fails to look into the precedential nature of the proposed Project and does not disclose cumulative impacts. The Wilderness Act and applicable BLM Manuals require the BLM to provide guidance for how the BLM would provide reasonable access to valid existing mineral rights within a designated wilderness area. The BLM is following those procedures with this project and doing so does not set a precedent or provide any requirement for the BLM in any future actions. The EA has been revised to address cumulative impacts resulting from a list of RFFAs added to EA Chapter 3.

The BLM received comments requesting clarification of Twin Bridges’ Alternative A Applicant committed environmental protection measures for the Labyrinth Canyon Wilderness Area, specifically questioning the language in Section 3.9 of the Draft EA about “existing disturbance” and requesting clarification regarding the location of temporary fencing. The BLM worked with Twin Bridges, which resulted in the Applicant clarifying this measure to specify that the temporary fencing would not be located in the Labyrinth Canyon Wilderness Area. Additionally, the BLM revised Section 3.9 of the EA to remove or clarify references to existing areas of disturbance when describing the location of the Alternative A well pad. These comments also requested clarification that the proposed well pad would not be located within the Congressionally-designated wilderness area. The BLM reviewed the Applicant’s submitted materials, visited the Project area to stake the wilderness boundary based on the boundaries established by Congress, and in doing so confirmed the well pad is not located in the Congressionally-designated wilderness area.

The BLM received questions regarding Section 3.9 of the Draft EA which stated, “The only proposed Project activities within the Labyrinth Canyon Wilderness Area would include underground horizontal drilling that is unlikely to direct impacts to the wilderness area’s naturalness.” These comments included requests for clarification regarding whether the BLM believes that Wilderness does not extend below the surface. The BLM revised the relevant portions of Section 3.9 of the EA to clarify that the subsurface estate is part of the Congressionally-designated wilderness and the underground well bores would be located in the Congressionally-designated wilderness area. The BLM also revised the

analysis in Section 3.9 to disclose underground occupancy of the wilderness area. If approved by the BLM, the Proposed Action would be implemented in accordance with the Wilderness Act, which requires the minimization of impacts to wilderness character, allowing reasonable access, and honoring valid existing rights. Beyond the valid existing mineral rights described in the EA, no other Federal minerals will be produced by the Proposed Action. The applicant will abide by minimum setbacks for lease boundaries established by the State of Utah to ensure no unleased or withdrawn Federal minerals are produced. Sections 4(d)(2) and 4(d)(3) of the Wilderness Act describe how minerals and mining activities are to be managed in wilderness areas. The BLM manages mineral resources within designated wilderness subject to valid existing rights while preserving wilderness character to the greatest extent possible. As provided for under the Wilderness Act, the BLM also permits activities related to gathering information about mineral resources to the extent that they are compatible with the preservation of wilderness character. Section 4(d)(2) specifies that nothing in the Wilderness Act prevents “any activity, including prospecting, carried out for the purpose of gathering information about mineral or other resources, if such activity is carried out in a manner compatible with the preservation of the wilderness environment.” Mineral leases, permits, or licenses existing prior to the date of an area’s designation as wilderness, can be operated under the original terms and conditions.

The BLM received comments that stated that the Draft EA failed to adequately analyze the direct, indirect, and cumulative impacts of the proposal on the wilderness and wilderness character, including impacts from permanent structures and motorized access. The comment also stated that the BLM failed to rigorously explore reasonable alternatives that would lessen or eliminate those impacts. As described in other comment responses, the BLM has made revisions to the analysis contained in the EA, including the analysis of impacts on wilderness, based on the comments submitted on the Draft EA. Section 2.6 of the EA describes how the BLM worked with the Applicant to develop Alternative A after the Applicant submitted an APD for Alternative B. As described in the EA, Alternative A would minimize impacts on the Labyrinth Canyon Wilderness Area and would not require motorized access within the wilderness area while providing the reasonable access to the Applicant’s valid existing mineral rights that the BLM is legally required to provide.

Commenters urged the BLM to consider deferring approval of the proposed action until such time that it completes a Wilderness Management Plan. The Dingell Act does not specify any set timeline for completing a Wilderness Management Plan for the Labyrinth Canyon Wilderness. In accordance with the Wilderness Act, valid rights such as mineral leases that existed prior to the date of Dingell Act becoming law, must be honored and can be operated under the original terms and conditions. Regardless of future decisions to be made within a wilderness management plan, BLM would still be required to provide reasonable and appropriate access to the leased mineral estate within the Labyrinth Canyon Wilderness while preserving wilderness to the greatest extent possible. After careful consideration of these obligations under the Wilderness Act, BLM has thoroughly analyzed the alternatives in accordance with NEPA and selected a proposed action that would preserves wilderness character to the greatest extent possible. BLM believes that deferring approval of the proposed action until such time as a wilderness management plan is completed would only result in the same decision, serve no useful public purpose and would not meet its statutory obligations under the Wilderness Act and other applicable laws cited in Chapter 1.

Commenters pointed out that the EA lacks evidence that BLM has completed the required “official survey” of “the portion of the boundary of the Wilderness adjacent to the lease,” as required in BLM Manual 6340.1.6.(C)(11)(d), nor is a copy of this survey appended to the document. Comments suggest the NEPA document must contain this information to ensure that the agency and public know the precise boundaries of the Labyrinth Canyon Wilderness and whether impacts from the road and well pad (under either Alternative A or B) would occur within wilderness.

BLM is making every effort to follow the policy guidelines provided in BLM Manual 6340 while fulfilling its statutory requirement to provide access to valid existing rights in accordance with the Wilderness Act. As described in EA Appendix G, Twin Bridges has committed to environmental protection measures to include marking the wilderness area boundaries to ensure that all surface disturbance occurs within the approved ROWs. The BLM would work with Twin Bridges during this process to verify the wilderness boundaries established by Congress.

Commenters made suggestions for the Minimum Requirements Decision Guide (MRDG) found in EA Appendix I. These comments and agency responses are provided in Table J.1.

Lands with Wilderness Characteristics

The BLM received comments suggesting that the EA failed to take a hard look at impacts to lands with wilderness characteristics. Concerns raised in public comments include the need to describe the existing scenery characteristics in the analysis area, the lack of impact analysis for the proposed improvements to Emery County Road 1026 under Alternative B, the need to add more impact analysis for lands with wilderness characteristics related to recreational use and access to the Five Hole Arch Trailhead, and the lack of cumulative impacts analysis for lands with wilderness characteristics.

EA Section 3.9 has been revised to address these public comments by including a description of existing facilities located within the analysis area for lands with wilderness characteristics, impacts from road improvements on Emery County Road 1026, and cumulative impacts from RFFAs identified for the analysis area. EA Section 3.8.2 describes the potential impacts to recreational users along Emery County Road 1026 and the Five Hole Arch Trailhead.

Mexican Spotted Owl

The BLM received comments supporting the BLM's approach to not allowing construction or drilling activities within 0.5 mile of potential Mexican spotted owl habitat in Keg Springs Canyon during the nesting season unless and until a complete survey has been conducted, no owls have been documented, and permission is granted by the Authorized Officer following consultation with the U.S. Fish and Wildlife Service. The comments also requested clarification regarding which "measures will be taken to mitigate noise to below 68 dBA" if initial exceedances above 68 dBA are detected using the noise monitoring protocol described in the EA.

Analysis pertaining to the risk of noise disturbance during construction and operation of the project can be found in Section 3.7 of the EA. The timing restriction related to MSO breeding season has been revised based on coordination between the BLM and USFWS (USFWS 2020) and the BLM, USFWS, and the Applicant are collaboratively working to develop an appropriate noise monitoring protocol. If exceedances above 68 dBA are detected using the noise monitoring protocol approved by the BLM and USFWS, the BLM and Operator would determine the best approach to reduce noise levels, which could include, but is not limited to, restricting the use of certain equipment, using an acoustic barrier or noise muffling equipment, or postponing certain activities.

A requirement for surveys under the 2012 Mexican Spotted Owl Recovery Plan survey protocol, including a second year of surveys in Spring 2021, has already been established and no revision to the EA is warranted. See the analysis in Section 3.7 of the EA.

Migratory Birds

Comments suggested that the BLM modify language contained in the EA regarding requirements for migratory bird nesting surveys if vegetation removal were to occur during the migratory bird nesting season. The BLM made revisions to the migratory bird analyses in Section 3.7 to clarify the requirements for migratory bird nesting surveys. If an action alternative is approved by the BLM, the BLM would include requirements for pre-construction nesting surveys in any approvals issued.

National Environmental Policy Act Process

The BLM received comments stating that Twin Bridges' Federal lease was offered without allowing for public review or comments and without site-specific environmental analysis. Commenters also requested an extension to the 19-day public comment period for the Draft EA for this Project. Commenters suggested that the BLM prepare an Environmental Impact Statement (EIS) due to potential significant impacts to resources such as a designated wilderness and a wild and scenic river, the lack of cost analysis impacts on recreation, the lack of public review and comment during the leasing process, and the significant controversy surrounding the proposed development of the lease. Commenters stated the Draft EA was insufficient to support issuance of a FONSI or for making an informed decision. Comments suggested that more analysis was needed to analyze impacts such as: the months it would take to complete the drilling of up to seven helium wells, years of maintenance and production of helium therefrom, road improvements (widening, grading, graveling), the granting of several rights-of-way for pipelines and communications, the construction and operation of a roughly 10-acre helium processing facility, and the transportation of helium to market by tanker truck on dirt roads.

Twin Bridges purchased a Federal oil and gas lease (Parcel 257, UTU-93713) on December 11, 2018 through a competitive lease sale offered by BLM Utah State Office. The lease was offered following a Decision Record issued by BLM and a Determination of NEPA Adequacy (DNA) DOI-BLM-UT-G020-0057 prepared by the BLM Price Field Office. The parcels and leases, along with proposed stipulations and lease notices were posted for a 15-day public scoping period from July 16, 2018 to July 31, 2018 and the Notice of Competitive Oil and Gas Lease Sale was posted for a protest period from October 25, 2018 to November 5, 2018. The DNA was prepared in full compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), implementing regulations at 40 C.F.R. § 1500 to 1508, and BLM Manual 3120.

In preparing an EA, BLM is given discretion to determine the form of public involvement (BLM NEPA Handbook H-1790-1). The Draft EA for this Project was posted to the ePlanning website on October 22, 2020, and public comments were received through November 9. The BLM initially posted the EA for a 15-day public comment period but extended the public comment period to a total of 19 days based on public requests. Based on the analysis in the EA, BLM will determine whether or not the selected alternative will have significant environmental effects, as defined in 40 CFR 1508.27. As described in Section 1.1 of the EA, the EA provides evidence for determining whether to prepare a finding of no significant impact (FONSI) or an environmental impact statement (EIS). The Proposed Action and alternatives are described in Chapter 2 and

Appendix G of the EA. This description includes the extent and duration of construction and operation activities. The EA does analyze the impacts of constructing, operating, and maintaining the roads, well pad, up to 2 wells, and associated infrastructure described in Chapter 2 of the EA. While the future development of up to 5 additional wells was considered as a potential future cumulative impact, there have been no Federal or State APDs submitted for these wells and a more detailed analysis is not warranted for the BLM to make a decision on the applications before the BLM at this time. The impacts of the Proposed Action and alternatives are analyzed in the resource sections in Chapter 3.

Pollinators

The BLM received comments urging analysis of impacts to pollinators. BLM has determined that while the vegetation identified under the action alternatives does not include abundant flowering plants, the San Rafael desert's unique sand dune landscape provides valuable habitat for pollinators. BLM has applied a mitigation measure in alignment with lease notice UT-LN-156 to the proposed project and which require dust-abatement mitigation to address indirect impacts to special-status plant species and pollinators (refer to Appendix K). Additionally, the Applicant has included additional dust mitigation in their revised proposed action (Refer to Appendix G). Section 3.6 of the EA has been updated with this information. Refer to the BLM Interdisciplinary Team checklist contained in Appendix B for additional information. The surface disturbance associated with each action alternative includes interim and final reclamation. The EA has been revised to include estimated timelines for reclamation if the efforts described in the EA are followed, see Section 3.4 and 3.6. Regarding federally listed Jones cycladenia, BLM determined that the proposed project area under either action alternative does not contain suitable habitat for the species based on a field review by qualified botanists, and therefore a detailed analysis is not warranted. See BLM Interdisciplinary Team (IDT) checklist and Table H-7 in Appendix H for information regarding potential for occurrence.

Purpose and Need

The BLM received comments requesting that the BLM add additional information into the BLM's purpose and need statement. These comments included requests to add information about the Applicant's project description to the BLM's purpose and need statement. The BLM reviewed the comments submitted and determined that revisions to the purpose and need statement were not warranted. The information regarding the Applicant's project description is already included in other portions of the EA and the purpose and need statement complies with the requirements in BLM's Handbook H-1790-1 and the applicable Council on Environmental Quality NEPA regulations.

Recreation

The BLM received comments that stated the description of the existing recreational setting appears contradictory and requested that the EA clarify the existing recreational use of the area. Comments requested that the BLM acknowledge existing surface disturbance and human activity along Emery County Road 1025 and Spur Road 1025. Comments also requested a recreation map to help readers better understand the proximity of the Project area (under both action alternatives) to recreation areas described in the document. Section 3.8.1.2 of the EA was revised in response to comments to clarify that while the recreation destinations in the analysis are relatively popular, because of its remote location the analysis area receives much less visitation (Five Hole Arch receives approximately 800 to 1,200 visitors annually) than the nearby national parks and other more developed recreation areas, which can receive over one million visitors per year. County Roads 1025 and 1026 are regularly used for

dispersed recreation in the analysis area. Section 3.8.2.2.1 of the EA was revised to clarify that surface disturbance from Spur Road 1025 and other evidence of human activity along Spur Road 1025 (a cattle stock tank and an abandoned tank) represent existing disturbance that already affects recreational visitors' experience in the area. Specific calculations of existing disturbance are not necessary as it would not change the recreation impacts conclusions. Appendix F has been revised to include a recreation map (Figure F-10).

Comments stated that the analysis did not clearly describe required closures of Emery County Road 1026 during road and pad construction, or disclose that once complete, the road will be shared with operations traffic, and all recreational users accessing the Five Hole Arch Trailhead would pass the well pad. Comments requested clarification of the impacts to Emery County Road 1026, both during and post construction, and how that will affect recreational users accessing the Five Hole Arch Trailhead. Comments also stated development would likely improve roads and increase traffic in the area having additional impacts to the broader region outside of the specific development area and stated that increased visitation tends to lead to damage to cultural sites and illegal OHV use. Section 3.8.2.3.3 was revised to clarify the impacts that road construction would have on recreational users accessing Five Hole Arch Trailhead. The recreation analysis (Section 3.8 of EA) addresses the potential of increased visitation to the analysis area as a result of the proposed road improvements, including potential negative impacts on recreational users seeking a more primitive, wilderness-oriented experience (see Section 3.5.2.3.3 of EA). Potential impacts on the Labyrinth Canyon Wilderness are addressed in Section 3.9 of the EA. The recreation analysis (Section 3.8 of EA) addresses the potential for increased visitation to the analysis area as a result of the proposed road improvements. There is no evidence that increased visitation would result in illegal OHV use. BLM prepared two cultural resources surveys for this undertaking, in compliance with Section 106 of the NHPA. Neither survey identified historic properties (i.e., properties that are listed on or eligible for listing on the National Register of Historic Places). Because no historic properties are present, BLM, in consultation with the Utah State Historic Preservation Officer, has determined that the undertaking will have no adverse effect to historic properties.

Comments noted the proximity of the parcel to Labyrinth Canyon Wilderness/Labyrinth Canyon Scenic segment of the Green River and expressed concern about degradation of the experience of visitors to this area. The BLM received comments suggesting that the BLM should add stipulations or conditions of approval to any approval of the Applicant's ROWs and APDs that would reduce the impacts of the project on users of the Labyrinth Canyon section of the Green River. Specific comments suggested limiting construction and operational activity to the river "off season" (December – February) and that the surface facilities should be moved at least 5 miles from the river. The potential impacts to recreational users of the Green River are addressed in Sections 3.8.2.2.4 and 3.8.2.3.4 of the EA. The BLM considered the need to add additional stipulations or conditions of approval through the NEPA process if the BLM selects an action alternative. Impacts to noise and visual resources are discussed in the EA under the recreation and wildlife sections. Impacts to wilderness characteristics, which include opportunities for solitude and primitive and unconfined recreation are disclosed in Section 3.9.2. The BLM has carefully considered whether the Alternatives may be visible from or otherwise impact users of the Green River and has determined that the Alternatives are not likely to impact users on the Green River, as explained in Section XX of the EA.

Comments asserted that development of commercial, industrial facilities does not comport with the semi-primitive, motorized (SPM) recreational experience setting of the Labyrinth Canyon Special Recreation Management Area (SRMA), stating that per the RMP, Recreation Opportunity Spectrum (ROS) classes within the SRMA are prescriptive. Comments also stated that the action appears to violate RMP Decision REC-43: *No facilities will be constructed in ROS Primitive class areas; minimal facilities will be used in semi-primitive non-motorized and semi-primitive*

motorized class areas and will be used only to protect critical resources. Comments stated that driving through an industrial zone just prior to arriving at the Five Hole Arch Trailhead would detract from the experience and that the anticipated increased use resulting from improved roads would also lessen opportunity for solitude and degrade the experience.

The BLM has evaluated conformance with the SRMA standards and confirmed the project conforms to the standards established in the RMP. Under both Alternative A and Alternative B, there are no facilities located in ROS Primitive class areas. Each alternative could include some facilities located in ROS Semi-Primitive Motorized (SPM) class areas. As identified in the Price Field Office RMP, the SPM ROS Spectrum's "Evidence of Humans" classification standards include: 1) Natural setting with moderate alterations; 2) Strong evidence of motorized trails, routes, and roads; and 3) Isolated structures. The proposed project would be consistent with these standards. The EA's recreation analysis discusses the proposed project's potential impact on users of the Five Hole Arch Trail and other recreation resources in the analysis, including discussion of potential impacts on solitude, visual resources, and other impacts associated with the primitive recreation experience. The analysis has also been revised to clarify that the facility proposed on SITLA land are not subject to SRMA and RMP standards/decisions. Comments stated the EA fails to take a hard look at noise and soundscape impacts on key areas such as Keg Knoll / Keg Spring Canyon and did not identify noise and soundscapes as potential resources that warrant analysis even though development activities will create significant short- and long-term noise. The recreation section of the EA (Section 3.8) addresses the Proposed Action's potential impacts on noise levels and the impacts that may have on recreational users in the analysis area. As discussed in Section 3.8.2.2.1 of the EA, it is assumed that temporary construction noise would be approximately 100 dBA and would decrease the farther one is from the construction site. Intervening topography also affects how far sound can travel and would reduce noise impacts in many of the more popular dispersed recreation destinations in the vicinity of the Project. More information about noise from standard operation activities has been added to 3.8.2.2.1 of the Final EA. The analysis acknowledges that recreational users may expect a more primitive, wilderness-oriented experience in the analysis area. A qualitative analysis of impacts to night skies and a discussion of potential mitigation measures was added to Section 3.10. Section 3.8.2.3.1 of the EA was revised to acknowledge that recreation at Keg Knoll/Keg Springs Canyon would not be impacted by the proposed actions because the proposed well pad would be over 2 miles from Keg Knoll/Keg Springs Canyon and operations activities would not be audible nor visible because of distance and intervening topography. A qualitative analysis of impacts to night skies and a discussion of potential mitigation measures has been added to Section 3.10.

Relation to San Rafael Desert Master Leasing Plan

The BLM received comments on multiple resources (e.g., visual resources, noise, water resources) stating that the BLM had previously concluded that it had to prepare a Master Leasing Plan (MLP) prior to offering new leases for development in this area because BLM did not have adequate information regarding the impacts to various resources to inform decision making or because existing restrictions on development were inadequate to protect resource values. The comments noted that BLM began to collect the information and prepare an MLP/EA but did not finish the effort. Some comments directed the BLM to alternatives considered in the MLP and suggested that the consideration of those alternatives suggested that existing stipulations and notices from the Price RMP were inadequate to protect resources and therefore more restrictive stipulations should be applied. The comments noted that in this EA, for some resources, the BLM failed to incorporate the updated information that was being collected for the MLP to inform its decision.

First, the San Rafael Desert MLP and associated RMP amendments is not in effect and was never finalized, therefore, the BLM did not include information and elements of the draft MLP because they are not relevant. However, the BLM did incorporate the RFDs which were developed in the initial phases of the MLP effort because they include the most relevant information regarding potential future mineral development in the Project area. The BLM initiated the San Rafael Desert MLP pursuant to IM No. 2010-117, Oil and Gas Leasing Reform - Land Use Planning and Lease Parcel Reviews and previous version of BLM Handbook H-1624-1, Planning for Fluid Minerals Resources. However, before the MLP was completed, BLM issued IM No. 2018-034 - Updating Oil and Gas Leasing Reform – Land Use Planning and Lease Parcel Reviews. This IM superseded previous policy announced in IM No. 2010-117, Oil and Gas Leasing Reform - Land Use Planning and Lease Parcel Reviews, issued on May 17, 2010, and replaced any conflicting guidance or directive found in the BLM Manual or Handbook. BLM IM 2018-034 states “It is BLM policy that existing land use plan decisions remain in effect until an amendment or revision is complete or approved. Therefore, the BLM will not routinely defer leasing when waiting for an RMP amendment or revision to be signed. Rather, when making leasing decisions, the BLM will exercise its discretion consistent with existing RMPs and the State Director should consult with the Washington Office (WO) before deciding to defer leasing of any parcels. When necessary, state/field offices will maintain or amend RMPs to accommodate changes in lease stipulations in accordance with guidance found in H-1610-1, Land Use Planning, sections VI.H and VII.B.”

Because of these policy changes, this MLP effort was never completed and the associated information is irrelevant to the BLM decision to issue Twin Bridges’ Federal lease. Moreover, comments relating to the underlying Federal Lease are also irrelevant and are not the subject of this EA. The BLM reviewed the data needs for this EA based on the resources that are present and may be impacted by the alternatives analyzed in the EA. Section 201 of FLPMA directs BLM to “prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values.” Data was collected and updated as necessary to support the analysis. For example, the current BLM Visual Resource Inventory and VRM Classes from the RMP (updated to address reclassifying the lands in the Labyrinth Canyon Wilderness Area to be VRM Class I) were used in the analysis.

Social Cost of Carbon and Carbon Budgeting

Comments stated that while BLM must include quantitative estimates of the total GHG emissions resulting as well as an assessment of ecological, economic, and social impacts of those emissions. Comments acknowledged while that BLM is not required to use any specific protocols to determine the significance of emissions under NEPA, the agency must undertake a more robust discussion of GHG emissions and stated BLM failed to analyze and disclose the significance of the emissions and related climate change impacts using existing tools such as the Interagency Working Group’s (IWG’s) Social Costs of Greenhouse Gases and global carbon budgeting. Comments stated that while social cost of carbon (SCC) may underestimate climate costs because it does not include all important damages, the IWG’s social cost metrics remain the best estimates yet produced by the Federal government. THE comments also stated that the BLM’s emissions percentage comparison to national emissions is misleading, as it implies that a project adding 23 million more tons of carbon dioxide would have a relatively less significant effect in 2014 than in 2012, whereas monetizing climate damages would accurately reveal that the emissions in 2014 were much more damaging than the emissions in 2012. Comments stated an action’s emissions to a state, national, global, or sectoral inventory reveals nothing about the significance of the action’s contributions to actual environmental impacts, whereas the use of social cost of greenhouse gas metrics enable accurate and transparent comparisons of projects with varying greenhouse gas emissions over time. Comments also stated that the withdrawal of the technical documents does not negate the fact that the model used the best available scientific data. Comments identified the following a three-step carbon budget

analysis process: (1) list the remaining global carbon budget for estimated probabilities of limiting warming to 2° and 1.5°C; (2) list the cumulative greenhouse gas emissions from its lease sales; and (3) compare figures (1) and (2). Comments stated that while imperfect, global carbon budgets represent tools presently available to agencies analyze and disclose to the public in an easily understood way the significance of their decisions on GHG emissions and their implications for climate change. Comments asserted that the public would likely understand a budget more readily than disclosing impacts as a percentage of total emissions. Comments noted NEPA does not allow agencies to use uncertainty as an excuse for refusing to conduct reasonably available analysis of foreseeable environmental consequences and stated that the BLM cannot cite uncertainty as a rationale for rejecting application of the carbon budget but instead should disclose those uncertainties. Comments further stated that avoidance of catastrophic risks requires acknowledging the possibility that remaining carbon budgets may be at the lower end of the estimated range of variation and acknowledging the increasing costs of delays in decarbonization.

The BLM acknowledges these comments. Appendix H has been revised to contain an explanation of why SCC analyses and carbon budgets were not considered in the analysis. The preparation of this EA was done in compliance with all Federal statutes, regulations, and applicable policies. The BLM considered whether performing a SCC analysis would help inform the decision-maker and the public for this NEPA review, by disclosing meaningful information regarding the Proposed Action's potential impacts on GHG emissions and climate change. After careful consideration, the BLM determined this approach was not appropriate and instead favored a quantitative analysis of these potential impacts. See EA, Section 3.2.2. Specifically, the BLM rejected the SCC approach because 1) that approach, adopted in EO 12866 (58 Fed. Reg. 51,735 [October 4, 1993]), was originally intended to apply only to rulemaking, not project-specific NEPA analyses, like the one here; 2) this guidance has subsequently been withdrawn by EO 13563 (76 Fed. Reg. 3821 [Jan. 18, 2011]); 3) NEPA does not require a cost-benefit analysis (40 CFR 1502.23); and 4) because the full social impacts of coal development have not been monetized, quantifying only the SCC without considering all other cost/benefits, and would skew the analysis and not be useful. The EA includes a robust analysis of direct and downstream GHG emissions and analyzed those emissions in the context of local, statewide, national, and global projections, which provides the contextual understanding of relative impacts. The BLM approach in the EA meets the "hard look" requirement by presenting the environmental impacts of the proposal and the alternatives in comparative form (quantified greenhouse gas emissions), and discusses cumulative climate impacts, providing for the definition of issues and environmental consequences and ensuring that an informed decision can be made. Finally, an analysis of the cumulative effects was performed and considered potential climate change impacts at the state level based on future climate trends under a range of global GHG emissions scenarios known as the RCPs. Specifically, the USGS Climate Change Viewer was used to provide projections of future climate trends under low (RCP4.5) and aggressive (RCP8.5) emission scenarios. See Section 3.2.2.5 of the EA.

BLM does not agree that comparing emissions against the remaining carbon budget is easier for the public to understand than the analysis method used, and the carbon budget method does no more to provide context to the magnitude of environmental impacts than the current methodology. Both metrics are mechanisms to provide context to the public and due to the high degree of uncertainty in estimation of the remaining global carbon budget, the methodology that BLM uses is simpler to convey and is the most consistent methodology by which impacts are presented and evaluated across BLM field offices. The issue with carbon budgets is not that there is uncertainty in the budget but rather that the IPCC states the uncertainty is "substantial" (Rogeli et al, 2018). The IPCC states that the uncertainty from the climate response from CO₂ and non-CO₂ emissions is ± 400 gigatons (Gt) CO₂, the level of historic warming contributes ±250 Gt CO₂ of uncertainty, and another ±250 Gt CO₂ from future non-CO₂ mitigation efforts. For the 50% probability budget of 580 Gt CO₂ for 1.5 °C, these uncertainties could mean that the budget has already been expended or is up to 900 Gt larger. This amount of uncertainty is not useful to inform the decision maker. Presenting the emissions data in

comparison with the remaining carbon budget would not provide the decision maker or the public with further context of the significance of impacts when compared to disclosing the relative magnitude of GHG emissions at multiple geographic scales as a proxy for climate change impacts.

See also Greenhouse Gas Emissions comments for discussion of methodology used for analyzing GHG impacts. The BLM approach in the EA meets the “hard look” requirement by presenting the environmental impacts of the proposal and the alternatives in comparative form (quantified greenhouse gas emissions) and discusses cumulative climate impacts. This provides a definition of issues and environmental consequences and ensures that an informed decision can be made.

Socioeconomics

The BLM received comments indicating that the BLM should analyze the potential socioeconomic impacts of approving the alternatives analyzed in the EA. The comments suggested the socioeconomic impacts could include increases in employment, increases in mineral royalty revenue and impacts on the recreation and tourism economies in Emery County, Green River, and Moab. After reviewing these comments, the BLM determined that a change to the Interdisciplinary Team checklist was warranted and socioeconomics was changed from a NI (present, but not affected to a degree that detailed analysis is required) to a PI (present with potential for relevant impact that need to be analyzed in detail in the EA). A socioeconomic analysis of the potential impacts of the project are included as Section 3.11 of the revised EA.

Soils

Comments suggested that EA acknowledge that soils in the Alternative A well pad area is already disturbed and indicated the EA should modify disturbance estimates to remove previously disturbed areas. Section 3.3.2 of the EA has been revised to clarify that since the previous impacts to soils have largely been remediated due to physical acts and the passage of time, new construction in this area would be similar to disturbance of untouched soils and therefore, for the purposes of evaluating impacts on soil resources, would have similar effects as new disturbance.

Comments also suggested that some of the potential impacts to soil are located on non-Federal (SITLA) lands and suggested that the EA either clarify which surface disturbances take place on Federal versus non-Federal land or only disclose impacts to BLM-managed surface lands. The processing plant and associated impacts are indirect effects of the BLM’s decisions to be made and is appropriate to include surface disturbance acreages related to development of the plant in the analysis. Sections 2.2. and 2.3 of the EA identified the processing plant as being located on SITLA lands.

Comments suggested that the EA be revised to include a map of the HUC-10 watershed analysis area and further suggested that the EA did not fully identify and analyze cumulative impacts to soil resources. The EA has been revised to include a map of all cumulative impact analysis areas in Appendix F.

Special Status Plant Species

The BLM received comments suggesting that the EA fails to take a hard look at special status plants. The EA acknowledges that approximately 837 individuals of entrada rushpink, a BLM sensitive species, were identified as both single occurrences and denser “clusters” in the Alternative A analysis area. The comments stated that under Alternative A, BLM is prepared to allow impacts on a sizeable portion of a documented population of this globally imperiled sensitive plant species (G2 ranking, NatureServe 2020). Commenters cite reports suggesting the population of entrada rushpink at the Twin Bridges Project site is one of only a small number of documented populations across the very limited range of this species in Utah and only a “few” (defined as 1-3) occurrences are currently “appropriately protected,” with all of those occurrences in Arches National Park. Commenters urge the BLM to detail the steps it and Twin Bridges propose to avoid rushpink habitat under Alternative A. The EA’s general statement that the company is “committed to coordinating with BLM biologists to alter the road expansions and pipeline installation methods in the proposed ROW, and to minimize mortality and direct impacts to identified individuals” is simply too vague and unenforceable and does not meet BLM’s duty under NEPA to adequately describe mitigation measures. Commenters refer to BLM Manual 6840 and the agency’s mandate to adequately protect BLM sensitive plant species. The comments also stated that the EA’s cumulative impact section regarding sensitive plant species and the entrada rushpink in particular fails to take a hard look at impacts from climate change, livestock grazing, invasive species and fire frequency.

The EA Section 3.5 has been updated to revise the analysis area for direct and indirect impacts to habitat to more accurately account for the distribution of potential and occupied habitat of entrada rushpink, as well as potential impacts related to the analyzed action alternatives. Additionally, the Applicant has included additional dust control measures and as described in Appendix K, the BLM is imposing additional mitigation measures that would reduce the potential impacts on entrada rushpink. The EA has also been updated to reflect changes to the cumulative impacts scenario and analyzes the potential cumulative impacts under each alternative.

Special Status Wildlife Species

Comments stated that anthropogenic climate change is impacting the Colorado River in ways that are altering temperature, streamflow, and the hydrologic cycle and that climate change is likely to have effects on endangered fish species in the Colorado River basin—the Colorado pikeminnow, razorback sucker, bonytail chub, and humpback chub—and the Colorado River ecosystem. The BLM examined impacts to endangered fish species in the Colorado River basin. As disclosed in the Section 3.7 of the Draft EA, under both action alternatives none of the proposed activities would cause further depletion of Colorado River water or its tributaries. Thus, all alternatives would result in an Endangered Species Act Section 7 consultation effects determination of No Effect due to lack of suitable habitat for aquatic species within proximity of the proposed Project location and no impacts to water availability. Therefore, BLM determined that detailed analysis of potential impacts to aquatic species within the Colorado River Basin would not be required.

Subsidence

The BLM received comments indicating that the BLM should have considered the potential for subsidence as a result of the alternatives analyzed in the EA. The BLM considered the various types of impacts that are likely to occur as a result of the actions analyzed in the EA. Subsidence is not known to occur from helium or oil and gas developments similar to the actions analyzed in the EA in Utah. As a result of the depth of the proposed wells (approximately 6,500 feet), there is no anticipated subsidence impacts associated with the Project.

Vegetation

Comments suggested that the EA acknowledge that vegetation in the well pad area, under Alternative A, is already disturbed and indicated the EA should modify disturbance estimates to remove previously disturbed areas. Section 3.4.2 of the EA has been revised to clarify most previous impacts to vegetation have since been remediated by physical acts and the passage of time; therefore, new construction in this area would be similar to disturbance of undisturbed vegetation and would have similar effects. As such, the acres of surface disturbance have not been revised to remove areas that were previously disturbed.

Comments also suggested that statements that vegetative reestablishment could take 100 years are not supported by information contained in Appendix H, which noted that some roads constructed in the 1950s and 1960s have naturally reclaimed to the point that they are barely visible. Other comments concurred with the EA information regarding the acknowledgement of the difficulties associated with restoration in the San Rafael Desert (including the 100-year reclamation timeframe), and provided several sources concurring with the difficulties of restoration, particularly with regard to biological soils crusts. Comment further pointed out that some changes will effectively be permanent due to climate change. The BLM has revised the referenced language within Section 3.5.2 (Special Status Plant Species) to acknowledge that while regeneration of some areas could take more than 100 years, reclamation in other vegetation types could and has occurred within 50 years. Sections 3.3.2 (Soils) and 3.4.2 (Wildlife) has been revised to include similar information about reclamation timeframes.

Visual Resources

The BLM received comments suggesting that the EA failed to take a hard look at visual resource impacts. Concerns raised in public comments include the size of the analysis area for visual resource impacts, the description of existing scenery characteristics in the analysis area, the lack of visual analysis for the drill rig that may be visible from the Key Observation Points (KOPs), the location of KOPs, impacts to night skies and viewsheds, the visual impacts of vehicle traffic associated with the proposed Project, and the lack of cumulative impacts analysis for visual resources. Multiple comments were received regarding potential revisions to KOP worksheets.

BLM determined the visual resource analysis area based on studies conducted by the BLM associated with other infrastructure projects including electric transmission lines; in particular, a field study sponsored by the BLM, Electrical Transmission Line Visibility and Visual Contrast Threshold Distances in Western Landscapes (BLM 2014) (https://blmwyomingvisual.anl.gov/docs/NAEP14_Sullivan_Transmission_VCTDFinal141029.pdf). While this study focuses on transmission line projects, including the presence of multiple repeating structures, the threshold for a 230kV transmission line to be noticeable to casual observers is up to 3.5 miles away. The height of 230kV transmission line

structures are relatively similar to the height of the proposed drilling rig (150 ft.). The study also identified the more conservative distance for an impact analysis as 4-5 miles for a 230kV transmission lines. The viewshed analysis for the proposed Project was run from the long-term project components to identify areas that may have views of the Project. This viewshed was not run from the KOP locations but instead, by using project location data and proposed heights (e.g., the 150-foot height of the drilling rig), and therefore identifies where in the greater landscape area would have views of the Project. This data was shown on the visual resource maps in Appendix D of the Draft EA. To more clearly depict this data, an additional map set has been added to Appendix D (Maps D-3 and D-4) which also includes an additional viewshed analysis run from the well head location for each alternative to identify the areas where short-term views of the drill rig may occur.

Other revisions to the visual resource analysis in the EA include:

- Revisions have been made to worksheets for KOPs 1, 2, 3 (Alternative A) and 4 (Alternative B) to address public comments.
- A discussion of existing disturbances in the visual resource analysis area was added.
- Additional short-term impact discussions have been added to the EA to describe the effects from construction activities and the drill rig.
- A qualitative analysis of impacts to night skies and a discussion of potential mitigation measures was added.
- A qualitative discussion of visual impacts on scenery and viewing locations, from increased truck traffic, has been added.

Water Use and Availability

The BLM received comments that expressed concern about potential impacts to water availability and recommended that the BLM analyze cumulative impacts from mineral leasing and development on water availability. These comments directed the BLM to various studies regarding water use associated with hydraulic fracturing and oil and gas well development, expressed concern about aquifer depletion, and indicated that such high levels of water use are unsustainable. The comments stated that water use must be analyzed in the context of increasing water scarcity in Utah. Comments expressed concern that withdrawal of large quantities of freshwater from streams and other surface waters would decrease the supply for downstream users such as farmers or municipalities and diminishing the water bodies' capacity for dilution and degradation of pollutants.

Comments stated that while the EA discusses anthropogenic climate change it fails to provide a full accounting of the cumulative and interrelated impacts of warming, aridification, and flow declines in the Colorado River resulting from mineral leasing and development and its associated greenhouse gas emissions. Comments stated that anthropogenic climate change is impacting the Colorado River in ways that are altering temperature, flow, and the hydrologic cycle. Comments stated that climate change is likely to have significant effects on endangered fish species in the Colorado River basin—the Colorado pikeminnow, razorback sucker, bonytail chub, and humpback chub—and the Colorado River ecosystem. Comments also expressed concern about impacts to surface hydrology from subsurface development.

Section 1.5 of the EA has been revised to provide additional rationale regarding why water use is not included for detailed analysis. As noted in the section (and as included in Appendix G of the EA), the project would obtain water supply from the City of Green River under valid existing,

perfected Water Rights 91-336, 91-1902, and 91-102. The Project does not include any action that would further deplete surface waters, aquifers or otherwise contribute to cumulative impacts beyond these existing water rights. The proposed total water use under either alternative is estimated to be 4-acre feet annually (AFY), including 3 AFY for production and 1 AFY for road maintenance, which is considered a relatively small amount of water. Section 1.5 of the EA has also been revised to clarify that the Project does not include hydraulic fracturing, a completion method used for well development that is typically water intensive. As such, detailed direct, indirect, or cumulative impacts analysis is not necessary to assist the decisionmaker in making a determination of the context and intensity of water use impacts or in distinguishing between alternatives.

Additionally, and as noted in Section 3.7 of the EA, the action alternatives do not propose any action that would further deplete water in the Colorado River or its tributaries. Thus, the BLM determined that all alternatives would result in an No Effect on the endangered Colorado River fish species due to lack of suitable habitat for aquatic species within proximity of the proposed Project location and no impacts to water availability. Therefore, BLM determined that detailed analysis of potential impacts to aquatic species within the Colorado River Basin would not be required.

Wildlife

Comments suggested that the BLM should apply additional timing limitations to reduce impacts on big game species, including pronghorn and big horn sheep. The EA has been updated in Section 3.6 with a revised analysis area for big game species. However, BLM has analyzed site-specific conditions and has determined that a timing limitation for big-horn sheep is not warranted due to the distance from the proposed project locations to suitable canyon habitat in Keg Spring Canyon, see Section 3.6 for additional analysis. BLM also determined that timing restriction related to pronghorn is not warranted due to the availability of adjacent habitat within the analysis area and the level of noise anticipated from the Proposed Action, see Section 3.6 for additional information.

Comments also suggested that the analysis of potential impacts on pronghorn and big horn sheep was inadequate. Specifically, the commenters took issue with the scientific studies cited by the BLM and suggested reviewing other scientific literature regarding the impacts of oil and gas on big game species in North Dakota and Wyoming. The comments noted the similarities of helium drilling and development to oil and gas development in terms of land disturbance, noise and increased anthropogenic activities. The BLM has reviewed the studies included as exhibits to comment and has determined that they are not applicable for this Project analysis because there are substantial differences in the life history and migration patterns of Utah's bighorn sheep and pronghorn versus those that were included in these other studies. There are also substantial differences in the scale of development at issue in those studies, which looked at higher density multi well pad oil and gas development, as compared to the single well pad being proposed here in the Project. Therefore, the BLM determined that the studies cited in the EA are more appropriate for the analysis in this EA. An update to the EA has been made to include additional citations of the Berger et. al 2007 study.

Additional Unique Substantive Comments and BLM Responses

Table J.1 below contains additional substantive comments and BLM responses. These comments raise specific issues that are not summarized in the comment summaries and responses above.

Table J.1. Unique Substantive Comments with BLM's Response

Comment #	Comment Topic	Comment	BLM Response
A-5-1	Air	<p>BLM cannot approve the Twin Bridges project unless and until the agency finalizes the ongoing statewide supplemental greenhouse gas emissions and leasing EA and completes other curative analyses specific to lease UTU-93713. It is undisputed that the greenhouse gas (GHG) emissions and climate change analysis BLM prepared and relied on to issue lease UTU-93713 to Twin Bridges violated NEPA.¹ BLM's draft curative NEPA analysis for GHG emissions and climate change expressly concedes as much and includes the December 2018 lease sale Determination of NEPA Adequacy (DNA) that BLM prepared to issue lease UTU-93713—the lease held by Twin Bridges and proposed for development in the Twin Bridges EA. See Supplemental GHG EA at 74, tbl. 20 (listing the BLM Price field office, December 2018 lease sale). BLM's Supplemental GHG EA also includes the September 2018 lease sale environmental assessment, which was the NEPA analysis BLM relied on in the December 2018 lease sale DNA. See <i>id.</i> at 73, tbl. 20. Thus, BLM's Supplemental GHG EA and the Twin Bridges EA are inextricably linked. BLM cannot approve the Twin Bridges project unless and until the agency finalizes the Supplemental GHG EA and issues a finding of no significant impact and decision record, or instead completes an environmental impact statement and record of decision.</p> <p>Further, because lease UTU-93713 was issued in violation of NEPA and FLPMA, BLM cannot approve any development thereon until those shortcomings are remedied including, but not limited to, correcting the agency's inadequate GHG and climate leasing analysis.</p> <p>In addition, and as those comments detail, BLM's inadequate discussion and analysis of GHG emissions and climate in its September 2018 lease sale EA and December</p>	<p>The purpose of the GHG EA is being prepared to evaluate the GHG emissions from 14 lease sales that occurred between 2014 and 2018. Moreover, the status of that effort is not relevant here because this EA is evaluating the potential impacts from the proposed action related to the development of Twin Bridges' three leases and is not a leasing decision. Therefore, this EA properly includes a site-specific analysis of GHGs emissions associated with this project as defined in Chapter 2 of the EA, in compliance with NEPA. Additionally, the EA has been revised to include a more detailed analysis of state and national contributions from BLM leasing activities to better inform the public with respect to cumulative impacts.</p>

Comment #	Comment Topic	Comment	BLM Response
		<p>2018 lease sale DNA were not the only legal mistakes BLM made when it issued the Twin Bridges lease. The following is a non-exclusive list of other fatal shortcomings: • When BLM suspended the leases it committed to analyze the potential impacts to resource values beyond GHG emissions and climate—analysis that has not been completed or even initiated. See SUWA Comments on Supplemental GHG EA at 1-3.</p> <p>•BLM’s analysis in the Supplemental GHG EA underestimates GHG emissions and fails to consider enforceable mitigation measures to minimize GHG emissions. See id. at 5-6.</p> <p>•When it issued the Twin Bridges lease BLM failed to analyze all direct, indirect, and cumulative impacts of leasing and development, failed to explain its reversal of position regarding the San Rafael Desert Master Leasing Plan, violated FLMPA and NEPA by unlawfully restricting public participation, and failed to analyze NEPA alternatives. See id. at 8-23, 25-37. BLM must remedy all of these legal mistakes before it can approve any development on lease UTU-93713.</p> <p>As noted above, lease UTU-93713 and the proposed development thereon are inseparably connected with BLM’s ongoing Supplemental GHG EA. That is because when BLM issued this lease, like so many in Utah, it failed to fully analyze and disclose the GHG emissions and climate change impacts from leasing and development. As also noted above, we incorporate in its entirety SUWA’s comments on the Supplemental GHG EA. However, to ensure that BLM considers and responds to SUWA’s comments on that NEPA document, and because the Twin Bridges EA analysis on this issue is woefully inadequate, SUWA restates its Supplemental GHG EA comments here, with updated references to the Twin Bridges EA, as appropriate. See Twin Bridges EA at 18-20 (briefly discussing GHG emissions and climate impacts).</p>	

Comment #	Comment Topic	Comment	BLM Response
A12-4	Decision Process	<p>Legal and Regulatory Context</p> <p>Twin Bridges does not disagree with the discussion of the applicable laws and regulations provided in Section 1.4.2 of the DEA, but there are two additional items that are relevant to the analysis that are not currently discussed. First, BLM should include the limitations on its authority to restrict access to lands granted at statehood as it pertains to the SITLA parcels. As expressed in the Utah Enabling Act, state trust lands are to be held, appropriated, and disposed of in a manner that generates revenue to support funding for educational and other enumerated purposes. BLM must respect the unique legal status of SITLA lands as it navigates the decision-making process for the Project.</p> <p>Second, while the Wilderness Act of 1964 provides the basic framework for wilderness management, the individual enabling statutes provide the controlling management directives for particular wilderness areas. Here, in addition to protecting valid existing rights like Twin Bridges' state and federal leases, the Dingell Act provides that "Congress does not intend for the designation of the wilderness areas to create protective perimeters or buffer zones around the wilderness areas." Further, the Dingell Act specifies that "[t]he fact that non-wilderness activities or uses can be seen or heard from areas within a wilderness area should not preclude the conduct of those activities or uses outside the boundary of the wilderness area."⁸ Thus, when considering the relationship with other federal laws and governing management principles for the Project, BLM must also consider these specific limitations on the impact of the wilderness designation that Congress specifically placed in the Dingell Act.</p>	<p>Section 1.4 of the EA specifically describes conformance with the Price Field Office RMP and other Federal laws, regulations, and policies. These laws, regulations, and plans provide the clarity requested in the comment. For example, Price RMP decision LAR-10 states "In accordance with the State of Utah v. Andrus, Oct. 1, 1979 (Cotter Decision), the BLM will grant the State of Utah reasonable access to State lands for economic purposes, on a case-by-case basis." The Wilderness Act also acknowledges that owners of inholdings must be granted adequate access. 16 U.S.C. § 1134(a).</p> <p>Nothing in the EA implies that the BLM is applying a "buffer zone" around wilderness areas. Additionally, under both action alternatives some underground occupancy of the Labyrinth Canyon Wilderness Area would be necessary, and the BLM has considered the appropriate approvals outside of the designated wilderness area in accordance with the Approved RMP, and other applicable Federal laws, regulations, and policies.</p>

Comment #	Comment Topic	Comment	BLM Response
A15-18	Relationship to Federal Laws and Policies	The EA does not refer to the land exchange provision, Section 1255, of the legislation that established the Labyrinth Canyon Wilderness. This could have an effect on whether the SITLA lands are to be retained by the State or transferred to the Federal Government in exchange for other parcels.	Section 1255 of the John D. Dingell, Jr. Conservation, Management, and Recreation Act (2019) allows for the exchange of BLM and SITLA lands. Prior to an exchange, the value of the land shall be appraised, taking into account any valid existing mining claims (Sec. 1255 (c)(4)). Any exchange will be subject to valid existing rights (Sec. 1255 (b)(5)). At the time the EA was prepared, there was no exchange proposal before the BLM for the parcels within the Labyrinth Canyon Wilderness Area. Any exchange with the State of Utah would require the State to be a willing participant in the exchange.
A12-22	Land with Wilderness Characteristics	3.9.1.1. The regulatory framework does not mention the Dingell Act, which established this wilderness. The DEA should include in the regulatory framework for managing wilderness areas and lands with wilderness characteristics the specific management requirements included with the wilderness designation in the Dingell Act.	Section 3.9.1.1 was revised to include reference to the Dingell Act and its establishment of the Labyrinth Canyon Wilderness Area. As stated in the Dingell Act, the new designations of wilderness areas are pursuant to the Wilderness Act of 1964 and as components of the National Wilderness Preservation System. Section 1.4.2 and Section 3.9.1.1 of the EA, detail the applicable wilderness act regulatory framework of the Wilderness Act and BLM Manual 6340.
A-5-19	Mexican Spotted Owl	BLM proposed “under all alternatives” in the draft MLP that in order to protect Mexican spotted owls it would require a lease notice “that includes a requirement for noise emissions to be reduced to 45 dBA at 0.5 mile from suitable Mexican spotted owl habitat, including canyon rims, when permanent actions may impact owls or their habitat.” San Rafael Desert MLP EA at 4-74. Stated differently, under all evaluated alternatives, BLM concluded that in order to protect the species on-lease noise levels had to remain below 45 dBA at all times within ½ mile of Mexican spotted owl habitat. The Twin Bridges EA neither discloses nor analyzes the information and instead proposes to allow helium development within that ½ mile buffer and allow noise that far exceeds the 45 dBA threshold it previously identified as necessary.	Reference to or reliance on a lease notice in a draft plan that was never completed and therefore not in effect is misplaced. As previously explained in response to comments and in the EA, the San Rafael Desert MLP EA was never completed and the BLM never enacted the lease notice requirement. During the review of Twin Bridges’ proposed action, the BLM coordinated with USFWS to complete Section 7 consultation under the Endangered Species Act. Through this consultation effort and in the preparation of this EA, the BLM determined, and the USFWS confirmed, that 68 dBA is an appropriate noise threshold as it is consistent with the USFWS 2012 MSO Recovery Plan guidelines. Section 3.7 of the EA contains a Mexican spotted owl noise impact analysis.

Comment #	Comment Topic	Comment	BLM Response
		BLM must—but has not—provide in the Twin Bridges EA a “reasoned explanation” for this changed position regarding (non)acceptable dBA levels in or near Mexican spotted owl habitat. BLM must also explain how and why Mexican spotted owls will not be significantly impacted by allowing development and noise in an area and at dBA levels the agency previously determined would adversely impact the species.	
30-1	Reclamation	The well site mitigation plan is also insufficient for the disposal of drilling fluids and returning the well site to a natural condition after the exploratory well is complete.	Appendix G of the EA describes the Applicant’s proposed methods for waste handling on site. Appendix G also describes the interim and final reclamation plans.
A-3	Reclamation	Emery County requests that all state and federal agencies coordinate their reclamation plans with the County. Any changes to the current system should reflect consultation with and consideration of the effects on private industry as well.	The BLM is required to follow current manuals and policies when administering land under their jurisdiction. The BLM encourages public participation in the creation and implementation of RMPs and other management plans. Your comment has been noted and taken under advisement.
A12-16	Special Status Plants	3.5.2.2. It is difficult from the narrative descriptions alone to determine the proximity and extent of surface impacts to special status plant species under each of the alternatives. Consider including one or more maps of the analysis areas and disturbance areas of Alternatives A and B and the expected surface impacts on special status plant species in the DEA.	Section 3.5.2.2 has been revised to reflect additional measures related to the protection and mitigation of potential impacts to identified special status plant species and their habitat. Special-status plant species location data is confidential and not mapped in the EA to ensure individual plants are protected from illegal collection or other unauthorized removal. Data and maps related to the locations of special-status plant species has been included in the administrative record. However, additional maps of the cumulative impact analysis areas have been included in the EA.
A15-6	Wilderness	The EA is internally inconsistent regarding impacts to Wilderness. The EA alleges that Alternative A would not go into Wilderness (page 53). Yet, the MRDG concludes on page 2 that action in the Wilderness is necessary. The MRDG on the same page then equivocates and obfuscates with this statement, “There is an option to put the well pad right on top of the road. However, the	As shown in Figure F-2 in Appendix F, the surface facilities associated with Alternative A would be located within an area excluded from the Labyrinth Canyon Wilderness Area. Section 3.9 of the EA has been revised to clarify that authorization of underground drilling of well bores would be required in the Labyrinth Canyon Wilderness Area under both alternatives.

Comment #	Comment Topic	Comment	BLM Response
		<p>technical requirements of the well pad may require it to be larger than the size of the cherrystem. The cherrystem in this case is 200 feet wide, so a part of the pad must be in the wilderness, if the pad must be larger than 200 feet.”¹ That hardly suffices for adequate NEPA analysis because we don’t know whether the pad will be in the Labyrinth Canyon Wilderness or not.</p>	<p>The Minimum Requirements Decision Guide (MRDG) refers to the general location of Twin Bridges’ Federal lease UTU 93713. However, the surface location of all facilities associated with Alternative A would be located within an area excluded from the Labyrinth Canyon Wilderness Area. The MRDG details that the “terminus of Emery County Road 1025 (Spur Road 1025) includes a disturbed circular roundabout that was also excluded from the Labyrinth Canyon Wilderness Area. Emery County Road 1026 bisects Federal lease UTU 93713. The width of the excluded corridor for each road is 100 feet from centerline of the existing disturbance”.</p> <p>The MRDG clarifies in the analysis of Alternative B that the well pad would be approximately 400 feet by 500 feet. Therefore, the well pad could not be located within the area excluded from the wilderness area along County Road 1026. This conclusion is appropriate noted in relevant sections of the MRDG addressing Alternative B.</p>
A15-7	Wilderness	<p>The actual wilderness boundary is also an issue that merits further discussion. This aerial view (below) from wilderness.net shows the exclusion for the wellpad in Alternative A, though it is obvious the route is primitive and turnaround itself barely exists, if at all. As such, the width of this corridor is not consistent with BLM Manual direction regarding wilderness boundary offsets of primitive roads (30 feet from centerline). Since the EA also refers to a 30-foot ROW (EA at 6 and 8), it creates confusion by leading a reader informed about BLM policy to conclude the boundary is much closer to the primitive road than the EA later states. Yet, the MRDG (Appendix I) and EA (for example, page 53) refer to a 200-foot excluded corridor. As such, the EA is unclear as to the actual width of the wilderness exclusion. If it is the greater amount, is this consistent with the legislation? And, how is it consistent with the BLM Manual guidance for boundaries adjacent to primitive routes, which applies in</p>	<p>The wilderness boundary setbacks found in BLM Manual 6340 are policy guidelines based on established practices, but the Wilderness Act gives Congress the primary authority to determine what the wilderness boundaries and setbacks will be. Wilderness boundary setbacks along roads established under the Dingell Act have been confirmed with Congress, and BLM does not have the authority to change the setback for Spur Road 1025. In this case, Congress specifically chose to put the wilderness boundary setback on Spur Road 1025 at 100 feet from centerline.</p>

Comment #	Comment Topic	Comment	BLM Response
		this case, judging from the nature of the route itself (see photo below)?	
A15-15	Wilderness	Yet, even dissecting the Wilderness Act as the Minimum Requirements Analysis does, the EA and MRDG both fail. The EA ignores a category of untrammeled, and conflates it with naturalness (page 54), “Specifically, the proposed action would increase the levels of trammeling and human development adjacent to and visible from within the wilderness.” While the MRDG includes untrammeled as a category, it confuses it with natural conditions. As such, the MRDG is inadequate.	The MRDG primarily addresses potential surface impacts that would be noticeable to visitors and could affect wilderness character. However, the Labyrinth Canyon Wilderness does extend into the subsurface mineral estate so subsurface disturbance is considered for the proposed alternatives. In order to maintain consistency in the MRDG analysis, active construction and drilling operations have been addressed under the Untrammeled quality; any structures created, either temporary or longer term such as road upgrades, well pads, well head trees, tanks, pipelines, and cased bore holes, are addressed under the Undeveloped quality, and potential impacts to native plants, wildlife, and soils are addressed under the Naturalness quality. The subsurface impacts of cased bore holes, and the subsequent occupation of the wilderness below the surface, have been addressed under the Undeveloped quality.
A12-34	Wilderness	MRDG p.2. The explanation for question 2 should be clarified to acknowledge that access to the wilderness for well pad development is only necessary to develop the leases under Alternative B. This explanation should be revised to clarify that Alternative A is the proposed method for accessing the leased area and drilling would occur from outside of the wilderness area (without surface impacts in the wilderness) and would only require subsurface access across unleased federal acreage.	The BLM has made revisions to the MRDG question 2 based on comments received and additional BLM internal reviews. The MRDG clarifies that Alternative A would only require subsurface occupancy of the wilderness area.

Comment #	Comment Topic	Comment	BLM Response
A12-35	Wilderness	MRDG p.12. Explanation of undeveloped quality analysis does not reflect that the road and existing impacts are already visible from the Five Hole Arch trail. The explanation should be revised to accurately describe that the road and existing impacts are already visible to users of the Five Hole Arch trail and that impacts from the project would be limited to changes to visual impacts of changes to the already visible disturbance.	The BLM has made revisions to the MRDG question 2 based on comments received and additional BLM internal reviews. The evaluation of the undeveloped quality acknowledges the existing disturbance in the area and measures that Twin Bridges would take to reduce impacts.

APPENDIX K

Bureau of Land Management Mitigation Measures

The Section 508 amendment of the Rehabilitation Act of 1973 requires that the information in federal documents be accessible to individuals with disabilities. The Bureau of Land Management has made every effort to ensure that the information in this document is accessible. If you have any problems accessing information, please contact Joe Rodarme at jrodarme@blm.gov or 435.636.3660.

BUREAU OF LAND MANAGEMENT–DEVELOPED MITIGATION MEASURES

The following section contains mitigation measures that the BLM developed for the Project. Mitigation measures are actions that would avoid or reduce adverse impacts identified in the BLM's environmental assessment that are not incorporated into the proposed action submitted by the Applicant. Therefore, these measures are in addition to the Applicant-committed environmental protection measures presented in Appendix G.

The Applicant would be required to be in compliance with the BLM-developed mitigation measures and Applicant-committed environmental protection measures at all times. Waivers, exceptions, or modifications to the following BLM developed mitigation measures or Applicant-committed environmental protection measures may be specifically approved in writing by the AO if either the resource values change, or the Applicant demonstrates that adverse impacts can be mitigated. In this case, the AO is the Price FO field manager, or his/her designated acting.

Sensitive Plant Species

The BLM will require that Twin Bridges minimize surface disturbances within the sensitive plant species occupied habitat (polygons) provided to reduce direct impacts on the sensitive plants, their habitats, and associated pollinator habitat.

- In the occupied habitat polygons, Twin Bridges must locate all buried infrastructure within the approved road surface disturbance area. This could include locating buried infrastructure underneath the road travel surface itself or in the ditch adjacent to the road. Final location of the infrastructure will be approved by the BLM AO prior to the initiation of construction of the buried infrastructure. Twin Bridges will avoid placing turnouts in sensitive plant polygons unless absolutely necessary for safety purposes and approved by the BLM AO in coordination with the BLM botanist. The purpose of this measure is to reduce the amount of surface disturbance and number of individuals impacted by surface disturbing activities in occupied sensitive plant species habitat.
- A BLM-approved botanical expert must be on site when vegetation is cleared within plant habitat polygons. Both pre- and post-surface disturbance photos will be provided to the BLM anytime surface disturbance occurs in the plant habitat polygons.

Mexican Spotted Owl

The BLM would require that additional Mexican Spotted Owl surveys be completed if more than five years have elapsed between the last survey year and the initiation of the proposed action, then one additional year of survey is recommended prior to project implementation. If Mexican Spotted Owl surveys are positive, then the timing limitations and all of the other applicant committed measures related to this species will apply for the life of the project.

Up to five additional development wells may be drilled from the proposed well pad. ESA consultation has not occurred on any wells other than the 36-1 and the 5-2, therefore, Section 7 consultation would have to be completed along with the appropriate NEPA before any additional wells are drilled on this well pad.

Dust Control

To reduce potential impacts to BLM sensitive plant species, pollinators and visual impacts, a dust suppressant would be applied on the adjacent sections of the roadway where these resources could be affected, to include the well pad (we will refer to a map indicating where it will be applied).

- Prior to use, the dust suppressant would need to be approved by the BLM Authorized Officer (AO). The approved suppressant would (1) be of a natural or organic material, (2) not result in any other environmental effects, (3) be readily available within the United States, and (4) be applied according to manufacturer instructions.
- Liquids can be applied with a common water truck. While a spreader bar is recommended, it is not required unless specified by the manufacturer. It is recommended that a meter or other means be used to accurately measure the volume of suppressant product being used.
- Applications would occur only when wind speed is below 10 miles per hour or in accordance with manufacturer instructions, whichever is more restrictive.
- Dust would be considered as controlled when (1) no dust is generated above the cab of the vehicle, or (2) there are no hanging dust plumes.
- All of the dust suppressant technologies require ongoing maintenance applications. Because of this requirement, a threshold for the reapplication of dust suppressant is necessary. The proponent would be responsible for determining when additional dust treatment or road repairs are necessary according to the agreed standards. BLM and State officials also have the ability to monitor dust levels and prescribe dust treatment if the applicable thresholds are exceeded.

Interim Reclamation

Assuming the wells are productive, interim reclamation would consist of reclaiming all areas not needed for helium production operations and would occur as soon as possible. This would include recontouring these areas to match existing undisturbed topography, redistributing stockpiled topsoil, and revegetating with a BLM-recommended seed mixture (Appendix C). Approximately 3 acres would be recontoured and reseeded during interim reclamation, leaving a long-term disturbance footprint of 2.4 acres during well operations (Appendix F, Figure F-5).

Following the Green River District Reclamation Guidelines (Instruction Memorandum No. UT-G000-2011-003) (BLM 2014a) and in accordance with Onshore Oil and Gas Order No.1, interim reclamation would be completed within 6 months of completion of the well to reestablish vegetation, reduce dust and erosion, and reduce visual impacts. All equipment and debris would be removed from the area proposed for interim reclamation. The well pad would be reduced to the minimum area necessary to safely conduct production operations. All other areas would be subject to interim reclamation, which would include recontouring, spreading of topsoil, seedbed preparation, and seeding.

Recontouring would use excess cut and well pad fill material to achieve the original contour and grade, or a contour that blends with the surrounding topography. Salvaged topsoil would be spread and seeded with a BLM-recommended seed mixture (Appendix C). Final seedbed preparation would depend on the condition of the soil surface and would include scarifying a crusted soil surface or roller packing an excessively loose soil surface. Seed would be broadcast or drilled after August 15 but before winter freezing of the soil, as outlined in BLM Instruction Memorandum No. UT-G000-2011-003, or at a time specified by the BLM. The BLM-recommended seed mix presented in Appendix C would be used for revegetating the interim (and final) reclamation areas. The seed would be certified pure-live and weed-free. Any trees cleared during site preparation and large rocks excavated during construction would be scattered across the interim reclamation area. Reclaimed areas receiving incidental disturbance during the life of the producing well would be recontoured and reseeded as soon as practical.

Final Reclamation

If the exploratory well is not successful, Twin Bridges would return the well site to its current condition, cutting off the casing at the base of the collar or 3 feet below the final graded ground level, whichever is deeper, and capping the casing with a metal plate with a minimum thickness of 0.25 inch. The cap would be welded in place with the location, lease number, operator name, and well name engraved on the top. The cap would be constructed with a weep hole. All surface facilities associated with the well would be removed from the site, and the remaining disturbed surface would be returned to the approximate original contours of the land before being reseeded. Topsoil would be distributed on the former well location to blend the appearance of the site with its natural surroundings before reseeding with the BLM-recommended seed mix presented in Appendix C. Reclamation activities would be considered complete when vegetation has reached a minimum of 75% of background vegetation (undisturbed areas), or as approved by the BLM AO in accordance with BLM Instruction Memorandum No. UT-G000-2011-003.

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