United States Department of the Interior
Bureau of Land Management

BLM

Environmental Assessment
DOI-BLM-CO-N050-2020-0052-EA

Caerus BJU M23A and 5 Other Well Pads

November 2020

Estimated Lead Agency Total Costs Associated with Developing and Producing this EA: $70,000

U.S. Department of the Interior
Bureau of Land Management
Northwest District
White River Field Office
220 East Market St
Meeker, CO 81641

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1. INTRODUCTION

1.1. Identifying Information

Project Title: Caerus Big Jimmy Unit (BJU) M23A and 5 Other Well Pads

Legal Description: See Appendix A.

Applicant: Caerus Piceance LLC

NEPA Document Number: DOI-BLM-CO-N050-2020-0052-EA

Lease/Casefile/Project Number: Big Jimmy Unit Leases: COC64814, COC61137, COC61136, COC61459, COC65557, COC61129

Expanded Liberty Unit Leases: COC57684, COC68353, COC62802, COC70687, COC57955

Lease stipulations are summarized in Appendix B.

1.2. Background

The operator, per agreement contract between Caerus Piceance LLC and the BLM, is under obligation to drill, complete and produce new wells within the Expanded Liberty Unit. The agreement contract states in part:

> "…such lands shall no longer be a part of the unit area and shall no longer be subject to this agreement, unless diligent drilling operations are in progress on unitized lands not entitled to participation on September 1, 2019, in which event all such lands shall remain subject hereto for so long as such drilling operations are continued diligently with no more than eighteen (18) months' time elapsing from the spud date of the last well drilled on one pad and the spud date of the first well to be drilled (x) on the next pad or (y) upon the re-entry of a partially developed pad, as further described below. This eighteen-month (18) period shall hereinafter be referred to as the "Planning Period." The unit operator will drill and complete a minimum of four (4) wells (the "Minimum Well Requirement") per pad in a single occupation. Operations undertaken in accordance herewith that satisfy the Minimum Well Requirement shall be considered "diligent drilling operations.""

Four wells is the minimum number required to drill and complete within each "planning period" and those four wells will be collocated on a different pad for each "planning period." If the operator fails to meet this requirement, the Unit boundaries will contract.

Therefore, Caerus Piceance LLC., has submitted applications necessary to meet these obligations to construct the pads and drill the wells within this Unit. The O13, A18 and M12 pads have a

proposed total of 98 APDs that would all be within the Expanded Liberty Unit and apply towards the Unit agreement.

Onsite visits were conducted on May 28, 2020 for the BJU facilities and on June 2, 2020 for the Expanded Liberty Unit (ELU) facilities.

1.3. Purpose and Need for Action

The purpose of the action is to provide the applicant the opportunity to develop oil and gas resources consistent with their federal oil and gas leases and federal oil and gas unit. The need for the action is established by the BLM's responsibility under the Mineral Leasing Act of 1920 (MLA), as amended [30 USC 181 et seq.], the Onshore Oil and Gas Leasing Reform Act (FOOGLRA) of 1987, and the Energy Policy Act (EPA) of 2005. The MLA authorizes the BLM to issue oil and gas leases for the exploration of oil and gas and permit the development of those leases. It is the policy of the BLM to make mineral resources available for leasing and to encourage development of mineral resources to meet national, regional, and local needs while protecting other natural resources. The existing lease is a binding legal contract that allows development of the mineral by the lessee.

1.4. Decision to be Made

Based on the analysis contained in this EA, the BLM will decide whether to approve or deny the proposed Applications for Permits to Drill (APDs), and if so, under what terms and conditions. Under the National Environmental Policy Act (NEPA), the BLM must determine if there are any significant environmental impacts associated with the Proposed Action warranting further analysis in an Environmental Impact Statement (EIS). The Field Manager is the responsible officer who will decide one of the following:

- To approve the APDs with design features as submitted;
- To approve the APDs with additional mitigation added;
- To analyze the effects of the Proposed Action in an EIS; or
- To deny the APDs.

1.5. Conformance with the Land Use Plan

The Proposed Action is subject to and is in conformance (43 CFR 1610.5) with the following land use plan:

Land Use Plan: 1997 White River Record of Decision and Approved Resource Management Plan (ROD/RMP), as amended by the White River Field Office Oil and Gas Development Approved Resource Management Plan Amendment (RMPA) and the Northwest Colorado Greater Sage-Grouse Approved RMPA

Land Use Plan Amendment: White River Field Office Oil and Gas Development Approved Resource Management Plan Amendment (Oil and Gas RMPA)

Date Approved: August 2015

Decision Language: "Make federal oil and gas resources available for leasing and development in a manner that provides reasonable protection for other resource values." (page 2-34)

"Manage BLM public lands, including the siting of public and private facilities through the issuance of applicable land use authorizations, in a manner that balances the needs of oil and gas development with the management for other resources values." (page 2-39)

Land Use Plan Amendment: Northwest Colorado Greater Sage-Grouse Approved Resource Management Plan Amendment (GRSG RMPA)

Date Approved: September 2015

Decision Language: The Proposed Action, as conditioned, is consistent with the Objectives and Management Decisions (MD) for leased fluid minerals (MR) as presented on page 2-15 of the GRSG RMPA. A detailed plan conformance review is provided in Appendix G.

2. PUBLIC INVOLVEMENT

The BLM uses a scoping process to identify potential significant issues in preparation for impact analysis. The principal goals of scoping are to identify issues, concerns, and potential impacts that require detailed analysis. Scoping is both an internal and external process. Internal scoping was initiated when the project was presented to the White River Field Office (WRFO) interdisciplinary team on July 7, 2020. External scoping was conducted by posting this project on the WRFO's on-line National Environmental Policy Act (NEPA) register on August 26, 2020.

3. PROPOSED ACTION AND ALTERNATIVES

3.1. Proposed Action (Alternative A)

Within the BJU, Caerus is proposing three new well pads (M23A, B26, P25) with a total of 84 Applications for Permits to Drill (APDs) and a Central Delivery Point (CDP) pad (N23). The M23A and B26 well pads occur on the same ridge and would use the existing F26 frac/completions pad and the proposed N23 CDP pad to support development of the proposed wells. The P25 well pad is southwest of these locations and would rely on the existing J25 frac/completions pad to support development of its wells.

Within the ELU, Caerus is proposing three new well pads (O13, M12, A18) with a total of 98 APDs and a CDP pad (G13). The O13, M12, and A18 well pads would be centrally located around the proposed G13 CDP which would be used to support drilling completions and well production operations for the proposed wells.

All pads are located on private surface (overlying Federal minerals) with an estimated total new disturbance of 143.5 acres (Appendix B, Figure 1 and Tables 1). The wells would develop Federal minerals and the combined total wells to be drilled on the six new proposed well pads is 182.

General Schedule
Table 1 summarizes Caerus' proposed construction and drilling schedule; however, the exact timeframes may change based on factors such as market conditions and weather[1].

Table 1. Estimated Construction and Drilling Schedule

Unit	Pad Name	Construction Start Date	Drilling Start Date
Big Jimmy	M23A Well Pad	September 2022	August 2023
	B26 Well Pad	September 2026	May 2027
	N23 CDP Pad	September 2022	Unknown
	P25 Well Pad	September 2024	June 2025
Expanded Liberty	O13 Well Pad (existing)	September 2021	November 2022
	M12 Well Pad	September 2025	April 2026
	A18 Well Pad	September 2023	June 2024
	G13 CDP Pad	September 2021	Unknown

3.1.1. Project Components

Big Jimmy Unit

Caerus has submitted plans for six new well pads containing a total of 182 proposed new wells, which are all on fee surface and federal minerals. Caerus has submitted 145 APDs for five of the new well pads. The proposed 37 APDs for the ELU M12 pad have not been submitted yet. The CDPs and pipelines are being presented as a connected portion of each of the developments, however, they are not part of the overall approval but rather the outcome of the BLMs approval of this development proposal.

M23A Well Pad
Caerus has submitted 27 APDs for the M23A pad (Figures 1 and 2). Construction of the well pad, re-routing the access road, and installation of pipelines would result in approximately 19.8 acres of new surface disturbance. The M23A pad would have approximately 2,700 ft of new pipeline corridor (approximately 5.9 acres of disturbance) running South back to the F26 pad where the existing infrastructure can be tied into. The M23A well pad would use the existing F26

[1] Once issued, APDs expire after two years unless the wells have been drilled and completed. The operator may also apply for a one-time two-year extension. If wells are not drilled and completed within this four-year period, the operator would need to submit new APD applications and pay the current APD processing fees. The BLM would then need to complete a new NEPA review and decide whether to approve the new APDs.

pad, adjacent on the south end of the proposed B26 well pad, as a frac/completions pad for remote completions operations.

B26 Well Pad
Caerus has submitted 30 APDs for B26 pad (Figures 1 and 3). Construction of the well pad, re-routing the access road, and installation of pipelines would result in approximately 16.2 acres of new surface disturbance. The B26 pad would have approximately 3,700 ft of new pipeline corridor (approximately 4.9 acres of disturbance) running South back to the F26 pad where the existing infrastructure can be tied into. The B26 well pad would use the existing F26 pad, adjacent on the south end of the proposed B26 well pad, as a frac/completions pad for remote completions operations.

N23 CDP Pad
Construction of the N23 CDP pad, re-routing the access road, and installation of pipelines would result in approximately 2.3 acres of new surface disturbance. The N23 CDP pad would service both the M23A and the B26 pads for well production. The pipelines associated with the N23 CDP pad have already been accounted for in the M23A and B26 surface disturbance acreage calculations. The CDP is not part of the overall approval since they are located on fee surface, however, is directly related to the production of the federal minerals and therefore provided disturbances such that they can be accounted for in the cumulative sections of the analysis.

BJU P25 Pad
Caerus has submitted 27 APDs for the P25 pad (Figures 1 and 5). Construction of the well pad, re-routing the access road, and installation of pipelines would result in approximately 16.1 acres of new surface disturbance. The P25 pad would have approximately 2,900 ft of new pipeline corridor (approximately 5.1 acres of disturbance) running West back to the J25 pad where the existing infrastructure can be tied into. The P25 well pad would use the existing J25 frac/completions pad for remote completions operations and the existing J25 CDP for well production operations. Both pads are NW of the proposed P25 location.

Table 2. Estimated Surface Disturbance in the Big Jimmy Unit

Project Component	Disturbance During the Construction Phase (acres)	Disturbance During the Production Phase/After Interim Reclamation (acres)	Disturbance After Abandonment/ Final Reclamation (acres)
M23A Well Pad	11.1	2.3	0
Access Roads	2.8	1.3	0
Pipelines	5.9	0	0
Subtotal for the M23A Location	**19.8**	**3.6**	**0**
B26 Well Pad	10.6	2.1	0
Access Roads	0.7	0.1	0

Pipelines	4.9	0	0
Subtotal for the B26 Location	**16.2**	**2.2**	**0**
P25 Well Pad	10.4	2.5	0
Access Roads	0.6	0.2	0
Pipelines	5.1	0	0
Subtotal for the P25 Location	**16.1**	**2.7**	**0**
N23 CDP Pad	2.3	2.3	0
Access Roads	0	0	0
Pipelines	0	0	0
Subtotal for the N23 Location	**2.3**	**2.3**	**0**
Total for the Big Jimmy Unit	**54.4**	**10.8**	**0**

Expanded Liberty Unit

The Oil Shale Corporation is the landowner for these ELU pads. Caerus has a signed Surface Use Agreement with The Oil Shale Corporation for the ELU pads. The Surface Use Agreement is attached to each ELU APD under the Surface Plan Data section of the APD packages.

O13 Well Pad

Caerus has submitted 26 APDs for proposed wells on the O13 pad (Figures 1 and 6). This proposed well pad is completely within an existing larger disturbance, so the well pad and access roads acreages (8.2 acres) are not being counted as new disturbance. Construction of the well pad, re-routing the access road, and installation of pipelines would result in approximately 15.5 acres (including existing disturbance) of surface disturbance. The O13 pad would have approximately 3,200 ft of new pipeline corridor (approximately 7.3 acres of disturbance) running North to the proposed G13 CDP pad for remote drilling completions and well production operations.

M12 Well Pad

Caerus plans to submit 37 APDs for proposed wells on the M12 pad (Figures 1 and 9). Construction of the well pad, re-routing the access road, and installation of pipelines would result in approximately 23.1 acres of new surface disturbance. The M12 pad would have approximately 4,565 ft of new pipeline corridor (approximately 9.1 acres of disturbance) running East and then South to the proposed G13 CDP pad for drilling completions and well production operations.

A18 Well Pad

Caerus has submitted 35 APDs for proposed wells on the A18 pad (Figures 1 and 7). Construction of the well pad, re-routing the access road, and installation of pipelines would result in approximately 26.8 acres of new surface disturbance. The A18 pad would have approximately 4,500 ft of new pipeline corridor (approximately 9.3 acres of disturbance) running North and then Southwest connecting back to the proposed G13 CDP pad for remote drilling completions and well production operations.

G13 CDP Pad

Construction of the CDP pad, re-routing the access road, and installation of pipelines would result in approximately 23.7 acres of new surface disturbance (Figures 1 and 8). The G13 CDP pad would service the O13, M12 and A18 well pads. The current plan is to construct the G13 CDP pad large enough to accommodate modular type expansion of equipment for other future well pads in the area, without increasing the pad disturbance footprint when that time comes. The G13 CDP pad would have approximately 9,500 ft of new support pipeline corridor (approximately 13.1 acres of disturbance) installed between the G13 CDP and the existing K14 pad location (located to the South of the proposed G13 pad location) to provide a connection to the existing infrastructure. The CDP is not part of the overall approval since they are located on fee surface, however, is directly related to the production of the federal minerals and therefore provided disturbances such that they can be accounted for in the cumulative sections of the analysis.

Table 3. Estimated Surface Disturbance in the Expanded Liberty Unit

Project Component	Disturbance During the Construction Phase (acres)	Disturbance During the Production Phase/After Interim Reclamation (acres)	Disturbance After Abandonment/ Final Reclamation (acres)
O13 Well Pad	7.2 (existing)	2.2	0
Access Roads	1.0 (existing)	0.6	0
Pipelines	7.3	0	0
Subtotal for the O13 Location[1]	**15.5**	**2.8**	**0**
A18 Well Pad	11.3	3.2	0
Access Roads	6.2	6.0	0
Pipelines	9.3	0	0
Subtotal for the A18 Location	**26.8**	**9.2**	**0**
M12 Well Pad	11.2	2.5	0
Access Roads	2.8	2.4	0
Pipelines	9.1	0	0
Subtotal for the M12 Location	**23.1**	**4.9**	**0**
G13 CDP Pad	10.4	10.4	0
Access Roads	0.2	0	0
Pipelines[2]	13.1	0.2	0
Subtotal for the G13 Location	**23.7**	**10.6**	**0**

Total for the Expanded Liberty Unit	**89.1**	**27.5**	**0**

[1] The O13 pad and access roads would be constructed completely within an already existing, much larger disturbance. Therefore, those portions are not being counted as new disturbance.

[2] Appendix B, Figure 8 acreage does not include pipeline corridor.

3.1.2. Design Features

The entire Surface Use Plan of Operations (SUPO) is incorporated into the Proposed Action and is available for review at the WRFO. Key items relevant to the issues associated with the Proposed Action are listed in Appendix D.

3.1.3. WRFO Standard Conditions of Approval

The WRFO routinely requires a standard set of conditions of approval (COAs) that are applicable to most oil and gas development projects (most of these standard COAs are described in Appendix 2 of the Oil and Gas Development RMPA). Relevant COAs that were not already included in the SUPO are listed in Appendix E. Site-specific mitigation measures, if applicable, are identified as mitigation in the EA in each analysis section below and complied in Appendix F.

3.2. No Action Alternative (Alternative B)

The No Action Alternative constitutes denial of the APD(s) associated with the Proposed Action. Under the No Action Alternative, none of the proposed project components described in the Proposed Action would take place.

3.3. Alternatives Considered but Eliminated from Detailed Analysis

No feasible alternative surface locations were identified for the proposed project that would result in less impacts than the proposed location. All of the six proposed well pads have been located to reach specific bottom hole targets. The three proposed well pads in BJU are in a developed gas field, however, nearby existing well pads already host multiple existing gas wells and existing infrastructure pads are currently serving multiple existing large multi-well pads. There would be multiple adverse consequences in trying to add wells to any of the existing pads in the area, including, but not limited to, bottom hole target locations not being achievable, shutting down existing multi-well pads to accommodate the drilling and completions operations, increased surface disturbance above the proposed acreage, and multiple rig moves. In addition, many of the consequences would have economic impacts on the Operator.

The three proposed well pads in the Expanded Liberty Unit are in areas that have not been developed yet. One of the proposed pads, the ELU O13, is proposed to be located completely within a much larger existing disturbance. The other two well pads are in undeveloped areas.

4. ISSUES

The CEQ Regulations state that NEPA documents "must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail" (40 CFR 1500.1(b))[2]. While many issues may arise during scoping, not all of the issues raised warrant analysis in an environmental assessment (EA). Issues will be analyzed if: 1) an analysis of the issue is necessary to make a reasoned choice between alternatives, or 2) if the issue is associated with a significant direct, indirect, or cumulative impact, or where analysis is necessary to determine the significance of the impacts. The following sections list the resources considered and the determination as to whether they require additional analysis.

4.1. Issues Analyzed

The following issues are analyzed in detail in this EA (Section 5):

Air Quality

1. How would emissions generated from the equipment used in the development and operations of the proposed project impact air quality? (section 5.4.1)

Wildlife

2. How would construction of the six well pads and associated infrastructure as well as drilling, completions, and operation of the wells affect greater sage-grouse and migratory birds? (section 5.5.1)
3. How would activity associated with construction, drilling, completions, and operation of the wells affect nesting raptors? (section 5.5.2)
4. How would construction of the six well pads and associated infrastructure as well as drilling, completions, and operation of the wells affect big game seasonal ranges? (section 5.5.3)

4.2. Issues Considered but not Analyzed in Detail

Soil Resources

5. **How would surface disturbing activities, drilling, completions, and transportation of products affect soil resources?**

   The proposed project is on private surface. No surface disturbing activities would occur on lands classified as prime farmland, fragile soil, or steep slopes.

   New disturbance from the proposed pads, access, and pipelines would be approximately135 acres over the six years of project development. Upon project completion and successful achievement of interim reclamation there would be roughly 38

[2] References to the CEQ regulations throughout this EA are to the regulations in effect prior to September 14, 2020. The revised CEQ regulations effective September 14, 2020 are not referred to in this EA because the NEPA process associated with the proposed action began prior to this date.

acres that would remain disturbed during the life of the wells (approximately 25 years). With ongoing interim reclamation, it is estimated the maximum area of disturbance during any one year would be less than 90 acres. Final reclamation would occur after all wells on a pad are plugged and abandoned.

Surface disturbing activities would result in soil compaction, removal of vegetation, exposure of subsoil, mixing of soil horizons, loss of topsoil productivity, and an increase in the susceptibility of soils to wind and water erosion. All impacts to vegetation occur on private lands and would not impact public soil resources. Implementation of Caerus's drilling plan and SUPO (Appendix D, Design Features numbers 1-11 and 13-17) along with the Standard Conditions of Approval (COA) in section E.9. Reclamation Procedures (Appendix E) would help reduce loss of soil productivity, stability, and limit loss of topsoil from erosion until a desirable vegetative cover is re-established.

Caerus's Design Features include the use, inspection, monitoring, and corrective actions of structural and non-structural controls to manage erosion, drainage, and sediment in and adjacent to disturbed areas. They also include measures that would help optimize the success of interim and final reclamation.

Contamination of soils could occur from the unintentional releases of exploration and production liquids. Potential loss of soil productivity from contamination would be minimized with the implementation of Design Features numbers 3, 4, and 15 through 17 (Appendix D) and the and Colorado Oil and Gas Commission's (COGCC) 300, 600, 900, 1000, and 1100 Series Rules regulating oil and gas exploration and production wastes, including spill control, reporting, and cleanup. Any releases from construction, drilling, completion, and operations would likely be small in nature and would be cleaned up immediately.

Implementation of the control measures, interim, and final reclamation procedures would minimize the potential loss of topsoil until a self-sustaining diverse native vegetative community is re-established. Once this is achieved, it is likely soil and vegetative cover would return to pre-disturbance productivity levels.

Water Quality

6. How would construction, drilling, completion, operations and transportation of products affect surface water and groundwater quality?

The proposed project is not within a mapped COGCCs Rule 317b public water system protection area. All pads would be located on ridgelines and the edge of disturbances are more than 300 feet from the nearest mapped intermittent stream and more than 1,000 feet from mapped perennial streams and springs.

Potential impacts to surface water and groundwater from the development of the proposed project could result from sediment transportation and unintentional releases of chemicals or produced fluids during construction, drilling, completion (including hydraulic fracturing), production, and transportation. The Design Features, Standard COAs, and COGCC Rules previously mentioned in the soil section would minimize potential impacts to surface water by controlling and containing the transportation of

sediment and unintentional releases. These control measures would limit their dispersion into surface water or waterways.

Groundwater could be impacted by the infiltration of unintentional releases and when drilling operations penetrate freshwater zones or encounter a loss circulation zones. The COGCC 300, 600, 900, 1000, and 1100 Series Rules regulating oil and gas exploration and production wastes, including containment, spill control, reporting, and cleanup limit the potential for impacts to groundwater from infiltration from the surface. Surface casing is required to extend below all known or reasonably estimated freshwater levels. Standard COAs in Appendix E, sections E.2. Wildlife (Number 10) and E.6. Waste, include the use of freshwater and water base muds during the drilling and setting of the surface casing. Caerus's SUPO (Appendix D Design Features numbers 3, 4, 15-17) tank containment, containment lining, cuttings management, and tank contained completion flow back would limit potential for unintentional releases. Any spills from drilling and completion equipment would likely be small in nature and would be cleaned up immediately.

Water usage for each well is anticipated to be 248,000 barrels (~32 acre-feet); 14,000 barrels (~1.8 acre-feet) would be freshwater and the remaining 234,000 barrels (~30.2 acre-feet) would be recycled produced water. Estimated annual freshwater usage would range from 46.9 to 66.8 acre-feet. The proposed six year, 182 well project would result in an estimated 328.4 acre-feet of freshwater usage and 5,490 acre-feet of recycled water. Water rights would not be affected by the Proposed Action. Freshwater used for construction and drilling would be obtained under Caerus's Industrial Rights.

No riparian areas or aquatic wildlife are located in the immediate project area. The water depletion for this action is covered under the Programmatic Biological Opinion (PBO)(ES/GJ-6-CO-08-F-0006 TAILS 65413-2008-F-0073-R001) with the U.S. Fish and Wildlife Service (FWS) for water usage that could indirectly impact threatened and endangered fish species.

Vegetation

7. Would surface disturbing activities increase the likelihood of spreading noxious/invasive weeds?

The proposed project area is entirely located on private land. Overall, the proposed projects all occur within either a Wyoming sagebrush shrubland (with an understory of native forbs and grasses), aspen woodland, mountain shrubland, or oak brush shrubland (WestWater 2020a-e). Invasive non-native plant species are currently a minor component within the surrounding areas; biological surveys performed by a third-party contractor found minimal invasive species within the project area.

Surface disturbing activities would result in a direct loss of woody and herbaceous vegetation. In addition to direct vegetation loss, the increased traffic and soil disturbance could potentially result in the introduction and establishment of noxious and/or invasive weeds. Without prompt establishment of desirable species from reseeding and continued weed control, noxious and/or invasive weeds could readily establish in the disturbed

areas. All impacts to vegetation occur on private lands and would not impact public vegetation resources. Implementation of Caerus's drilling plan and SUPO (Appendix D Design Features) along with the Standard Conditions of Approval (COA) in section E.9. Reclamation Procedures (Appendix D) would help maintain soil productivity, stability, and limit loss of topsoil from erosion until a desirable vegetative cover is re-established.

Implementation of weed control measures and interim and final reclamation procedures would minimize the potential loss of topsoil until a self-sustaining diverse native vegetative community is re-established. Once this is achieved, it is likely soil and vegetative cover would return to pre-disturbance productivity levels. Any reclamation efforts would be consulted on with all private landowners to ensure landowners are agreeable to reclamation efforts.

Paleontological Resources

8. **How would construction or expansion of well pads and associated infrastructure affect scientifically important paleontological resources?**

   The area of the Proposed Action is generally mapped as the Uinta Formation (Tweto 1979), designated by the BLM as a Potential Fossil Yield Classification (PFYC) 5 formation for its very high potential to yield scientifically noteworthy fossil resources. Fossil resources of the Uinta Formation and known in the general project vicinity primarily include fossilized large mammal bone (5RB.4174 and 5RB.8900) as well as contemporaneous flora fossils (5RB.6558). Excavations into the underlying native sedimentary rock could crush and displace previously unidentified subsurface fossil resources; any loss of scientifically noteworthy fossils would result in an irreversible and irretrievable permanent loss of scientific data from the regional paleontological database. Such impacts would be avoided or minimized so long as the operator adheres to the Standard COAs in Section E.3 Paleontological Resources (Appendix E) and the site-specific COA for a paleontological monitor (Appendix F).

5. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

5.1. General Setting & Access to the Project Area

The well pads are located in the south-central portion of the BLM White River Field Office area. The M23A well pad is at approximately 8,100 ft. elevation, and the five other well pad locations vary from 8,000 ft. to 8,400 ft elevation All six well pad locations are on ridge tops with mixed mountain shrubs, including sagebrush, and scattered pockets of aspen trees.

Caerus intends to access the locations using the existing roads starting at Parachute, Colorado from the South: Garfield County (GarCo) Road 215 approximately 10.6 miles North to a private road, continuing North approximately 6.4 miles to the intersection with GarCo Road 401 and GarCo Road 403. Then continue West on GarCo Road 401 approximately 1.1 miles to the F26

pad access road intersection. Then proceed North 0.6 miles to the proposed access road for the M23A and B26 well pad locations. (See Appendix B, Figure 1.)

5.2. Cumulative Impacts

5.2.1. Cumulative Impacts Analysis Areas

The geographic extent of cumulative impacts varies by the type of resource and impact. The timeframes, or temporal boundaries, for those impacts may also vary by resource. Different spatial and temporal cumulative impact analysis areas (CIAAs) have been developed and are listed with their total acreage in Table 4. 4.

Table 4. Cumulative Impact Analysis Areas by Resource

Resource	CIAA	Total CIAA Acreage	Temporal Boundary
Air Quality	WRFO	~2.7 million acres	6 years for construction, drilling, and completions; 25 years operations
Greater Sage-Grouse Habitat	Priority Habitat Management Area (PHMA) and General Habitat Management Area (GHMA) in Management Zone (MZ) 17	Total GRSG Habitat in MZ 17: 303,162 acres PHMA: 143,380 GHMA: 159,782	Anticipated impacts associated with construction, drilling, and reclamation activities would be reduced once these activities cease. Reclamation of pipelines and interim reclamation (3-4 years) would return some foraging habitat while the wells are in production. Other impacts associated with habitat avoidance due to production activities or the loss of habitat on the well pad would remain for decades (assuming the wells are in production for 35 years) until the wells are plugged, the land reclaimed, and the shrub component is allowed to re-establish.

Raptor and Migratory Bird Habitat	Watershed subbasins: Middle Parachute Creek, Dry Thirteenmile-Piceance Creek, Steward Gulch	Approximately 82,800 acres	Anticipated impacts associated with avoidance of suitable habitat due to human activity during construction, drilling, and reclamation would be reduced once these activities cease.
Big Game Habitat	Summer Range and Severe Winter Range in Game Management Unit (GMU) 22	Total: 311,300 acres Summer Range: 82,400 acres Severe Winter Range: 228,900 acres	Anticipated impacts associated with construction, drilling, and reclamation activities would be reduced once these activities cease. Reclamation of pipelines and interim reclamation (3-4 years) would return some foraging habitat while the wells are in production. Other impacts associated with habitat avoidance due to production activities or the loss of habitat on the well pad would remain for decades (assuming the wells are in production for 35 years) until the wells are plugged, the land reclaimed, and the shrub component is allowed to re-establish.

5.2.2. Past, Present, and Reasonably Foreseeable Future Actions

Cumulative effects are defined in the CEQ regulations (40 CFR 1508.7) as "...the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

Past and Present Oil and Gas Development

There are approximately 3,420 active wells (e.g., producing, shut-in, temporarily abandoned, injection, and drilling status) within the WRFO. The Colorado Oil and Gas Conservation Commission (COGCC) online database indicates 88 wells have been spud since January 2019. As an example of past and present development in the vicinity of the proposed action, Table 5 presents estimates of existing surface disturbance associated with oil and gas development on the subject leases.

Table 5. Estimates of Existing Surface Disturbance on Leases of the Proposed Action.

Lease Number	Proposed Pad Locations	Lease Size	Existing Disturbance Associated with Oil and Gas Development
COC064814	M23A and B26	2,524.2 acres	135.5 acres (5.3%)
COC061136	P25	640 acres	78.6 acres (12.3%)
COC057684	O13	1,889.5 acres	44.8 acres (2.4%)
COC062802	A18	1,686 acres	0 acres
COC057955	M12	1,277.8 acres	4.3 acres (0.3%)

Reasonably Foreseeable Future Actions

In 2015 the BLM published the Oil and Gas Development Proposed RMP Amendment/FEIS, which considered changes in the location, type, and level of oil and gas development within the resource area. Based on an updated 2007 Reasonably Foreseeable Development (RFD) scenario, it is assumed that the majority of oil and gas development would occur within the Mesaverde Play Area (MPA; Piceance Basin) and consist of multi-well pads. The Proposed RMPA/FEIS considered drilling up to 15,040 wells from 1,100 well pads with an associated surface disturbance of 13,200 acres (Section 2.4.6, page 2-29 of the Proposed RMPA/FEIS). An estimated 12 acres per pad would be disturbed initially (including areas needed for associated infrastructure) however that would be reduced to 5 acres per pad following interim reclamation (see Table 4-2 of the Proposed RMPA/FEIS). Further, it was assumed there would be up to 790 miles of roads and 565 miles of utility lines (pipelines and power lines) developed to support this activity (see Table 4-3 of the Proposed RMPA/FEIS).

This project is located within the 598,600-acre MPA, where it was assumed that full-field development would include a total of 972 well pads and require two to three pads per section.

Other past, present, and reasonably foreseeable actions in the project area include livestock grazing and associated range improvement projects, vegetation treatments, and both wildfires and prescribed burns. Other mineral development within the area includes sodium solution mining. Recreation use is characterized by dispersed camping, OHV use, and hunting.

5.3. Air Quality

5.3.1. How would emissions generated from the equipment used in the development and operations of the proposed project impact to air quality?

Affected Environment

The proposed project is in north-central Garfield County and south-central Rio Blanco County, Colorado on private surface. It is situated a straight-line distance of 15 miles north of Parachute, Colorado and 25 miles southwest of Meeker, Colorado on ridgelines with an average elevation of roughly 8,100 feet. This area is within the Colorado Department of Public Health and Environment's (CDPHE) Western Slope air quality region which is designated as attainment and is in full compliance with the National Ambient Air Quality Standards (NAAQS) for Criteria Pollutants. No private residences are within two miles of the proposed wells.

Oil and gas development activity in the vicinity of the proposed wells is relatively high. According to the COGCC database, there are 292 active and 9 plugged/drilled and abandoned wells within a two-mile radius (an area representing approximately 21,500 acres) of the proposed pads. Fifty-five of the 292 active wells were spud since January 2019. Approximately 5 percent (~2,000 acres) of the area within the two mile-radius is federal surface and 93 percent (~20,000 acres) is federal oil and gas mineral estate. Included in the area are portions of the Big Jimmy (COC74105X) and the Expanded Liberty (COC69926X) Federal Oil and Gas Exploratory Units. The proposed wells would be in-fill wells for both units. Table 6 is a summary of the oil and gas mineral ownership and active wells within the two-mile radius area.

Table 6. Oil and Gas Mineral Ownership and Active Wells Within the Two-Mile Radius Area.

Oil and Gas Mineral Ownership	Unit	Acres Within 2-Mile Radius	Percent of 2-Mile Radius Area	Active Wells[1]	Producing Wells
Federal	COC69926X	9,540	44%	0	0
	COC74105X	7,930	37%	292	241
	Non Unit Leased	2,020	9%	0	0
	Unleased	540	3%	0	0
Non Federal	Non Unit Private	1,470	7%	0	0
Total		21,500	100%	292	241

[1] COGCC Active: producing, shut-in, temporarily abandoned, injection, and drilling

In accordance with Section V of BLM Colorado's Comprehensive Air Resource Protection Protocol (CARPP), the BLM Colorado State Office Air Resource Specialists prepared the 2019 Annual Report as a comprehensive assessment tool to assist in the preparation of project level NEPA for oil and gas development projects. The 2019 Annual Report provides up to date information on oil and gas development (current regulations, rates for drilling and production, emissions inventories, etc.) and the state of the atmosphere (air pollutant concentration trends, air quality related values, etc.) for each applicable Colorado Field Office or Planning Area. The

report also places this information in the context of the Colorado Air Resource Management Modeling Study (CARMMS 2.0), which provides cumulative analyses for multiple projected oil and gas development scenarios in Colorado out to year 2025.

The 2019 Annual Report is a web-based, dynamic, data-driven document that allows BLM Colorado to convey a vast amount of information in a relatively compact and reusable framework. Consistent with CEQ regulation 40 CFR 1502.21, Incorporation by Reference, and mandates to reduce paperwork, the data from the 2019 Annual Report for the White River Field Office is incorporated by reference in this analysis to describe the affected environment and cumulative impacts analysis associated with the proposed or preferred action. All of the documents described above are available to the public on BLM Colorado's website at: https://www.blm.gov/programs/natural-resources/soil-air-water/air/colorado.

Alternative A (Proposed Action) – Direct and Indirect Effects

In general, Alternative A would have a temporary impact on air quality, which would mostly occur during construction, drilling, completion, and the initial production years of the well before well yields decline (production declines in excess of 50 percent during the first three years are typical). Use of the access roads, pipeline construction, disturbed well pad areas, and development activities such as drilling, hydraulic fracturing, well completion, and equipment installation would all impact air quality through the generation of dust related to worker travel, materials transport, and general construction. This phase would also produce short-term emissions of criteria, hazardous, and greenhouse gas pollutants from vehicle and construction equipment exhausts. Once drilling and completion are complete, the daily activities at the site would be reduced to operational and maintenance checks and product load-out and hauling, which initially may occur as frequently as multiple daily visits (prior to declining production). Emissions from these activities would include vehicle and compression or artificial lift pump exhaust, fugitive emissions of production related gases from infrastructure components, pneumatic devices that use the gas's kinetic energy to operate, and liquid product load-out. Methane is the primary component for the majority of the various gas streams, although at some points in the process the fraction of volatile organic compounds and hazardous air pollutants may be elevated compared to the sales gas fractions.

A detailed emissions inventory for the Proposed Action was prepared in accordance with section III.B of BLM Colorado's CARPP. The inventory was developed using the BLM CO Emissions Tool and supplemented with a proposed drilling and development timeline. The inventories include emissions from construction, drilling, completion, and production related activities and is the best available information. Table 7 contains the estimated maximum annual criteria and hazardous air pollutant emissions (Particulate Matter ($PM_{2.5}$, PM_{10}), Volatile Organic Carbon (VOC), Nitrogen Oxides (NOx), Carbon Monoxide (CO), Sulfur Oxides (SO_x), Hazardous Air Pollutants (HAPs)) which could occur during the six year construction and development the project. Production and operation emissions would occur during the productive like of the wells (~25 years) and would likely decline with time.

Table 7. Estimated Maximum Annual Project Emissions – (tons)

Phase	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_X	HAPs
Construction/Development[1]	33.2	9.2	7.7	146.6	89.2	5.5	1.9
Production/Operations[2]	2.8	2.4	46.2	39.3	33.7	0.4	0.7
Maximum Annual[1]	36.0	11.6	53.9	185.9	122.9	5.9	2.6

[1]Would only occur during construction and development timeframe (~6 years)

A quantitative analysis of the potential impacts from Alternative A was produced using a screening level gridded near-field assessment tool based on the results of the CARMMS 2.0. This data is useful for determining the relative contribution of federal oil and gas emissions to the cumulative concentrations modelled within the grid cells. In addition to data specific to the project location, the tool also retrieves data for the modelled grid cell (any grid cell) from each CARMMS 2.0 scenario with the closest emissions greater than the project-specific emissions. The scenario with the lowest modelled impacts is used to represent the "project only" modelled emissions (i.e., it is the one least influenced by neighboring grid cells, where higher neighboring emissions would influence adjacent cell concentrations beyond a project specific source estimate) and is used to determine what the project's contributions to the site-specific concentrations would actually be. There are a variety of factors that can affect the overall accuracy of this approach for describing project-related impacts. However, as a screening assessment there is a high degree of conservatism in using cumulative projected domain-specific data to analyze project impacts (so long as the emissions are fully accounted for). As a first-tier approach for analysis this method provides a fast and reliable way to allocate CARMMS 2.0 gridded emissions and impacts for project tracking assessments at the near-field scale.

A quantitative analysis of the potential impacts from the increased emissions that would result from Federal mineral development was completed using the screening level assessment tool.

The gridded emissions near-field assessment tool was run for the maximum emissions project year (for both NO_X and VOC). The results from the CARMMS 2.0 modeling domain produced spatially allocated emissions (i.e., the maximum grid cell) in excess of the project emissions for each pollutant analyzed. Table 8 shows the maximum expected modelled concentration in the modeling domain for each year and pollutant analyzed. All concentrations are shown in the form of the NAAQS standards. The $PM_{2.5}$ values represent the daily (24 hour) and annual standard respectively. The CARMMS 2.0 modeling domain predicted no modeled exceedances for any of the NAAQS pollutants analyzed.

Table 8. Gridded Domain Model Impacts

Pollutant (units)	High CARMMS 2.0 Model Concentration[1]	Percent NAAQS[2]	POD Project Contributions[3]	SIL[4]
NO2 1 hour (ppb)	60.1	60%	18.86	4
O3 8 hour (ppb)	69.4	99%	2.00	1
PM10 (µg/m3)	10.3	7%	5.59	5
PM2.5 24 hour (µg/m3)	4.5	13%	1.85	1.2
PM2.5 Annual (µg/m3)	2.7	23%	0.61	0.2

[1] Ambient concentration based on the full cumulative model (cleanest background)

[2] The percent of the NAAQS the full cumulative model results represent

[3] The project emissions contributions to the cumulative ambient concentrations

[4] Significant Model Impact Levels (SIL) defined by CDPHE and EPA, to be referenced if NAAQS is exceeded

Climate Change Analysis

No analysis tools exist to describe the project's incremental contributions to the global phenomenon of climate change in terms of potential warming, drought, sea level rise or other common environmental metrics associated with increasing concentrations of atmospheric greenhouse gases. The problem is by nature a cumulative issue, and any downscaling of the projected global climate changes effects to project scales (based on emissions scaling) does not provide meaningful analysis due to the fact that no significance levels have been defined. As identified in the emissions inventory (below) the project would emit greenhouses gases and would thus contribute to the accumulation of atmospheric greenhouse gases, and potential climate change effects if future year global emissions and impacts are consistent with any of the scenarios analyzed by the Intergovernmental Panel on Climate Change (IPCC) contributing scientists.

The wells would remain in production for approximately 25 years. Over that time the conservative estimated sum of the total oil and gas produced would equal approximately 9.4 times the initial first year maximum production volumes. This estimate is based on empirical data of Denver-Julesburg Basin well production rates tracked over varying service periods, and the operator's experience in the basin for how these wells might produce during the first year (where production is typically the highest). The greenhouse gas (GHG) estimates assume that all of the oil and gas production is eventually combusted in one form or another (the exact nature and/or configuration and location of that combustion apparatus is unknown and not reasonably foreseeable). Table 9 summarizes the estimated total project GHG emissions, in the form of carbon dioxide CO_2 and carbon dioxide equivalent (CO_2e), attributable to the six-year development of the project and 25-year operational phase of the wells.

Table 9. Project GHG Emissions (tons)

Sub-activity	CO_2	CO_2e	Total CO_2e
Subtotal – Development[1]	1,284,900	888,600	2,173,500
Subtotal – Downstream[2]	49,023,700	61,700	49,085,400
Total Emissions	50,308,600	950,300	51,258,900

Alternative B (No Action Alternative) – Direct and Indirect Effects

Under the No Action Alternative, the BLM would not authorize any of the Proposed Action elements and there would be no additional direct or indirect impacts to air quality or climate change beyond that associated with the operation of the existing infrastructure. Such air quality impacts would continue for the life of the existing wells until final reclamation has been completed.

Cumulative Impacts

As previously mentioned, the Colorado State Office Air Resource Specialists prepared the 2019 Annual Report as a comprehensive assessment tool to assist in the preparation of project level

NEPA for oil and gas development projects. The 2019 Annual Report provides up to date information on oil and gas development (current regulations, rates for drilling and production, emissions inventories, etc.) and the state of the atmosphere (air pollutant concentration trends, air quality related values, etc.) for each applicable Colorado Field Office or Planning Area. The report also places this information in the context of the CARMMS 2.0, which provides cumulative analyses for multiple projected oil and gas development scenarios in Colorado out to year 2025. Overall future development in the WRFO is expected to remain at the current level, or lower, and it is reasonable to expect the cumulative impacts of the two well pads developed beyond 2025 would be similar to the 2025 scenario. The proposed project would fall within the high CARMMS 2.0 scenario for the WRFO.

The BLM expects oil and gas development to decline or remain on the current track (i.e., tracking low relative to the RMPA) for the foreseeable future in Colorado Rate of well development in Colorado has steadily declined since 2017 and is not expected to increase substantially in the foreseeable future. The decline rate could be attributed to several factors including depressed prices, Colorado's new oil and gas rules, and the COVID 19 pandemic.

Given the low Federal development that has occurred over the monitoring period, it is reasonable to conclude that the WRFO is meeting the air quality goals and objectives defined for oil and gas development within its RMP. Overall development is tracking well below the levels analyzed under the high CARMMS 2.0 scenario. The CARMMS 2.0 data shows that the projected development in WRFO is not likely to have significant impacts on the NAAQS or visibility at nearby Class I areas.

Climate Change Analysis
Production and development of the Proposed Action's 182 wells is estimated to contribute a maximum of 51 million tons of CO_2e over the 25-year estimated project's life, representing approximately 8 percent of federal oil and gas 2019 annual downstream emissions, and 1.3 percent of the 2019 annual U.S. total downstream GHG emissions (2019 Annual Report Table 6-1). If compared on the same temporal scale (i.e., annually) the project would contribute far less towards the compared GHG metrics and would rapidly decline as the project ages.

5.4. Wildlife

5.4.1. How would construction of the six well pads and associated infrastructure as well as drilling, completions, and operation of the wells affect greater sage-grouse and migratory birds?

Affected Environment

The Proposed Action is located in the Piceance-Parachute-Roan (PPR) greater sage-grouse PHMA and GHMA in Management Zone 17. PHMA are areas identified by the BLM in coordination with Colorado Parks and Wildlife (CPW) as possessing the highest conservation value in maintaining sustainable sage-grouse populations and include breeding, late brood-rearing, and winter concentration areas. Sage-grouse occupy shrub habitats on ridges, plateaus, and upper ends of drainages from 7,000 to 8,700 feet in elevation and occupied ridges and

plateaus are naturally fragmented by steep drainages and cliffs (CGSSC 2008). Active leks in the PPR are typically small, ranging from 1 to 33 males, with annual total high counts of males from all PPR leks counted ranging from 77 to 250 males from 2005 to 2017 (CPW, unpublished data) (Shyvers 2018). Overall, this population had been over the 50th quartile for the 30-year median, but is now declining, as reported by CPW in February 2020 during the annual meeting with BLM and the FWS.

Sage-grouse are considered a sagebrush ecosystem obligate species, and sagebrush provides nesting, brooding, and fall and winter cover as well as forage throughout the year. Male sage-grouse congregate in late winter through spring on leks to display their breeding plumage and to attract hens for mating. Typically, leks are positioned within proximity of nesting and brood-rearing habitat; therefore, they are often considered an excellent reference point for monitoring and habitat protection measures. Nesting habitat is primarily characterized by sagebrush communities that have 15 percent to 30 percent canopy cover and a grass and forb understory; residual cover of grasses is also important for nesting cover. Most nesting occurs within 4 miles of leks (Colorado Greater Sage-grouse Steering Committee 2008).

The proposed well pads would be in PHMA, where there are six active leks and one inactive lek within 4 miles of the proposed well locations. The M23A pad is along the Divide Road and is between the two prominent complexes of leks in the Barnes Ridge group; the nearest lek is 1.3 miles west of the pad. Due to the parallel ridge and valley terrain of the project area, intervening terrain provides a degree of visual and aural isolation from those leks. Based on recent seasonal habitat modeling (Walker et al. 2015) the majority of the Proposed Action is in habitat that would likely be used for sage-grouse nesting, brood-rearing, and wintering habitat, with sagebrush and sagebrush-grassland habitats at intermediate elevations used during breeding and winter and higher elevations of more diverse sagebrush habitats used during summer and fall. During 2019 surveys, WestWater biologists walked pedestrian surveys across all suitable greater sage-grouse habitat on the ridge top within both project areas; no sage-grouse sign (i.e., fecal pellets, caecal pellets, feathers, etc.) or birds were observed (WestWater 2019). There are 53 active (and 45 inactive) leks within Management Zone 17. CPW's high male count data in 2020 was 70 and the and the 3-year average was 53 males for the population (CPW 2020). The data for 2018 and 2019 is incomplete due to logistical and protocol issues with data collection, causing lower counts. Data still indicates a downward trend since 2016, when this population had a male count of 221 and the CO population (as a whole) peaked.

Sagebrush, mountain shrub, and aspen habitats in the project area are likely also used by migratory birds as nesting habitat largely during the months of May through July, including a number of species warranting higher conservation interest that include Brewer's sparrow (BLM sensitive species), Cassin's finch, and Lewis' woodpecker.

Alternative A (Proposed Action) – Direct and Indirect Effects

The Proposed Action would remove approximately 104.3 acres of nesting, brood-rearing, and wintering habitat in PHMA and five acres of GHMA. All surface disturbance associated with the Proposed Action would be located on private surface. To determine the area of direct and

indirect effects, a 4-mile buffer around active leks within a 4-mile radius of the Proposed Action was used to identify associated nesting habitat (2015 GRSG RMPA, p. E-3).

A review of existing studies on conservation buffer distances that was generated by the United States Geological Survey for the BLM in 2014 infers that 75 to 95 percent of a local population's habitat utilization falls within 3.1 miles of a lek (Manier et al. 2014). A multiscale assessment of factors associated with lek abandonment between 1965 and 2007 found that the level of the human footprint within 5 km (3.1 mi) of the lek was negatively associated with lek persistence (Knick and Hanser 2011), and the Colorado Greater Sage-grouse Steering Committee (2008) recommended a 6.4 km (4 mi) circular buffer. Gregory and Beck (2014) documented lek attendance decline when energy development averaged 0.7 well pads/km2 (1.81 well pads/sq mile) across multiple populations and different development patterns. Holloran et al. (2010) demonstrated that yearling males reared near natural-gas fields had a lower survival rate and were less likely to establish a breeding territory compared to males reared in areas with limited activities associated with natural-gas fields, and the yearling female population generally avoided nesting within 950 m (0.6 miles) of the infrastructure of natural-gas fields. All these responses represent indirect effects that contribute to habitat loss. The pattern and density of development varies widely among these studies, but the implications have remained consistent: oil and gas development activity and its infrastructure impact GRSG behavior at distances up to 4 miles, prompting declines in lek persistence and male attendance, yearling and adult hen survival, and nest initiation rates and eliciting strong avoidance response in yearling age classes, nesting/brooding hens, and wintering birds.

Noise generated by oil and gas development and production activity has been found to prompt declines in lek attendance and use of nesting habitat. Recent studies suggest that loud noises transmitted at decibels (70 dB at the source and 40 dB at 100 m) to approximate a noise source 400 m (1,300 ft) from leks caused decrease lek activity. These noises attenuate with distance and have been found to decline to levels generally accepted as noise management objectives for sage-grouse lek and nesting habitats (i.e., <10 dB over ambient) 0.75 to 1.5 miles from the source (Blickley et al. 2012, Patricelli et al. 2012). Additionally, COAs based on COGCC Rules 604 c.(2)A for drilling and 802 for rural development designed to restrict noise generated to <70 dB while drilling and 55 dB during long-term production would lessen residual impacts to nesting and brood-rearing habitat associated within 0.6 miles of the well pads. Applying COAs for the restriction of permanent noise generating equipment on the well location would further reduce the overall long-term impacts to nesting and brood-rearing habitats surrounding the project area.

Starting in 2019, Caerus has actively been monitoring sound generated during various stages of drilling and completions from two previously permitted Federal well pads and determined that completion activities are the loudest phase of the process. Caerus collected data 350 ft from the sound source, from the four cardinal directions, in 15 minute increments; BLM staff then averaged the maximum decibels recorded from each well in each direction, generating a maximum average value of 55-63 dB (Summit 2019, 2020), which consistently falls below the COGCC <70 dB limit. Though monitoring indicates that sound levels are within required levels and would attenuate to <10 dB over background at the nearest lek, the issue was discussed

during the on-site inspection for the M23A location. It was determined that the N23 completions pad could be a buffer with berm material moved on the 'fill-side', to further block and absorb sound, and straw bales or sound walls could be deployed to further buffer sound if needed. Noise generated on the M23A pad by drilling and completion activities with the additional buffering should dissipate to approximately 44 dB (https://www.omnicalculator.com) to near background (typically 35-40 dB) at the nearest lek (1.3 mile). A timing limitation (GRSG-TL-46e), from March 1 through July 15, during lekking, nesting, and early brood-rearing applied to construction, drilling, and completion activities would also minimize disturbance while birds are moving through these more sensitive life-cycle phases. Drilling and completion activities would impact approximately 1,300 acres of habitat (within 1,300 feet of the well pads) (Blickley et al. 2012). Once the wells are in production and vehicle visits to the well pads are reduced, sage-grouse would likely avoid the infrastructure by 0.6 mile (Holloran et al. 2010), an indicated area of about 4,800 acres (representing 1.58 percent of PHMA within the 303,160-acre MZ). Interim reclamation of the well pads and pipelines would return about 105 acres to a grass/forb mix and would be capable of serving as a source of herbaceous forage once that vegetation becomes established. Reclamation success criteria in GRSG habitat would be contingent on evidence of successful establishment of desired forbs and sagebrush. Reclaimed acreage would be expected to progress without further intervention to a state that meets GRSG cover and forage needs (see Table H-1, 2015 GRSG RMPA). Reclamation of the disturbance would return it as habitat and ensure surface and subsurface stability, growth of self-generating, permanent, vegetative cover that is diverse and of the same seasonal growth as adjoining vegetation (Appendix E.5 and E.9 and Appendix F #1). Final reclamation, after the well is plugged and the well pad and access road are reclaimed, would be re-vegetated with a seed mix intended to establish forage for GRSG. Reclamation of the disturbance would return it as habitat and ensure surface and subsurface stability, growth of self-generating, permanent, vegetative cover that is diverse and of the same seasonal growth as adjoining vegetation (Appendix E #30).

Additionally, Caerus has a Wildlife Mitigation Plan (WMP) with CPW that contains mitigation measures that were designed to reduce impact to wildlife (including sage-grouse); the following COAs from this plan are considered as design features:

- Site new disturbance so as to use topographic features to shield leks from new disturbance whenever feasible.
- Restrict new disturbance within nesting and brood-rearing habitat as much as possible from April 15 to July 1.
- Restrict well site visitation in occupied habitat to between 9 AM and 4 PM during lekking season (March 15 to May 15).
- Use interim-reclamation to redevelop ground cover that provides for secure ground movements of sage-grouse and is an effective precursor to the reestablishment of appropriate sagebrush cover.

- Implement three-phase gathering systems to reduce onsite facilities and increase acreage put into interim-reclamation.
- Remote well control and monitoring to reduce traffic through work/project prioritization and increase emergency response efficiency.
- In coordination with the BLM and CPW the operator has committed to these reclamation standards.

Alternative B (No Action Alternative) – Direct and Indirect Effects

The No Action Alternative would not result in impacts associated with the Proposed Action and therefore would not result in any additional loss to available habitat for sage-grouse and migratory birds. To allow development of the leases and Units, the BLM would still likely evaluate other well pad (APDs) locations in the future that would have similar impacts to the other alternatives.

Cumulative Impacts

In regard to local conditions, a recent study conducted by CPW concludes that the total footprint of energy development has more than doubled within PPR occupied range from 2005 to 2015, most before 2009, resulting in approximately 2.85 percent disturbance of PHMA in Management Zone 17 (Walker, et. al, 2020). The discrepancy with the BLM's disturbance calculation is reasoned to be incomplete mapping, the exclusion of reclaimed infrastructure from BLM's calculation, the use of different criteria and the interpretation of reclamation status. "Three land cover classes most affected by energy infrastructure were also those strongly selected by greater sage-grouse (GRSG). Topographic constraints appear to concentrate energy infrastructure in areas with gentler topography that also have the highest GRSG use. Together, these patterns suggest that future energy development will cause substantial additional loss and modification of GRSG habitat in the PPR" (Walker, et. al, 2020).

Surface disturbance is tracked by the BLM in the Surface Disturbance and Reclamation Tracking Tool (SDARTT). The 303,162-acre Management Zone 17 currently has an anthropogenic disturbance of 1.91 percent of the three percent disturbance cap and an average energy facility density of 0.92 per 640 acres (Table 10 and Appendix G). Development of the M23A pad, five other well pads, and two CDPs would contribute approximately 143.5 acres (includes 8.2 existing disturbance for the O13 pad) to cumulative direct habitat loss associated with surface disturbance to 1.98 percent and increase the facility density to 0.93 per 640 in Management Zone 17 (Table 10 and Appendix G).

Table 10. SDARTT[1] Calculations for Management Zone 17

Management Zone 7	Anthropomorphic Disturbance	Density of Facilities per 640 Acres
Existing (before Proposed Action)	1.91%	0.92
Including M23A pad, five other well pads, and two CDPs	1.98%	0.93

[1]SDARTT = Surface Disturbance and Reclamation Tracking Tool

On a more site-specific scale, habitat influenced within a 4-mile buffer by the Proposed Action, the cumulative effects could extend to 22,116 acres of PHMA and 13,366 acres of GHMA, which represent 15.4 percent of PHMA and 8.4 percent of GHMA within Management Zone 17. As stated in the Air Quality Section 5.4.1, "oil and gas development activity in the vicinity of the proposed well is relatively high. According to the COGCC database, there are 292 active and 9 plugged/drilled and abandoned wells within a two-mile radius (an area representing approximately 21,500 acres) of the proposed pads. Fifty-five of the 292 active wells were spud since January 2019." Long-term avoidance by sage-grouse of the Proposed Action may extend out to an area of approximately 4,800 acres while these wells are in production (30+ years), and it is expected that development could continue into the future until the leases and the Units reach full development. Cumulative impacts for migratory birds and their habitats would be similar to those described for sage-grouse.

Mitigation Measures and Residual Impacts

Net conservation gain, including accounting for any uncertainty associated with the effectiveness of such mitigation, would be achieved by first avoiding, then minimizing, and finally compensating for unavoidable impacts associated with actions on the impacted project area (RMPA 2015). In accordance with IM 2019-018, net conservation gain would be met through coordination with CPW and other requirements by the State of Colorado for their authorization.

Avoidance and Minimization

Avoidance and minimization are documented using the Required Design Features (RDFs), Preferred Design Features (PDFs), and Suggested Design Features determined by the BLM in the 2015 GRSG RMPA to ensure regulatory certainty by using these recommended best management practices (see Appendix G for a complete list of these Features and COAs). For this project, each specific RDF for oil and gas development within PHMA were addressed. In addition, pertinent stipulations, including timing limitations as identified in the 2015 GRSG RMPA, would be applied through COAs to minimize impacts.

As discussed in Section 3.3, no other viable locations were identified on the leases that would have less impacts to sage-grouse and other resources.

Mitigation measures #2-4 in Appendix F would help to minimize impacts on greater sage-grouse lekking, nesting, and early brood-rearing activities. To reduce disturbing and disruptive activities during the period of animal occupation, the BLM would implement a timing limitation from March 1 through July 15 for construction, drilling, and completion activities. Noise levels would be restricted to 70 decibels or less measured 350 feet (4 feet above ground level) from the source

during drilling and completion activities and restricted to 55 decibels long term, once the wells are in production to reduce disturbance to greater sage-grouse.

Mitigation Measure # 5 in Appendix F requires the operator to provide the BLM, via sundry notice (form 3160-5), an estimated cost to fully reclaim the proposed well location. This estimate will be used to assess the overall cost the BLM would incur to complete the reclamation of the well if the operator is no longer viable**.** The operator's bond will be increased to cover this overall cost for future reclamation of the well site in accordance with 2015 GRSG RMPA.

Interim reclamation with native seed and control of invasive weed species that would return some habitat to the benefit of foraging birds and final reclamation would ultimately return cover for nesting (as required by COAs in Appendix E.5, E.9, and Appendix F #1). Reclamation success criteria in sage-grouse habitat would be contingent on evidence of successful establishment of desired forbs and sagebrush. Reclaimed acreage would be expected to progress without further intervention to a state that meets sage-grouse cover and forage needs (see Table H-1, 2015 GRSG RMPA) based on site capability and seasonal habitat.

Compensatory Mitigation
Unavoidable impacts that cannot be mitigated through avoidance and/or minimization are accounted for through additional mitigation efforts to achieve net conservation gain. According to the 2017 M-37046, the BLM has evaluated this APD within the context of specific factual circumstances and the regulatory provisions which govern this type of authorization. As such, the minimization and mitigation strategy are in conformance with the 2015 GRSG RMPA (MD SSS-3). Any additional impacts related to direct or indirect impacts from the Proposed Action will be compensated for by applying beneficial mitigation actions. As per IM 2019-018, the operator will coordinate with state agencies, including CPW, and meet any state requirements, including mitigation for the Proposed Action. Examples of this mitigation may include but are not limited to mitigation projects conducted by an authorized operator, contribution to an existing mitigation/conservation fund, or utilization of certified mitigation/conservation bank or credit exchanges like the Colorado Habitat Exchange. Mitigation efforts would be prioritized in the same MZ as the action would occur. CPW, BLM, and Caerus discussed for mitigation of wildlife impacts through brush-thinning treatments to be completed while construction equipment is in the field. CPW and BLM are coordinating with Caerus to design a mitigation plan during the 2020 winter to be implemented prior to or within a year of construction of the 1st well pad approved in this proposed action.

Mitigation Strategy
Indirect impacts can largely be mitigated with avoidance and minimization through the proper application of stipulations, design features, BMPs, and other COAs. Direct impacts would be lessened after completion of interim reclamation and compensatory mitigation, coordinated with CPW, would help offset impacts of the Proposed Action. As directed in IM 2019-018, the BLM will not accept any monetary payment related to mitigation and mitigation efforts are coordinated with the state agency, including CPW, as a requested authorization associated with the Proposed Action. The BLM and CPW will coordinate with the operator prior to the

construction of the first well pad to design a mitigation plan. The mitigation work must start within one year after the first pad is constructed. Standards for successful mitigation would be pre-determined as part of the mitigation plan and tracked to ensure durability. The result of mitigation must continue to meet net conservation gain requirements throughout the life of the project.

In the 2015 GRSG RMPA, MD SSS-3 requires mitigation that provides a net conservation gain to the species and that will account for any uncertainty associated with the effectiveness of such mitigation. To comply with this management decision and in accordance with IM 2019-018, the state's Habitat Quantification Tool (HQT) (managed by CPW), will be used to calculate credits at least equal to the debit value of functional acres. This may not equate to the number of on-the-ground acres of mitigation, as functional acre scores for both impacts and debits are calculated using the HQT.

The purpose of the HQT is to serve as a means of quantifying the change in condition of habitats for sage-grouse resulting from a management action—either as an impact ("debit") or as a benefit ("credit"). The HQT describes how the quality of habitat and change in quality resulting from management actions is quantified. Conditions specific to each seasonal habitat type (i.e., breeding, summer, and winter) are accounted for independently. A separate functional acre score is calculated for each seasonal habitat type, which are summed to a final functional acre value. *The number of functional acres impacted calculated for this project are 104.3.*

Mitigation Measure #6 in Appendix F would require the operator to coordinate with both the BLM and CPW to identify appropriate beneficial actions that would *net a minimum of 104.3 credits* as per state agency standards and calculations. Possible beneficial actions could include road decommissioning, conifer removal treatments, removal of invasive species, or brood-rearing habitat improvements. The agreed upon action(s) would take place within Management Zone 17 of the NWCO GRSG population and start prior to or within one year of the construction of the first well pad.

In addition to the mitigation discussed here, the State of Colorado may require additional conditions of approval related to mitigation before authorizing a state permit.

5.4.2. How would activity associated with construction, drilling, completions, and operation of the wells affect nesting raptors?

Affected Environment

The elevation at the project area is approximately 8,000-8,400 feet and all six well pad locations and CDPs are on ridge tops with mixed mountain shrubs, including sagebrush, and scattered pockets of aspen trees; the project areas is encompassed within the following three watershed subbasins: Middle Parachute Creek, Dry Thirteemile-Piceance Creek, and Stewart Gulch. The M23A and B26 well pads and N23 CDP are located on a ridge top above the Stewart Gulch watershed and the M12 well pad is located on the eastern side of the drainage. The P25 pad would be located on the divide of the Middle Parachute Creek and Dry Thriteenmile-Piceance

Creek watersheds. The O13 well pad and G13 CDP are situated along the divide between Dry Thriteenmile-Piceance Creek and the Stewart Gulch and the A18 well pad would be on the western edge of this drainage. These drainages consist of approximately 83,000 acres of a variety of vegetation types that provide habitat for nesting and foraging raptors, including aspen stands at the higher elevations and converting to pinyon-juniper woodlands down drainage. Historic BLM records have documented 17 raptor nests along the Stewart Gulch drainage (on primarily BLM surface), two nests in the Dry Thriteenmile-Piceance Creek drainage, and none within the Middle Fork Parachute Creek, though this is likely a data gap due to most of the landownership being private.

Surveys of approximately 479 acres of suitable woodland raptor nesting habitat of mature aspen woodlands and oak brush shrublands located an additional three raptor nests within the 0.25-mile raptor survey areas: an occupied long-eared owl nest near the M23A pad, a red-tailed hawk nest west of the B26 location, and another red-tailed hawk nest downslope of the A18 pad (WestWater 2020). Mature aspen woodlands within the area provide poor to good quality raptor nesting habitat. In most aspen stands, many of the trees were dead with some re-sprouting occurring.

Several additional species of raptors may potentially inhabit the region; common species include Cooper's hawk, great horned owl, long-eared owl, northern harrier falcon, red-tailed hawk, and sharp-shinned hawk, flammulated owl (a Bird of Conservation Concern), and northern goshawk (special status species). These raptors generally initiate nesting in April. Nestlings are fledged and generally independent of the nest and associated nest habitat by late July or early August.

Alternative A (Proposed Action) – Direct and Indirect Effects

While the footprint of individual oil and gas wells is minimal relative to other energy developments (e.g., mining), the total habitat lost to the network of wells and connecting roads can be considerable in areas undergoing full-field development (Postovit and Postovit 1989). The potential for oil and gas-related disturbance of nesting, foraging, or roosting raptors arises not only from road and well pad construction, drilling, and equipment installation, but also from continual servicing and maintenance of wells over their productive lifetime (BLM TN 433). Recommendations concerning temporal buffers suggest that nesting areas should be protected from the time of adult arrival through at least the first few weeks after hatch (Suter and Joness 1981, Romin and Muck 2002). Evidence suggests that nesting raptors may be less sensitive to disturbance after hatching (White and Thurow 1985).

Development of the proposed locations would not directly remove raptor nest habitat. An adjacent aspen grove supports an established long-eared owl and is located down-slope from the Proposed Action, where forest provides some visual and audial screening. Field development and associated infrastructure, as well as well-maintained access, have been in place for several years and continued use during the summer months for construction and well development are not likely to alter nest conditions or status, especially late in the nesting sequence. Raptors and the majority of other birds in the United States are protected by the Migratory Bird Treaty Act (MBTA). Removing or destroying active nests (i.e., nests that contain eggs or young) or causing abandonment of an active nest with intent could constitute a violation of the MBTA.

Impacts to raptors and migratory bird species can be minimized if surface disturbing and disruptive activities take place outside the nesting season. Timing limitations are intended to prevent disruption of ongoing nest efforts, including development-induced absences of the adult birds sufficient to jeopardize egg or nestling survival from malnourishment, exposure, or predation. Nesting season is generally considered to occur from April 1 to August 1 in this area; impacts to nesting raptors and migratory bird species would be somewhat mitigated by implementing a timing restriction from February 1 through August 1 (WR-TL-15) on surface disturbing and disruptive activities within 0.25 miles of an active raptor nest.

Alternative B (No Action Alternative) – Direct and Indirect Effects

The No Action Alternative would not result in impacts associated with the Proposed Action and therefore would not result in any additional loss to available raptor habitat. To allow development of the leases and Units, the BLM would still likely evaluate other well pad (APDs) locations in the future that would have similar impacts to the other alternatives.

Cumulative Impacts

There are over 20 natural gas well pads, as well as ancillary facilities for compression of gas and water handling (and associated access roads) within the Middle Parachute Creek, Dry Thirteenmile-Piceance Creek, and Stewart Gulch watersheds. The approximate 143.5-acre Proposed Action would contribute to cumulative forms of habitat loss, fragmentation, and disruptive activities. However, there are more than 82,000 acres of available habitat adjacent to the project areas. The Proposed Action would not impact the overall suitability of the habitat in the cumulative impacts analysis area.

Mitigation Measures and Residual Impacts

Biological surveys located active nests near the proposed M23A, B26, and A18 well pads and the following mitigation would apply a timing limitation from February 1 through August 1, as a COA (Appendix F #7): “Surface-disturbing and disruptive activities will not be allowed within 0.25 miles of active nest sites of those raptors that are not considered special-status during the period from nest territory establishment to dispersal of young from nest. A survey for nest status would be required before construction, drilling, or completions can proceed. If activities begin outside this window and the nest becomes active (e.g., drilling begins in Dec or Jan) the timing limitation would not be applied. The Authorized Officer may also grant an exception if the nest is unattended or remains unoccupied by May 15 of the project year.” The survey did not locate any active raptor nests near the P25, O13, and M12 pads, so an exception to the timing limitation is granted while the current survey is valid. The construction of the CDPs are not subject to federal authorization and therefore would not be subject to timing limitations.

Table 11. Raptor COAs by Location

Location	Nest Status	Timing Limitation
M23A Pad	Active nest	WR-TL-15 applied
B26 Pad	Active nest	WR-TL-15 applied
P25 Pad	Inactive nest	Exception to WR-TL-15 granted while surveys are valid (until May 1, 2022)

O13 Pad	Inactive nest	Exception to WR-TL-15 granted while surveys are valid (until May 1, 2022)
M12 Pad	Inactive nest	Exception to WR-TL-15 granted while surveys are valid (until May 1, 2022).
A18 Pad	Active nest	WR-TL-15 applied

Raptor surveys for the project are valid until May 1, 2022, at which time WR-TL-15 would either be applied to all surface disturbing or disruptive activities or re-survey of sites concludes there are no active raptor nests in the project area.

5.4.3. How would construction of the six well pads and associated infrastructure as well as drilling, completions, and operation of the wells affect big game seasonal ranges?

Affected Environment

The project area is located within GMU 22 and is delineated by CPW as elk calving grounds, summer range and winter for mule deer and elk, as well as the edge of severe winter range for mule deer. These seasonal ranges receive heaviest use from May through November, depending on snow accumulation. Typically, deer and elk herds winter at lower elevations along Piceance Creek and migrate to spring and summer ranges in the upper elevations on the Roan Plateau as green-up occurs.

The Oil and Gas RMPA analyzed threshold allowances, a predetermined percentage of disturbance for of each discrete seasonal range, based on deer seasonal range, within a lease holding within a GMU. The Proposed Action is partially in the RMPA-designated big game summer range (southern locations) and partially in severe winter range (the three northern locations).

The project area is a landscape of ridges and valleys of sagebrush steppe, montane grasslands, and mixed mountain shrub with pockets of aspen forest on side-slopes and big sagebrush in the bottomlands which provides severe winter range for big game. The shrubland-aspen complex is a key source of cover and herbaceous forage for deer and elk during post-partum functions (i.e., raising of young) from June through September.

Alternative A (Proposed Action) – Direct and Indirect Effects

Pad, access road, and pipeline construction would create approximately 143.5 acres of disturbance for the M23A and five other well pad locations and the two CDPs, the majority of which is grass and sagebrush shrublands. Interim reclamation would return approximately 107 acres to a grass/forb mix and would be capable of serving as a source of herbaceous forage once that vegetation becomes established.

Adverse impacts to big game from energy development result from the direct habitat removal for the footprint of the development and indirect impacts caused by traffic, noise and light, invasive plants, and the overall fragmentation of habitat as the density of facilities accumulates (CPW, 2020). Recent research in the Piceance Basin showed “deer strongly avoided areas within 600 m of well pads with active drilling at all times, and this avoidance persisted out to 1000 m at night

(with the strongest responses within 800 m). During both day and night, the strength of avoidance of drilling well pads increased as distance decreased, with essentially no locations falling within 200 m of these pads" (Northrup et al. 2015). Sawyer et al. (2009) also documented a greater avoidance of active drilling than other energy development activities by mule deer, indicating that this activity is the predominate stressor during hydrocarbon development. Thus, measures aimed at mitigating impacts from drilling, such as seasonal drilling restrictions, sound and light barriers, and reductions in vehicle traffic, are likely to have the greatest benefit to deer. The other development infrastructure (i.e., roads and producing pads) altered deer behavior, but to a lesser extent (Nothrup et al. 2015). Avoidance was demonstrated to a distance of 200 m around producing pads and 100 m around roads and would be further diminished around pipelines as vegetation becomes established.

More pronounced avoidance responses of deer and elk are likely to remain localized during construction, drilling, and completion activities and extend to an estimated 1,260 acres of summer range and 1,120 acres of winter range habitat within 600 m or 1.5 percent of the summer range and 0.49 percent of severe winter range available in GMU 22.

In an effort to encourage clustered development and reduce the extent of seasonal ranges subject to cumulative adverse behavioral effects (i.e., harassment, avoidance) attributable to oil and gas development, exceptions to timing limitations would be offered contingent on development remain below threshold allowances that were analyzed in the 2015 Oil and Gas RMPA (Table 12). The threshold strategy is intended to confine more high intensity activities (e.g., high frequency traffic, noise, concentrated human presence associated with pad/access/pipeline construction, drilling, and completions) on big game ranges to a pre-defined extent (i.e., the acute allowance within each lease holding or GMU). This activity and the accumulation of locations that continue to require regular activity to prepare the well(s) for sustained production, up to and including interim reclamation work, would also be confined to a predetermined proportion of a lease holding (i.e., the collective allowance).

Table 12. Current Thresholds for Caerus Leaseholdings in GMU 22.

Big Game Seasonal Range	Acute Threshold Allowance	Calculated Acute Effects	Collective Threshold Allowance	Calculated Collective Effects
Summer Range	15%	0.2%	20%	2.74%
Winter Range	20%	0	20%	7.8%
Severe Winter Range	15%	0	20%	10.5%
Winter Concentration Area	20%	0	20%	0

*Data from the White River Data Management System (WRDMS).

The federally-authorized portion of the Proposed Action in summer range (the 52.1-acre footprint for the M23A, B25, and P25 well pads) added to the existing and approved APDs in the acute category, would result in an acute avoidance area of approximately 710 acres and increase disturbance to 1.26 percent of acute and 2.74 percent collective effects for the allowable summer

range disturbance, below the allowable threshold for acute disturbance to summer range habitats (15 percent) for the Caerus lease holdings (Table 13).

The federally authorized portion of the Proposed Action in severe winter range (a 65.4-acre footprint for O13, A18, and M12 well pads) would result in an acute avoidance area of approximately 198 acres and increase disturbance to 3.36 percent of acute and 10.48 percent collective effects for the allowable severe winter range disturbance, below the allowable threshold for acute disturbance to severe winter range habitats (15 percent) for the Caerus lease holdings (Table 13). The CDPs do not require federal authorization and are not included in the WRDMS.

Table 13. Proposed Disturbance Thresholds for Caerus Leaseholdings in GMU 22.

Big Game Seasonal Range	Disturbance Threshold Status	Well Pads	Disturbance Acres[1]	Total Acres in Seasonal Range	Threshold Allowance in Leaseholding	Percent of Range Used
Summer Range	Acute	3 Constructed + 2 Approved Locations, not yet constructed **+ 3 New Locations (Proposed Action)** **8 Locations in Acute Disturbance**	113+280+**317** = **710 acres**	56,245	15%	1.26%
	Collective	23	1,544	56,245	20%	2.74%
Winter Range	Acute	0	0	50,696	20%	0%
	Collective	43	3,937	50,696	20%	7.77%
Severe Winter Range	Acute	**+3 (Proposed Action)**	**198**	5,901	15%	3.36%
	Collective	13	5,901	5,901	20%	10.48%
Winter Concentration Areas	Acute	0	0	0	20%	0%
	Collective	0	0	0	20%	0%

*__Bold__ font represents Proposed Action and increased disturbance.

[1]Acute threshold disturbance calculations include a 200-meter buffer.

The BLM calculated this estimate using the available data in the WRDMS and geospatial data of known data gaps (not uploaded in WRDMS) of recently permitted and constructed locations. Collective data will continue to be uploaded bringing more certainty to the Collective acreage; the Acute acreage estimates were generated from as-built shapefiles for this calculation.

Alternative B (No Action Alternative) – Direct and Indirect Effects

The No Action Alternative would not result in impacts associated with the Proposed Action and therefore would not result in any additional loss to available seasonal big game range. To allow development of the leases and Units, the BLM would still evaluate other well pad locations in the future that could have similar impacts to the other alternatives.

Cumulative Impacts

As projected by WRDMS, acute avoidance of approximately 1.26 percent (710 acres) of GMU 22 designated as big game summer range and approximately 3.36 percent (198 acres) designated as severe winter range in the Oil and Gas RMPA would be created by the federally-authorized portion of the Proposed Action. WRDMS acreages and percentages reflect only the federal mineral estate as analyzed for the application of big game timing limitation thresholds from the Oil and Gas RMPA.

The Proposed Action would contribute about 2,380 acres to cumulative direct and indirect forms of big game habitat loss, fragmentation, and disruptive activities. These impacts would be diminished after disruptive drilling and completion activities cease and interim reclamation of the pad and pipeline disturbance is revegetated and available as forage. The Proposed Action is in an area of concentrated development attributed to the Big Jimmy Unit and now extending into the Expanded Liberty Unit, and though there are oil and natural gas fields of development throughout, there are approximately 374,800 acres of summer range (as delineated by CPW) in GMU 22 that provide connectivity from Calamity Ridge to the north, along Cathedral Bluffs and from the Roan Plateau west to Skinner Ridge and approximately 187,200 acres of severe winter range that provides connectivity along the lower elevations of the Piceance Basin.

Mitigation Measures and Residual Impacts

The application of timing limitations (Appendix F #8, 9) from May 15 through August 15 (WR-TL-13) and from December 1 through April 30 (WR-TL-12) are intended to reduce the intensity, frequency, and extent of disturbances imposed on animals occupying important seasonal habitats during periods when animals are physiologically or energetically challenged; application of timing limitations for big game summer ranges reduce exposure of big game to disruptive activities that place further energetic demands on lactating females and developing young and big game severe winter range to reduce exposure of big game to disruptive activities. The behavioral response of animals exposed to these disturbances generally elevates energetic demands (e.g., avoidance movements, elevated metabolism) or reduces foraging efficiency (e.g.,

disuse of available resources, reduced foraging efficiency) which suppresses animal fitness or reproductive performance.

To qualify for timing limitation exceptions, fluid mineral development activity, must not exceed the percentage of acreage represented by those threshold allowances. The area of acute effects would be defined by the physical footprint of those concentrated, intensive activities associated with, for example, pad and pipeline construction and well drilling and completion operations, buffered by 660 feet on all seasonal ranges. The area of acute effects would include the area of collective effects in addition to all residual and incomplete lease development activities buffered by 660 feet, including but not limited to: access corridors, multiple-well pads awaiting further drilling or not meeting interim reclamation success criteria (as defined in the WRFO Reclamation Plan), linear ROWs that support vehicle traffic after final reclamation, and facilities receiving frequent visitation (i.e., an average greater than seven vehicle trips per pad per week). The current development activity within the lease holdings of Caerus meets the current identified threshold allowances and would therefore likely be granted an exception to allow for year-round drilling when the operator identifies a need and requests the exception. The timing limitation continues to be issued on the overall project as additional work may occur over the life of the development which would be restricted to those time periods.

Disturbed areas would be revegetated during interim reclamation providing forage for big game species and ultimately would return cover for security as final reclamation becomes established.

6. SUPPORTING INFORMATION

6.1. List of Preparers

Name	Title	Area of Responsibility	Date Signed
Paul Daggett	Mining Engineer	Air Quality, Soil Resources, Surface and Ground Water Quality	10/8/2020
Shawn Wiser	Wildlife Biologist	Special Status Animal Species, Migratory Birds, Terrestrial Wildlife,	10/19/2020
Matthew Dupire	Natural Resource Specialist	Vegetation	10/6/2020
Luke Trout	Archaeologist	Cultural Resources, Paleontological Resources	10/22/2020
Stacey Burke	Realty Specialist	Realty Authorizations	7/9/2020
Tim Barrett	Natural Resource Specialist/Project Lead	Project Lead	11/02/2020
Heather Sauls	Planning & Environmental Coordinator	NEPA Compliance	11/4/2020

6.2. Tribes, Individuals, Organizations, or Agencies Consulted

All surface disturbance associated with the six proposed well pads was inventoried for cultural resources at the Class III (100% pedestrian) level (OAHP Doc #'s RB.LM.R1530; RB.LM.NR2510; MC.LM.NR324; GF.LM.NR1130; GF.LM.NR1131; and GF.LM.R670) or otherwise exempt from additional survey due to overlap with previous adequate Class III inventory. There would be *no historic properties affected* as a result of the pad developments/expansions. This proposal does not require additional consultation with the State Historic Preservation Officer (SHPO) pursuant to Section X.F.5 of the State Protocol Agreement between the Colorado State Director of the BLM and the Colorado SHPO.

The U.S. Fish and Wildlife Service issued a Programmatic Biological Opinion (PBO)(ES/GJ-6-CO-08-F-0006 TAILS 65413-2008-F-0073-R001) on December 26, 2017, which concurred with BLM's determination that water depletions are "Likely to Adversely Affect" the Colorado Pikeminnow, Razorback Sucker, Humpback Chub, and Bonytail. The BLM would obtain data on actual freshwater used for the federal action via Condition of Approval (Appendix E, #6) and subsequent sundry notice. These water use amounts would be summarized to calculate a total annual water depletion amount that would be submitted at the end of each calendar year to the U.S. Fish and Wildlife Service and tracked against the overall projected threshold freshwater use.

The BLM and CPW staff met with Caerus representatives and contractors on the locations on May 28 and June 2, 2020. CPW and BLM discussed recommendations for mitigation of wildlife impacts through brush-thinning treatments to be completed while construction equipment is in the field.

In October 2020, CPW reviewed BLM's COAs determined that their application was warranted and there were no additional comments, recommendations, or COAs. Caerus will continue to apply BMPs and COA from the wildlife mitigation plan with CPW. CPW and the BLM are coordinating with Caerus to design a mitigation plan during the 2020 winter to be implemented prior to or within a year of construction of the 1st well pad approved in this proposed action.

6.3. References

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WestWater Engineering
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2020d. Biological Survey Report Caerus Oil and Gas M12 496 Well Pad and White River BLM Field Office. May 2020. Grand Junction, Colorado.

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APPENDIX A. LEGAL DESCRIPTIONS

BJU M23A Well Pad (Garfield County)
Sixth Principal Meridian, Colorado
T. 4 S., R. 96 W.,
sec. 23, W1/2SW.

BJU B26 Well Pad (Garfield County)
Sixth Principal Meridian, Colorado
T. 4 S., R. 96 W.,
sec. 26, NENW.

BJU N23 CPD Pad (Garfield County)
Sixth Principal Meridian, Colorado
T. 4 S., R. 96 W.,
sec. 23, SESW.

BJU P25 Well Pad (Garfield County)
Sixth Principal Meridian, Colorado
T. 4 S., R. 96 W.,
sec. 25, SESE.

ELU O13 Well Pad (Rio Blanco County)
Sixth Principal Meridian, Colorado
T. 4 S., R. 96 W.,
sec. 13, W1/2SE.

ELU M12 Well Pad (Rio Blanco County)
Sixth Principal Meridian, Colorado
T. 4 S., R. 96 W.,
sec. 12, W1/2SW.

ELU A18 Well Pad (Rio Blanco County)
Sixth Principal Meridian, Colorado
T. 4 S., R. 96 W.,
sec. 18, NWNW.

ELU G13 CDP Pad (Rio Blanco County)
Sixth Principal Meridian, Colorado
T. 4 S., R. 96 W.,
sec. 13, W1/2NE.

APPENDIX B. FIGURES

Figure 1. Caerus BJU M23A Vicinity Map

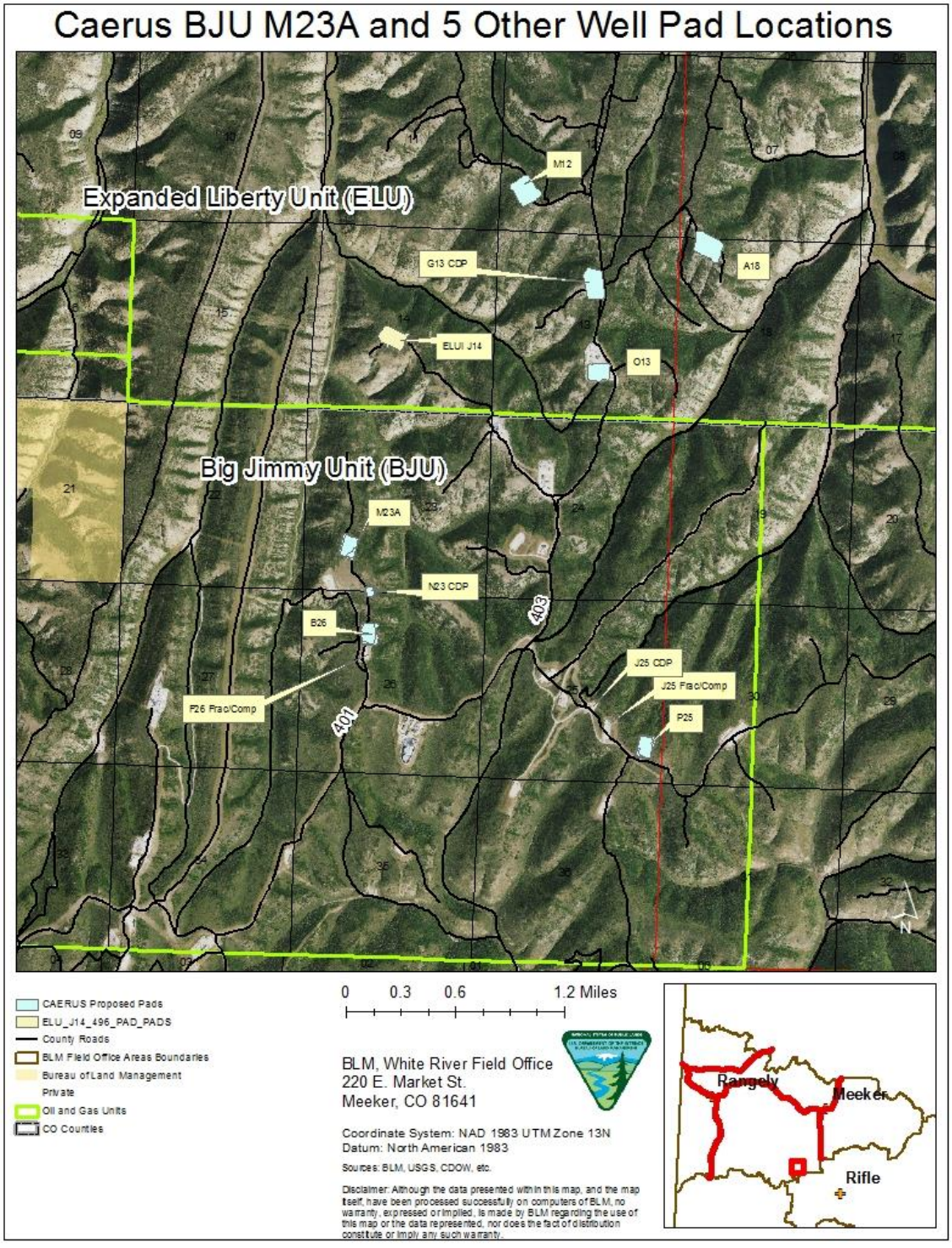
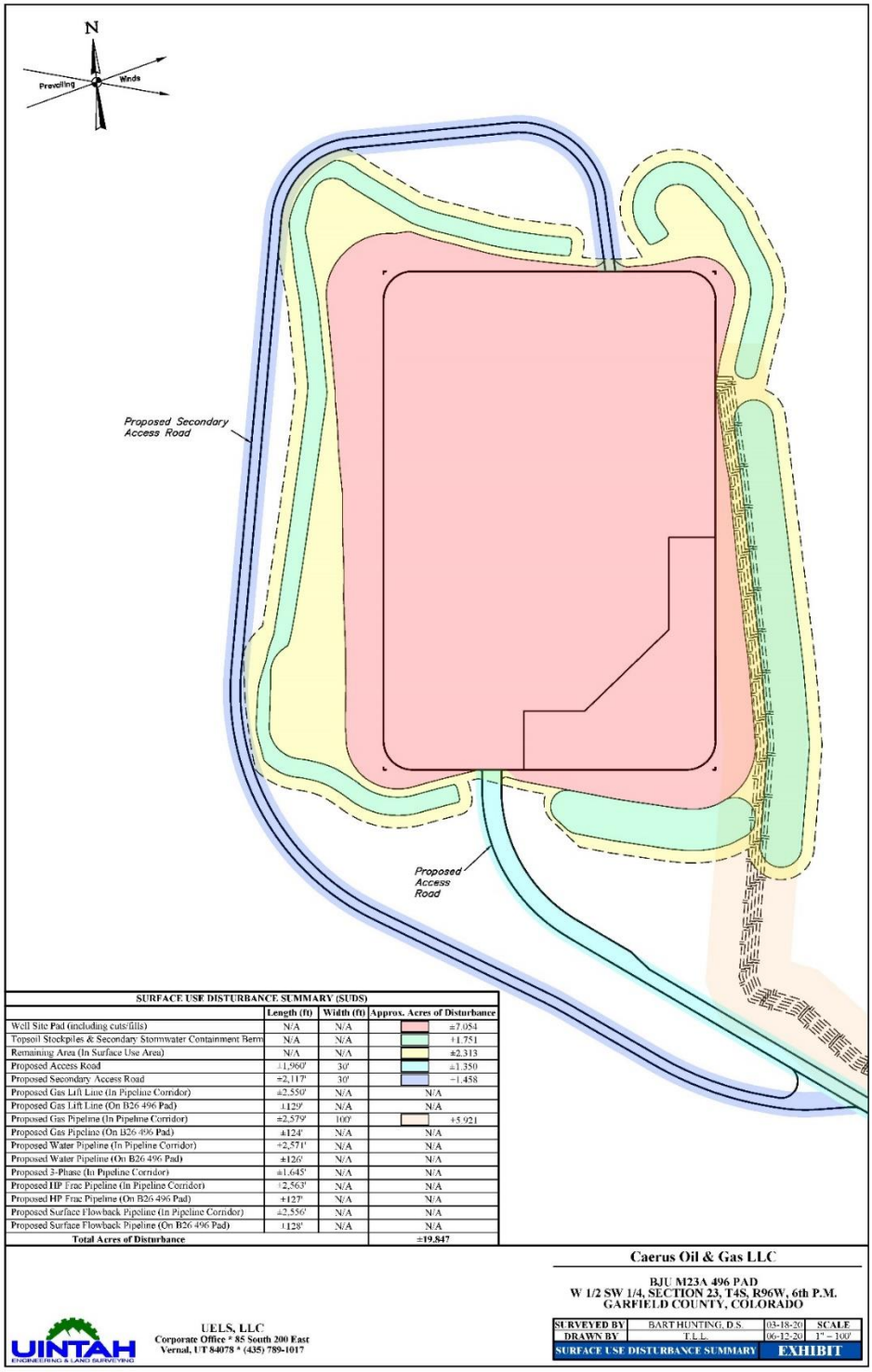


Figure 2. Caerus BJU M23A 496 Well Pad



SURFACE USE DISTURBANCE SUMMARY (SUDS)			
	Length (ft)	Width (ft)	Approx. Acres of Disturbance
Well Site Pad (including cuts/fills)	N/A	N/A	±7.054
Topsoil Stockpiles & Secondary Stormwater Containment Berm	N/A	N/A	±1.751
Remaining Area (In Surface Use Area)	N/A	N/A	±2.313
Proposed Access Road	±1,960'	30'	±1.350
Proposed Secondary Access Road	±2,117'	30'	±1.458
Proposed Gas Lift Line (In Pipeline Corridor)	±2,550'	N/A	N/A
Proposed Gas Lift Line (On B26 496 Pad)	±129'	N/A	N/A
Proposed Gas Pipeline (In Pipeline Corridor)	±2,579'	100'	±5.921
Proposed Gas Pipeline (On B26 496 Pad)	±124'	N/A	N/A
Proposed Water Pipeline (In Pipeline Corridor)	±2,571'	N/A	N/A
Proposed Water Pipeline (On B26 496 Pad)	±126'	N/A	N/A
Proposed 3-Phase (In Pipeline Corridor)	±1,645'	N/A	N/A
Proposed HP Frac Pipeline (In Pipeline Corridor)	±2,563'	N/A	N/A
Proposed HP Frac Pipeline (On B26 496 Pad)	±127'	N/A	N/A
Proposed Surface Flowback Pipeline (In Pipeline Corridor)	±2,556'	N/A	N/A
Proposed Surface Flowback Pipeline (On B26 496 Pad)	±128'	N/A	N/A
Total Acres of Disturbance			**±19.847**

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

Caerus Oil & Gas LLC

BJU M23A 496 PAD
W 1/2 SW 1/4, SECTION 23, T4S, R96W, 6th P.M.
GARFIELD COUNTY, COLORADO

SURVEYED BY	BART HUNTING, D.S.	03-18-20	SCALE
DRAWN BY	T.L.L.	06-12-20	1" = 100'
SURFACE USE DISTURBANCE SUMMARY		EXHIBIT	

Figure 3. Caerus BJU B26 496 Well Pad

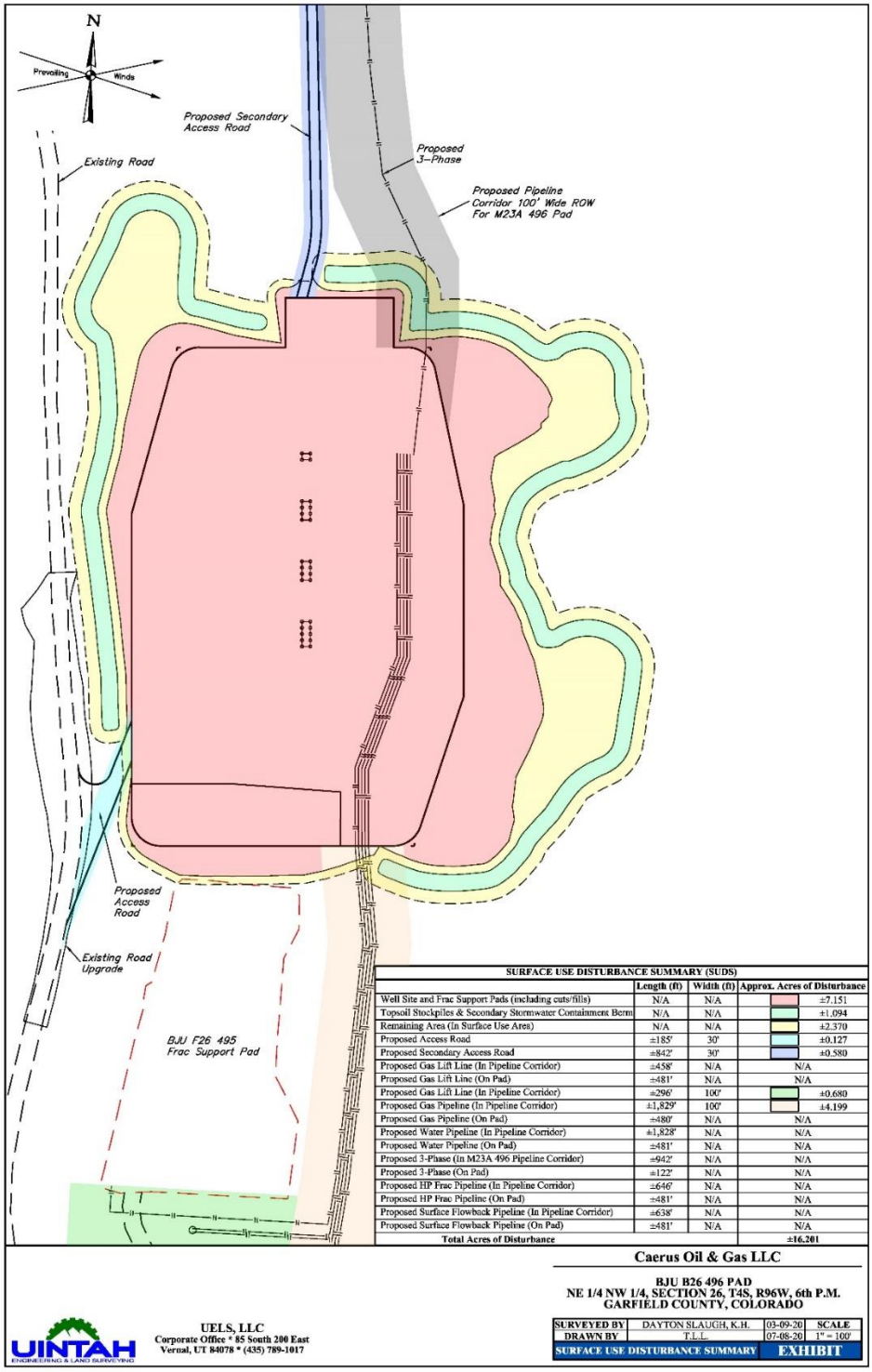


Figure 4. Caerus BJU N23 496 CDP Pad

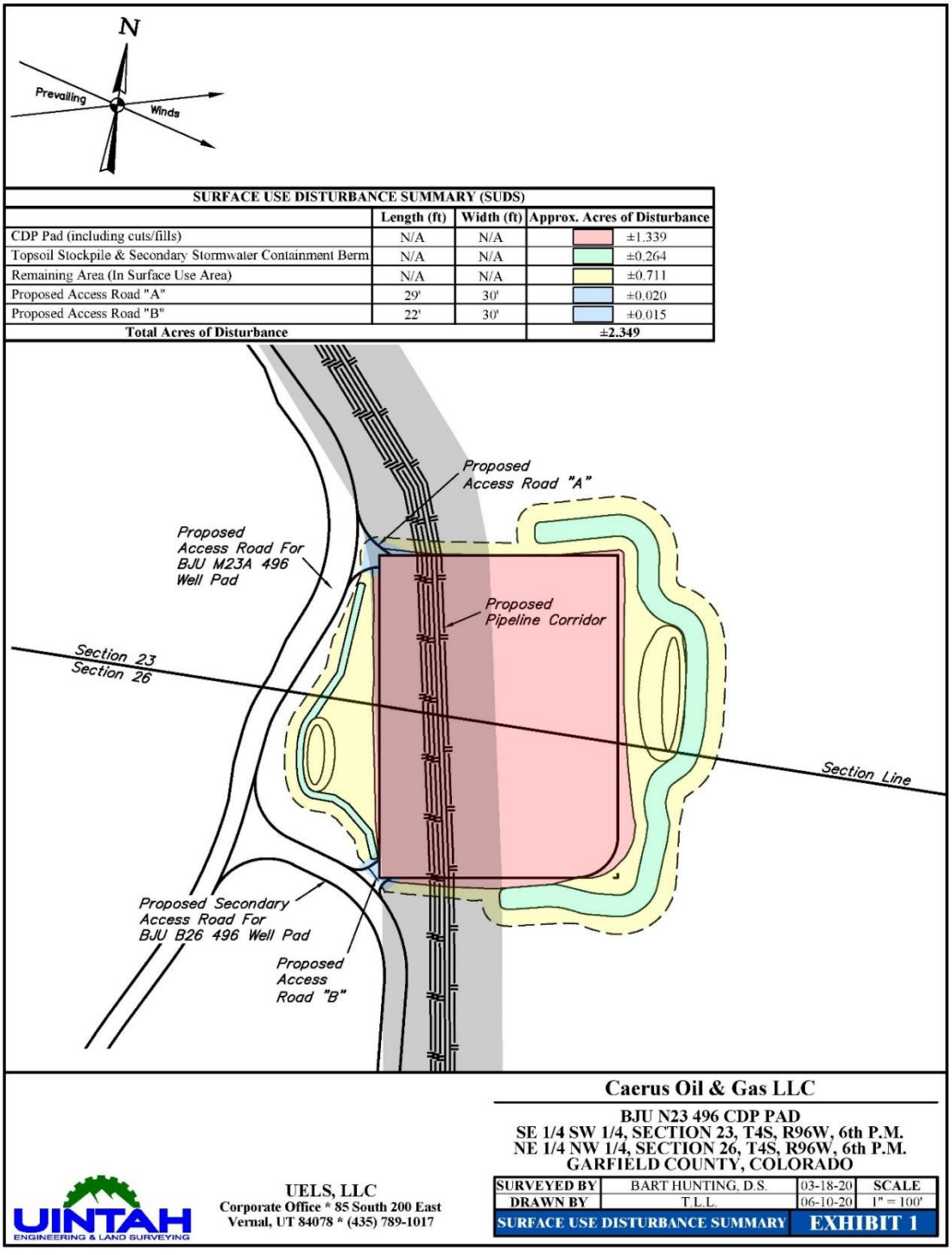


Figure 5. Caerus BJU P25 496 Well Pad

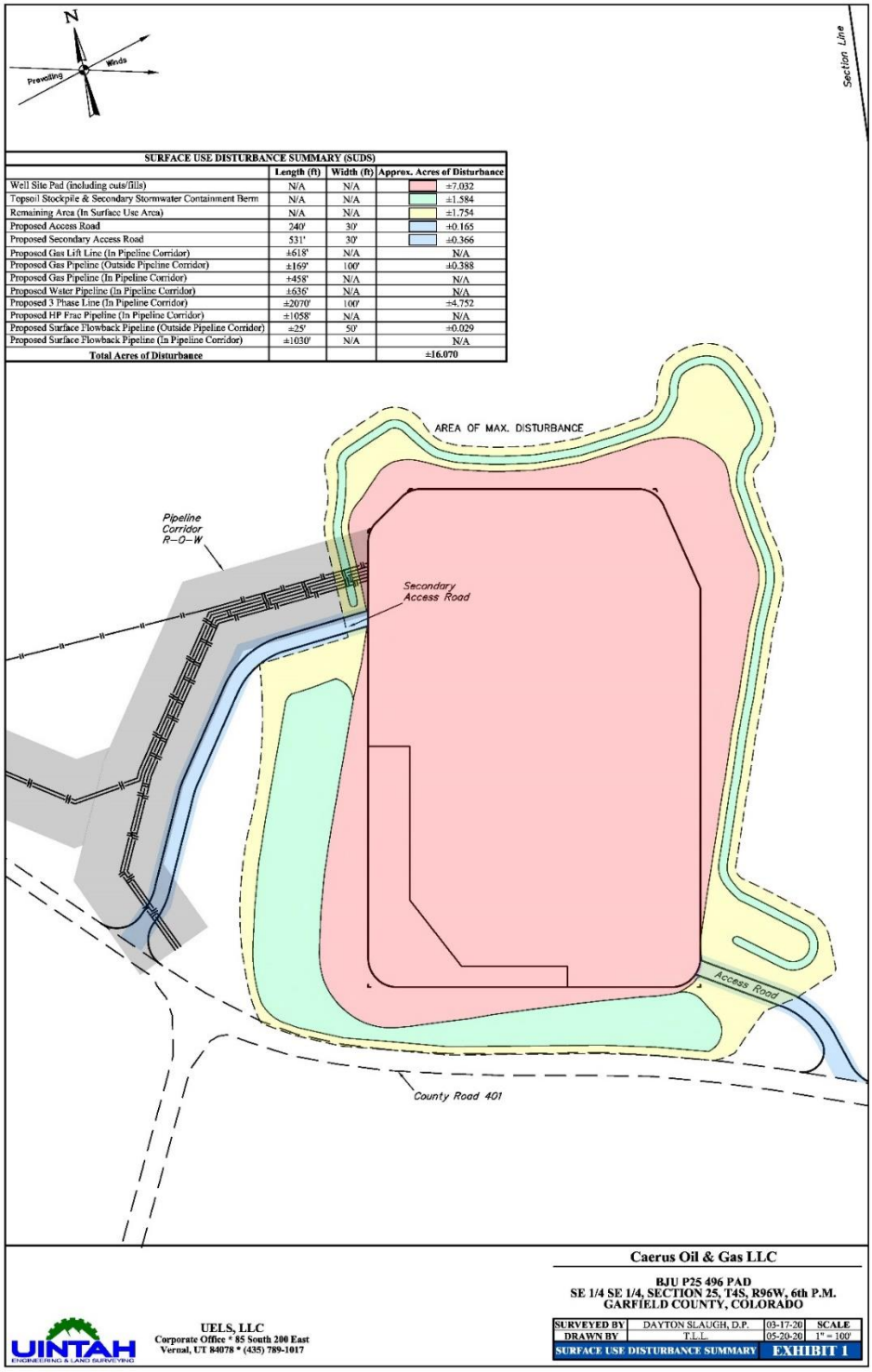


Figure 6. Caerus ELU O13 496 Well Pad

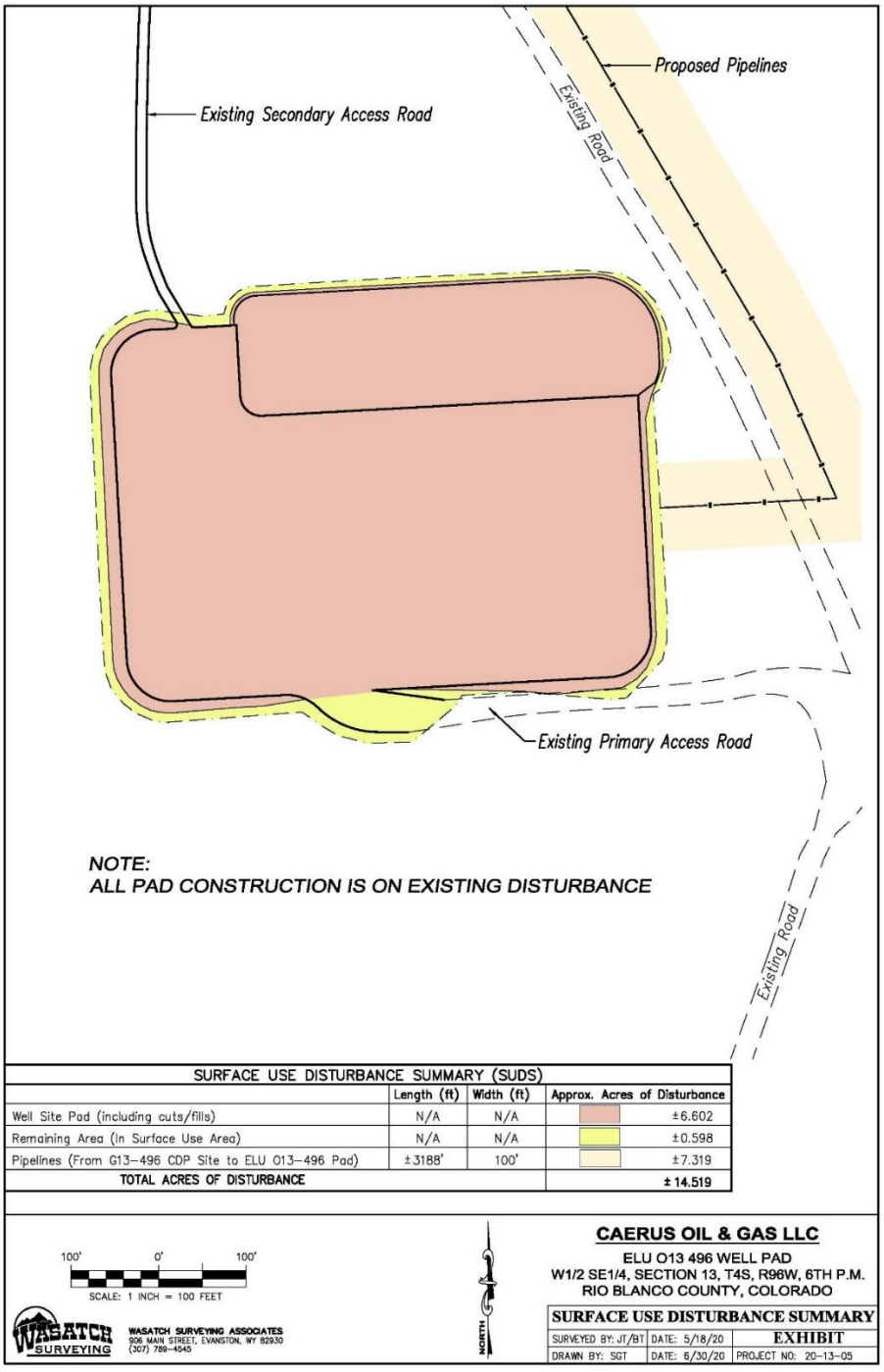
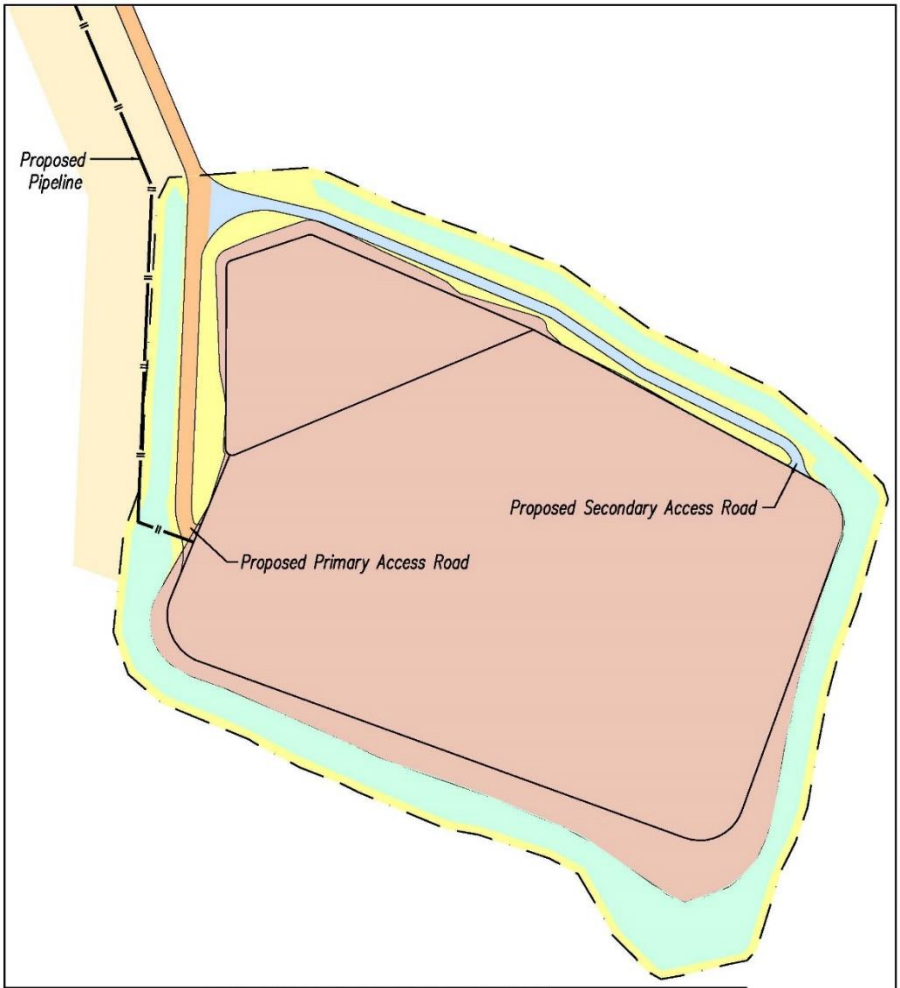


Figure 7. Caerus ELU A18 495 Well Pad



SURFACE USE DISTURBANCE SUMMARY (SUDS)			
	Length (ft)	Width (ft)	Approx. Acres of Disturbance
Well Pad Site (including cuts/fills)	N/A	N/A	±8.320
Topsoil Stockpiles & Secondary Stormwater Containment Berm	N/A	N/A	±1.695
Remaining Area (In Surface Use Area)	N/A	N/A	±1.278
Proposed Primary Access Road (Outside of Surface Use Area)	± 4210	60	±5.798
Proposed Primary Access Road (In Surface Use Area)	N/A	N/A	±0.182
Proposed Secondary Access Road	N/A	N/A	±0.235
Proposed Pipeline	± 4500	90'	±9.298
TOTAL ACRES OF DISTURBANCE			± 26.806

100' 0' 100'
SCALE: 1 INCH = 100 FEET

WASATCH SURVEYING
WASATCH SURVEYING ASSOCIATES
906 MAIN STREET, EVANSTON, WY 82930
(307) 789-4545

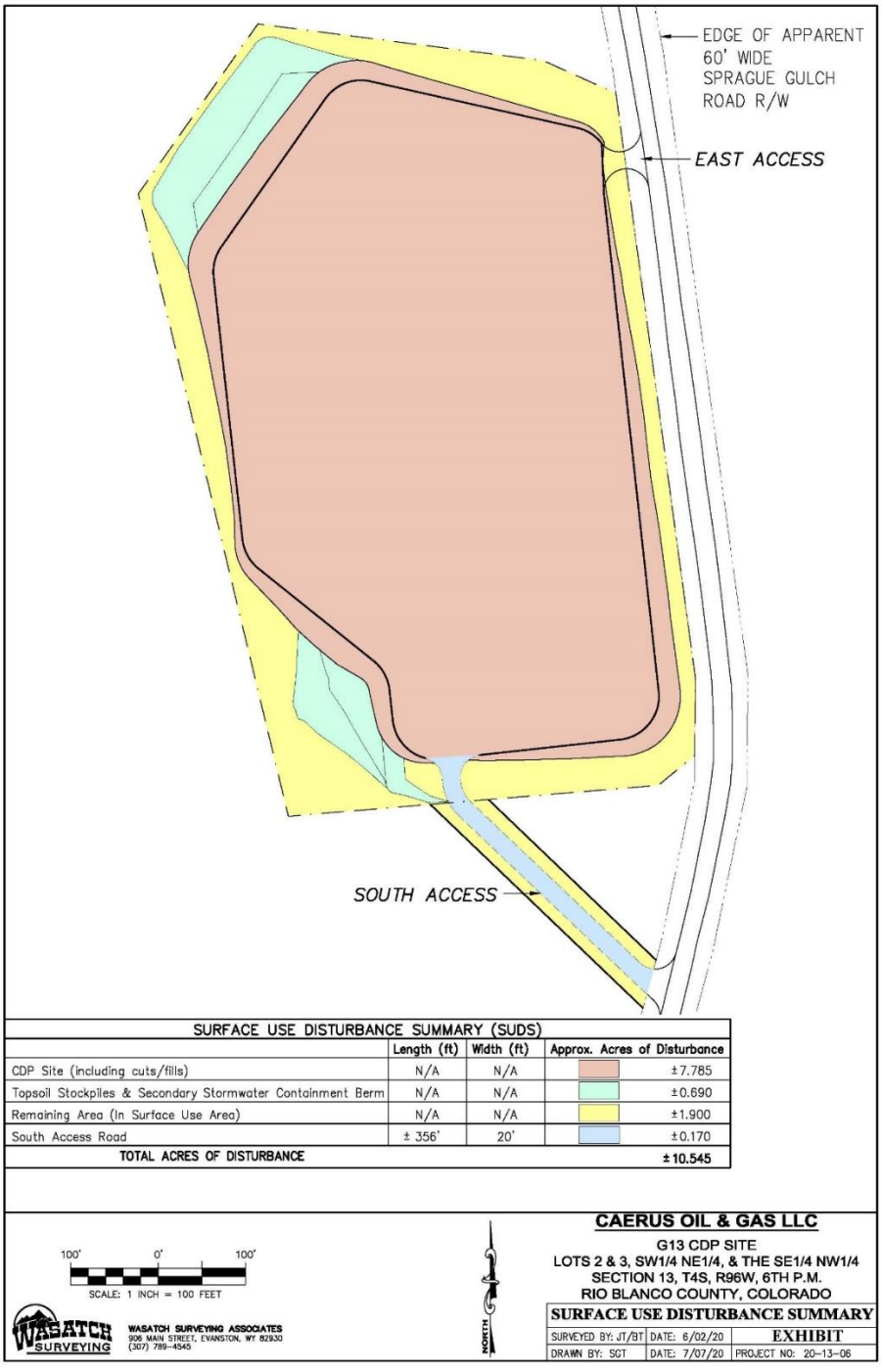
NORTH

CAERUS OIL & GAS LLC
ELU A18 495 WELL PAD
LOT 3 (NW1/4 NW1/4),
SECTION 18, T4S, R95W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

SURFACE USE DISTURBANCE SUMMARY

SURVEYED BY: JT/BT	DATE: 5/18/20	EXHIBIT
DRAWN BY: SCT	DATE: 9/03/20	PROJECT NO: 20-13-04

Figure 8. Caerus ELU G13 496 CDP Pad



SURFACE USE DISTURBANCE SUMMARY (SUDS)			
	Length (ft)	Width (ft)	Approx. Acres of Disturbance
CDP Site (including cuts/fills)	N/A	N/A	±7.785
Topsoil Stockpiles & Secondary Stormwater Containment Berm	N/A	N/A	±0.690
Remaining Area (In Surface Use Area)	N/A	N/A	±1.900
South Access Road	± 356'	20'	±0.170
TOTAL ACRES OF DISTURBANCE			±10.545

100' 0' 100'
SCALE: 1 INCH = 100 FEET

WASATCH SURVEYING
WASATCH SURVEYING ASSOCIATES
906 MAIN STREET, EVANSTON, WY 82930
(307) 789-4545

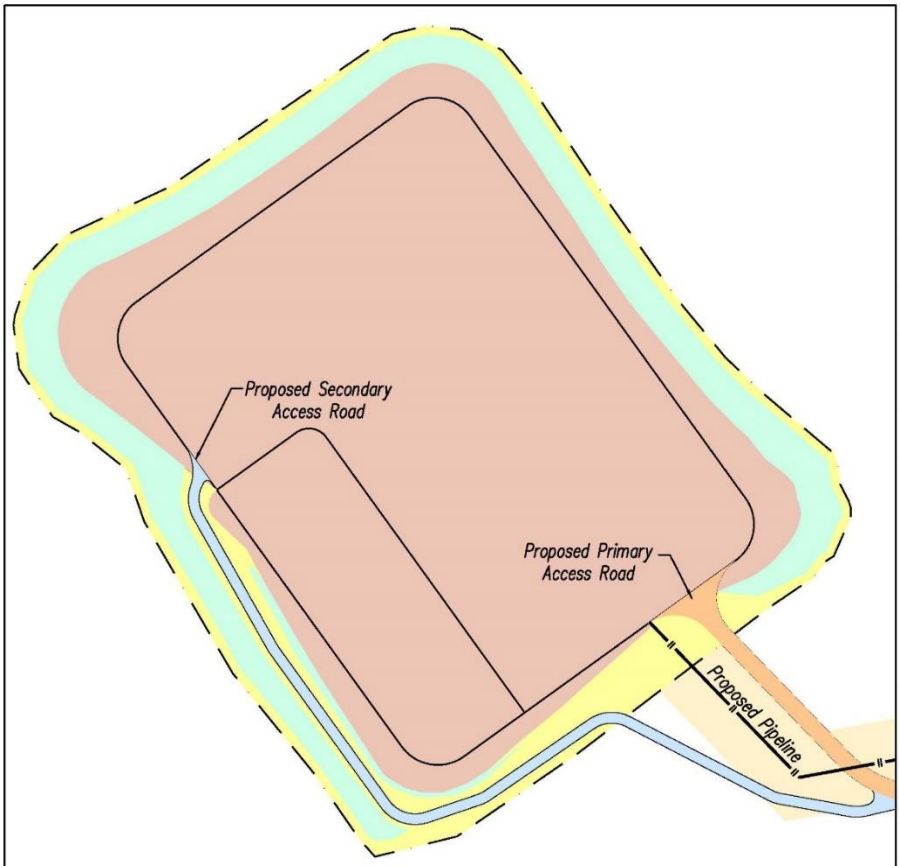
NORTH

CAERUS OIL & GAS LLC
G13 CDP SITE
LOTS 2 & 3, SW1/4 NE1/4, & THE SE1/4 NW1/4
SECTION 13, T4S, R96W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

SURFACE USE DISTURBANCE SUMMARY

SURVEYED BY: JT/BT	DATE: 6/02/20	EXHIBIT
DRAWN BY: SGT	DATE: 7/07/20	PROJECT NO: 20-13-06

Figure 9. Caerus ELU M12 496 Well Pad



SURFACE USE DISTURBANCE SUMMARY (SUDS)			
	Length (ft)	Width (ft)	Approx. Acres of Disturbance
Well Pad Site (including cuts/fills)	N/A	N/A	±8.416
Topsoil Stockpiles & Secondary Stormwater Containment Berm	N/A	N/A	±1.635
Remaining Area (In Surface Use Area)	N/A	N/A	±1.148
Proposed Primary Access Road (Outside of Surface Use Area)	±1720'	60'	±2.369
Proposed Primary Access Road (In Surface Use Area)	N/A	N/A	±0.054
Proposed Secondary Access Road (Outside of Surface Use Area)	± 344'	20'	±0.158
Proposed Secondary Access Road (In Surface Use Area)	N/A	N/A	±0.207
Proposed Pipeline	±4420'	90'	±9.132
TOTAL ACRES OF DISTURBANCE			± 23.119

100' 0' 100'
SCALE: 1 INCH = 100 FEET

WASATCH SURVEYING
WASATCH SURVEYING ASSOCIATES
906 MAIN STREET, EVANSTON, WY 82930
(307) 789-4545

NORTH

CAERUS OIL & GAS LLC
ELU M12 496 WELL PAD
W1/2 SW1/4 SECTION 12, T4S, R96W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

SURFACE USE DISTURBANCE SUMMARY

SURVEYED BY: JT/BT	DATE: 4/02/20	EXHIBIT
DRAWN BY: SGT	DATE: 10/05/20	PROJECT NO: 20-13-03

APPENDIX C. LEASE STIPULATIONS

C.1. Leases Associated with the Big Jimmy Unit

The following leases are associated with the Big Jimmy Unit (COC074105X) which was established in 2010:

Table C1. Stipulations and Lease Notices on the COC64814 Lease (6/1/2001)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-NSO-04	No Surface Occupancy Stipulation	Protect Sage-Grouse Strutting Grounds (Leks)	Portion NWNW Sec 22, Lot 8, SWSW, SWSE Sec 23, S2S2 Sec 24, NW Sec 26, S2NW, NE Sec 27, T4S, R96W
WR-TL-06	Timing Limitation Stipulation	Protect Sage-Grouse nesting habitat associated with individual Leks	Portion: Lot 1-6, E2NE, E2NW, SWNW, S2S2 Sec 22; Lot 1,2,4-8, NE, W2NW, S2SW, SWSE Sec 23; Lot 1-4, S2N2, S2 Sec 24; NW Sec 26; N2 Sec 27, T4S, R96W
WR-NSO-09	No Surface Occupancy Stipulation	Protect Sensitive Plants and Remnant Vegetation Associations	Portion W2SE Sec 24, T4S, R96W

Table C2. Stipulations and Lease Notices on the COC61137 Lease (1/1/1998)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-TL-06	Timing Limitation Stipulation	Protect Sage-Grouse nesting habitat associated with individual Leks	Portion, SW Sec 26, SE Sec 27, T4S, R96W
WR-TL-09	Timing Limitation Stipulation	Protect deer and elk summer range	Portion, NE, S2 Sec 26, SE Sec 27, T4S, R96W

Table C3. Stipulations and Lease Notices on the COC61136 Lease (6/1/1998)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-NSO-09	No Surface Occupancy Stipulation	Protect Sensitive Plants and Remnant Vegetation Associations	Portion T4S, R96W, Section 25, NWNE
WR-TL-09	Timing Limitation Stipulation	Protect deer and elk summer range	T4S, R96W, Section 25: All

Table C4. Stipulations and Lease Notices on the COC61459 Lease (4/1/1998)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-TL-09	Timing Limitation Stipulation	Protect deer and elk summer range	All

Table C5. Stipulations and Lease Notices on the COC61129 Lease (1/1/1998)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-NSO-04	No Surface Occupancy Stipulation	Protect Sage-Grouse Strutting Grounds (Leks)	Portion (Outside of the Proposed Action's downhole locations)
WR-TL-06	Timing Limitation Stipulation	Protect Sage-Grouse nesting habitat associated with individual Leks	Portion: all of T4S, R96W, Section 24
WR-NSO-09	No Surface Occupancy Stipulation	Protect Sensitive Plants and Remnant Vegetation Associations	Portion (Outside of the Proposed Action's downhole locations)

C.2. Leases Associated with the Expanded Liberty Unit

The following leases are associated with the Expanded Liberty Unit (COC069926X) which was established in 2004:

Table C6. Stipulations and Lease Notices on the COC57684 Lease (3/1/1995)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
N/A	No Surface Occupancy Stipulation	Protect Sage-Grouse Strutting Grounds (Leks)	Portion, Lots 1-4 Sec 13, N2NW Sec 15, T4S, R96W
N/A	Timing Limitation Stipulation	Protect Sage-Grouse Strutting Grounds (Leks)	Portion, Lots 1,2, S2N2, S2 Sec 13, Lots 1-3, SWNE, S2NW. S2 Sec 15, T4S, R96W

Table C7. Stipulations and Lease Notices on the COC68353 Lease (6/1/2005)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
N/A	Endangered Species Act Stipulation	Protect any species or its habitat, where such species is listed or proposed to be listed, now or hereafter, pursuant to the Endangered Species Act.	All
WR-CSU-01	Controlled Surface Use Stipulation	Protecting Fragile Soils on Slopes Greater Than 35 Percent & Saline Soils	All
WR-TL-06	Timing Limitation Stipulation	Protect Sage-Grouse nesting habitat associated with individual Leks	All

Table C8. Stipulations and Lease Notices on the COC62802 Lease (6/1/1999)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-TL-06	Timing Limitation Stipulation	Protect Sage-Grouse nesting habitat associated with individual Leks	Portion: T4S, R95W, Sec. 6: Lots 4 - 7; Sec. 6: SENE, SENW, E2SW. NWSE, S2SE;

			Sec. 7: Lots 1 – 4; Sec. 7: E2, E2W2; Sec. 18: NE, E2NW

Table C9. Stipulations and Lease Notices on the COC70687 Lease (6/1/2001)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-CSU-01	Controlled Surface Use Stipulation	Protecting Fragile Soils on Slopes Greater Than 35 Percent & Saline Soils	Portion T4S, R95W, Sec 18:NESW, S2SE
WR-NSO-09	No Surface Occupancy Stipulation	Protect Sensitive Plants and Remnant Vegetation Associations	Portion T4S, R95W, Sec 18: Lot 5; Sec 19: NWNE, N2NW
WR-TL-06	Timing Limitation Stipulation	Protect Sage-Grouse nesting habitat associated with individual Leks	Portion T4S, R95W, Sec 18: Lot 5, 6; Sec 18: E2SW, SE; Sec 19: NE, NESW
WR-TL-09	Timing Limitation Stipulation	Protect deer and elk summer range	Portion (Outside of the Proposed Action's downhole locations)

Table C10. Stipulations and Lease Notices on the COC57955 Lease (7/1/1995)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
N/A	No Surface Occupancy Stipulation	Protect Sage-Grouse Strutting Grounds (Leks)	Portion T4S, R96W, Sec 12: SWSW
N/A	Timing Limitation Stipulation	Protect Sage-Grouse Strutting Grounds Buffer Zone	All

APPENDIX D. DESIGN FEATURES FROM SURFACE USE PLAN OF OPERATION

The entire Surface Use Plan of Operations (SUPO) is incorporated into the Proposed Action and is available for review at the WRFO. Key items relevant to the issues associated with the Proposed Action include:

1. Access roads and surface disturbing activities will conform to standards outlined in the 2007 version of BLM and USFS "Surface Operating Standards for Oil and Gas Exploration and Development – The Gold Book."

2. All equipment and vehicles will be confined to the access road, pad and areas specified in the APD. CAERUS will be responsible for continuous inspection and maintenance of the access road and will conform to a schedule of preventive maintenance, which at a minimum, provides for the following corrective measures on a biannual basis. (Problem areas will be corrected as needed.)

    - Road surface grading.
    - Relief ditch, culvert cleaning and cattle guard cleaning.
    - Erosion control measures for cut and fill slopes and all other disturbed areas.
    - Road closures in periods of excessive soil moisture to prevent rutting caused by vehicular traffic.
    - Road and slope stabilization measures as required. The road shall be maintained to the standards required for the construction of the road until final abandonment and rehabilitation takes place.

3. All tanks are installed in secondary containment that is lined (i.e. production tanks, produced water tanks, etc.). Secondary containment will be constructed on compacted subsoil, be impervious, and hold 110% of the capacity of the largest tank.

4. All tank containments will be lined with a minimum 24 mil impermeable liner.

5. Run off and sediment Best Management Practices will be implemented and maintained per Caerus Piceance LLC Stormwater Management Plan (CDPHE Certification #COR037689) which includes Structural Controls (e.g, sediment traps, diversions, and silt fences) and Non-structural Controls (e.g., revegetation, mulching, and surface roughening).

6. Re-vegetation is accomplished as soon as practical following the preparation of a site for final stabilization.

7. Seeding will be done when seasonal or weather conditions are most favorable. Whenever possible, seeding is timed to take advantage of moisture, such as early spring or late fall.

8. Reclamation of disturbed areas no longer needed for drilling/completion operation will be accomplished by grading, leveling, and seeding as recommended by the Bureau of Land Management.

9. Once all topsoil has been distributed across the site, the location is then seeded with recommended seed mix by drill seeding methods or broadcast seeding. All reclaimed areas except areas needed for production will be seeded.

10. On terrain where drill seeding is appropriate, seed may be planted using a drill equipped with a depth regulator to ensure proper depth of planting. Drilling will be used where topography and soil conditions allow operation of equipment to meet the seeding requirements of the species being planted while steeper

11. Unless otherwise directed by the landowner or a jurisdictional authority, rocks, cut vegetation, and other surface material temporarily stockpiled during construction are redistributed as backfill on the project area and blended into the natural landscape. The segregated topsoil is then spread evenly across the reclaimed areas. Due to the amount of soil moved around the site during reclamation, perimeter sediment controls such as wattles or diversion ditches will need to be implemented if not present already.

12. Caerus will use green completions to reduce venting of natural gas to atmosphere during new well completions.

13. Temporary surface water delivery lines will be used to reduce truck traffic.

14. All areas needed for production will be graveled. The pad boundary will be fenced per surface owner request.

15. Drill cuttings generated during drilling of the proposed well will be managed on the pad surface in a cutting's management area. The area will be sufficiently bermed to provide run-on protection and run-off controls. The moisture content will be as low as practicable to prevent accumulations of liquids greater than a de minimis amount. Any liquid removed the solids will be reused as part of the drilling process. Both surface interval and production interval drill cuttings will be segregated and sampled for the pertinent suite of COGCC Table 910-1 analytes, such that the different cuttings can be managed appropriately (if necessary). Those cuttings analytically demonstrating conformance with applicable COGCC Table 910-1 standards will be beneficially reused as part of the pad reclamation efforts. Cuttings analytically above COGCC Table 910-1 standards will be remediated on-site to below pertinent thresholds and then beneficially reused as part of the pad reclamation.

16. The cuttings management area will be reclaimed in accordance with the 900 and 1000 COGCC Rules.

17. During completion operations produced water will be confined to flow back tanks for a period not to exceed ninety days after initial production. The produced water will then be recycled and used on future completion operations.

APPENDIX E. STANDARD CONDITIONS OF APPROVAL (FEDERAL SURFACE AND SPLIT-ESTATE)

E.1. General

1. The Operator will submit a Sundry Notice a minimum of 48-hours prior to commencing construction and/or reclamation work.
2. Notify Craig Interagency Dispatch (970-826-5037) in the event of any fire.
    a. The reporting party will inform the dispatch center of fire location, size, status, smoke color, aspect, fuel type, and provide their contact information.
    b. The reporting party, or a representative of, should remain nearby, in a safe location, in order to make contact with incoming fire resources to expedite actions taken towards an appropriate management response.
    c. The applicant and contractors will not engage in any fire suppression activities outside the approved project area. Accidental ignitions caused by welding, cutting, grinding, etc. will be suppressed by the applicant only if employee safety is not endangered and if the fire can be safely contained using hand tools and portable hand pumps. If chemical fire extinguishers are used the applicant must notify incoming fire resources on extinguisher type and the location of use.
    d. Natural ignitions caused by lightning will be managed by Federal fire personnel. If a natural ignition occurs within the approved project area, the fire may be initially contained by the applicant only if employee safety is not endangered. The use of heavy equipment for fire suppression is prohibited, unless authorized by the Field Office Manager.

E.2. Wildlife

3. In the event a producing well is established, all new production equipment which has open-vent exhaust systems, such as heater treaters, separators, dehydration units, and flare stacks, will be designed and constructed to prevent birds and bats from entering or nesting in or on such units, and to the extent practical, to discourage birds from perching on the exhaust stacks.
4. The operator will prevent access to facilities that store or are expected to store fluids which may pose a risk to such birds and bats (e.g., toxicity, compromised insulation, drowning). Features that prevent access to such fluids must be in place and functional within 24 hours of installation and will remain effective until such features are removed or incapable of storing fluids. Deterrence methods may include netting or other alternative methods that effectively prevent use and that meet BLM approval. All lethal and non-lethal events that involve migratory birds will be reported to the BLM Authorized Officer immediately.
5. Water Use**.** The purpose of this COA is to assist the BLM with ensuring that water depletions associated with Federal oil and gas development activities are adequately

covered by the U.S. Fish and Wildlife Service (FWS) Programmatic Biological Opinion for the four endangered Colorado River fishes.

The Operator will provide the volumes of fresh water and reused/recycled water used during project development. The river sub-basin of origin (i.e., Colorado, Dolores, Green, Gunnison, White, and Yampa) will be identified for fresh water. The volumes per well will be identified by each development phase (construction, drilling, and completion) and by activity (e.g., dust abatement, pipeline hydrostatic testing, drilling, and completion operations). The water volumes will be identified in an attachment to the BLM Form 3160-4, "Well Completion or Recompletion Report and Log" (completion report) submitted to the BLM Field Office. All volumes are to be reported in barrels per well.

For reporting the water used during construction, submit the total water used for construction with the first completion report. Completion reports submitted subsequent to the first completion report will have the water-use that was not included in the previous completion reports.

Well Name/No.:			**API No.:**		
County:			**Well Pad:**		
Operator:					
Water Source (River Sub-Basin)					
Purpose	**Water Use (barrels)**				
	Construction	**Drilling**		**Completion**	
	Fresh	**Fresh**	**Reused/ Recycled**	**Fresh**	**Reused/ Recycled**
Dust Abatement (Road/Pipeline/Pad)					
Pipeline Hydrostatic Testing					
Cementing					
Mud					
Acid Wash/ Hydraulic Fracturing					

E.3. Paleontological Resources

6. The operator/holder is responsible for informing all persons who are associated with the project operations that they will be subject to prosecution for disturbing or collecting vertebrate fossils, collecting large amounts of petrified wood (over 25lbs./day, up to 250lbs./year), or collecting fossils for commercial purposes on public lands.
7. If any paleontological resources are discovered as a result of operations under this authorization, the operator/holder or any of his agents must stop work immediately at that

site, immediately contact the Authorized Officer, and make every effort to protect the site from further impacts, including looting, erosion, or other human or natural damage. Work may not resume at that location until approved by the Authorized Officer. The BLM or designated paleontologist will evaluate the discovery and take action to protect or remove the resource within 10 working days. Within 10 days, the operator will be allowed to continue construction through the site, or will be given the choice of either (a) following the Paleontology Coordinator's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (b) following the Paleontology Coordinator's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area.

E.4. Cultural Resources

8. The applicant is responsible for informing all persons who are associated with the project that they will be subject to prosecution for knowingly disturbing archaeological sites or for collecting artifacts.
9. If any archaeological materials are discovered as a result of operations under this authorization, activity in the vicinity of the discovery will cease, and the BLM WRFO Archaeologist will be notified immediately. Work may not resume at that location until approved by the Authorized Officer. The applicant will make every effort to protect the site from further impacts including looting, erosion, or other human or natural damage until BLM determines a treatment approach, and the treatment is completed. Unless previously determined in treatment plans or agreements, BLM will evaluate the cultural resources and, in consultation with the State Historic Preservation Office (SHPO), select the appropriate mitigation option within 48 hours of the discovery. The applicant, under guidance of the BLM, will implement the mitigation in a timely manner. The process will be fully documented in reports, site forms, maps, drawings, and photographs. The BLM will forward documentation to the SHPO for review and concurrence.
10. Pursuant to 43 CFR 10.4(g), the applicant must notify the Authorized Officer, by telephone and written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the operator must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the Authorized Officer. Colorado Statute CRS 24-80-1302 must be adhered to upon the identification of suspected human skeletal remains and associated funerary items on Colorado State and private lands. The applicant will immediately notify the coroner of the county wherein the remains are located as well as the sheriff, police chief, or land managing agency official.

E.5. Invasive, Noxious, and Non-Native Species

11. It is recommended all vehicles and construction equipment be cleaned using compressed air or high-pressure water spraying equipment prior to use to reduce the potential for introduction of invasive, noxious weeds or other undesirable non-native species. The wash/blow down will concentrate on tracks, feet, or tires and on the undercarriage, with special emphasis on axles, frame, cross members, motor mounts, and on underneath

steps, running boards, and front bumper/brush guard assemblies. Operator will dispose of solid wastes collected from the cleaning station.

12. All seed, straw, mulch, or other vegetative material to be used on reclamation will comply with United States Department of Agriculture (USDA) state noxious weed seed requirements and must be certified by a qualified Federal, State, or county office as free of noxious weeds. Any seed lot with test results showing presence of State of Colorado A or B list species will be rejected in its entirety and a new tested lot will be used instead.
13. All sites will be monitored and treated for noxious weeds for the life of the project until Final Abandonment has been approved by the BLM. Monitoring will be conducted annually during the growing season to determine the presence of any State-listed noxious weeds. Noxious weeds that have been identified during monitoring will be promptly treated and controlled.

E.6. Waste

14. When drilling to set the surface casing, drilling fluid will be composed only of fresh water, bentonite, and/or a benign lost circulation material that does not pose a risk of harm to human health or the environment (e.g., cedar bark, shredded cane stalks, mineral fiber and hair, mica flakes, ground and sized limestone or marble, wood, nut hulls, corncobs, or cotton hulls).
15. All substances that pose a risk of harm to human health or the environment will be stored in appropriate containers. Fluids that pose a risk of harm to human health or the environment, including but not limited to oil, condensate, and/or produced water, must be stored in appropriate containers and in secondary containment systems at 110 percent of the largest vessel's capacity. Secondary fluid containment systems, including but not limited to tank batteries must be lined with a minimum 24 mil impermeable liner.
16. As a reasonable and prudent lessee/operator in the oil and gas industry, acting in good faith, all lessees/operators and right-of-way holders will report all emissions or releases that may pose a risk of harm to human health or the environment, regardless of a substance's status as exempt or nonexempt and regardless of fault, to the BLM WRFO by phone at 970-878-3800 or by email to BLM_CO_WR_NRS@blm.gov.
17. As a reasonable and prudent lessees/operator and/or right-of-way holder in the oil and gas industry, acting in good faith, all lessees/operators and right-of-way holders will provide for the immediate clean-up and testing of air, water (surface and/or ground) and soils contaminated by the emission or release of any substance that may pose a risk of harm to human health or the environment, regardless of that substance's status as exempt or non-exempt. Where the lessee/operator or right-of-way holder fails, refuses or neglects to provide for the immediate clean-up and testing of air, water (surface and/or ground) and soils contaminated by the emission or release of any quantity of a substance that poses a risk of harm to human health or the environment, the BLM WRFO may take measures to clean-up and test air, water (surface and/or ground) and soils at the

lessee/operator's expense. Such action will not relieve the lessee/operator of any liability or responsibility.

E.7. Range Management

18. The operator must coordinate with the livestock grazing permittee Piceance Creek Ranch, Ltd. authorized to graze livestock within the project area a minimum of 72 hours prior to drilling activities associated with this permit. Livestock grazing permittee contact information may be found at www.blm.gov/ras/ or by contacting the appropriate BLM Field Office. The operator will provide the grazing permittee the location, nature, and extent of the anticipated activity being completed.
19. Any range improvement projects such as fences, water developments, cattleguards, gates, or other livestock handling/distribution facilities that are damaged or destroyed either directly or indirectly as a result of implementation of the Proposed Action will be promptly repaired or replaced by the applicant to restore pre-disturbance functionality. If the operator damages any range improvement project(s) the operator will notify the Authorized Officer and identify the actions taken to repair the feature(s).

E.8. Visual Resource

20. All long-term above ground structures will be painted an appropriate color from the BLM "Supplemental Environmental Colors" chart to blend with the natural color of the landscape background. The BLM has determined that the appropriate environmental color for this well location is "Shale Green" on the BLM's Standard Environmental Colors Chart CC-001: June 2008.

E.9. Reclamation Procedures

- ***Interim Reclamation***

21. All long-term above-ground structures will be painted and maintained Shale Green from the BLM "Supplemental Environmental Colors" chart to blend with the natural color of the landscape background.
22. To reduce erosion and reduce the risk of weed establishment, interim reclamation will be initiated when either there are no drilling activities expected on the pad for the next six months or there has been no activity on the pad within the last six months, regardless of whether or not there are outstanding approved APDs.
23. In order to inspect and operate the well or complete workover operations, it may be necessary to drive, park, and operate equipment on restored, interim vegetation within the previously disturbed area. Damage to soils and interim vegetation will be repaired and reclaimed following use. To prevent soil compaction, under some situations, such as the presence of moist, clay soils, the vegetation and topsoil will be removed prior to workover operations and restored and reclaimed following workover operations.

- ***Final Reclamation***

24. Final abandonment of pipelines and flow lines will involve flushing, capping, and properly disposing of any fluids in the lines. All surface lines and any lines that are buried close to the surface that may become exposed in the foreseeable future due to water or wind erosion, soil movement, or anticipated subsequent use, must be removed. Deeply buried lines may remain in place unless otherwise directed by the Authorized Officer.

- ***Monitoring and Final Abandonment Approval***

25. All seed tags will be submitted via Sundry Notice (SN) to the designated Natural Resource Specialist within 14 calendar days from the time the seeding activities have ended. The SN will include the purpose of the seeding activity (i.e., seeding well pad, cut and fill slopes, seeding pipeline corridor, etc.). In addition, the SN will include the pipeline, well(s) or well pad number associated with the seeding activity, if applicable, the name of the contractor that performed the work, his/her phone number, the method used to apply the seed (e.g., broadcast, hydro-seeded, drilled), whether the seeding activity represents interim or final reclamation, the total acres seeded, an attached map that clearly identifies all disturbed areas that were seeded, and the date the seed was applied.
26. Each year by January 1st, Caerus Piceance LLC. will submit a Reclamation Status Report to the WRFO via the most current BLM approved data management system that includes the pipeline name and/or well number, API number, legal description, UTM coordinates, project description (e.g., well pad, pipeline, etc.), reclamation status (e.g., interim or final), whether the well pad and/or pipeline has been re-vegetated and/or re-contoured, date seeded, photos of the reclaimed site, acres seeded, seeding method (e.g., broadcast, drilled, hydro-seeded, etc.), and contact information for the person responsible for developing the report. The report will include maps showing each point (), polygon (e.g., well pad), and/or polyline (e.g., road, pipeline) feature that was included in the report. The data must be submitted in UTM Zone 13N, NAD 83, in units of meters. In addition, scanned copies of seed tags that accompanied the seed bags will be included with the report. Internal and external review of the WRFO Reclamation Status Report and the process used to acquire the necessary information will be conducted annually, and new information or changes in the reporting process will be incorporated into the report.
27. The operator will be responsible for ensuring that all disturbance GIS and reclamation data will be submitted via White River Data Management System (WRDMS) which can be accessed at https://my.usgs.gov/wrfo/

E.10.Reclamation Performance Standards

- ***Interim Reclamation Standard***

28. Disturbed areas not needed for long-term production operations or vehicle travel have been recontoured, protected from erosion, and revegetated with a self-sustaining,

vigorous, diverse, native (or otherwise approved) plant community sufficient to minimize visual impacts, provide forage, stabilize soils, and impede the invasion of noxious weeds.

- ***Final Reclamation Standard***

29. The operator must meet the following reclamation success criteria, and these standards apply to both interim and final reclamation:
    a. Self-sustaining desirable vegetative groundcover consistent with the site Desired Plant Community (DPC) (as defined by the range site, WRFO Assessment, Inventory, and Monitoring (AIM) protocol site data (BLM TN 440), ecological site or an associated approved reference site) is adequately established, as described below, on disturbed surfaces to stabilize soils through the life of the project.
    b. Vegetation with 80 percent similarity of desired foliar cover, bare ground, and shrub and/or forb density in relation to the identified DPC. Vegetative cover values for woodland or shrubland sites are based on the capability of those sites in an herbaceous state.
    c. The resulting plant community must have composition of at least five desirable plant species, and no one species may exceed 70 percent relative cover to ensure that site species diversity is achieved. Desirable species may include native species from the surrounding site, species listed in the range/ecological site description, AIM data, reference site, or species from the BLM approved seed mix. If non-prescribed or unauthorized plant species (e.g., yellow sweetclover, *Melilotus officinalis*) appear in the reclamation site, BLM may require their removal.
    d. Bare ground does not exceed the AIM data, range site description, or if not described, bare ground will not exceed that of a representative undisturbed DPC meeting the Colorado Public Land Health Standards.
    e. Reclamation sites affected by cheat grass and or other invasive annuals will be qualified based on the condition of the site (i.e., the relative vegetative cover) prior to disturbance.
        i. If the Project site contains less than 25 percent relative cover of undesirable species, interim and final reclamation will be considered acceptable when relative cover of undesirable species on the project site does not exceed 5percent.
        ii. If the project site contains 25 percent to 50 percent relative cover of undesirable species, interim and final reclamation will be considered acceptable when relative cover to of undesirable species on the project site does not exceed 10 percent.
        iii. If the project site contains more than 50 percent relative cover of undesirable species on the project site does not exceed the level defined by site-specific criteria established in the reclamation plan for that site.

30. Reclamation success criteria in GRSG habitat would be contingent on evidence of successful establishment of desired forbs and sagebrush. Reclaimed acreage would be

expected to progress without further intervention to a state that meets GRSG cover and forage needs (see Table H-1, NWCO GRSG ARMPA) based on site capability and seasonal habitat, as described in the Colorado Greater Sage Grouse Conservation Plan (Colorado Greater Sage-grouse Steering Committee 2008). Reclamation would ensure surface and subsurface stability, growth of self-generating, permanent, vegetative cover and compatibility with post land use. The vegetation should be diverse and of the same seasonal growth as adjoining vegetation. Post land use would be determined by the AO but normally would be the same as adjoining uses.

APPENDIX F. SITE SPECIFIC CONDTIONS OF APPROVAL

1. The BLM recommends that Caerus Piceance, LLC would reseed reclamation areas at the first appropriate seeding window (September 1st – March 31st) following disturbance using Standard BLM seed mix #6 outlined in the table below. Seed mixture rates are Pure Live Seed (PLS) pounds per acre. Drill seeding is the preferred method of application and drill seeding depth shall be no greater than ½ inch. If drill seeding cannot be accomplished, seed should be broadcast at double the rate used for drill seeding and harrowed or raked into the soil.

Cultivar	Common Name	Scientific Name	Application Rate (lbs PLS/acre)
UP Plateau	Sandberg bluegrass	*Poa secunda ssp. sandbergii*	0.5
San Luis	slender wheatgrass	*Elymus trachycaulus ssp. trachycaulus*	2
Sherman	big bluegrass	*Poa secunda ssp. ampla*	1
Bromar	mountain brome	*Bromus marginatus*	2
Maple Grove	Lewis flax	*Linum lewisii*	1
Bandera	Rocky Mountain penstemon	*Penstemon strictus*	0.5
Alternates:			
Canbar	Canby bluegrass	*Poa secunda ssp. canbyi*	0.5
	balsamroot	*Balsamorhiza sagittata*	3

2. GRSG-TL-46e: No surface disturbing or disruptive activities are authorized within 4 miles from active leks during lekking, nesting, and early brood-rearing from March 1 to July 15 to minimize disturbance, displacement, or mortality to greater sage-grouse.

   Criteria*:

   - Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat

   - An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation

   - An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is

particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines.

To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.

3. Caerus will minimize the temporary noise levels of well operations during drilling, completions, re-completions, workovers, or similar activities to a maximum permissible noise level of 70 decibels or less measured 350 feet (4 feet above ground level) from the source to reduce disturbance to greater sage-grouse.
4. To prevent long term impacts associated with noise, sound producing equipment (such as compressors or pump jacks) must be equipped with a hospital grade muffler or similar device which limits sound emissions to 55 decibels or less measured 350 feet (4 feet above ground level) from the source.
5. A full reclamation bond specific to the site (in accordance with MD MR-14 [GRSG RMPA 2015]) is required for the well pads and access roads. This bond will be necessary prior to the construction of the well pads and access roads. Therefore, operator must submit an estimated cost to fully reclaim the location within 30-days of the APDs' approval. Once the estimate is received, the BLM will review the information and provide the operator with the necessary bond amount to ensure bonds are sufficient. The bond is required to cover all overhead and contracting costs anticipated to be incurred by the BLM to result in full restoration of the lands to the condition it was found prior to disturbance.
6. Prior to beginning construction of the proposed well, the operator is required to coordinate with both the BLM and CPW to identify appropriate beneficial actions that would net a minimum of 104.3 credits as per state agency standards and calculations. Possible beneficial actions could include road decommissioning, conifer removal treatments, removal of invasive species, or brood-rearing habitat improvements. The agreed upon action(s) would take place within MZ 17 of the PPR greater sage-grouse population. CPW and BLM are coordinating with Caerus to design a mitigation plan during the 2020 winter to be implemented prior to or within a year of construction of the 1st well pad approved in this proposed action.
7. WR-TL-15: Surface-disturbing and disruptive activities will not be allowed within 0.25 miles of active nest sites of those raptors that are not considered special-status during the period from nest territory establishment to dispersal of young from nest (from February 1 through August 1).

   Exception: An exception to the TL can be granted if an environmental analysis of the Proposed Action indicates that nature or conduct of the activity could be conditioned so as not to interfere with adult attendance and visitation of the nest site, jeopardize survival of the eggs or nestlings, or otherwise impair the utility of nest for current or subsequent nesting activity or occupancy. The Authorized Officer may also grant an

exception if the nest is unattended or remains unoccupied by May 15 of the project year. An exception may be granted to these dates by the Authorized Officer, consistent with policies derived from federal administration of the Migratory Bird Treaty Act.

a. WR-TL-15: On the M23A, B26, and A18 locations, surface-disturbing and disruptive activities (including construction, drilling, completion, and intensive maintenance activities) will not be allowed within 0.25 miles of active nest sites of those raptors that are not considered special-status during the period from nest territory establishment to dispersal of young from nest (from February 1 through August 1). The current survey is valid until June 1, 2021.

b. WR-TL-15: No active nests were located near the P25, O13, and M12 locations and an exception to this stipulation is granted until June 1, 2021, at which time the timing limitation will be applied or a new biological survey must be conducted to consider another exception to the timing limitation.

8. The following stipulation applies to M23A, B25, and P25 well pads:

   WR-TL-13: No surface disturbing activities (including construction, drilling, completion, and intensive maintenance activities) from May 15 through August 15 would be permitted in order to reduce the disturbance of big game animals on summer range. Exceptions and modifications to this Condition of Approval may be considered as expressed in WR-TL-13 in the WRFO Oil and Gas RMPA ROD (2015).

9. The following stipulation applies to O13, A18, and M12 well pads:

   WR-TL-12: No surface disturbing activities (including construction, drilling, completion, and intensive maintenance activities) from December 1 through April 30 would be permitted in order to reduce the disturbance of big game animals on severe winter range. Exceptions and modifications to this Condition of Approval may be considered as expressed in WR-TL-12 in the WRFO Oil and Gas RMPA ROD (2015).

10. Any excavations into the underlying native sedimentary rock must be monitored by a permitted paleontologist. The monitoring paleontologist must be present before the start of excavations that may impact the underlying rock.

APPENDIX G. GREATER SAGE-GROUSE REQUIRED DESIGN FEATURES AND APPLICABLE MANAGEMENT ACTIONS

This appendix documents the conformance of the Proposed Action with the Greater Sage Grouse Environmental Impact Statement Record of Decision (ROD) and Approved Resource Management Plan Amendment (ARMPA) and associated management actions for Colorado, approved in September 2015.

Italics text provides rational for conformance with applicable management decisions, RDFs, and PDFs.

SPECIAL STATUS SPECIES DECISIONS

Objective SSS-1: Maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain GRSG populations.

MD SSS-2: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B.

From Appendix B, Buffer Distances and Evaluation of Impacts on Leks:
The BLM will apply the lek buffer distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate (see below). The lower end of the interpreted range of the lek buffer distances is as follows:

- Linear features (roads) within 3.1 miles of leks
- Infrastructure related to energy development within 3.1 miles of leks
- Tall structures (e.g., communication or transmission towers and transmission lines) within 2 miles of leks
- Low structures (e.g., fences and rangeland structures) within 1.2 miles of leks
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks (page B-1).

The 2015 GRSG RMPA seeks to limit the construction of roads and other infrastructure related to energy development within 3.1 miles of an active lek (section 1.5, MD SSS-2). The proposed M23A well pad is within 1.3 miles of the closest lek. The 2015 GRSG RMPA acknowledges its implementation may be limited by valid, existing rights (43 CFR 3101.1-2).

B.2 FOR ACTIONS IN PRIORITY HABITAT MANAGEMENT AREAS (PHMA)
The BLM will apply the lek buffer distances identified above as required conservation measures, such as Conditions of Approval, to fully address the impacts on leks as

identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer distance(s) identified above.

The BLM may approve actions in PHMA that are within the applicable lek buffer distance identified above only if:

- The BLM, with input from the state fish and wildlife agency, determines, based on best available science, landscape features, and other existing protections, that a buffer distance other than the distance identified above offers the same or greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area.

Impacts from constructed features will be decreased due to the unique topography of the area. In addition, noise will be mitigated by berming excess material. COAs limiting the noise to 70 dB during drilling and completion activities and 55 dB during production will be applied to the APD.

MD SSS-3: In all sage-grouse habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.

Avoidance, minimization, and compensatory mitigation will be used to mitigate impacts from the Proposed Action. See the mitigation section below.

LEASED FLUID MINERAL DECISIONS

Objective MR-2: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator or project proponent in developing an Application for Permit to Drill for the lease to avoid, minimize, and compensate for impacts to GRSG or its habitat and will ensure that the best information about GRSG and its habitat informs and helps guide development of such federal leases. (page 2-15)

MD MR-8: Within 1 mile of active leks, disturbance, disruptive activities, and occupancy are precluded. If it is determined that this restriction would render the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 disturbance per 640 acres and/or the 3 percent disturbance cap, use the **criteria* (MD MR-9)** below to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in **Appendix F** (GRSG RMPA 2015, F-1).

Table 14 from Section 5.4.1: SDARTT[1] Calculations for Management Zone 17

Management Zone 7	Anthropomorphic Disturbance	Density of Facilities per 640 Acres
Existing (before Proposed Action)	1.91%	0.92
Including M23A pad, five other well pads, and two CDPs	1.98%	0.93

[1]SDARTT = Surface Distrubance and Reclamation Tracking Tool

There are 6 active leks and 1 inactive lek within 4 miles of the proposed well locations. The nearest active lek is 1.3 miles to the west of the M23 location along the Divide Road. The B26 is located 1.6 mile east of the nearest active lek and is shielded by intermittent terrain. The Proposed action would not exceed disturbance and density caps (see above SDARTT table). The Parachute-Piceance-Roan (PPR) sage-grouse population (MZ 17) is distinguished from other sage-grouse populations because the available habitat is naturally fragmented. In the PPR steep, parallel drainages separate the available mountain big sagebrush habitat found along the ridge tops.

MD MR-9: In PHMA and within 4 miles of an active lek, the **criteria*** below would be applied to guide development of the lease or unit that would result in the fewest impacts possible to GRSG. (page 2-15)

Criteria*:

- Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat
- An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation
- An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines.

Potential threats are largely reduced due to the distinct topography of MZ 17, as mentioned above. Remaining potential threats have been analyzed and the appropriate compensatory or off-site mitigation will occur to offset impacts from threats to the population.

MD MR-10: Prohibit construction, drilling, and completion within PHMA within 4 miles of a lek during lekking, nesting, and early brood-rearing (March 1 to July 15). (page 2-15)

The GRSG TL-46e stipulation has been applied as a COA. There will be no activities associated with construction, drilling, and completion from March 1- July 15.

MD MR-14: For future actions in ADH [All Designated Habitat], require a full reclamation bond specific to the site in accordance with 43 CFR, Parts 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM will perform the work. (page 2-16)

The following COA will also be attached to the APD: A full reclamation bond specific to the site (in accordance with MD MR-14 [GRSG RMPA 2015]) is required for the well pads and access roads. This bond will be necessary prior to the construction of the well pad and access road. Therefore, operator must submit an estimated cost to fully reclaim the location within 30-days of the APDs' approval. Once the estimate is received, the BLM will review the information and provide the operator with the necessary bond amount to ensure bonds are sufficient. The bond is required to cover all overhead and contracting costs anticipated to be incurred by the BLM to result in full restoration of the lands to the condition it was found prior to disturbance.

COORDINATION WITH THE STATE OF COLORADO

Onsite visits were conducted on May 28, 2020 for three new proposed well pads and one CDP pad in Big Jimmy Unit (BJU). Onsite visits were conducted on June 2, 2020 for three new proposed well pads and one CDP pad in Expanded Liberty Unit (BJU). A combined total of 182 wells would be drilled on the six new proposed well pads.

CPW and BLM discussed potential mitigation with Caerus during the on-sites. There are areas of mixed mountain shrub that could be thinned to the benefit of sage-grouse, as well as big game. Caerus would prefer to perform any vegetation treatment on their own property (the southern part of the project area) and while they have equipment in the field.

REQUIRED DESIGN FEATURES

- **Provide rationale for RDFs which will not be applied.**

- 12 PDF (PHMA) Cluster disturbances, operations (e.g., fracture stimulation and liquids gathering), and facilities.
- 13 PDF (PHMA) Use directional and horizontal drilling to reduce surface disturbance.
- 14 PDF (PHMA) Place infrastructure in already disturbed locations where the habitat has not been restored.
- 27 PDF (PHMA) Use only closed-loop systems for drilling operations and no reserve pits.
- 30* PDF (PHMA) Limit noise to less than 10 decibels above ambient measures (20-24 dBA) at sunrise at the perimeter of a lek during active lek season (Patricelli et al.

2010; Blickley et al. In preparation). ***COAs designed to limit noise will be added. These COAs reflect the COGCC Light Industrial Rule 802.b. regulations.*

- 31* PDF (PHMA) Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season. ***COAs to limit noise will be applied to APDs*
- 37 RDF (PHMA) Include objectives for ensuring habitat restoration to meet GRSG habitat needs in reclamation practices/sites. Address post reclamation management in reclamation plan such that goals and objectives are to protect and improve GRSG habitat needs (Appendix E.9, #30).
- 54 PDF (ADH) Equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids (Appendix E.2, #3).
- 55 PDF (ADH) Use remote monitoring techniques for production facilities and develop a plan to reduce the frequency of vehicle use (included in the WMP with CPW).
- 56 PDF (ADH) Clean vehicles in a manner that prevents transport of weeds (Appendix E.5, #11).

Additionally, Caerus has a Wildlife Mitigation Plan (WMP) with CPW that contains mitigation measures that were designed to reduce impact to wildlife (including sage-grouse); the following COAs from this plan are considered as design features:

- Site new disturbance so as to use topographic features to shield leks from new disturbance whenever feasible.
- Restrict new disturbance within nesting and brood-rearing habitat as much as possible from April 15 to July 1.
- Restrict well site visitation in occupied habitat to between 9 AM and 4 PM during lekking season (March 15 to May 15).
- Use interim-reclamation to redevelop ground cover that provides for secure ground movements of sage-grouse and is an effective precursor to the reestablishment of appropriate sagebrush cover.
- Implement three-phase gathering systems to reduce onsite facilities and increase acreage put into interim-reclamation.
- Remote well control and monitoring to reduce traffic through work/project prioritization and increase emergency response efficiency.

RESTRICTIONS APPLIED

The following Timing Limitations and COAs will be applied to the APD:

- GRSG-TL-46e: No surface disturbing or disruptive activities are authorized within 4 miles from active leks during lekking, nesting, and early brood-rearing

from March 1 to July 15 to minimize disturbance, displacement, or mortality to greater sage-grouse.

Criteria*:

- Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat

- An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation

- An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines.

To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.

- COA*- Caerus will minimize the temporary noise levels of well operations during drilling, completions, re-completions, workovers, or similar activities to a maximum permissible noise level of 70 decibels or less measured 350 feet (4 feet above ground level) from the source to reduce disturbance to greater sage-grouse.

- COA*- To prevent long term impacts associated with noise, sound producing equipment (such as compressors or pump jacks) must be equipped with a hospital grade muffler or similar device which limits sound emissions to 55 decibels or less measured 350 feet (4 feet above ground level) from the source.

- *Currently, Caerus has submitted a sound monitoring plan to determine if additional sound mitigation should be required. The operator has documented that general field noise and drilling operation are well within the 70dB range, but that completions operations have met or exceeded the limit. The BLM will determine whether these limits are exceeded to the extent that sound walls or additional buffering maybe implemented on future locations.

- A full reclamation bond specific to the site (in accordance with MD MR-14 [2015 GRSG RMPA]) is required for the well pads and access roads. This bond will be necessary prior to the construction of the well pad and access road. Therefore, operator must submit an estimated cost to fully reclaim the location within 30-days of the APD's approval. Once the estimate is received, the BLM will review the

information and provide the operator with the necessary bond amount to ensure bonds are sufficient. The bond is required to cover all overhead and contracting costs anticipated to be incurred by the BLM to result in full restoration of the lands to the condition it was found prior to disturbance.

- Prior to beginning construction of the proposed well, the operator is required to coordinate with both the BLM and CPW to identify appropriate beneficial actions that would net a minimum of 104.3 credits as per state agency standards and calculations. Possible beneficial actions could include road decommissioning, conifer removal treatments, removal of invasive species, or brood-rearing habitat improvements. The agreed upon action(s) would take place within MZ 17 of the PPR greater sage-grouse population and start either before the proposed project is finalized or within one year after the proposed project is finalized.

MITIGATION

Net Conservation Gain

Net conservation gain, including accounting for any uncertainty associated with the effectiveness of such mitigation, will be achieved by first avoiding, then minimizing, and finally compensating for unavoidable impacts associated with actions on the impacted project area (2015 GRSG RMPA). In accordance with IM 2019-018, net conservation gain will be met through coordination with CPW and other requirements by the State of Colorado for this authorization.

Avoidance and Minimization

Avoidance and minimization are documented using the Required Design Features (RDFs), Preferred Design Features (PDFs), and Suggested Design Features (SDFs) determined by BLM in the Colorado Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA 2015) to ensure regulatory certainty by using these recommended best management practices. For this project, each specific RDF for oil & gas development within PHMA were addressed. In addition, pertinent stipulations as identified in the 2015 ARMPA will be applied through Conditions of Approval (COAs) to minimize impacts. The operator has agreed to construct sound barriers by berming soil between applicable pad locations and lek locations to the north and west.

Compensatory Mitigation

Unavoidable impacts that cannot be mitigated through avoidance and/or minimization are accounted for through additional mitigation efforts to achieve net conservation gain. According to the 2017 M-37046, the BLM has evaluated this APD within the context of specific factual circumstances and the regulatory provisions which govern this type of authorization. As such, the minimization and mitigation strategy are in conformance with the 2015 GRSG RMPA (MD SSS-3). Any additional impacts related to direct or indirect impacts from the Proposed Action will be compensated for by applying beneficial mitigation actions. As per IM 2019-018, the operator will coordinate with state agencies, including CPW, and meet any state requirements, including mitigation for the Proposed Action. Examples of this mitigation may include but are

not limited to mitigation projects conducted by an authorized operator, contribution to an existing mitigation/conservation fund, or utilization of certified mitigation/conservation bank or credit exchanges like the Colorado Habitat Exchange. Mitigation efforts would be prioritized in the same MZ as the action would occur. CPW, BLM, and Caerus discussed for mitigation of wildlife impacts through brush-thinning treatments to be completed while construction equipment is in the field. CPW and BLM are coordinating with Caerus to design a mitigation plan during the 2020 winter to be implemented prior to or within a year of construction of the 1st well pad approved in this proposed action.

Mitigation Strategy
Indirect impacts can largely be mitigated with avoidance and minimization through the proper application of stipulations, design features, BMPs, and other COAs. Direct impacts would be lessened after completion of interim reclamation and compensatory mitigation, coordinated with CPW, would help offset impacts of the Proposed Action. As directed in IM 2019-018, the BLM will not accept any monetary payment related to mitigation and mitigation efforts are coordinated with the state agency, including CPW, as a requested authorization associated with the Proposed Action. The BLM and CPW will coordinate with the operator prior to the construction of the 1st well pad to design a mitigation plan. The mitigation work must start within one year after the 1st pad is constructed. Standards for successful mitigation would be pre-determined as part of the mitigation plan and tracked to ensure durability. The result of mitigation must continue to meet net conservation gain requirements throughout the life of the project. The result of mitigation must continue to meet net conservation gain requirements.

In the 2015 GRSG RMPA, MD SSS-3 requires mitigation that provides a net conservation gain to the species and will include accounting for any uncertainty associated with the effectiveness of such mitigation. In order to comply with this management decision and in accordance with IM 2019-018, the state's Habitat Quantification Tool (HQT), managed by CPW, will be used to calculate credits at least equal to the debit value of functional acres. This may not equate to the number of on-the-ground acres of mitigation, as functional acre scores for both impacts and debits are calculated using the HQT.

The purpose of the HQT is to serve as a means of quantifying the change in condition of habitats for GRSG resulting from a management action—either as an impact ("debit") or as a benefit ("credit"). The HQT describes how the quality of habitat and change in quality resulting from management actions is quantified. Conditions specific to each seasonal habitat type (i.e., breeding, summer, and winter) are accounted for independently. A separate functional acre score is calculated for each seasonal habitat type, which are summed to a final functional acre value. *The number of functional acres impacted calculated for this project are 104.3.*

Mitigation Measure #6 in Appendix F would require the operator to coordinate with both the BLM and CPW to identify appropriate beneficial actions that would *net a minimum of 104.3 credits* as per state agency standards and calculations. Possible beneficial actions could include road decommissioning, conifer removal treatments, removal of invasive species, or brood-rearing habitat improvements. The agreed upon action(s) would take place within Management

Zone 17 of the NWCO GRSG population and start prior to or within one year of the construction of the first well pad.

In addition to the mitigation discussed here, the State of Colorado may require additional conditions of approval related to mitigation before authorizing a state permit.