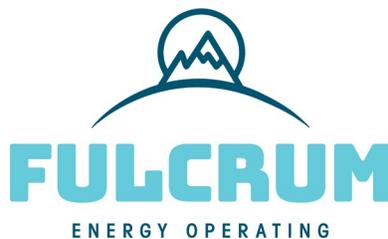


**JANET OGD  
Janet 0780 S5 Pad  
NOISE MITIGATION PLAN**

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240 Saint Paul Street, Suite 502 Denver, CO 80206

## **Article I.      Introduction**

### *Location Information*

This document provides site-specific information for the Janet 0780 S5 Pad and the Ray Ranch North 0880 S32 CTB located within the Janet OGD/2A Area. The information in this document relates specifically to the time during the construction, drilling, completion and operation of the ten (10) proposed horizontal wells plus one (1) vertical saltwater disposal well.

The Janet 0780 S5 Pad is not yet constructed. The Pad will be located approximately one mile east of State Highway 14. The highway access into the pad is located approximately 1.5 miles north of the intersection of State Highway 14 and Jackson County Road 24. The Pad will be located in the NENE of Section 5, Township 7 North, Range 80 West, zoned Ranch Land within Jackson County. Local government authorities do not regulate Oil and Gas Operations in Jackson County. As such, Local Government Permits are not required for this Pad.

Once constructed, the Janet 0780 S5 Working Pad Surface will cover approximately 4.89 acres. The Pad is located on Jackson County Assessor Parcel No. 4000609000 owned by Kohlman's OK Limited Partnership. The area disturbed by the pad construction is currently used for hay storage and cattle grazing.

Some of proposed production facility equipment for the Janet 0780 S5 Well Pad will be located within the Working Pad Area adjacent to the wells and the remainder will be located on the Ray Ranch North 0880 S32 CTB. Production facility equipment located on the Janet 0780 S5 Pad will potentially consist of separators, oil and water allocation vessels, LACT, pumps, generators, scrubbers, compressors, and pig launchers.

The Ray Ranch North 0880 S32 CTB is not yet constructed, although it has been previously disturbed and was historically used as the site for a sawmill, equipment storage area, and hay stacking yard by the private surface owner. The CTB site will be located adjacent to State Highway 14. The highway access into the pad is located approximately 1.5 miles north of the intersection of State Highway 14 and Jackson County Road 24. The CTB site will be located in the NESW of Section 32, Township 8 North, Range 80 West, zoned Ranch Land within Jackson County. Local government authorities do not regulate Oil and Gas Operations in Jackson County. As such, Local Government Permits are not required for this Pad.

Once constructed, the Ray Ranch North 0880 S32 CTB Working Pad Surface will cover approximately 7.43 acres. The CTB site is located on Jackson County Assessor Parcel No. 4000609000 owned by Kohlman's OK Limited Partnership. The area disturbed by the CTB site construction is currently used for hay storage and cattle grazing.

The proposed production facility equipment, which is to be located on the Ray Ranch North 0880 S32 CTB, will be located within the Working Pad Area adjacent to the saltwater disposal well and will potentially consist of oil tanks, water tanks, pigging stations, injection pumps, heater-treaters, vapor recovery towers (VRT), vapor recovery units (VRU), VOC combustors, emission control devices (ECD), generators, electric service panels, oil loadouts, third-party data mining centers, glycol & lube oil totes, electrical racks, data transformers, slug catchers, SWD charge pump and filters, SWD transfer pumps and a spill response trailer.

**Operational Phases for Ten Horizontal Wells located on the Janet 0780 S5 Pad**

Phase	Duration (days)	Estimated Start Date
Construction	30 days	3 <sup>rd</sup> Quarter (July) 2024
Drilling (incl. rig mobilization)	120 days	3 <sup>rd</sup> Quarter (August) 2024
Completion (incl. mobilization)	60 days	4 <sup>th</sup> Quarter (December) 2024
Flowback	21 days	1 <sup>st</sup> Quarter (February) 2025
Production	20 years	1 <sup>st</sup> Quarter (February) 2025

**Operational Phases for Salt Water Disposal Well located on the Ray Ranch North 0880 S32 CTB**

Phase	Duration (days)	Estimated Start Date
Construction	30 days	3 <sup>rd</sup> Quarter (August) 2024
Drilling (incl. rig mobilization)	15 days	3 <sup>rd</sup> Quarter (October) 2024
Completion	15 days	4 <sup>th</sup> Quarter (November) 2024
Flowback	N/A	N/A
Injection	25 years	1 <sup>st</sup> Quarter (January) 2025
Interim Reclamation	21 days	3 <sup>rd</sup> Quarter (July) 2025

**Article II. Background and Regulations**

Noise associated with oil and gas development is regulated by the Colorado Energy and Carbon Management Commission (ECMC) Rule 423. Jackson County has no specific noise level limits within zoning code and defers to state regulations. Operators will submit a noise mitigation plan that demonstrates one or more proposed methods of meeting the maximum permissible noise levels described by this Rule 423 as an attachment to their Form 2As, as required by Rule 304.c.(2). Oil and gas operations at any well site, production facility, or gas facility, will comply with the maximum permissible noise levels listed under Table 423-1 and provided as follows:

LAND USE DESIGNATION	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential/Rural/State Parks & State Wildlife Areas	55 db(A)	50 db(A)
Commercial/Agricultural	60 db(A)	55 db(A)
Light Industrial	70 db(A)	65 db(A)
Industrial	80 db(A)	75 db(A)
All Zones	60 db(C)	60 db(C)

In Section 423.b.(2), the regulation states, *“Unless otherwise required by Rule 423, drilling or completion*

operations, including Flowback: In Residential/Rural or Commercial/Agricultural, maximum permissible noise levels will be 60 dbA in the 7:00 pm to 7:00 am nighttime hours and 65 dbA in the daylight 7:00 am to 7:00 pm hours; and in all zones the maximum permissible noise level will be 65 dbC for all hours.”

### *Topographical Considerations*

The location is zoned Ranch Land per Jackson County with Walden sandy loam type-soils between 1% - 4% slopes, which is generally flat. The surrounding vegetative cover is mostly rangeland and wildlife habitat, with some hay production.

### **Article III. Expectation of Compliance**

#### *Distance to the impacted receptors*

The nearest residential building unit is >5280’ S of the edge of the working pad surface. The location is within Greater Sage Grouse Wildlife Habitat. Fulcrum has consulted with BLM and CPW and will comply with the appropriate noise mitigation stipulations as listed in BMP section.

#### *Sound Study*

A forecasted Sound Study that incorporates the applicable drilling rig and frac fleet noise signatures which are placed onto the topography of the site location has been performed to ensure that the location will be within the maximum permissible noise levels specified in Rule 423.b.(1).

#### Ambient Sound Level Survey Results

Day	Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels	
	dBA	dBC	dBA	dBC
7/8 - 7/9	36	59	37	54
7/9 - 7/10	36	58	35	54
7/10 - 7/11	41	63	37	61
Overall Leq	38	60	37	57

#### *Reasonable Expectation*

Fulcrum is able to comply with the maximum permissible noise levels specified in Rule 423.b.(1) without the use of sound walls per the attached modeling.

**Article IV. Mitigation Measures and Best Management Practices**

Best Management Practices and best engineering practices for measuring and mitigating noise levels shall include:

- Fulcrum will comply with the maximum permissible noise levels specified in Rule 423.b.(1).
- Background ambient noise surveys including both A and C scale measurements has been conducted to establish baseline conditions for noise levels on the site per 423.b.
- Fulcrum will orient the onsite equipment to direct sound away from residences.
- Fulcrum will install exhaust mufflers or replace offending noisy equipment with quieter systems.
- Noise Monitoring during Drilling and Completions: Upon commencement of drilling and/or completion activities, Fulcrum will collect noise data to verify the predicted noise levels and ensure compliance with ECMC limits. If compliance is not confirmed, Fulcrum will employ additional mitigation to ensure compliance with ECMC rules.
- Utilize electric submersible pumps (ESP) to the maximum extent practicable to reduce overall noise impacts within the North Park Wildlife Mitigation Plan WMP boundary.
- Avoid noise levels above 75 dBA at the edge of pads and/or facilities closest to the nearest active lek.

*Complaints*

There are no Residential Building Units within 2,000 feet of the Janet 0780 S5 Pad or the Ray Ranch North 0880 S32 CTB.

Should a noise complaint be communicated with the operator, the operator will take all necessary and reasonable measures to address the complaint. Should a complaint be filed with the ECMC or the Local Government Designee, the complaint should be forwarded to the following address:

Fulcrum Energy Operating  
Attn: Jason Schmidt  
240 St. Paul St, Suite 502  
Denver, CO 80206  
[jason@fulcrumef.com](mailto:jason@fulcrumef.com)



240 Saint Paul Street, Suite 502 Denver, CO 80206

**Article V. Exhibits/References/Appendices**

Noise Mitigation and Monitoring Plan

# Janet 0780 S5 Pad Form 2A Noise Mitigation and Monitoring Plan

September 07, 2023

Prepared for:

Fulcrum Energy Operating, LLC  
240 St. Paul Street  
Denver, CO 80206

Prepared by:

Behrens and Associates, Inc.  
9536 E. I-25 Frontage Rd.  
Longmont, CO 80504



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Israel Olivas Morales  
Staff Acoustical Engineer



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Jason Peetz  
Engineering Manager



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## 1. Executive Summary

The following Form 2A Noise Mitigation and Monitoring Plan (2A NMP) was prepared by Behrens and Associates Environmental Noise Control (BAENC) for the planned operations associated with the proposed Janet 0780 S5 Pad operated by Fulcrum Energy Operating, LLC (FEO). Predictive noise models representing the planned operations for the site were developed and assessed against the maximum permissible noise levels described in Rule 423 of the Colorado Oil and Gas Conservation Commission (ECMC) noise regulations and the Colorado Parks and Wildlife (CPW) wildlife mitigation plan noise limit. The following tasks were completed during development of the 2A NMP:

- Development of a site-specific drilling noise model representing the Precision 461 rig
- Development of a site-specific completions noise model representing a Halliburton fleet
- Development of a site-specific production noise model

The site-specific noise models were developed to predict the future noise impact of the proposed operations and determine what noise mitigation measures, if any, would be required to demonstrate compliance with the ECMC and CPW maximum permissible noise levels. The noise modeling results were calculated utilizing the ISO 9613-2 standard and include the effects of local topography, buildings, barriers, and ground cover. Both A-weighted (dBA) and C-weighted (dBC) noise levels were measured during the ambient survey and considered during the noise modeling assessment.

Additionally, the area surrounding the site was evaluated to establish noise points of compliance per Rule 423.a.(5). The need for continuous noise monitoring was also evaluated per Rule 423.c.(1). Table 1-1 below summarizes the analysis and mitigation findings in the Form 2A and presents them in the form of best management practices.

**Table 1-1 Site Mitigation and Best Management Practices**

<b>Task</b>	<b>Result of Analysis/ Action</b>
Ambient Survey	<ul style="list-style-type: none"><li>• An ambient sound level survey may be conducted at the site approximately 60-90 days before commencement of operations</li></ul>
Drilling Noise Model	<ul style="list-style-type: none"><li>• Developed noise model representing drilling to assess operational noise levels against ECMC and CPW allowable dBA and dBC noise levels</li><li>• Noise mitigation not recommended</li></ul>
Completions Noise Model	<ul style="list-style-type: none"><li>• Developed noise model representing completions to assess operational noise levels against ECMC and CPW allowable dBA and dBC noise levels</li><li>• Two Mitigation Options Recommended:<ol style="list-style-type: none"><li>1. Mitigated Halliburton Scenario: Approximately 1,000 total linear feet of 32-foot-high, Sound Transmission Class (STC) 32 acoustical barrier wall installed in a reversed “C” shape enclosing the northern, eastern, and southern pad edges.</li><li>2. Use Liberty Quiet Fleet in place of Traditional Halliburton Fleet</li></ol></li></ul>



Flowback Operations	<ul style="list-style-type: none"><li>• Flowback operations follow completions but utilize a fraction of similar pump trucks resulting in a smaller noise impact</li><li>• Noise mitigation recommended based on completions noise modeling</li></ul>
Production Noise Model	<ul style="list-style-type: none"><li>• Developed noise model representing production to assess operational noise levels against ECMC and CPW allowable dBA and dBC noise levels</li><li>• Noise mitigation not recommended</li></ul>
Land Use Evaluation	<ul style="list-style-type: none"><li>• Agricultural site zoning (Jackson County)</li></ul>
Continuous Monitoring Evaluation	<ul style="list-style-type: none"><li>• Noise points of compliance were not identified for the site due to the absence of RBU's within 2000-feet of working pad surface</li><li>• Continuous noise monitoring not recommended</li></ul>

Based on the noise modeling analysis, with the implementation of the best management practices outlined in Table 1-1, the drilling, completions, flowback, and production operations are predicted to comply with the CPW dBA and ECMC dBC noise limits.



## 2. Introduction

The following report provides a noise modeling assessment of the proposed activities at the Janet 0780 S5 Pad operated by FEO in relation to the Colorado Oil and Gas Conservation Commission (ECMC) noise regulations and the Colorado Parks and Wildlife (CPW) wildlife mitigation plan. The assessment includes a modeling analysis of the Precision 461 production rig, Halliburton completion crew, Liberty Quiet Fleet completion crew as an alternative, and continuous production. The Janet 0780 S5 Pad (40.613148, -106.389671) is located approximately 15 miles southwest of Walden, CO as shown in Figure 2-1.

To assess the operational noise levels of the proposed Janet 0780 S5 Pad, file noise level data previously measured and typical of the Precision 461 production rig, Halliburton completion crew, and Liberty Quiet Fleet completions crew were utilized in the noise modeling. The noise models were developed using SoundPLAN 9.0 software.

The following is provided in this report:

- A review of applicable ECMC noise standards
- A discussion of noise modeling methodology
- An assessment of the predicted operational noise levels in relation to ECMC and CPW
- Review of continuous noise monitoring requirements

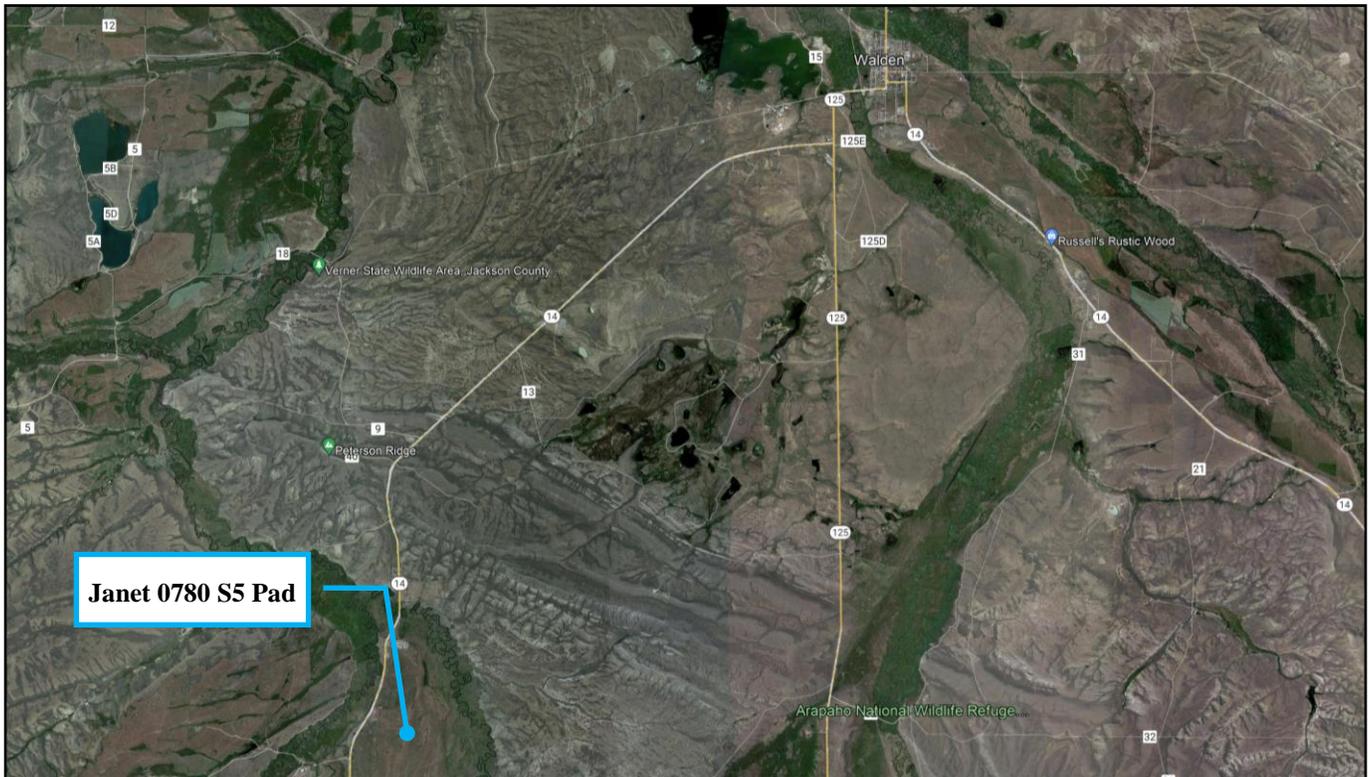
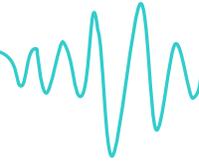


Figure 2-1 Janet 0780 S5 Pad Location



## 3. Noise Fundamentals

Sound is most commonly experienced by people as pressure waves passing through air. These rapid fluctuations in air pressure are processed by the human auditory system to produce the sensation of sound. The rate at which sound pressure changes occur is called the frequency. Frequency is usually measured as the number of oscillations per second or Hertz (Hz). Frequencies that can be heard by a healthy human ear range from approximately 20 Hz to 20,000 Hz. Toward the lower end of this range are low-pitched sounds, including those that might be described as a “rumble” or “boom”. At the higher end of the range are high-pitched sounds that might be described as a “screech” or “hiss”.

Environmental noise generally derives, in part, from a combination of distant noise sources. Such sources may include common experiences such as distant traffic, wind in trees, and distant industrial or farming activities. These distant sources create a low-level "background noise" in which no particular individual source is identifiable. Background noise is often relatively constant from moment to moment but varies slowly from hour to hour as natural forces change or as human activity follows its daily cycle.

Superimposed on this low-level, slowly varying background noise is a succession of identifiable noisy events of relatively brief duration. These events may include the passing of single-vehicles, aircraft flyovers, screeching of brakes, and other short-term events. The presence of these short-term events causes the noise level to fluctuate. Typical indoor and outdoor A-weighted sound levels are shown in Figure 3-1.

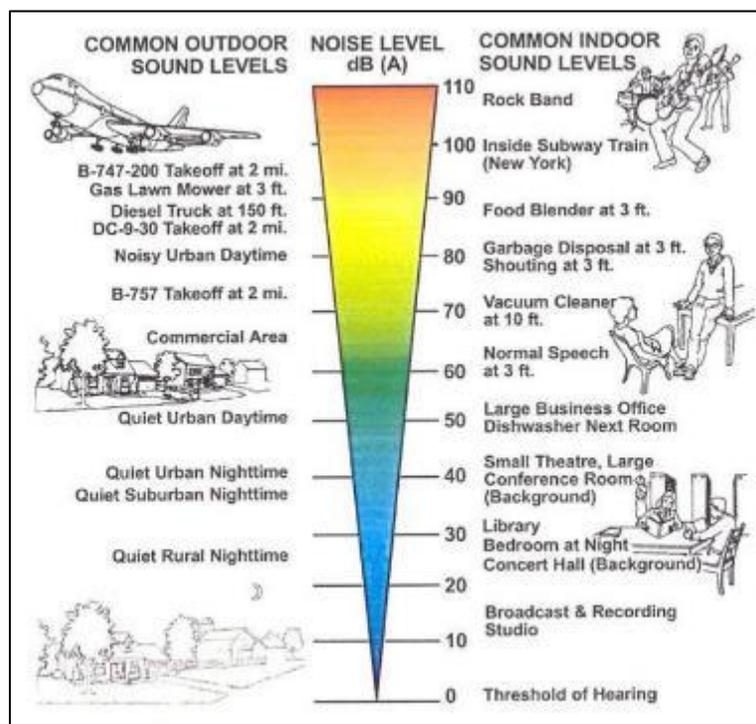


Figure 3-1 Typical Indoor and Outdoor A-Weighted Sound Levels



## 4. Noise Standards

The pad is located in Jackson County in the state of Colorado and is subject to the regulations of the Colorado Oil and Gas Conservation Commission (ECMC). The ECMC publishes rules regulating oil and gas operations with rules relating to noise found in Rule 423. Furthermore, Fulcrum has a current wildlife mitigation plan in agreement for oil and gas activities at this location that is being observed in this report.

### 4.1 Colorado Oil and Gas Conservation Commission (ECMC)

The ECMC Code lists noise limits for oil and gas operations. “All Oil and Gas Operations will comply with the following maximum permissible noise levels in Table 423-1 unless otherwise required by Rule 423.” The noise limits are provided in Table 4-1.

**Table 4-1 ECMC Table 423-1 – Maximum Permissible Noise Levels**

<b>Zone</b>	<b>7:00 am to next 7:00 pm</b>	<b>7:00 pm to next 7:00 am</b>
Residential / Rural / State Parks & State Wildlife Areas	55 dBA	50 dBA
Commercial / Agricultural	60 dBA	55 dBA
Light Industrial	70 dBA	65 dBA
Industrial	80 dBA	75 dBA
All Zones	60 dBC	60 dBC

Exceptions to the noise limits above are given in Rule 423.b(2):

- (2) Unless otherwise required by Rule 423, drilling or completion operations, including Flowback:
  - A. In Residential/Rural or Commercial/Agricultural, maximum permissible noise levels will be 60 db(A) in the hours between 7:00 p.m. to 7:00 a.m. and 65 db(A) in the hours between 7:00 a.m. to 7:00 p.m.; and
  - B. In all zones maximum permissible noise levels will be 65 db(C) in the hours between 7:00 p.m. to 7:00 a.m. and 65 db(C) in the hours between 7:00 a.m. to 7:00 p.m.



To demonstrate compliance with the sound level limits, Rule 423.c.(2).A states:

A. In response to a complaint or at the Director's request, Operators will measure sound levels at 25 feet from the complainant's occupied structure towards the noise source for low frequency (dbC) indicated issues. For high frequency (dba) measurement will be at the nearest point of compliance. For equipment installed at Oil and Gas Locations subject to a Form 2A approved prior to January 15, 2021, after the Commencement of Production Operations, no single piece of equipment will exceed the maximum permissible noise levels listed in Table 423-1 as measured at a point 350 feet from the equipment generating the noise in the direction from which the complaint was received.

Defining noise points of compliance, Rule 423.a.(5) states:

(5) For proposed Oil and Gas Locations with a Working Pad Surface within 2,000 feet of one or more Residential Building Units, at least one, and no more than six noise points of compliance where monitors will be located. Operators will identify noise points of compliance using the following criteria:

A. Provide one noise point of compliance in each direction in which a Residential Building Unit is located within 2,000 feet of the proposed Working Pad Surface.

B. Noise points of compliance will be located at least 350 feet from the Working Pad Surface, and no less than 25 feet from the exterior wall of the Residential Building Unit that is closest to the Working Pad Surface. If a Surface Owner or tenant refuses to provide the Operator with access to install a noise monitor, then the noise point of compliance will be located at either the next-closest Residential Building Unit or an alternative location approximately the same distance and direction from the Working Pad Surface.

With regards to adjusting maximum permissible noise levels based on measured ambient sound levels, Rule 423.d. states:

d. Cumulative Noise. All noise measurements will be cumulative.

(1) Noise measurements taken at noise points of compliance designated pursuant to Rule 423.a.(5) will take into account ambient noise, rather than solely the incremental increase of noise from the facility targeted for measurement.

(2) At new or substantially modified Oil and Gas Locations where ambient noise levels at noise points of compliance designated pursuant to Rule 423.a.(5) already exceed the noise thresholds identified in Table 423-1, then Operators will be considered in compliance with Rule 423, unless at any time their individual noise contribution, measured pursuant to Rule 423.c, increases noise above ambient levels by greater than 5 dBC and 5 dBA between 7:00 p.m. and 7:00 a.m. or 7 dBC and 7 dBA between 7:00 a.m. and 7:00 p.m. This Rule 423.d.(2) does not allow Operators to



increase noise above the maximum cumulative noise thresholds specified in Table 423-2 after the Commencement of Production Operations.

- (3) After the Commencement of Production Operations, if ambient noise levels already exceed the maximum permissible noise thresholds identified in Table 423-1, under no circumstances will new Oil and Gas Operations or a significant modification to an existing Oil and Gas Operations raise cumulative ambient noise above:

**Table 423-2 – Maximum Cumulative Noise Levels**

LAND USE	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential /Rural/State Parks/State Wildlife Areas	65 db(A)	60 db(A)
Commercial/Agricultural	70 db(A)	65 db(A)
Light Industrial	80 db(A)	75 db(A)
Industrial	90 db(A)	85 db(A)
All Zones	75 db(C)	70 db(C)

## 4.2 Summary of ECMC Maximum Permissible Noise Levels

Notwithstanding any influence or adjustments due to ambient noise or maximum cumulative noise levels of Rule 423 – Table 423-2, based on ECMC Rule 423, the allowable noise level limits applicable to the site are as follows:

**Table 4-2 Unadjusted Maximum Permissible Noise Levels**

Operation	Applicable Zoning	Noise Limits (dBA)	Noise Limits (dBC)
Drilling	Agricultural	65 day / 60 night	65 day and night
Completions & Flowback	Agricultural	65 day / 60 night	65 day and night
Production	Agricultural	60 day / 55 night	60 day and night

## 4.3 CPW – Wildlife Mitigation Plan Noise Limits

Fulcrum has a current wildlife mitigation plan in agreement (Wildlife Mitigation Plan – North Park, August 2021) for oil and gas activities with CPW at this location that is being observed in this report. Since the Janet 0780 S5 pad resides within two miles of the greater sage grouse lek site, seen in Figure 4-1, Fulcrum has agreed to avoid noise levels of 75 dBA at the edge of pad closest to the nearest active lek. Therefore, the 75 dBA noise limit will be observed at the eastern edge of the pad, which is nearest to the leaking site.

# Behrens and Associates, Inc.

Environmental Noise Control

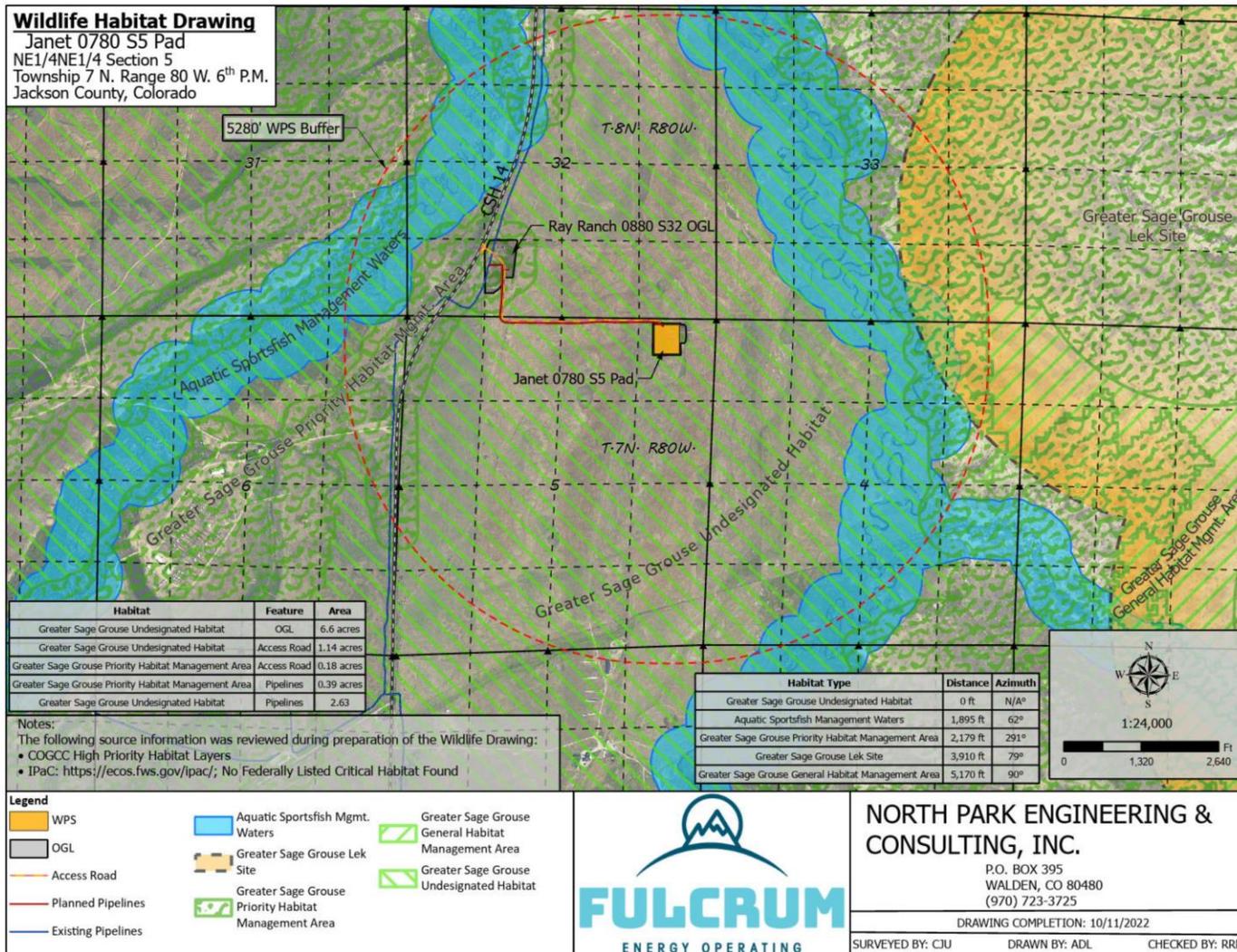


Figure 4-1 Janet 0780 S5 Pad – Wildlife Habitat Drawing – Dated 10/11/2022



## **5. Ambient Sound Level Survey**

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### **5.1 Ambient Sound Level Survey Procedure**

A single Type 1 SVANTEK SVAN 971 sound level meter was utilized to conduct an ambient sound level survey adjacent to the Janet 0780 S5 Pad. The sound level meter conforms to Type 1 as per ANSI S1.4 Specification for Sound Level Meters. The sound level meter was calibrated prior to deployment. The sound level monitoring period began on Friday, July 8, 2022 with the meter programmed to continuously monitor and record A-weighted and C-weighted sound levels. The monitoring period ended on Monday, July 11, 2022. The location of the sound level meter and weather station used to conduct the ambient sound level survey can be seen in Figure 5-1 below. Weather data was collected using a Larson Davis Technologies Vantage Vue Weather Station.

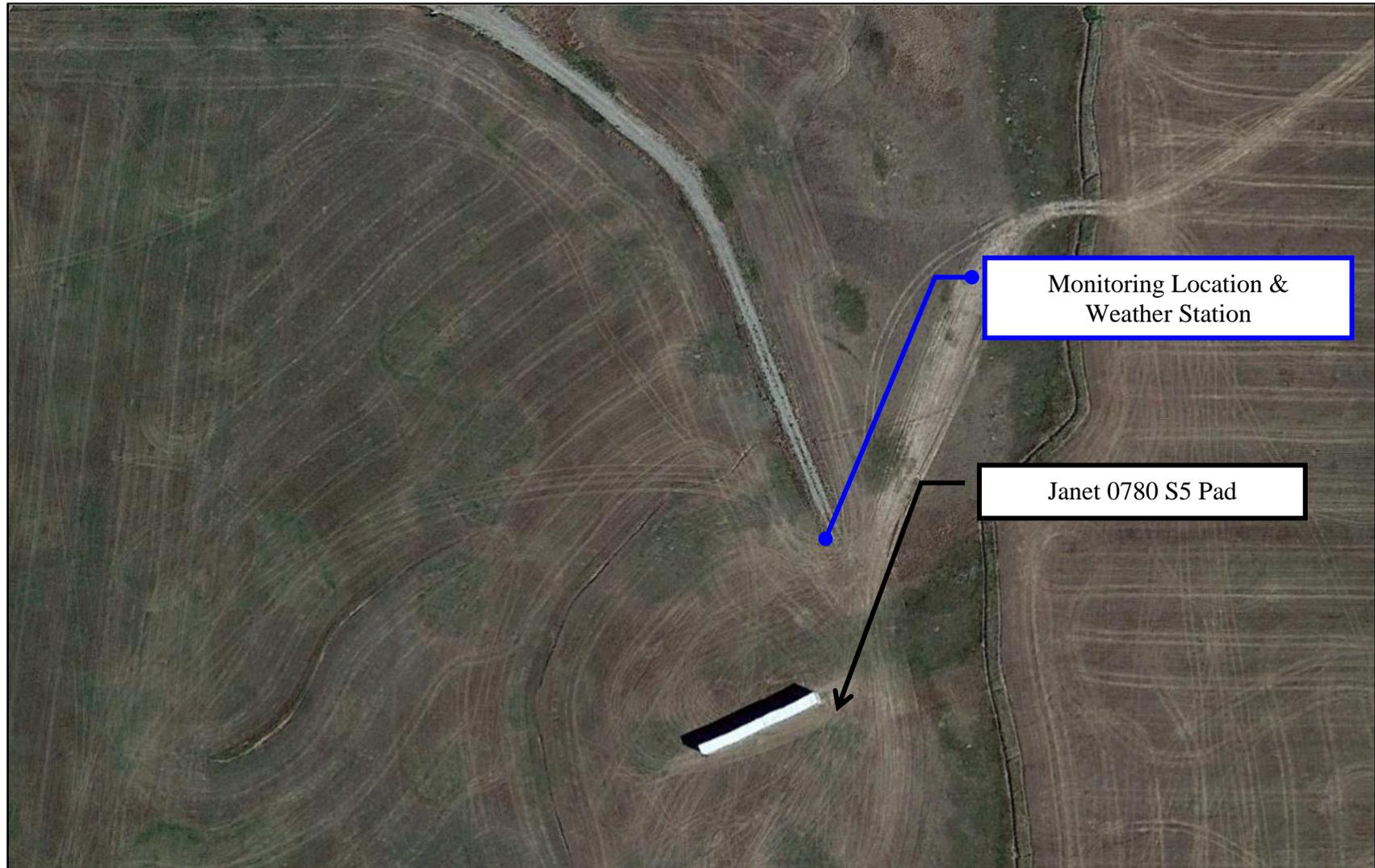
Per ECMC Rule 423.c.(2), the measurements were conducted at an approximate height of 5 feet. When calculating the ambient average sound levels shown in Table 5-1, the weather data collected during the survey was used to exclude periods from the calculation when winds exceeded 5 mph. The graphed ambient survey results show the measurement data before periods of wind above 5 mph were removed.

### **5.2 Ambient Sound Level Survey Results**

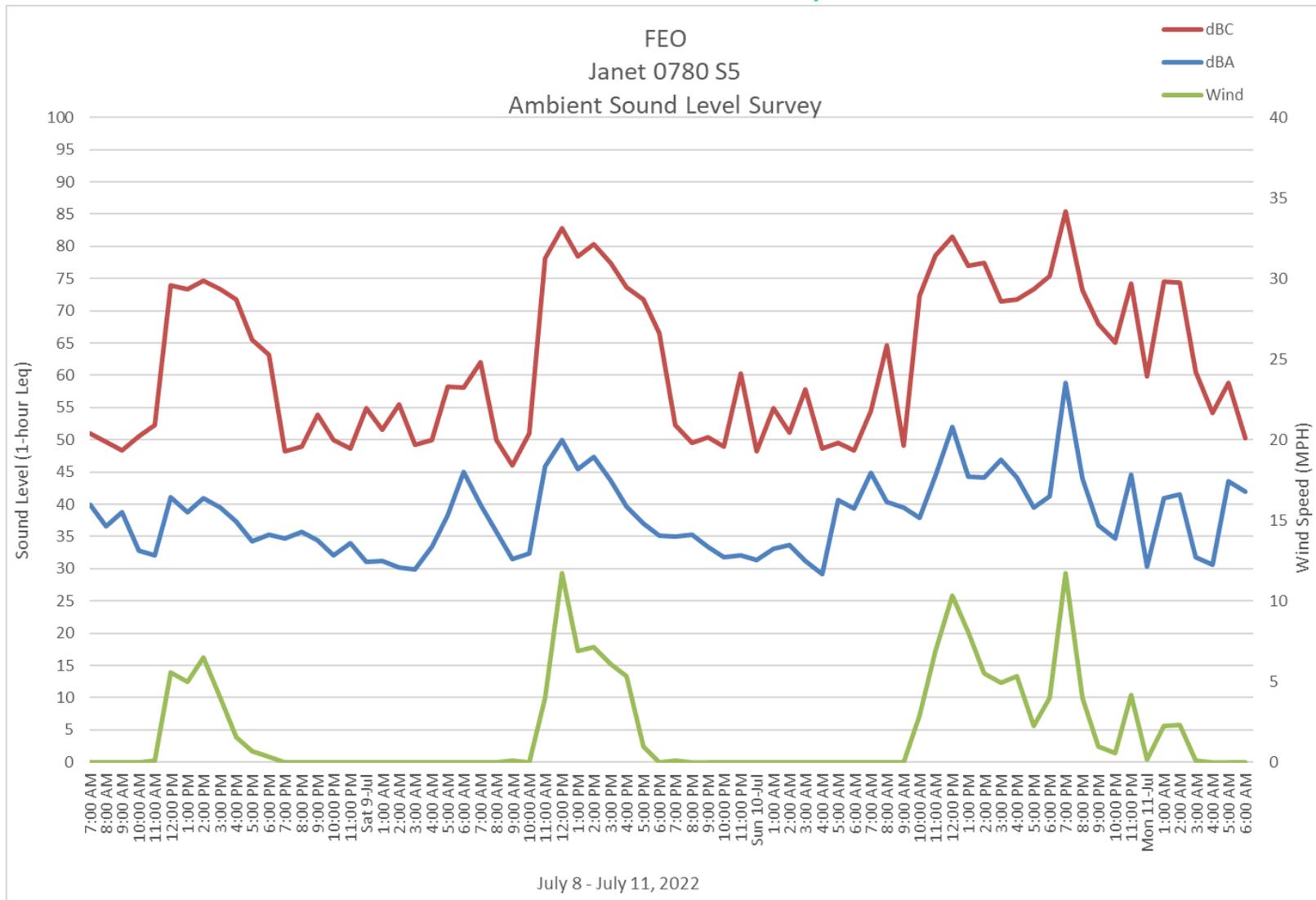
The measured A-weighted and C-weighted hourly average Leq for each monitoring location can be seen in Figure 5-1. The measured A-weighted and C-weighted daytime and nighttime average sound levels for Monitoring Locations 1 is shown in Table 5-1 below.

**Table 5-1 Ambient Sound Level Survey Results for Monitoring Location**

<b>Day</b>	<b>Daytime Leq Ambient Noise Levels</b>		<b>Nighttime Leq Ambient Noise Levels</b>	
	<b>dBA</b>	<b>dBC</b>	<b>dBA</b>	<b>dBC</b>
7/8 - 7/9	36	59	37	54
7/9 - 7/10	36	58	35	54
7/10 - 7/11	41	63	37	61
Overall Leq	38	60	37	57



**Figure 5-1 Ambient Noise Monitoring Location**



**Figure 5-2 Ambient Sound Level Survey**



## 6. Janet 0780 S5 Pad Noise Modeling

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### 6.1 Noise Modeling Methodology

The noise modeling was completed with use of three-dimensional computer noise modeling software. All models in this report were developed with SoundPLAN 9.0 software using the ISO 9613-2 standard. Noise levels are predicted based on the locations, noise levels and frequency spectra of the noise sources, and the geometry and reflective properties of the local terrain, buildings and barriers. To ensure a conservative assessment and compliance with ISO 9613-2 standards, light to moderate winds are assumed to be blowing from the source to receptor. The predicted noise levels represent only the contribution of the equipment operations and do not include ambient noise or noise from other facilities. Actual field sound level measurements may vary from the modeled noise levels due to other noise sources such as traffic, other facilities, other human activity, or environmental factors.

Sound level data utilized in the surface drilling model was based on file data of the Precision 461 rig collected by BAENC. The V door faces west with the backyard equipment positioned to the south. The predicted modeling results are dependent on equipment and mitigation orientation as indicated. The Precision 461 drilling rig was modeled in lieu of the planned Ironhand Drilling Rig 118. BAENC reviewed rig spec sheets and believes that Precision 461 is an equivalent rig to Ironhand 118 due to similar equipment (generators, shale shakers, etc.) and therefore was chosen as a substitute for this modeling study.

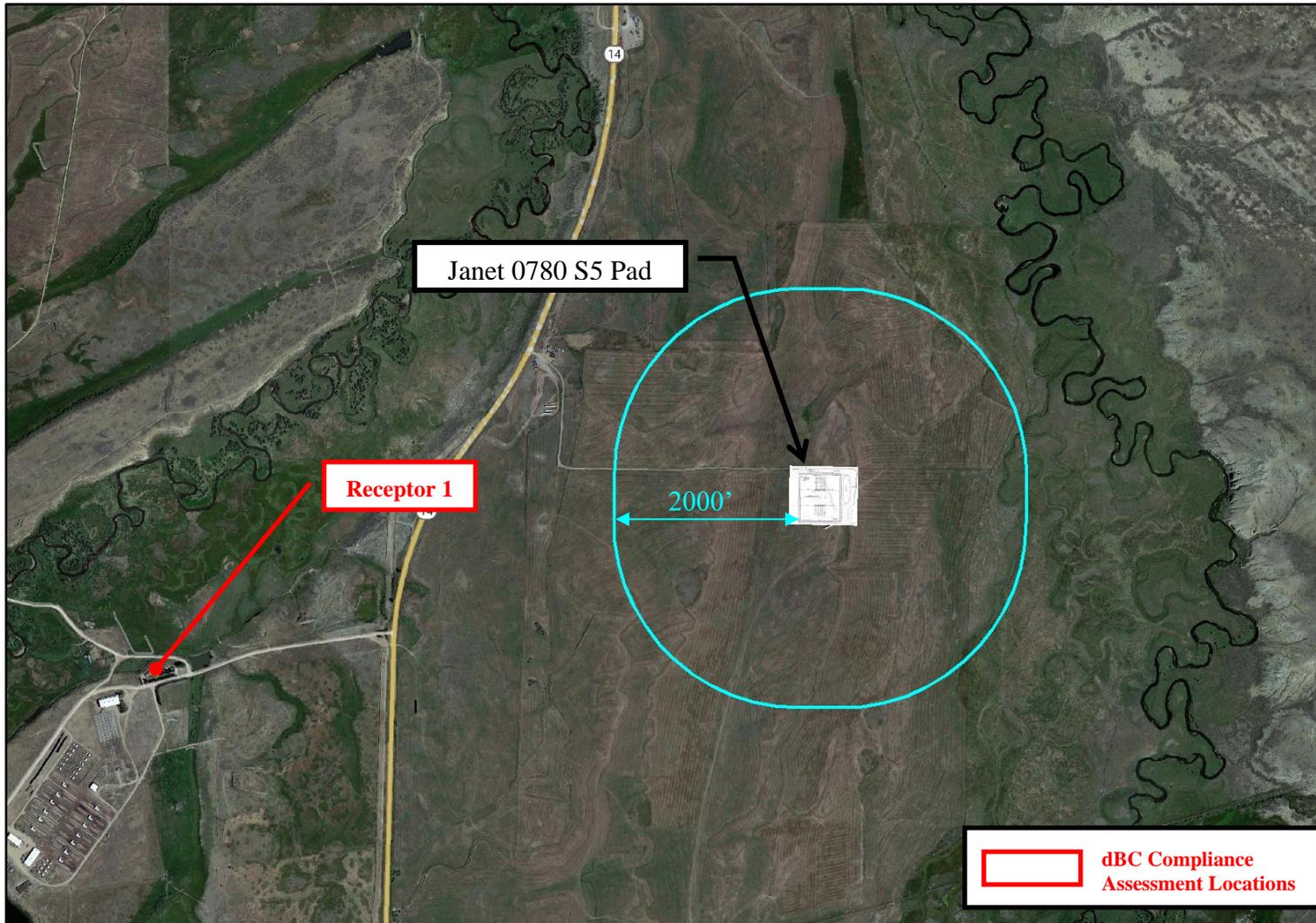
Sound level data utilized in the completions model was based on file data of the Halliburton completions crew, and Liberty Quiet Fleet completions crew as an alternative, collected by BAENC. The model consists of 12 completions trucks positioned south of the well heads. The predicted modeling results are dependent on equipment and mitigation orientation as indicated. Flowback operations follow completions but utilize a fraction of similar pump trucks resulting in a smaller noise impact. Mitigation for completions, if recommended, will remain in place throughout flowback operations.

### 6.2 Noise Sensitive Receptors

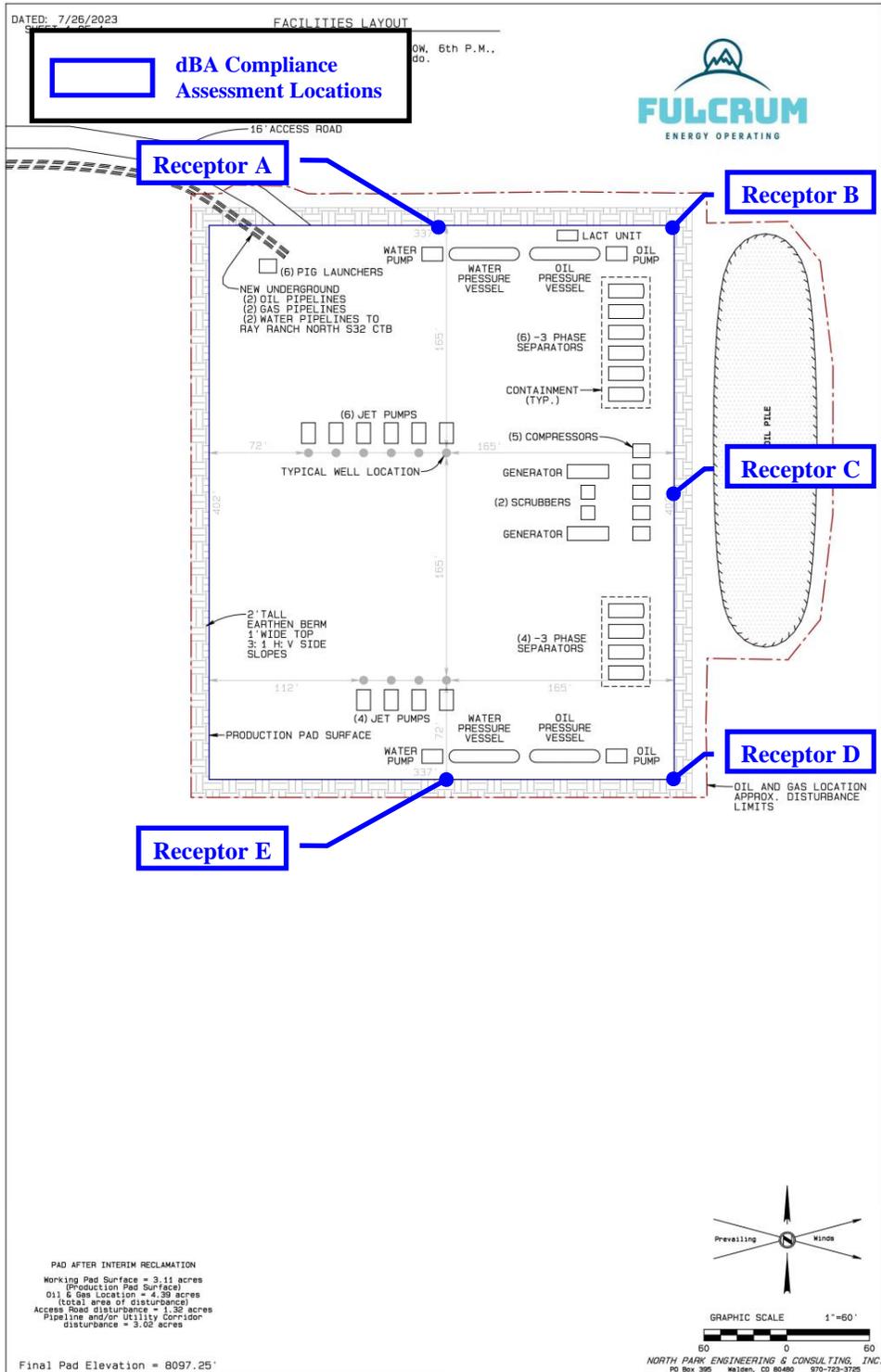
The noise sensitive receptors utilized in the drilling modeling were positioned to be consistent with the requirements of the ECMC noise standards and the CPW noise level agreement.

The ECMC requirements state that dBA noise levels shall comply with the applicable noise limits as measured at 350 feet from the working pad surface and no less than 25 feet from the exterior wall of the Residential Building Unit that is within 2,000 ft. and closest to the drill pad surface. Receptor points used in the modeling can represent multiple closely located RBU's. The requirements state that dBC noise levels shall comply with the applicable noise limits as measured at 25 feet from the exterior wall of nearby residences or occupied structures. Figure 6-1 shows the dBC noise sensitive receptor locations. Due to the absence of RBU's within 2000-feet of the working pad surface, A-weighted noise points of compliance were not evaluated for ECMC.

The Wildlife Mitigation Plan agreement between Fulcrum and CPW states that a 75 dBA limit will be applied to the edge of the pad nearest to the active lekking site. Figure 6-2 shows the dBA noise sensitive receptor locations on the eastern edge of the Janet 0780 S5 pad.



**Figure 6-1 Noise Sensitive Receptor Location - ECMC**



**Figure 6-2 Noise Sensitive Receptor Location - CPW**



### 6.3 Unmitigated Drilling and Completions Noise Modeling Results

The unmitigated modeling is based off current drilling and completion plans and does not include sound walls or other third-party acoustical mitigation measures. The results of the unmitigated noise modeling are presented in Table 6-1 and Table 6-2. The locations in the table correspond to the locations identified in Figure 6-1 and Figure 6-2. The predicted noise levels represent only the contribution of the project operations and do not include ambient noise or noise from other facilities. Figure 6-3 and Figure 6-4 show the Unmitigated PD 461 Noise Contour Map in dBA and dBC respectively. Figure 6-5 and Figure 6-6 show the Unmitigated Halliburton Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

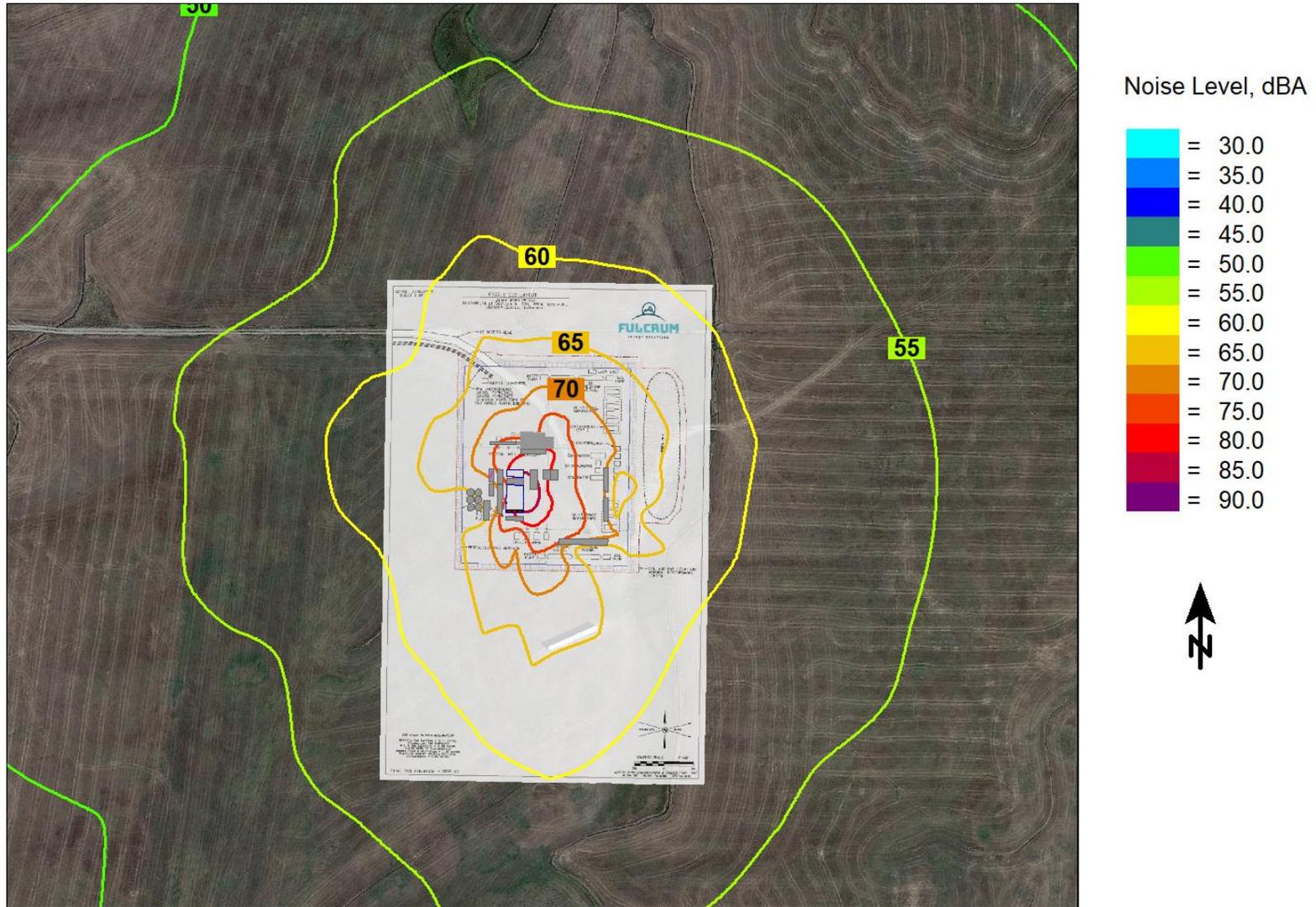
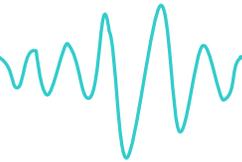
**Table 6-1 Unmitigated Noise Modeling Results (dBA)**

<b>Receptor</b>	<b>Location Description</b>	<b>Precision 461</b>	<b>Halliburton</b>
Location A	Northern Edge of Pad	67	82
Location B	Northeastern Edge of Pad	65	78
Location C	Eastern Edge of Pad	67	80
Location D	Southeastern Edge of Pad	64	74
Location E	Southern Edge of Pad	72	70
<b>CPW Noise Limit</b>	<b>Edge of Pad to the Nearest Active Lek</b>	<b>75</b>	<b>75</b>

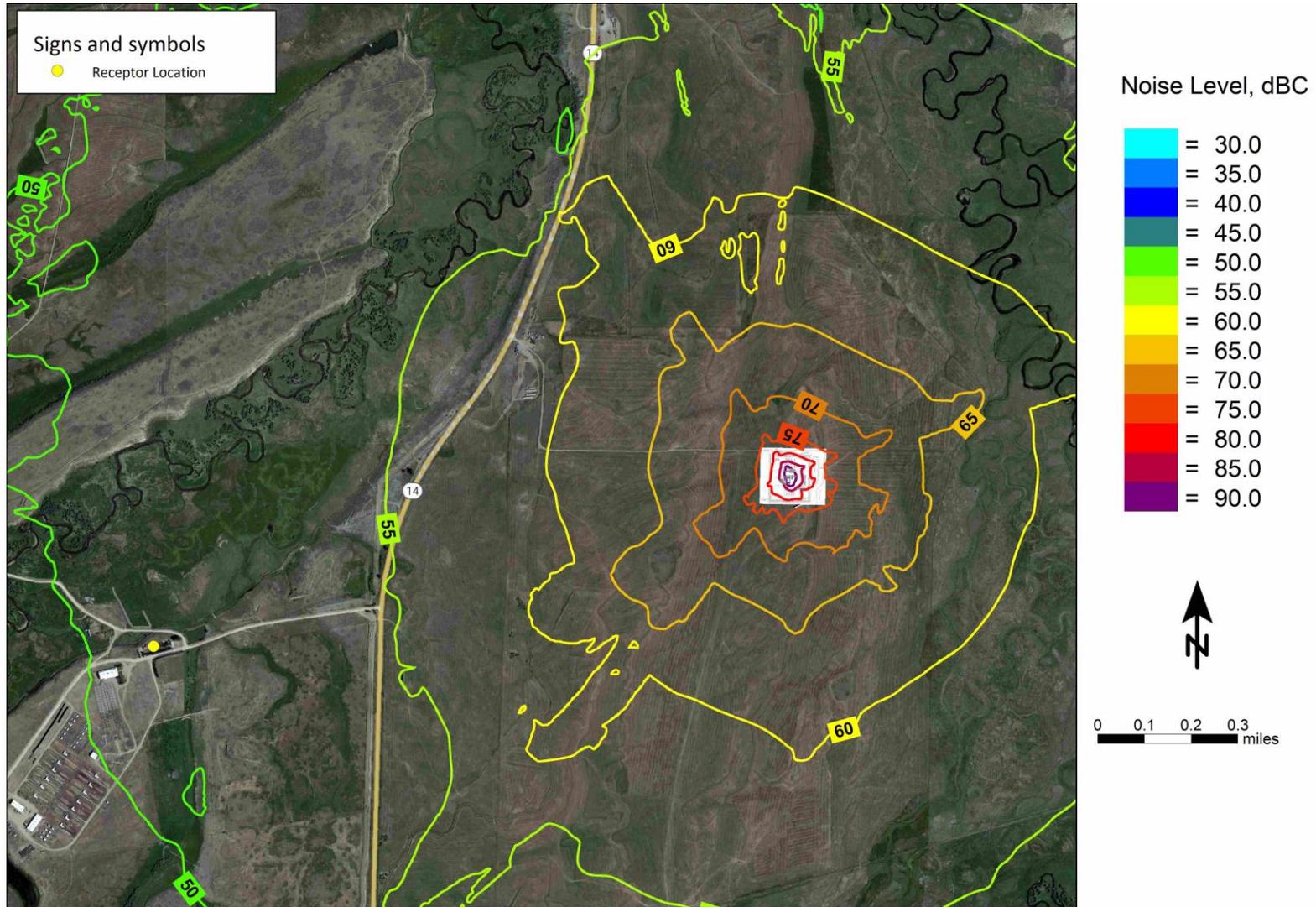
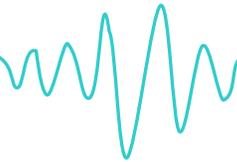
**Table 6-2 Unmitigated Noise Modeling Results (dBC)**

<b>Receptor</b>	<b>Location Description</b>	<b>Precision 461</b>	<b>Halliburton</b>
Location 1	25 ft. from property in 22421 CO-14	51	57
<b>ECMC Noise Limit</b>	<b>25 ft. from the exterior wall of a residence or occupied structure towards the noise source</b>	<b>65</b>	<b>65</b>

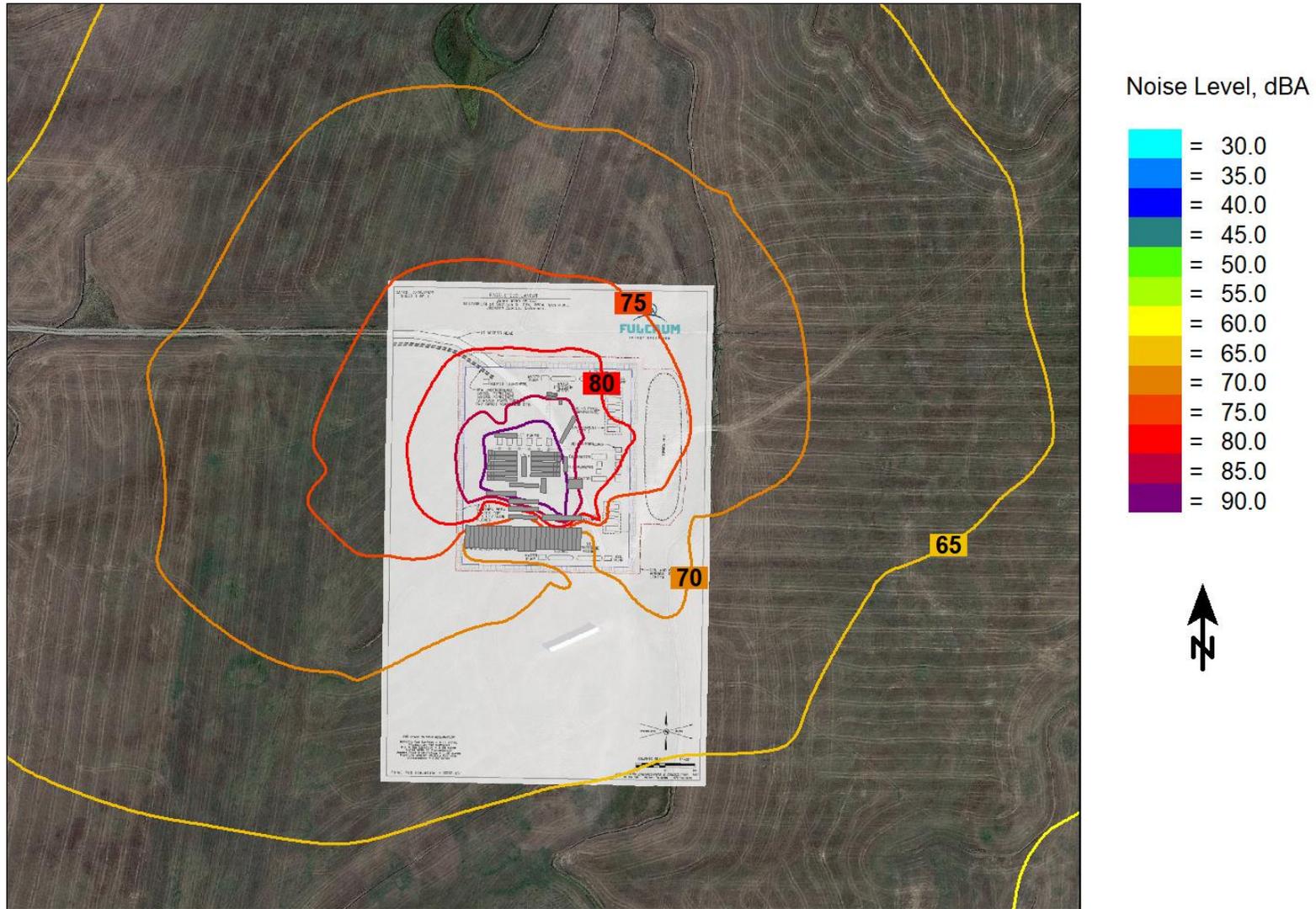
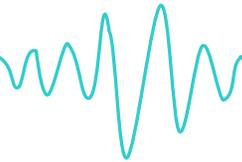
The results of the unmitigated noise modeling indicate that the drilling and completions operations will comply with the ECMC C-weighted noise level limits, but completion operations will not comply with the CPW A-weighted noise limits. Therefore, mitigation will be recommended for completions operations. Furthermore, as flowback operations have a smaller noise impact than completions operations, similar to completions, mitigation will be recommended for flowback operations.



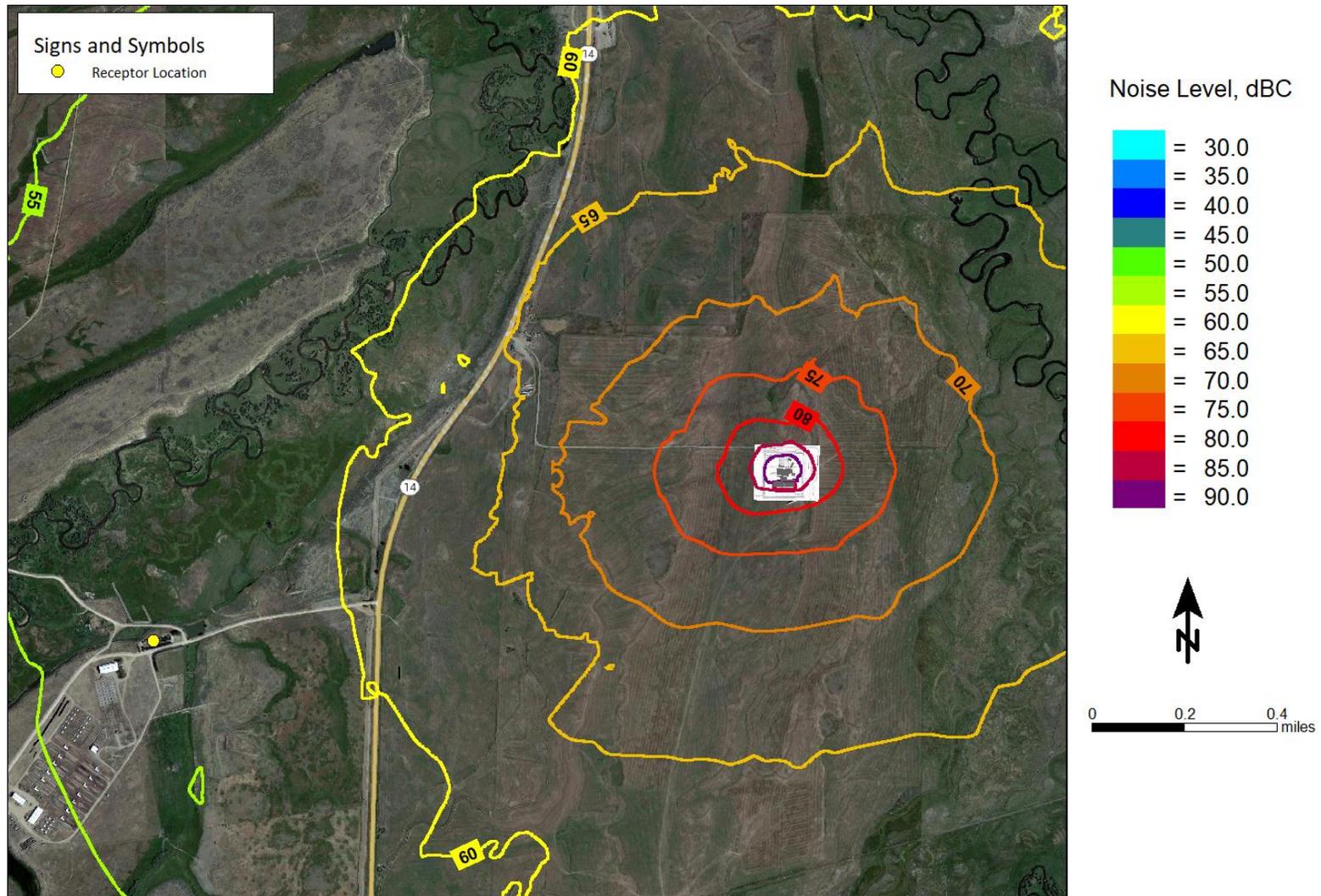
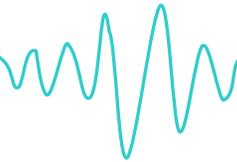
**Figure 6-3 Unmitigated PD 461 Noise Contour Map (dBA)**



**Figure 6-4 Unmitigated PD 461 Noise Contour Map (dBC)**



**Figure 6-5 Unmitigated Halliburton Noise Contour Map (dBA)**



**Figure 6-6 Unmitigated Halliburton Noise Contour Map (dBC)**



## 6.4 Mitigated Completions Noise Modeling Results

Noise mitigation for completion operations has been included in the modeling to reduce noise levels near the northern, eastern, and southern edge of the pad. The noise mitigation included in the modeling is described below:

- Mitigated Halliburton Scenario: Approximately 1,000 total linear feet of 32-foot-high, Sound Transmission Class (STC) 32 acoustical barrier wall installed in a reversed “C” shape enclosing the northern, eastern, and southern pad edges. The layout for the modeled mitigation scenario is shown in Figure 6-7.
- Liberty Quiet Fleet Scenario: Replaced Unmitigated Halliburton Completions Crew with Liberty Quiet Fleet Completions Crew

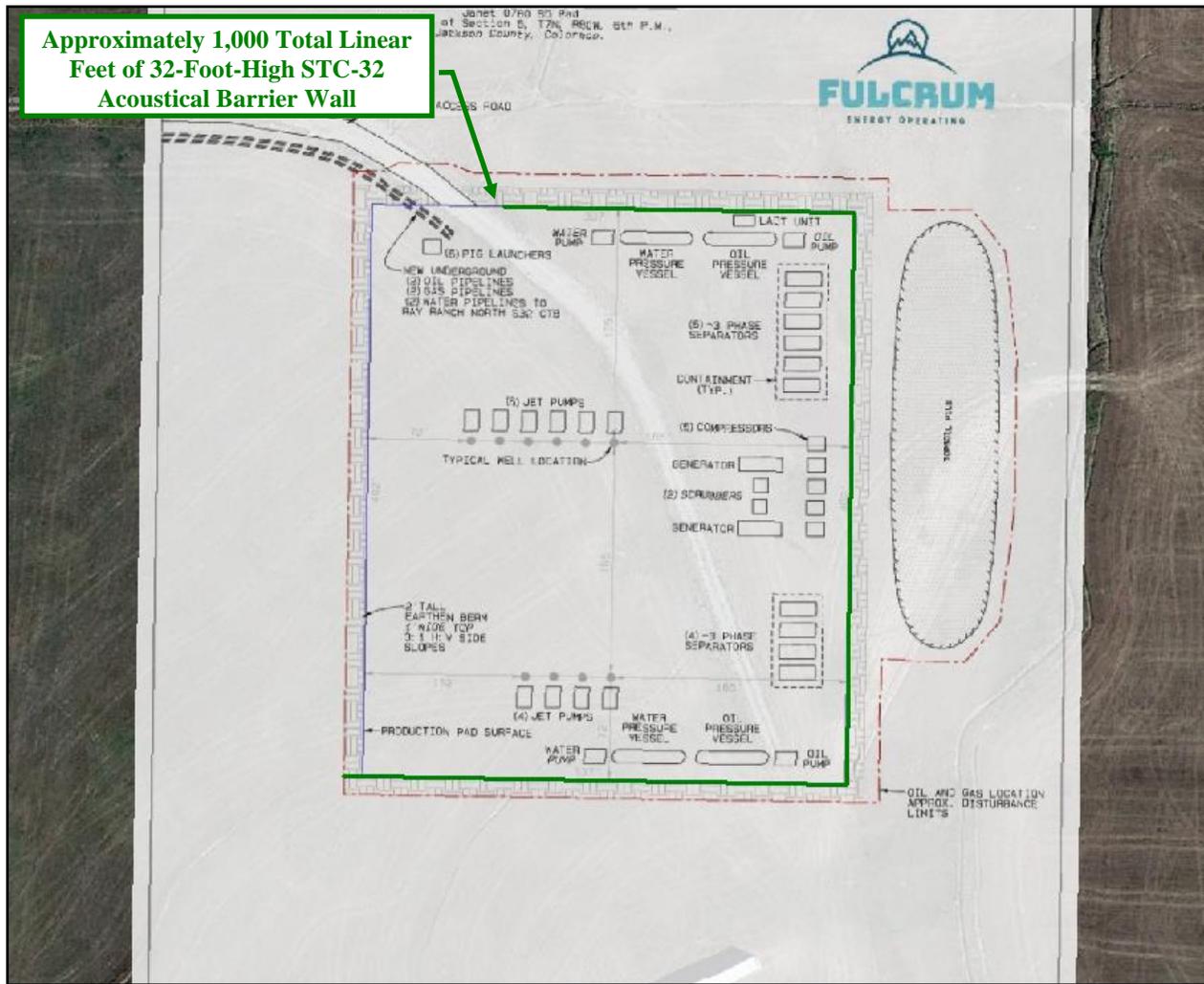


Figure 6-7 Mitigated Layout



The results of the mitigated noise modeling are presented in Table 6-3 and Table 6-4. The locations in the table correspond to the locations identified in Figure 6-1 and Figure 6-2. The predicted noise levels represent only the contribution of the project operations and do not include ambient noise or noise from other facilities. Figure 6-8 and Figure 6-9 show the Mitigated Halliburton Noise Contour Map in dBA and dBC respectively. Figure 6-10 and Figure 6-11 show the Liberty Quiet Fleet Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

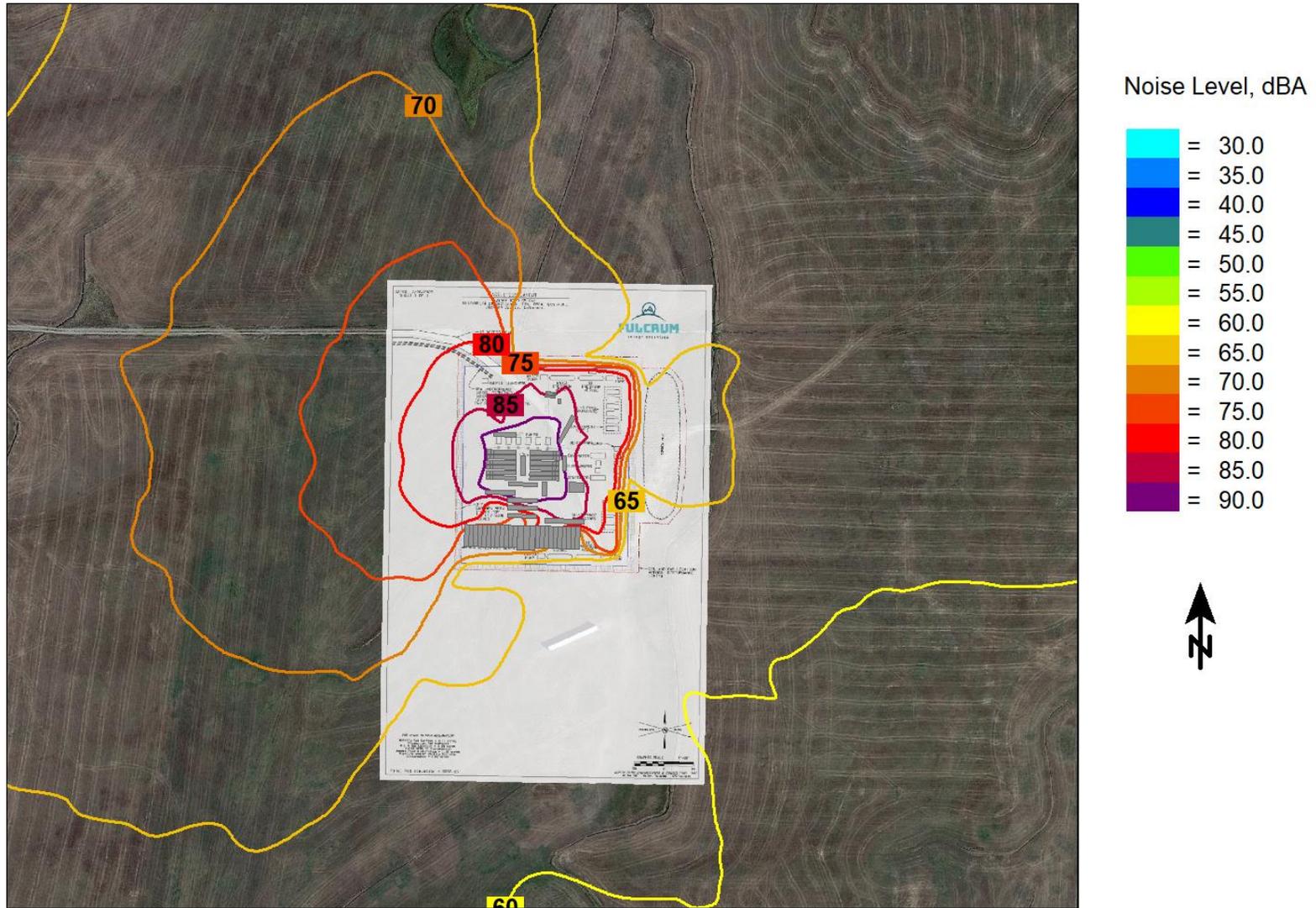
**Table 6-3 Noise Modeling Results (dBA)**

<b>Receptor</b>	<b>Location Description</b>	<b>Halliburton with Acoustical Barriers</b>	<b>Liberty Quiet Fleet</b>
Location A	Northern Edge of Pad	65	70
Location B	Northeastern Edge of Pad	62	67
Location C	Eastern Edge of Pad	66	70
Location D	Southeastern Edge of Pad	59	68
Location E	Southern Edge of Pad	63	70
<b>CPW Noise Limit</b>	<b>Edge of Pad to the Nearest Active Lek</b>	<b>75</b>	<b>75</b>

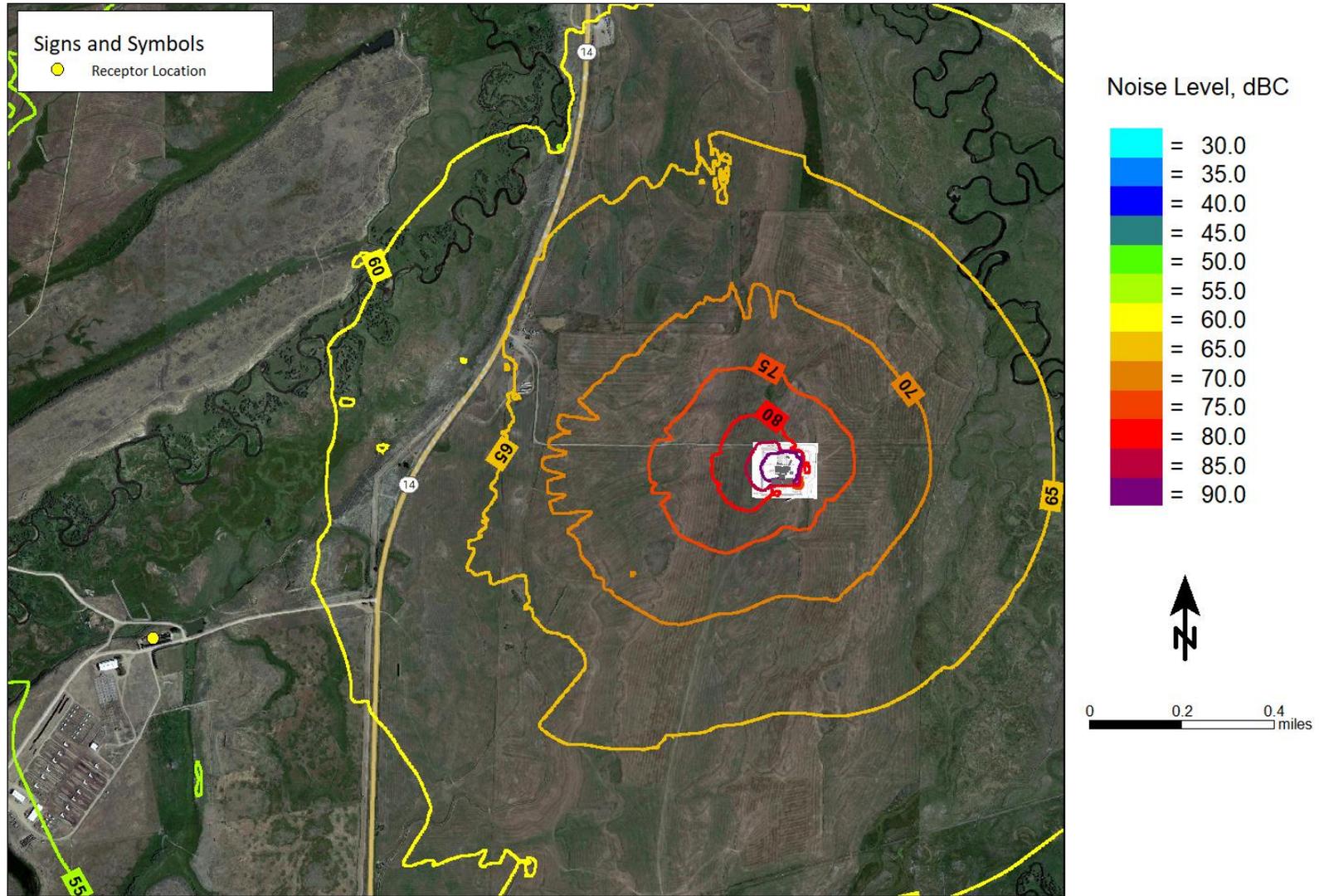
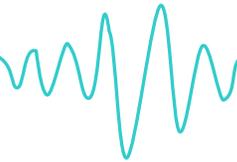
**Table 6-4 Noise Modeling Results (dBC)**

<b>Receptor</b>	<b>Location Description</b>	<b>Halliburton with Acoustical Barriers</b>	<b>Liberty Quiet Fleet</b>
Location 1	25 ft. from property in 22421 CO-14	57	52
<b>ECMC Noise Limit</b>	<b>25 ft. from the exterior wall of a residence or occupied structure towards the noise source</b>	<b>65</b>	<b>65</b>

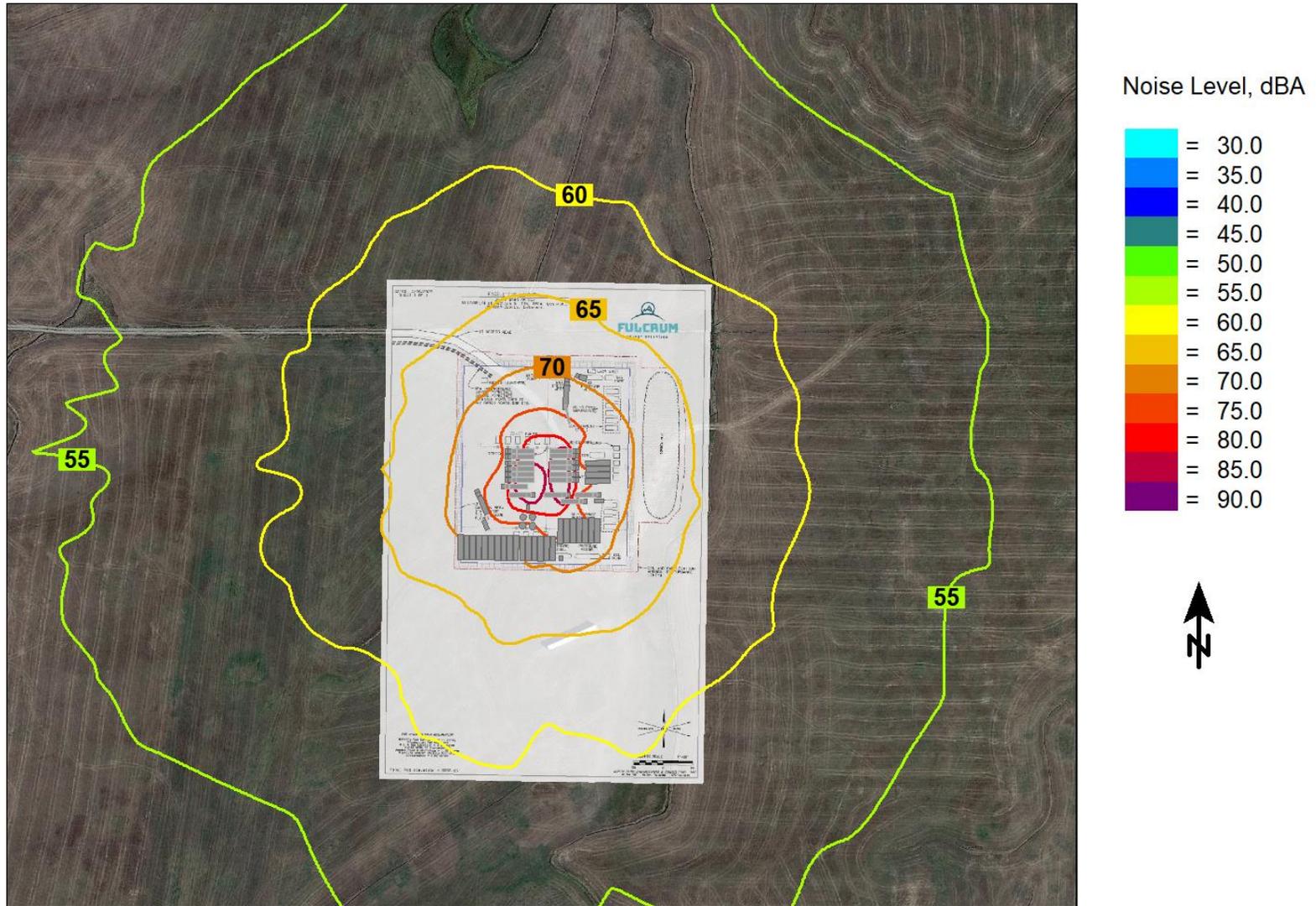
The results of the mitigated noise modeling indicate that with the implementation of the mitigation the proposed completions operations are predicted to comply with the allowable CPW A-weighted and ECMC C-weighted noise limits at all modeled receptors. Furthermore, as flowback operations have a smaller noise impact than completions operations, similar to completions, mitigation will not be recommended for flowback operations.



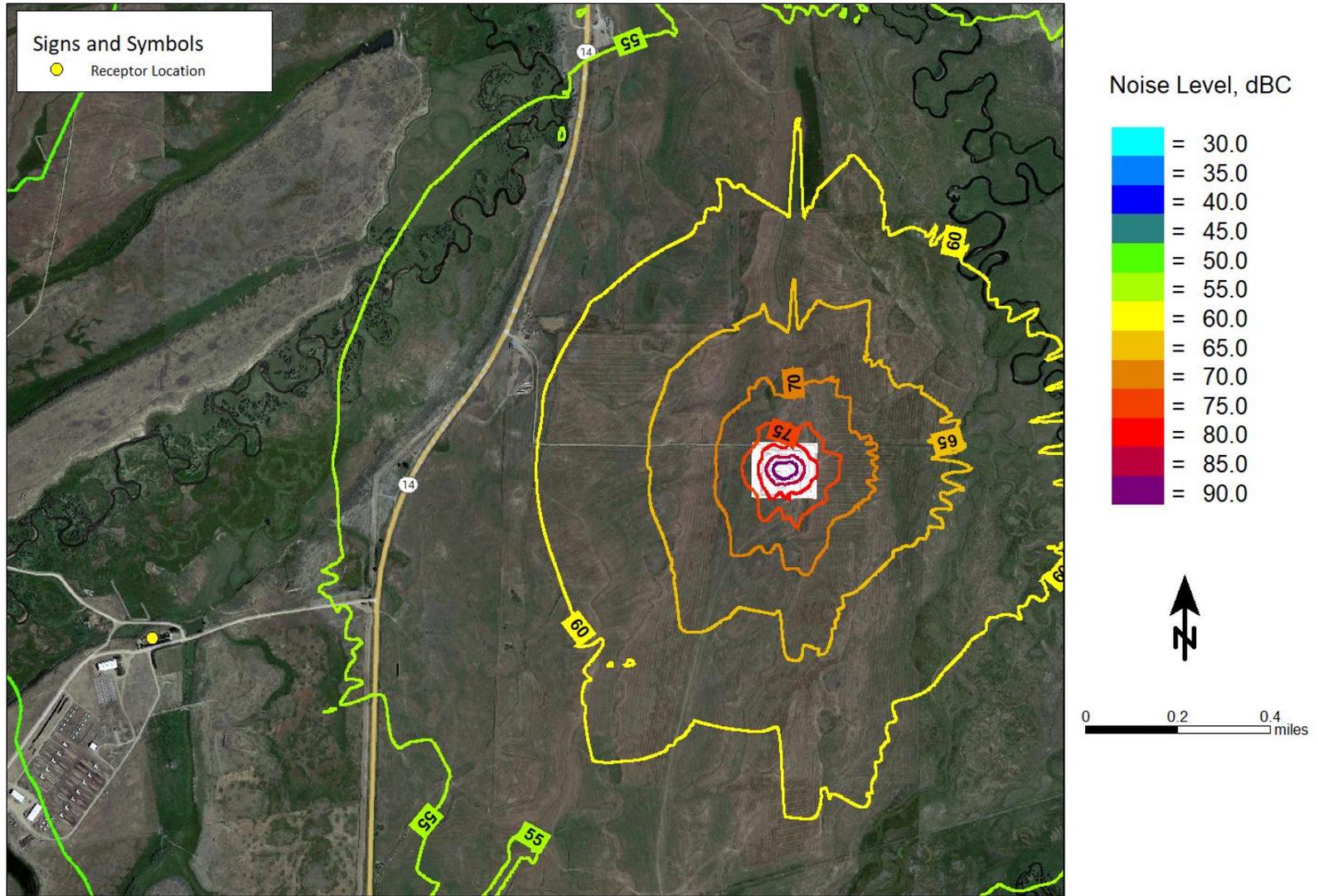
**Figure 6-8 Mitigated Halliburton with Acoustical Barriers Noise Contour Map (dBA)**



**Figure 6-9 Mitigated Halliburton with Acoustical Barriers Noise Contour Map (dBC)**



**Figure 6-10 Liberty Quiet Fleet Noise Contour Map (dBA)**



**Figure 6-11 Liberty Quiet Fleet Noise Contour Map (dBC)**



## 7. Janet 0780 S5 Pad Production Facility Noise Modeling

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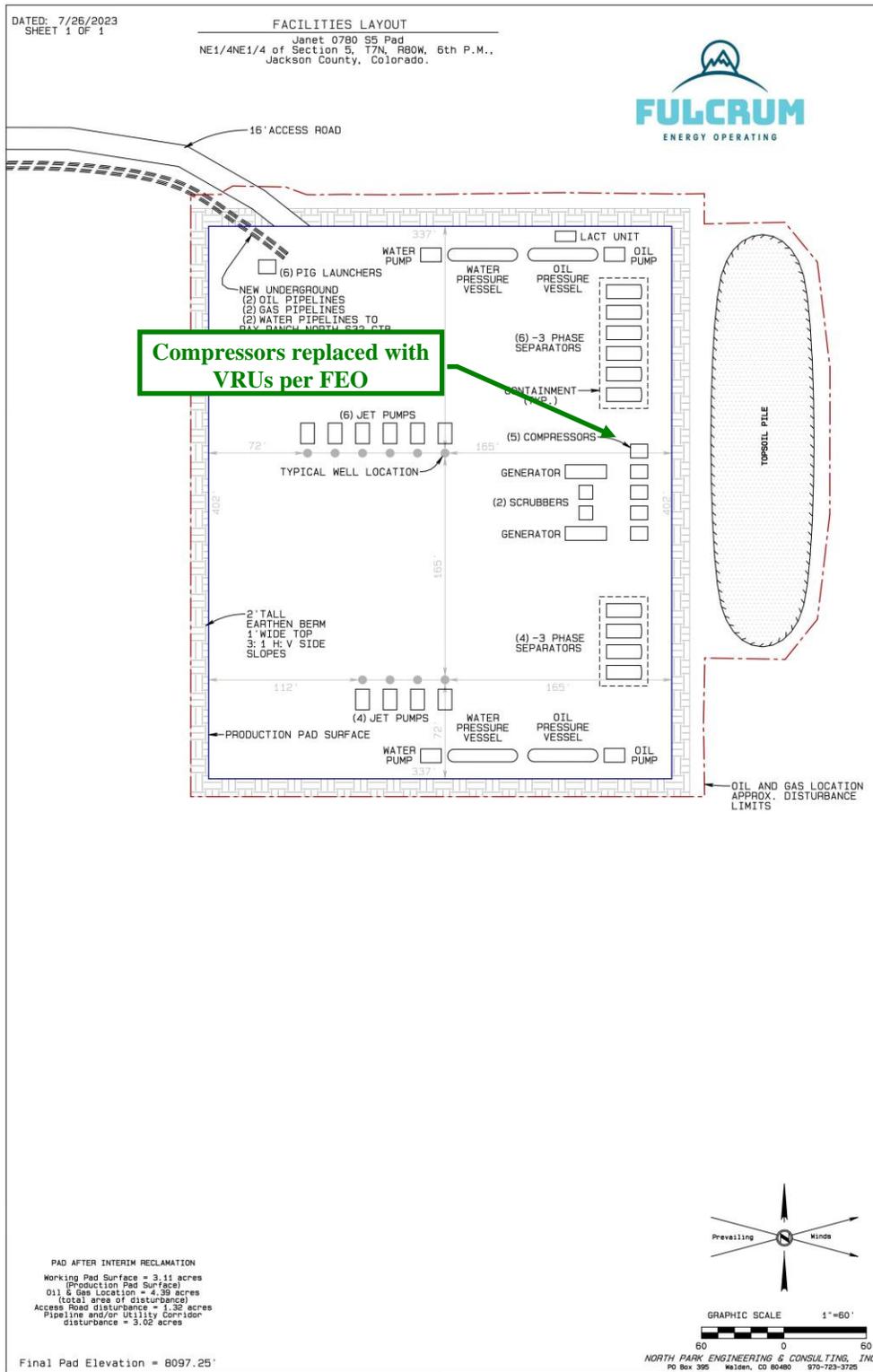
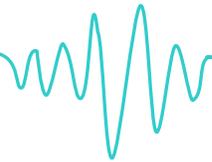
### 7.1 Unmitigated Production Facility Noise Modeling Results

The unmitigated modeling is based off current production site plans and does not include sound walls or other third-party acoustical mitigation measures. The production facility operational noise model was created to predict the constant, steady-state noise levels at the Janet 0780 S5 Pad and adjacent surroundings. The production facility was modeled assuming all listed equipment was operating simultaneously to represent the loudest operating scenario. Sound level data utilized in the production model was based on file data previously collected by BAENC at a production facility with similar equipment and general manufacturer and theoretical calculated sound level data for the electrical VRUs. As directed by Fulcrum, the VRUs were modeled in place of the compressors shown on the site plan. The production facility equipment list and equipment orientation were supplied by FEO and can be seen in Figure 7-1. The predicted modeling results are dependent on equipment and orientation as indicated.

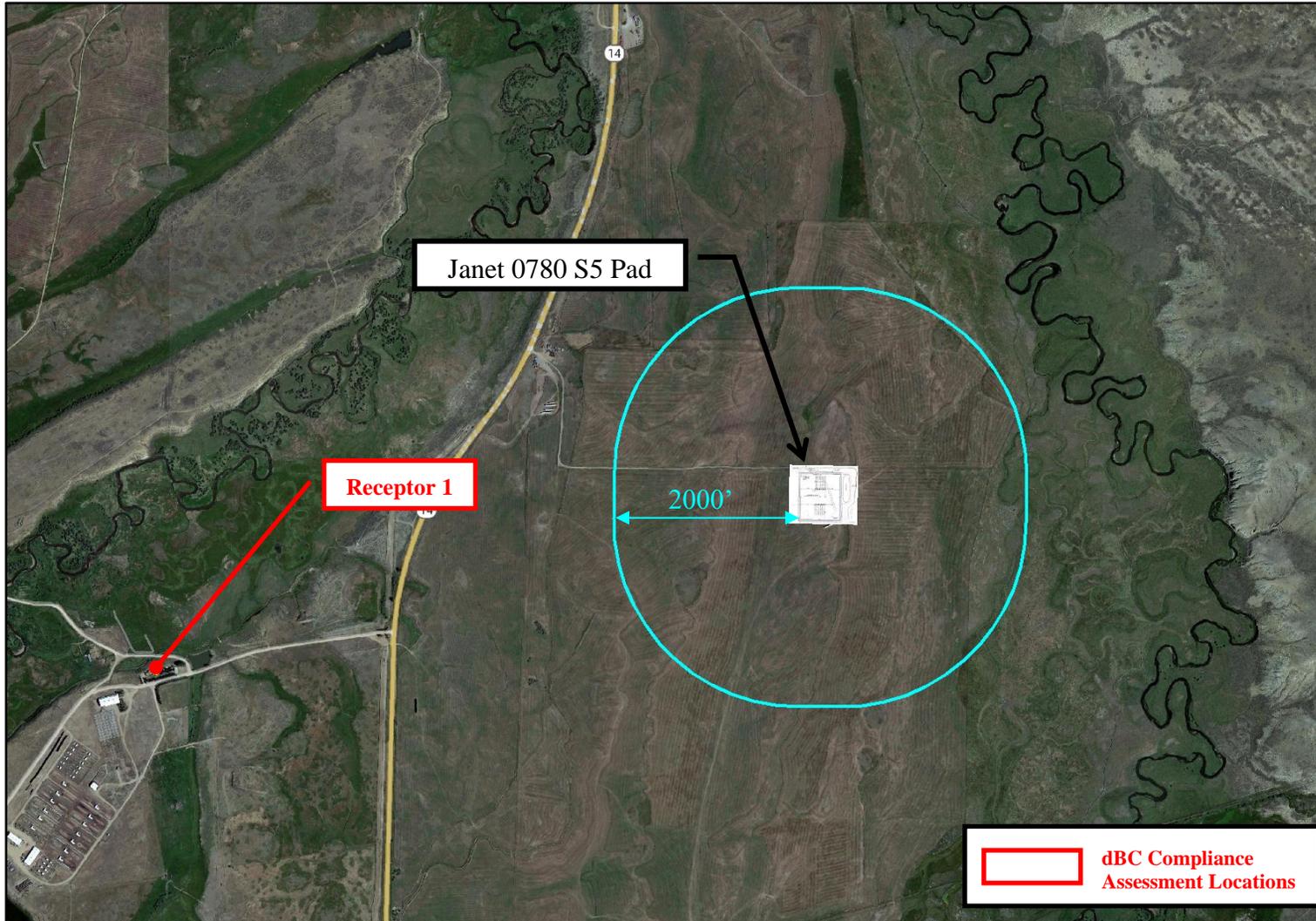
The equipment list and layout were scrutinized to determine the major noise emitting sources planned for the site. These major noise sources, listed in Table 7-1, were included in the production modeling. Other auxiliary/temporary equipment or smaller equipment not anticipated to generate significant noise was not included in the production model.

The noise sensitive receptors utilized in the production modeling were positioned to be consistent with the requirements of the ECMC and CPW noise standards. The requirements state that dBA noise levels shall comply with the applicable noise limits as measured at 350 feet from the working pad surface and no less than 25 feet from the exterior wall of the Residential Building Unit that is within 2,000 ft. and closest to the production pad surface. The requirements state that dBC noise levels shall comply with the applicable noise limits as measured at 25 feet from the exterior wall of nearby residences or occupied structures. Figure 7-2 shows the dBC noise sensitive receptor locations. Due to the absence of RBU's within 2000-feet of the working pad surface, A-weighted noise points of compliance were not evaluated for ECMC.

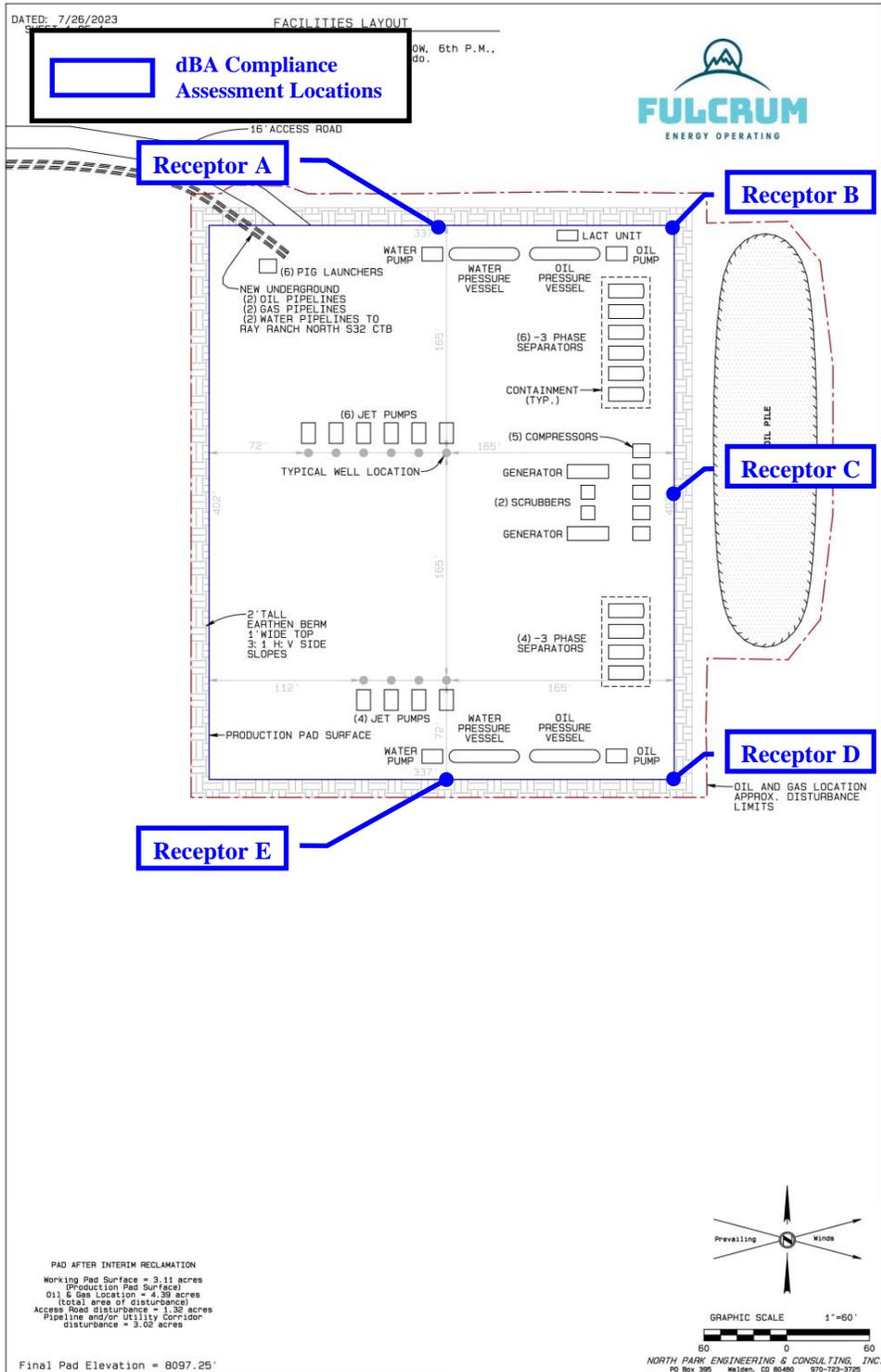
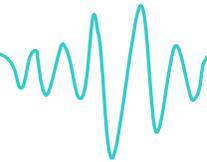
The Wildlife Mitigation Plan agreement between Fulcrum and CPW states that a 75 dBA limit will be applied to the edge of the pad nearest to the active lekking site. Figure 7-3 shows the dBA noise sensitive receptor locations on the northern, eastern, and southern edges of the Janet 0780 S5 pad.



**Figure 7-1 Modeled Janet 0780 S5 Pad Production Facility Layout**



**Figure 7-2 Noise Sensitive Receptor Location - ECMC**



**Figure 7-3 Noise Sensitive Receptor Location - CPW**



The predicted modeling results are dependent on equipment and mitigation orientation as indicated and are only inclusive of the equipment listed in Table 7-1. A standard generator was used for the model; it is recommended to use a generator that does not exceed 77 dB(A) at one meter. As directed by FEO, VRUs were used in place of the compressors on the site drawing.

**Table 7-1 Production Facility Major Noise Emitting Equipment Included in Model**

<b>Equipment</b>	<b>Quantity</b>
Three Phase Separators	10
Compressors	5
LACT Building	1
Generator*	2

\*A standard generator was used for the model; it is recommended to use a generator that does not exceed 77 dB(A) at one meter.

The results of the unmitigated production facility noise modeling are presented in Table 7-2 and Table 7-3. The locations in the table correspond to the locations identified in Figure 7-2 and Figure 7-3. The predicted noise levels represent only the contribution of the production operations and do not include ambient noise or noise from other facilities. Figure 7-3 and Figure 7-4 and show the Unmitigated Production Facility Noise Contour Map in dBA and dBC respectively. The noise contours are provided in 5 dB increments with the color scale indicating the sound level of each contour.

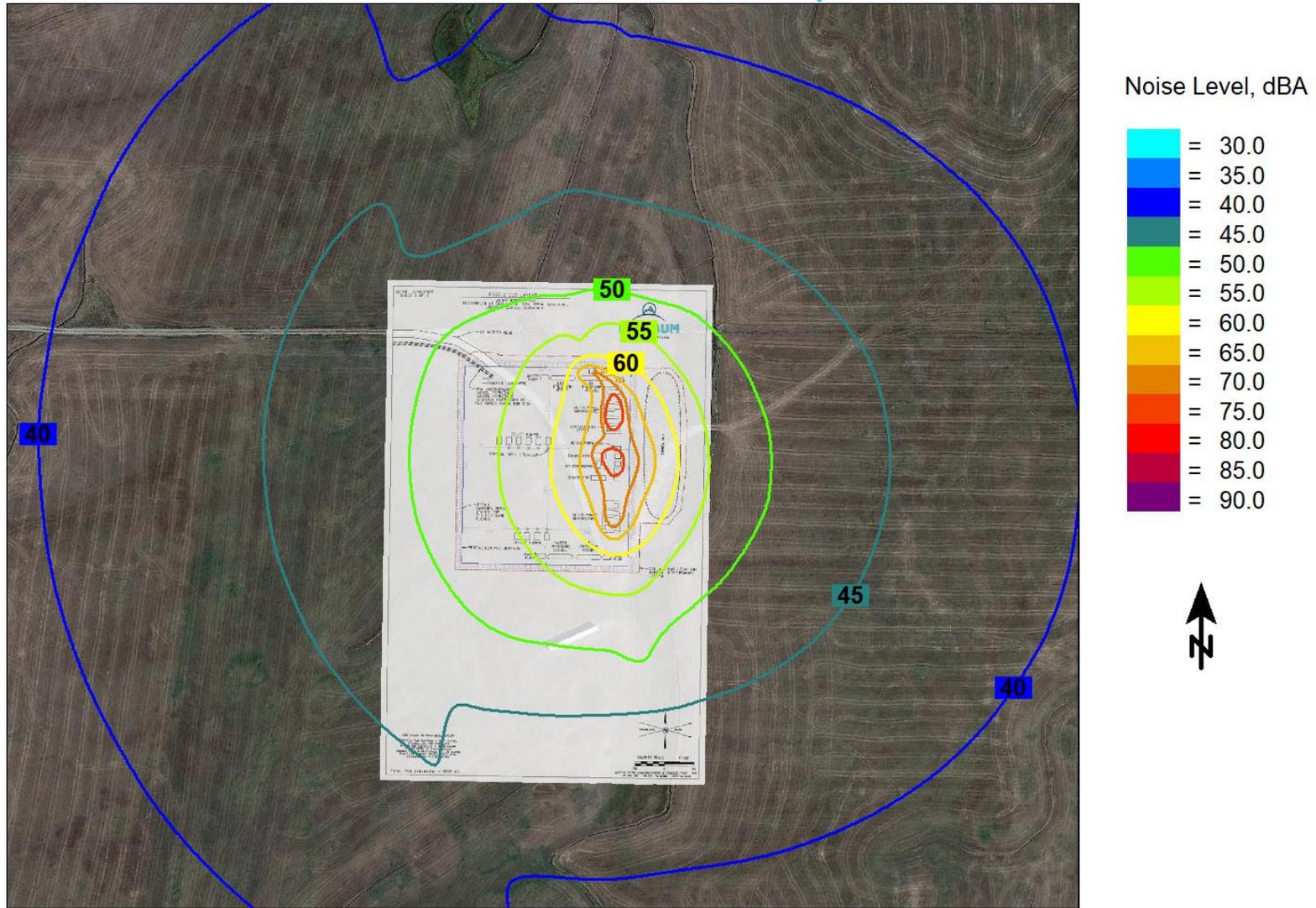
**Table 7-2 Unmitigated Noise Modeling Results (dBA)**

<b>Receptor</b>	<b>Location Description</b>	<b>Production Facility</b>
Location A	Northern Edge of Pad	57
Location B	Northeastern Edge of Pad	60
Location C	Eastern Edge of Pad	73
Location D	Southeastern Edge of Pad	58
Location E	Southern Edge of Pad	55
<b>CPW Noise Limit</b>	<b>Edge of Pad to the Nearest Active Lek</b>	<b>75</b>

**Table 7-3 Unmitigated Noise Modeling Results (dBC)**

<b>Receptor</b>	<b>Location Description</b>	<b>Production Facility</b>
Location 1	25 ft. from property in 22421 CO-14	35
<b>ECMC Noise Limit</b>	<b>25 ft. from the exterior wall of a residence or occupied structure towards the noise source</b>	<b>65</b>

The results of the unmitigated noise modeling indicate that the production operations will comply with the CPW A-weighted and ECMC C-weighted noise level limits. Therefore, mitigation will not be recommended for production operations.



**Figure 7-4 Production Facility Unmitigated Noise Contour Map (dBA)**

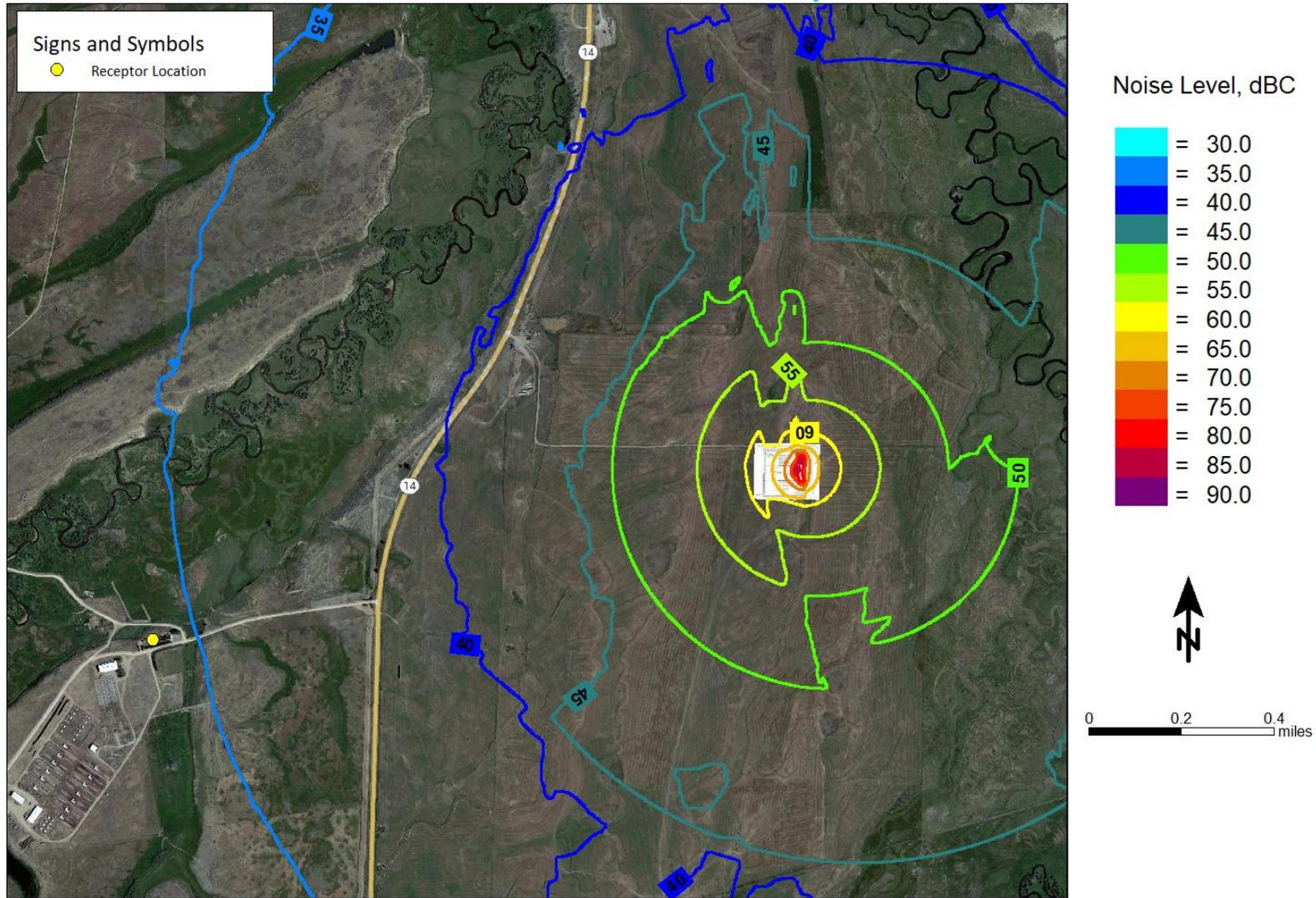


Figure 7-5 Production Facility Unmitigated Noise Contour Map (dBC)



## **8. Noise Points of Compliance and Continuous Noise Monitoring**

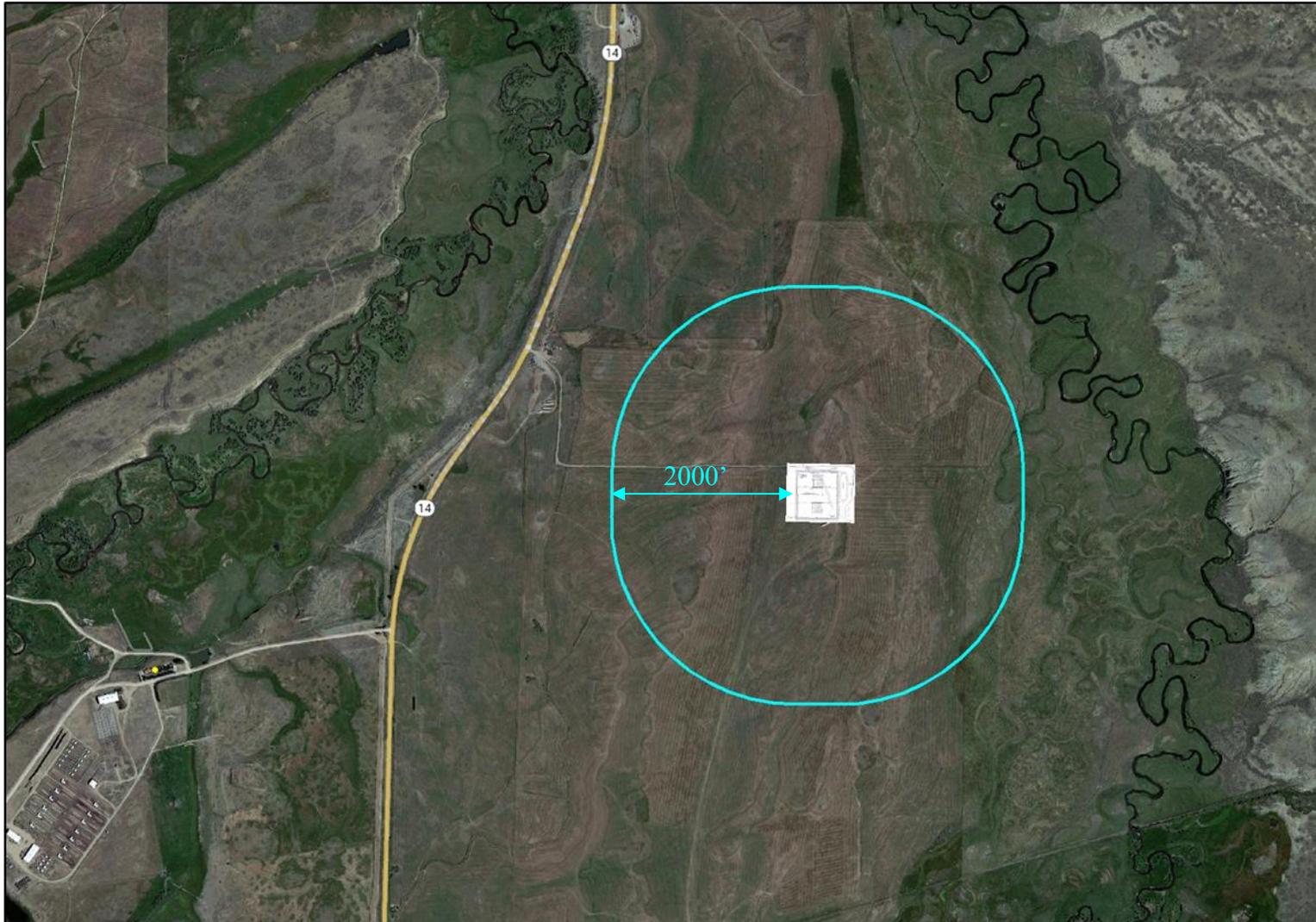
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### **8.1 Continuous Monitoring Evaluation**

ECMC Rule 423.c.(2) provides rules for continuous noise monitoring on oil and gas locations. Pre-production activities and ongoing operations lasting longer than 24 consecutive hours will require continuous monitoring measurements from each noise point of compliance designated. According to Section 423. Noise (c), to demonstrate compliance with Tables 423-1 and 423-2 Operators will measure sound levels according to the following standards:

- (1) During pre-production activities and ongoing operations lasting longer than 24 consecutive hours such as drilling, completion, recompletion, Stimulation, and Well maintenance, in areas zoned residential or within 2,000 feet of a Building Unit, Operators will take continuous sound measurements from each noise point of compliance designated pursuant to Rule 423.a.(5).

Figure 7-1 shows an aerial view of the proposed pad with an approximate 2,000 ft. radius from the working pad surface. Noise points of compliance were not identified for the site due to the absence of RBU's within 2000-feet of working pad surface. As a result, continuous noise monitoring is not recommended at the site.



**Figure 7-1 Continuous Monitoring Evaluation**