



CUMULATIVE IMPACTS PLAN

Date: May 11, 2023

Location: OGDG DP455– Y12-15 Pad and YY18-07 Pad

Development Area Legal Description:

Sections 1 and 12, Township 2 North, Range 64 West, 6th P.M.; and
Sections 7 and N/2 18, Township 2 North, Range 63 West, 6th PM, Weld County, Colorado

This Cumulative Impacts Plan has been prepared in accordance with the Colorado Oil and Gas Conservation Commission (COGCC or Commission) Rule 304.c.(19) and follows the resources analyzed for potential cumulative impacts pursuant to Rule 303.a.(5).

The Plan provides an overview of the OGDG DP455 Project, specifically the proposed disturbance for the two proposed well pads and the methodology used for determining cumulative impacts. Finally, the Plan also includes the following sections, as prescribed in Rule 304.c.(19):

Resources Impacted (Section 3.0) – A description of all resources to which cumulative adverse impacts are expected to be increased;

Minimization Measures (Section 4.0) – A description of specific measures taken to avoid or minimize the extent to which cumulative adverse impacts are increased;

Mitigation Measures (Section 5.0) – A description of all measures taken to mitigate or offset cumulative adverse impacts to any of the resources; and

Additional Information (Sections 1.0 and 2.0) – Information determined to be reasonable and necessary to the evaluation of cumulative impacts by the Operator, the Director, CDPHE, CPW, or the Relevant Local Government.

1.0 Project Overview

This document provides site-specific information for OGDG DP455. The information in this document relates specifically to the time during the construction, drilling, completion, and production of the sixteen (16) proposed horizontal wells in this OGDG. The proposed locations are in rangeland northeast of the intersection of WCR 20 and WCR 59.

A pre-application conference with Weld County was held on December 21, 2022, and was attended by representatives from Weld County, COGCC, CPW, CDPHE, the Town of Keenesburg, and Noble Energy. Much of this discussion was focused on Noble's efforts to consolidate the previous plan for this OGDG that consisted of three well pads and a multi (combined well pad and production facility) into the current plan of two well pads that will produce to an existing, permitted production facility. Additionally, it was noted that the haul route for this development would include roads owned by the Town of Keenesburg and the YY18-07 Pad was within 2,000 feet of the Town's municipal boundary. Noble has continued consultation with the Town of Keenesburg and will be entering into a road maintenance agreement with the Town to address any impacts to the Town's roads, and the Town has also provided documentation that they do not object to the proposed locations if BMPs are provided to address potential light impacts to Interstate 76 (I-76) and an RV park within the Town's boundaries that is over 1 mile to the S-SE of the proposed locations. Noble has committed to these BMPs, as detailed below.

The two proposed well pads will all produce to the existing, permitted Y11-28 Multi production facility (Location ID 450627). Equipment at the well pads will include chemical injection skids, meter buildings, multi-phase flow meters, a communication tower, flowline manifolds, a temporary MLVT, and solar skids. All production equipment will be located on the existing Y11-28 Multi facility.

1.1 *Surface Disturbance*

Construction associated with the OGDG DP455 locations and associated access road and flowline corridor would result in an estimated initial disturbance of 67 acres and long-term disturbance of 11.4 acres. Initial and long-term disturbance by project feature and Location is summarized in Table 1. Site reclamation would be initiated for portions of the well pad not required for the continued operation of the well within six months of completion, weather permitting.

**Table 1
Estimated Surface Disturbance**

Project Feature	Initial (acres)	Long-Term (acres)¹
New Well Pads	19.2	4.4
Y12-15 Pad	9.6	2.1
YY18-07 Pad	9.6	2.3
New Access Road Corridors	8.8	7.0
Y12-15 Pad	3.4	2.6
YY18-07 Pad	5.4	4.4
Flowline Corridors	38.9	0
Y12-15 Pad	23.3	0
YY18-07 Pad	15.7	0
OGDP Total	67.0	11.4

¹ Residual disturbance calculations are based on the assumption that interim reclamation would be successful.

The proposed locations are in an area that does not contain significant legacy wells and facilities. The development of the proposed horizontal wells would result in the plugging and abandoning (P&A) of 1 well and decommissioning of the associated facility in the vicinity of the OGDG. This P&A and decommissioning will result in approximately 2 acres of vegetation and wildlife habitat that will be restored to the ecosystem surrounding the OGDG DP455.

More impactful are the steps that Noble has taken to consolidate locations and reduce the overall surface impact from the development originally planned for DP455. Due to the continued advancement of drilling and completions technologies, Noble has been able to reduce the number of locations needed to develop DP455 from a total of 4 (3 well pads and 1 multi, which is a combination well pad and production facility) to the 2 well pads proposed in this OGDG. In addition, Noble has determined that the production facility portion of the multi that was originally planned for DP455 is no longer needed and the production from DP455 can be processed at the existing, permitted Y11-28 Multi to the northwest. As a result of this consolidation, the initial and long-term disturbance required for the locations has been reduced by approximately 29 and 15 acres, respectively.

Noble commits to the following timing for providing details for the final list of legacy wells and facilities that will be removed during development of this OGDG –

Prior to the completion of the first well in OGDG DP455, Noble will submit via Form 4, Sundry Notice a statement that details the API#s of the Wells to be plugged and the Location ID#s of the locations to be closed and reclaimed as part of this OGDG, and an approximate timeline for which these operations will commence and be completed.

The Form 4 will include emissions reduction estimates associated with the plugging and abandonment of the identified Wells and closure of the identified locations and any other equipment removal or reclamation projects as cited in the Form 2B.

The Form 4 will include an estimated vehicle reduction estimate associated with the plugging and closure of these Wells and locations.

The Form 4 will include any revisions to the Form 2B to address changes in equipment counts that may result.

The Form 4 will include which Wells and locations to be plugged and closed are located within 2,000 feet of Residential Building Units.

If unanticipated delays are encountered associated with safety concerns, wildlife stipulations, landowner considerations, offset operations or rig availability, and remediation obligations Noble will provide staff with an updated schedule for plugging and abandonment and facility closure via a Form 4.

2.0 Cumulative Impact Methodology

Cumulative impacts on the environment may result when the environmental effects associated with a proposed project are added to other past, current, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The proposed OGDG DP455 is within an area of existing oil and gas development, and is surrounded by agricultural, rangeland, and other industrial/developed areas in Weld County, Colorado, and within the incorporated boundary of the Town of Keenesburg, Colorado. Interstate 76 (I-76) separates this OGDG from the Town of Keenesburg and is located approximately 257 feet from the WPS for the YY18-07 Pad. Most of the past, present, and reasonably foreseeable development in the vicinity of the OGDG DP455 is associated with current or planned oil and gas exploration, midstream infrastructure, industrial development, and agricultural development. Information for this cumulative impact assessment was obtained from county, state, and federal websites, and other public domain sources. Specifically, the OGDG DP455 has approximately 34 oil and gas locations considered “active” within a 1-mile radius of the proposed locations according to the COGCC location files online.

To provide information relevant to COGCC decision making, a practical delineation of the spatial and temporal scales is needed for an informative cumulative impacts’ analysis. The geographic extent of each specific Cumulative Impact Analysis Area (CIAA) varies by resource and is larger for resources that are mobile or migrate, as compared to those that are stationary. For some resources, the CIAA is smaller due to the geographically confined nature of cumulative impacts (e.g., vegetation), while for others the CIAA is much larger (e.g., air quality). Table 2 provides the geographic extent for cumulative impact analysis that was applied for the OGDG DP455 locations. For most resources, the temporal boundary is assumed to be the 30-year life of production. For wildlife and vegetation, the temporal boundary is extended an additional 5 years to account for the time required to reach 75-100 percent reclamation.

**Table 2
Geographic Scope for Cumulative Impact Analysis**

Environmental Resource	Cumulative Impact Assessment Area (CIAA)
Air Quality	1-mile radius
Public Health	1-mile radius
Water Resources	½-mile radius
Terrestrial and Aquatic Wildlife Resources and Ecosystems	1-mile radius (specifically High Priority Habitats [HPH] within 1-mile)
Soil Resources	Limits of disturbance for the location (including access roads and pipeline rights-of-ways [ROWs])
Vegetation	1-mile radius
Public Welfare – Noise, Odor, Light	1-mile radius

3.0 Resources Impacted

The following section describes the resources for which cumulative impacts are anticipated, based on the information included on the Form 2B and the site-specific plans associated with Form 2A.

3.1 Air Resources and Public Health¹

Air quality in an area is generally influenced by the quantities of pollutants that are released within and upwind of the area, and it can be highly dependent upon the pollutants’ chemical and physical properties. Air quality regulations and source-specific permits limit the allowable quantities of pollutants that may be emitted. The topography, weather, and land use in an area will also affect how pollutants are transported and dispersed and the resulting ambient concentrations.

The location of the OGDG DP455 and broader CIAA currently contains various emission sources including agricultural fields, vehicle traffic, houses, and oil and gas production and infrastructure. The addition of the infrastructure needed to construct, drill, and operate the OGDG DP455 locations would have a cumulative impact on air quality within the 1- mile CIAA. However, the proposed wells’ contribution to cumulative effects would be minor, as demonstrated by the Emissions Inventory results reflected in Form 2B, and modeling assessment results from the October 17, 2019 *Final Report: Human Health Risk Assessment for Oil & Gas Operations in Colorado* published by CDPHE. Additionally, the nearest Residential Building Unit (RBU) to the proposed locations is approximately 3,200 feet to the southwest of the Working Pad Surface (WPS) for the Y12-15 Pad, and the above-referenced health risk assessment indicated that the health risk to residents at this distance from an oil and gas location is negligible.

¹ As the Public Health analysis is tied directly to the effects of Hazardous Air Pollutants, the Air Resources and Public Health cumulative impact analyses are combined in Section 3.1.

The Air Resources impacts would be minimized and mitigated by the measures included in Sections 4 and 5 of this Cumulative Impacts Plan. Emissions would be permitted and regulated by the Colorado Department of Public Health and Environment, Air Pollution Control Division, and would be subject to appropriate controls to reduce emissions to minimal levels. However, in the context of cumulative impact assessment, any contribution to emissions, no matter how small, adds to the cumulative effects from past, present, and reasonably foreseeable future projects.

It should also be noted that the OGD DP455 is not located within a disproportionately impacted community (DIC).

3.2 *Water Resources*

There are no public water system intakes located within a mile of the proposed OGD DP455 locations. Construction of oil and gas facilities and associated infrastructure and industrial development would likely have the greatest potential impact on water resources within the ½-mile radius CIAA due to the potential for increased erosion and sedimentation rates. Soils compacted on existing roads, new access roads, and well pads contribute to slightly greater runoff than undisturbed sites. Increased erosion and subsequent increased sedimentation of intermittent streams and ephemeral drainages within the CIAA is possible, especially during construction and other surface disturbing activities. These effects could have negative impacts on aquatic habitat within affected drainages.

To assess the potential of impacts to water resources, Noble utilizes several different sources of information and field surveys to verify the location and nature of hydrologic features. The Hydrology Maps included in the Form 2A submittals for each of the pads reflects the compilation of information available from a variety of public sources and limited information from land surveyors employed by Noble. Noble also utilizes the services of a third-party environmental consultant to conduct aquatic resources inventories and the results of these inventories are documented in the Aquatic Resources Inventory Reports (ARIRs) attached to the Wildlife Protection Plans included in the Form 2A submittals. These ARIRs document the results of additional desktop reviews and field surveys by qualified biologists to verify the results of the desktop reviews and to identify any resources that may not have been identified by the desktop reviews. These field surveys are conducted to identify and formally delineate any wetlands or other aquatic features within 500 feet of the proposed location. It is not uncommon for the ARIR to provide information that appears to conflict with the Hydrology Maps, however, the results of the ARIR are far more definitive.

For the Y12-15 Pad, the nearest aquatic feature to the WPS of the pad is permanently flooded riverine wetlands along Ennis Draw approximately 1,330' northeast of the proposed location. The ARIR for this location confirmed that there are no wetlands or non-wetland waterbodies within 500 feet of the location. As discussed below, Noble will implement several BMPs at these locations to minimize and mitigate any potential impacts to the wetlands or other aquatic features.

The Hydrology Map for the YY18-07 Pad indicates the presence of wetlands and an associated intermittent stream approximately 470 feet and 1,245' northwest of the location, respectively. However, the field survey conducted for the ARIR confirmed that both the wetland identified in the National Wetlands Inventory (NWI) and the intermittent stream identified in the National Hydrography Dataset (NHD) are upland features and no further action is required. Therefore, the nearest aquatic feature to the YY18-07 Pad are seasonally flooded emergent persistent palustrine wetlands located approximately 2,281' northwest of the pad location.

No direct impacts to these waterbodies are expected from activities on the well pads due to the implementation of minimization and mitigation measures (discussed in Sections 4 and 5) and the distance to the water bodies. The access road and flowlines will cross Ennis Draw and related aquatic resources between the two proposed well pads. Noble obtained a Jurisdictional Determination from the US Army Corps of Engineers (NOW-2019-01630-DEN) and these aquatic resources were determined to be non-jurisdictional. However, Noble will employ minimization and mitigation measures to protect these resources.

In addition, production activities at the OGD DP455 locations or other past, present, or reasonably foreseeable production facilities or industrial development could increase the potential for accidental spills of fuels, lubricants, and other petroleum products, which could contaminate surface water within the ½-mile CIAA. All production from the well pads will be transported via buried flowlines to the existing, permitted Y11-28 Multi facility where production equipment will be located. The existing, permitted Y11-28 Multi facility will utilize Noble's EcoNode design and, as a result, there will be no tanks or other storage vessels on the Facility or the proposed well pads. Spills of fuels or produced fluids from well pads and pipelines also have the potential to contaminate shallow alluvial groundwater. However, oil and gas development regulatory requirements to prevent spills from reaching surface and groundwater make these impacts unlikely, and therefore, represent a negligible potential cumulative impact within the CIAA.

Total water volume needed for the Project would be approximately 3,509,500 barrels (bbls). Water for the Project would come from existing, permitted sources (both surface and groundwater) outside of the OGD DP455 locations area; no new water wells or water storage areas are proposed – refer to the Water Plans submitted with the Form 2A's for details of the water sources. The use of more than 3.5 million bbls of water for the construction, drilling and completion of wells on the OGD DP455 locations would cumulatively contribute to water use from other oil and gas development, industrial, and agricultural activity within the CIAA. Noble does not currently plan to reuse or recycle of water for the OGD DP455 locations due to the distance to the nearest recycling facilities. Noble continually evaluates opportunities to reuse or recycle water based on access to infrastructure and schedule for other development in a given geographic area. Reuse or recycling of water for this project will be implemented if it becomes feasible in the future.

Noble's use of oil-based muds during drilling also reduces freshwater use at the Location. Other operators' use of oil-based drilling muds and water recycling programs also contribute to an overall reduction in the volume of fresh water needed to drill and complete wells within the CIAA. Minimization and mitigation measures intended to protect water resources within the CIAA are described in Section 4 and 5; Noble's commitment to implementation of these measures will further limit impacts to water resources within the CIAA.

3.3 *Terrestrial and Aquatic Wildlife Resources and Ecosystems*

Cumulative impacts on terrestrial wildlife populations and habitats primarily result from surface-disturbing activities. Cumulative impacts to aquatic species primarily occur from water depletion and impacts to the quality of surface and groundwater, such as those discussed in Section 3.2.

Wildlife Populations

Surface Disturbance Impacts

Development of the OGD DP455 locations would incrementally increase the acres of cumulative surface disturbance from past, present, and reasonably foreseeable development within the 1-mile CIAA. Cumulative impacts to wildlife species can include habitat fragmentation, habitat loss, loss of foraging opportunities, and animal displacement; impacts that can last until successful final reclamation is completed. As summarized below and discussed in detail in the Wildlife Protection Plans submitted with the Form 2A's, Noble is implementing several measures to mitigate impact to wildlife. Noble's EcoNode design also provides for all fluids to be piped from the location to the production facility and from the production facility into gathering infrastructure, which dramatically reduces the traffic traditionally associated with transporting these fluids.

The proposed well pads and the associated access roads and flowline corridors are not located within any High Priority Habitats, however, Noble will implement standard wildlife-related BMPs for all development. As noted above in Section 3.2, the access road and flowline corridor between the two proposed well pads will cross non-jurisdictional wetlands associated with Ennis Draw and minimization and mitigation measures will be employed to lessen any impact to these wetlands.

The proposed locations are in an area that does not contain significant legacy wells and facilities. The development of the proposed horizontal wells would result in the plugging and abandoning (P&A) of 1 well and decommissioning of the associated facility in the vicinity of the OGD DP. This P&A and decommissioning will result in approximately 2 acres of vegetation and wildlife habitat that will be restored to the ecosystem surrounding the OGD DP455.

More impactful are the steps that Noble has taken to consolidate locations and reduce the overall surface impact from the development originally planned for DP455. Due to the continued advancement of drilling and completions technologies, Noble has been able to reduce the number of locations needed to develop DP455 from a total of 4 (3 well pads and 1 multi, which is a combination well pad and production facility) to the 2 well pads proposed in this OGD DP. In addition, Noble has determined that the production facility portion of the multi that

was originally planned for DP455 is no longer needed and the production from DP455 can be processed at the existing, permitted Y11-28 Multi to the northwest. As a result of this consolidation, the initial and long-term disturbance required for the locations has been reduced by approximately 29 and 15 acres, respectively.

As noted above, the proposed well pads will be connected to the existing production facility via buried flowlines carrying oil, gas, and water to the production facility. As a result, there will be no truck traffic required to transport liquids when the wells are in production which will dramatically decrease the potential impact to wildlife populations. The removal of legacy wells and facilities in the vicinity will also remove the traffic currently associated with servicing those facilities, again reducing the overall impact to wildlife.

Noise and Light Impacts

Noise and light from anthropogenic activities both have the potential to adversely impact terrestrial and aquatic wildlife. Artificial light can have several effects on wildlife. Nocturnal animals rely on darkness for hunting, foraging, and scavenging. Predatory animals rely on darkness for hunting, while prey animals rely on the cover of darkness for protection from predators. Artificial light can also impact migratory birds including causing them to migrate too early or too late and miss ideal climate conditions for nesting, foraging, and other behaviors. Birds can also be attracted to sources of artificial light, which can lead to collisions and bird mortality. Artificial lights can also impact aquatic species. For example, glare from artificial lights can impact wetland or riparian habitats and interfere with activities such as nighttime croaking of frogs and toads, which can impact breeding and reproductive success and lead to reduced populations.

Noise from human activity can also have an adverse impact on wildlife. Wildlife species use sound for a variety of reasons, including to navigate, find food, attract mates, and avoid predators. Anthropogenic noise, especially loud or high frequency noise intrusions, can be perceived by wildlife as a threat, causing them to flee an area. Noise can distract foragers such as big game species, reducing their efficiency of finding and handling food. Noise may increase physiological stress levels, which can impact behaviors and result in decreased physical health of animals and decreased reproduction. Noise can have indirect effects on wildlife, such as scaring away prey from an area predators rely on, or conversely, driving predators into prey habitat. Human introduced noise can also impede acoustic communication between wildlife or mask the sounds of an approaching predator or potential prey. Noise can also hinder animal communication by reducing the distance at which a signal can be detected, limiting the ability of the signal to reach its intended receiver, and decreasing the amount of information that can be extracted from a signal. For example, anthropogenic noise can reduce the ability of birds, small mammals, and insects to collect information on their surroundings, increase their predation risk (by masking the sounds of predators), and interfere with signals that are crucial for their breeding success and parental care.

The pre-production potential for light and noise related impacts on wildlife will be decreased at the OGD DP455 locations because Noble intends to down-shield lighting during drilling and completion. Due to the proximity of the YY18-07 Pad to I-76, Noble will install sound walls on the east and south sides of the pad during all pre-production activities to minimize light impacts

to vehicles on the interstate. These sound walls will also reduce noise and light impacts to wildlife and other resources. Additionally, no permanent lighting will be located on the well pads, so long-term light and noise related impacts would be limited to headlights and vehicle engine noise from operational vehicles on location and enroute to and from the location during production. The majority of production-related traffic at the well pads will be during daylight hours. As indicated above, the use of pipelines to transport all fluids from the well pad will result in a dramatic reduction of traffic associated with production activities.

In addition, given the existing oil and gas, industrial, and agricultural activity in and around the CIAA, local wildlife has likely become habituated, to some extent, to human presence, vehicle traffic, and operational activities (including associated noise and light from vehicle traffic) associated with these current land uses. Finally, the minimization and mitigation measures outlined in Sections 4 and 5 of this Plan would further diminish cumulative impacts on terrestrial and aquatic wildlife within the CIAA.

3.4 Soil Resources

The CIAA for soils is a ½-mile radius around the Location. Construction of the OGDG DP455 locations would result in the disturbance of approximately 67 acres of soils. The soils present at each of the proposed locations are detailed in the Dust Mitigation Plans submitted with the Form 2A's.

Cumulative impacts on soil resources can occur from any surface-disturbing activity that removes native vegetation and topsoil. These impacts can result in soil compaction, increased erosion, and sediment yield, all of which reduce soil productivity, stability, and viability. Of these impacts, compaction may be the most deleterious. Compaction affects the movement of water and air across the soil surface boundary. Infiltration, the movement of water into the soils, is critical for plant and soil health. If water cannot move into the soil quickly, it will pond and run off, leaving vegetation dry and dying, increasing erosion, and increasing flood frequency and magnitude. Compaction can also cause a shift from aerobic to more anaerobic organisms and may increase losses of nitrogen to the atmosphere (denitrification). Surface disturbance can also impact soil biological functions and viability because the disturbance can 1) enhance or degrade the microbial habitat, 2) add to or remove food resources, and/or 3) directly add or kill soil organisms.

Most soil organisms – especially larger ones that contribute to soil health and viability – live in the top few inches of soil. Surface disturbance, compaction, and erosion disrupts and removes that habitat for soil organisms. As such, one of the most effective ways to reduce impacts to soil viability from surface disturbance is to protect and preserve topsoil. However, due to the very limited amount of humus and other organic material that is present in the surface soils in this vicinity, Noble has executed an alternative reclamation plan with the owner of the surface where the Y12-15 and YY18-07 Pads will be located. This plan requires Noble to utilize cut soils in areas that need to be filled to the extent possible and to import fill and organic material during interim and final reclamation to facilitate revegetation success. In the event that not all

cut material can be utilized as fill, Noble will implement the mitigation measures in Section 4.5 of this Plan.

Implementation of this and other minimization and/or mitigation measures listed in Sections 4 and 5 of this Plan, would help to lessen the potential for impacts to soils at the OGD DP455 locations, and therefore, reduce its cumulative contribution to soil disturbance and loss of soil viability. In addition, Noble and other operators' commitments to plug, abandon, and reclaim older wells and well pads result in restoring previously disturbed areas and reducing soil-related impacts within the CIAA and beyond.

3.5 Vegetation

The CIAA for vegetation is defined as a 1-mile buffer around the proposed OGD DP455 locations. Past, present, and other reasonably foreseeable activities within the CIAA that have or will continue to affect vegetation communities include oil and gas development/other industrial activities, livestock grazing, and agriculture. Construction of the OGD DP455 locations, when combined with all past, present, and reasonably foreseeable activities in the CIAA, would have minimal to moderate impacts on vegetation across the CIAA. Yet in the context of cumulative impacts, each acre of vegetation disturbance would incrementally add to other existing and future surface disturbances in the CIAA by increasing erosion, incrementally adding to the overall native vegetation loss, and potentially increasing invasion or expansion of invasive and noxious weeds. Cumulative impacts for general vegetation would be mitigated in accordance with COGCC requirements. Interim reclamation would reduce the locations and associated access road and flowline disturbance to approximately 11.4 acres. Minimization and mitigation measures (listed in Section 4 and 5 of this Plan) used to implement noxious weed management, erosion control, and apply dust abatement, would reduce impacts to native vegetation communities by reducing the potential for competition with invasive and noxious weed species, minimizing soil erosion and sedimentation, and reducing fugitive dust on plant surfaces.

3.6 Public Welfare – Noise, Odor, and Light

The OGD DP455 locations are wholly located within an agricultural area and zoned as such. The nearest RBU is located over 3,200' southwest of the Y12-15 Pad and over 1 mile from the YY18-07 Pad. The CIAA for Public Welfare is a 1-mile radius around the Location. There are no recreation areas within a 1-mile radius, and the OGD DP455 locations are located in an area that has active oil and gas development meaning that visual impacts from oil and gas are already present in the CIAA. The scenic value of the location will not be impacted by the construction and operation of the OGD DP455 locations.

Noise

The OGD DP455 locations are wholly located within an agricultural area and zoned as such. The nearest RBU is located over 3,200' southwest of the Y12-15 Pad and over 1 mile from the YY18-07 Pad.

Noise during production operations will be very limited. Because there will be no production operations on the well pads, visits to the pad by lease operators will be much less frequent than would occur on a traditional well pad that also includes production facilities. The lack of production equipment on the well pads will result in very few sources of noise during production activities. All produced gas and fluids will be piped from the well pads to the existing, permitted Y11-28 Multi facility and then from the Facility to gathering systems which eliminates the trucking of fluids and the noise impacts associated with this trucking.

Adverse noise related impacts as a result of the development of the OGDG DP455 locations are not anticipated for the nearest RBUs given the distance between the proposed pad and the RBUs. As noted previously, Noble will install sound walls on the east and south sides of the YY18-07 Pad to minimize light impacts to I-76, however, these sound walls will also address the Town of Keenesburg's concerns about potential impacts to an RV park located more than 1 mile to the SW. In the event of a noise related complaint from homeowners, Noble would evaluate potential mitigation measures to reduce production related noise, as needed.

Odor

Odor from existing and proposed oil and gas operations, including the OGDG DP455 locations, as well as other industrial operations within the CIAA could have a cumulative impact on residential building units (RBUs) in the CIAA. The nearest RBU is located over 3,200' southwest of the Y12-15 Pad and over 1 mile from the YY18-07 Pad. Based on Noble's current schedule for all drilling to be performed with Group III drilling fluids, the drilling operations for this OGDG will utilize these fluids. In the event there is any delay in the deployment of Group III drilling fluids that would prevent their use for this OGDG, Noble will utilize advanced oil-based mud systems which target the reduction of aromatics. Cuttings will not be stockpiled, but rather they will be removed from the location on a regular and timely basis to reduce potential odor impacts. Other exploration and production activity wastes stored onsite would be stored in compatible containers or engineered containment devices. Wastes would be transported offsite via truck by a licensed transporter, and transportation frequencies would vary based on waste volumes.

These measures would help to contain odors from being noticed within the CIAA. Additionally, the minimization and mitigation measures listed in Sections 4 and 5 would further limit the impacts of odor within the CIAA.

Light

Noble's development of the OGDG DP455 locations would require work activities to be performed 24 hours per day during drilling, completion, drill-out, and flowback stages; all of which require the use of temporary lighting. Lighting needed for these activities would conform to nationally recognized industry and federally mandated safety standards. However, during nighttime work activities, lighting required for safe operations may be observed from locations beyond the boundaries of the well pad site. As such, nighttime drilling and completion activities would result in a short- term contribution to cumulative light pollution within the CIAA. However, light pollution BMPs (see Section 4.7) would be used to minimize light impacts during all phases of the OGDG DP455 locations' proposed operations, including precautions to ensure that site lighting does not directly shine outside of the site boundaries, which would decrease

potential light impacts on nearby receptors. Cumulative light impacts within the CIAA during these phases would be short-term and temporary. As noted previously, Noble will install sound walls on the east and south sides of the YY18-07 Pad to minimize light impacts to I-76, however, these sound walls will also address the Town of Keenesburg's concerns about potential impacts to an RV park located more than 1 mile to the SW.

During production, operations would typically only occur during daylight hours. No permanent lighting is anticipated on the well pads during production operations. Therefore, there would be little or no long-term contribution to cumulative light pollution within the CIAA from the OGD P DP455 locations.

4.0 Minimization Measures

COGCC defines "minimizing adverse impacts" as provided by § 34-60-106(2.5), C.R.S., as "providing necessary and reasonable protections to reduce the extent, severity, significance, or duration of unavoidable direct, indirect and cumulative adverse impacts to public health, safety, welfare, the environment, or wildlife resources from oil and gas operations. Minimization measures reduce impacts to the smallest amount possible and can include operational and engineering controls. Noble has committed to the following minimization measures for resources based on the cumulative impact analysis provided in this Plan. These minimization measures are included within the operational plans submitted as attachments to Noble's Form 2A's for the proposed OGD P DP455 locations.

4.1 Air Quality

- Noble will employ practices for continuous control of fugitive dust caused by operations. These practices shall include but are not limited to:
 - Speed restrictions on lease roads and location of 10 MPH during dryer conditions (if dust is visible) and 20 when dust is not visible.
 - Regular lease road maintenance to consist of, grading and recompacting the road surface with the optimum amount of water applied when the road surface becomes deteriorated or monthly when heavy traffic is present.
 - Restriction of construction activity during high-wind days. On windy days or days when dust becomes fugitive (leaves or threatens to leave the site) construction or activities will be halted until either fresh water can suppress dust or dust is no longer visible.
 - All public roads to be utilized for this project are paved which will alleviate dust concerns.
 - Noble uses a gravity fed box proppant delivery system that meets OSHA standards, rather than the historic pneumatic trailer proppant transfer system that blows sand out of the trailer into frac sand silos on the location; a method that required supplemental dust control to meet OSHA requirements. With a gravity fed proppant delivery system, the delivery container is also a well pad storage container, eliminating the need for frac sand silos on location. Storing frac sand

in containers reduces sand dust during fracing operations by dropping sand directly from the container into the blender sand hopper. As a result of the gravity fed box proppant delivery system, Noble does not anticipate any silica dust to migrate off the proposed well pads during completion operations.

- Noble uses Automation on all new wells and production facilities to minimize truck traffic and to reduce the number of visits to location. Noble monitors locations 24 hours a day in the Operations Control Center (OCC) and that has cut down on the need for physical location checks greatly. Noble will also have camera coverage of the site that can be viewed remotely.
- Noble will not flare produced gas during normal operations.
- Noble will use supervisory control and data acquisition (SCADA) systems to monitor well operations, which will reduce emissions from vehicle traffic due to the reduced number of vehicle trips to the site.
- Noble has 24/7 monitoring through the OCC that allows for continuous monitoring operating conditions when personnel are not on-site to identify and correct any improper operations as soon as possible.
- Noble will transport all fluids from the well pad to the production facility via buried pipelines which will eliminate the truck traffic associated with transporting these fluids.
- Noble completes regular audio/visual/olfactory observations at every active location which provides early detection of equipment malfunctions thereby minimizing emissions from leaks.
- Noble will use instrument air pneumatic control valves at both the well heads and the production facilities.
- Noble will implement a Leak Detection and Repair program (LDAR). The LDAR would involve monthly inspections using infrared (e.g., FLIR) cameras.
- As Noble is committed to closed-loop drilling, there will be no emission-producing reserve pits.
- Noble's green completions practices includes transporting all flowback fluids via buried pipelines to the centralized production facility where they will be processed.

4.2 *Public Health*

- Based on the airborne HAP concentrations estimated using HAP emission rates described in Section 3.1, no HAP is expected to exceed the target cancer risk or noncancer hazard index for chronic duration exposures within the locations during pre-production or production. These results support the conclusion that HAP emissions are not expected to contribute to acute or chronic risks to human health within or beyond the locations. Therefore, no additional minimization measures are required.

4.3 *Water Resources*

- Noble will implement a site-specific Stormwater Management Plan (SWMP) (included with Form 2A) to protect Waters of the State that could receive stormwater runoff from the Location.
- Noble will have no staging, refueling, or chemical storage areas associated with the Project in the vicinity of water resources.
- Noble will manage potential pollutants located onsite by sealing, wrapping, covering, or having containment/protection while not actively being used in order to eliminate/minimize contact with stormwater runoff, and prevent discharges of chemicals or other materials from the site.
- Noble will practice proper storage, safe-handling, good housekeeping and spill prevention practices and procedures to prevent pollutants or contaminants from leaving the site.
- Upon surface owner authorization and per COGCC Rules 615 and 318A.e(4), Noble will collect baseline water quality samples from an appropriate set of water wells within the vicinity of the oil and gas location. Baseline samples will be collected prior to drilling (setting of conductor casing) operations for the initial site well.
- Noble will use SCADA to allow for rapid well shutdown in the event of a potential release.
- Although the wetlands and other aquatic resources associated with Ennis Draw have been determined to be non-jurisdictional, Noble will employ several BMPs for construction of the access road and flowlines through these resources.
 - Flowlines will be bored so that no open cutting will take place through these resources.
 - The access road will be constructed as close to grade as possible to maintain historic conditions and prioritize the surrounding aquatic resources.
 - No fuel or other fluids will be stored and no refueling of equipment will take place within 500 feet of these resources during construction.
 - Appropriate stormwater BMPs will be utilized during construction to protect the waterway from spills, surface water or silt discharge.
 - Culverts installed across Ennis Draw will be designed to not inhibit flow.

4.4 *Terrestrial and Aquatic Wildlife Resources and Ecosystems*

- Noble will inform and educate employees and contractors on wildlife conservation practices, which includes no harassment or feeding of wildlife.
- Noble will consolidate and centralize collection and distribution facilities to minimize impact to wildlife.
- Noble will pipe all produced oil, water and gas from these well pads to the associated production facility, thereby significantly reducing traffic impacts.

- Noble will adequately size infrastructure and facilities to accommodate both current and future gas production.
- Noble will implement fugitive dust control measures.
- Noble will minimize rig mobilization and demobilization by drilling or completing all wells on a given well pad before moving rigs to a new location.
- Noble will mow or brush hog vegetation where appropriate, leaving root structure intact, instead of scraping the surface, where allowed by the surface owner.
- Noble will limit access to oil and gas access roads as approved by surface owners, surface managing agencies, or local government.
- Noble will post speed limits and caution signs to the extent allowed by surface owners, Federal and state regulations, local government, and land use policies.
- Noble will use remote monitoring of well production to the extent practicable.
- Noble will reduce traffic associated with transporting drilling water and produced liquids with pipelines, large tanks, or other measures.
- Noble will install automated emergency response systems (e.g., high tank alarms, emergency shutdown systems).

4.5 *Soil Resources*

- Noble will implement a site-specific Topsoil Management Plan and Stormwater Management Plan (Form 2A). Key control measures from those documents are included here:
 - Noble has executed an alternative reclamation program with the owner of the surface where these pads will be located that does not involve the separation and stockpiling of topsoil. This program specifies that the shallow soils be used as fill where needed during pad construction and that fill and organic material be imported to facilitate reclamation.
 - BMPs such as straw mulch, sediment basins, swales and perimeter ditches will be used to prevent excess erosion of soils from disturbed areas. These structures will be installed during construction and left in place and maintained for the life of the project or until the disturbed slopes have been revegetated and stabilized.
 - The site will be inspected bi-weekly by a third-party contractor for BMP integrity and current installation. Any deficiencies noted will be brought to the attention of the operator and addressed in a timely manner.
 - Noble will limit construction activities during wet periods to avoid excess disturbance of areas surrounding operations.
 - Unless specifically requested by the landowner, all roads and pads will be contoured and revegetated to a stable condition.

- Noble will regrade cut and fill areas awaiting reclamation to match pre-existing contours to the nearest extent possible to provide long term erosion control and site stability.

4.6 *Vegetation*

- Noble will confirm that erosion and sedimentation controls are implemented as necessary before and after seeding operations, as detailed in the Site SWMP.
- Noble will monitor and maintain the vegetation on disturbed surfaces to promote native vegetation and to suppress invasive and noxious weeds.

4.7 *Public Welfare – Noise, Odor, and Light*

Public Welfare – General

- To minimize the possibility of fires during the construction phase, equipment, including welding trucks, will be equipped with fire extinguishers and spark arresters.
- Where alignment of pipelines will cross or parallel roads, highways, or waterways, Noble will provide warning signs to inform the public of the presence of the line.
- Vehicle users associated with the oil field will be instructed to travel at low speed and remain on existing roads and well pads at all times.
- Noble will transport all fluids from the well pad to the production facility via buried pipelines which will eliminate the truck traffic associated with transporting these fluids.
- Noble will not truck any water to location for completions. Rather, temporary surface pipelines will be utilized.
- Noble will use SCADA to reduce the frequency of vehicle trips to the Oil and gas location to monitor well operations.
- Noble will implement a Transportation Plan to guide the management of transportation throughout the implementation of the proposed project.

Noise

- Noble will utilize a quiet frac fleet for completions operations.

Odor

- Noble will ensure that oil and gas operations will be in compliance with the Department of Public Health and Environment, Air Quality Control Commission, Regulation No. 2 Odor Emission, 5 C.C.R. 1001-4, Regulation No. 3 (5 C.C.R. 1001-5), and Regulation No. 7 Section XVII.B.1 (a-c) and Section XII.
- Noble will utilize a freshwater mud system for surface hole.
- Noble plans to use Group III drilling fluids for these locations but, in the event that these fluids are unavailable or otherwise cannot be used, Noble will utilize low BTEX drilling muds and an odor neutralizer to treat drilling mud and other materials.

- Noble will store oil-based drilling fluid not being used in the active mud system in closed, upright tanks.
- To keep odor from oil base cuttings as low as possible, Noble continuously hauls cuttings to an approved disposal facility throughout the drilling process. Noble will not stockpile cuttings or store any large amount of cuttings on location. Trucks run continuously during daylight hours to keep the volume of cuttings on location at a bare minimum.
- Noble will wipe the OD and ID of the drill pipe to remove any residual mud upon tripping out of the hole.
- Noble will utilize a catch can system mounted around the BOP to catch any mud that falls through the rotary table, thereby preventing any spillage and reducing the source of odor.
- Noble will perform emission testing, as applicable, on natural gas-powered engines to ensure emission control devices are operating properly. Additionally, catalyst monitoring and maintenance activities recommended by the manufacturer or mandated by state and federal regulations will be performed to ensure that control devices are functioning as intended.

Light

Noble will utilize BMPs to minimize light pollution which may include the following:

- Use of LED fixtures, as feasible, to reduce skyglow.
- Position lights in a downward direction where vertical light is not required.
- Angle light away from off-site buildings.
- Reduce lighting within well pad to the minimal level for safe pre-production activity.
- Use of light sensors that automatically switch light sensors on and off on light masts.
- Direct lights to drilling and completion tasks only.
- Sound walls will be installed on the east and south sides of the YY18-07 Pad during pre-production activities to minimize light impacts to vehicles on I-76.
- No permanent lighting will be installed on the well pads.

5.0 Mitigation Measures

COGCC defines “mitigating adverse impacts” as “measures that compensate for unavoidable direct, indirect, and cumulative adverse impacts and loss of such resources from oil and gas operations.” Mitigation measures are used to offset the intensity or severity of impacts and can include compensatory actions and administrative controls. Noble has committed to the following mitigation measures for resources based on the cumulative impact analysis provided in this Plan.

5.1 *Air Quality*

- Minimization measures listed for air quality in Section 4 will address the potential impacts to air resources within the CIAA. Therefore, no additional mitigation measures for air quality are included.

5.2 *Public Health*

- HAP emissions are not expected to contribute to acute or chronic risks to human health within or beyond the well pad Location. Therefore, no additional mitigation measures are required.

5.3 *Water Resources*

- Minimization measures included in the site-specific SWMP for the OGDG DP455 locations and other measures included in Section 4 will address the potential impacts to water resources within the CIAA. Therefore, no additional mitigation measures are required.

5.4 *Terrestrial and Aquatic Wildlife Resources and Ecosystems*

- During final reclamation, Noble will re-contour and re-vegetate all roads and pads to a stable condition to restore natural habitats for wildlife species, as is compatible with ongoing agricultural operations.

5.5 *Soil Resources*

- Minimization measures listed for soil resources in Section 4 will address the potential impacts to these resources in the CIAA. Therefore, no additional mitigation measures for soil resources are included.

5.6 *Vegetation*

- Noble will reseed disturbed areas in the first favorable season following rig demobilization with species consistent with the plant community in the vicinity of the Location.
- Noble will monitor the site to identify areas of poor growth or areas that fail to germinate; these areas will be reseeded as needed.
- Noble will monitor the site for the presence of noxious weeds. If encountered, Noble will employ a third-party consultant knowledgeable in identifying such species and implement weed control measures consistent and in compliance with the Colorado Noxious Weed Act. If necessary, Noble will implement a weed control plan.

5.7 *Public Welfare – Noise, Odor, and Light*

Noise

- Noble will respond to any noise complaints with appropriate measures to mitigate the noise.
- Sound walls will be installed on the east and south sides of the YY18-07 Pad to mitigate light impacts to vehicles on I-76, however, these sound walls should also alleviate the concerns raised by the Town of Keenesburg regarding potential impacts to an RV park located over 1 mile to the southwest of this location.

Odor

- Minimization measures listed for odor in Section 4 will address the potential impacts from odors in the CIAA. Therefore, no additional mitigation measures for odors are included.

Light

- Minimization measures listed for lighting in Section 4 will address the potential impacts from lighting to the CIAA. Therefore, no additional mitigation measures for lighting are included.