

**Point Three 11-16HZ Well Pad and Facility**

**Site Mitigation and Best Management Practices:**

**Based on the noise modeling analysis provided by Behrens and Associates, Inc., Kerr-McGee Oil & Gas Onshore LP (KMOG) will implement the best management practices (BMPs) outlined in Table 1-1 for drilling, completions, and production operations to comply with the COGCC dBA and dBC noise limits.**

**Noise levels for flowback were considered during completions noise modeling and the following BMP will be implemented by KMOG throughout the duration of flowback operations:**

- **Perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, south, and west sides of the pad.**

# Point Three 11-16HZ Noise Mitigation and Monitoring Report

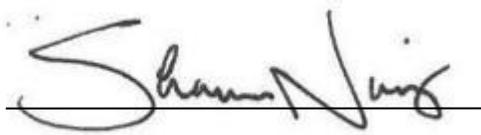
July 28, 2021

Prepared for:

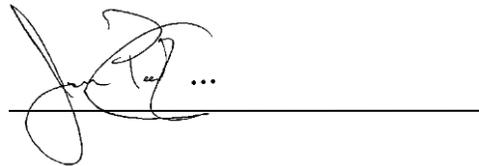
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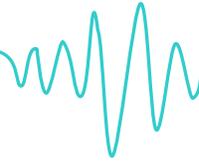
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## 1. Introduction

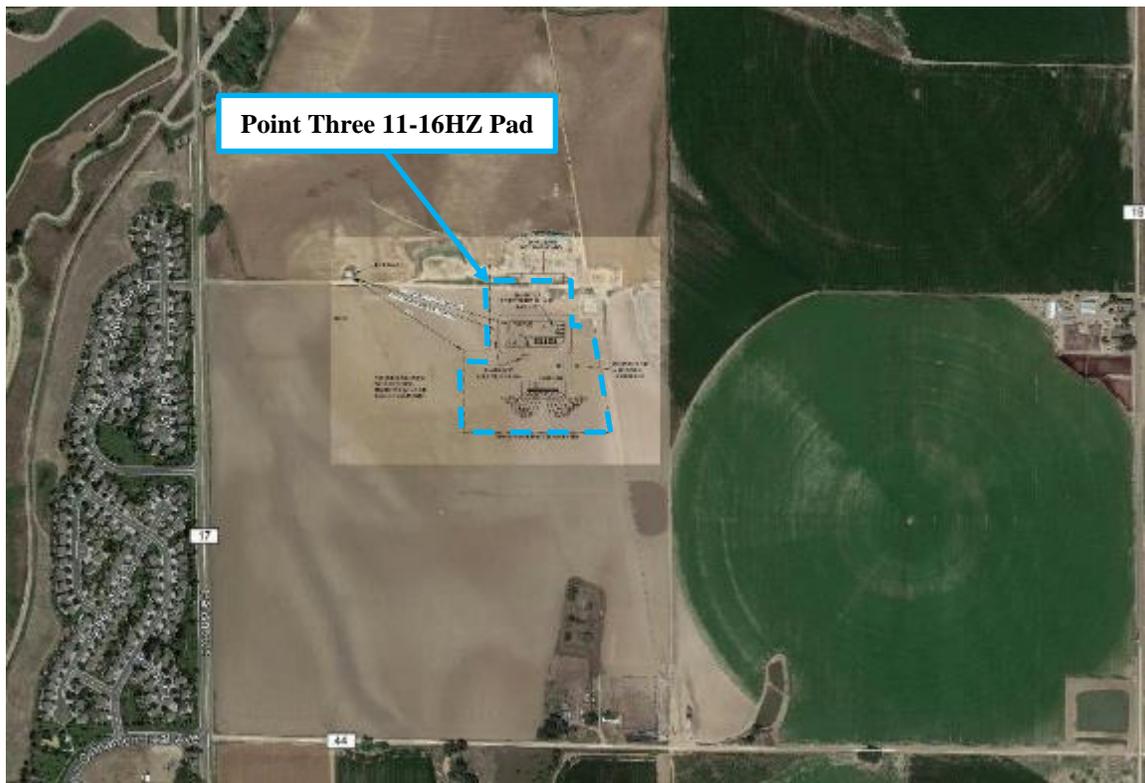
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The following report provides a noise modeling assessment of the proposed activities at the Point Three 11-16HZ pad operated by Kerr McGee Oil & Gas Onshore LP (KMOG) in relation to the Colorado Oil and Gas Conservation Commission (COGCC) noise regulations and the Operator Agreement (OA) with the Town of Johnstown. The assessment includes a modeling analysis of the PD 461 production rig, Halliburton Quiet fleet and Point Three Production Facility.

To assess the operational noise levels of the proposed Point Three 11-16HZ pad, file noise level data previously measured and typical of the PD 461 production rig, Halliburton Quiet fleet and production facility equipment were utilized in the noise modeling. The noise models were developed using SoundPLAN 8.1 software.

The following is provided in this report:

- A brief introduction of the fundamentals of noise
- A review of applicable COGCC noise standards and the OA with the Town of Johnstown
- A discussion of noise modeling methodology
- An assessment of the predicted operational noise levels in relation to the COGCC noise limits



**Figure 1-1 Pad Location**



Table 1-1 below summarizes the analysis and mitigation findings in the noise report and presents them in the form of best management practices.

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

Task	Result of Analysis/ Action
Ambient Survey	<ul style="list-style-type: none"> <li>• Ambient survey conducted to document noise levels in area around the site (August 2019)</li> <li>• Max permissible noise levels adjusted</li> </ul>
Drilling Noise Model	<ul style="list-style-type: none"> <li>• Developed noise model representing drilling to assess operational noise levels against COGCC allowable dBA and dBC noise levels</li> <li>• Perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, south, and west sides of the pad</li> </ul>
Completions Noise Model	<ul style="list-style-type: none"> <li>• Developed noise model representing completions to assess operational noise levels against COGCC allowable dBA and dBC noise levels</li> <li>• Perimeter mitigation includes 32-foot-high sound wall with minimum STC-25 rating installed on north, south, and west sides of the pad</li> </ul>
Production Noise Model	<ul style="list-style-type: none"> <li>• Developed noise model representing production to assess operational noise levels against COGCC allowable dBA and dBC noise levels</li> <li>• Noise mitigation not required</li> </ul>
Continuous Monitoring Evaluation	<ul style="list-style-type: none"> <li>• Noise points of compliance proposed</li> <li>• Continuous monitoring proposed at 3 locations</li> </ul>

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



## 2. 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 2-1.

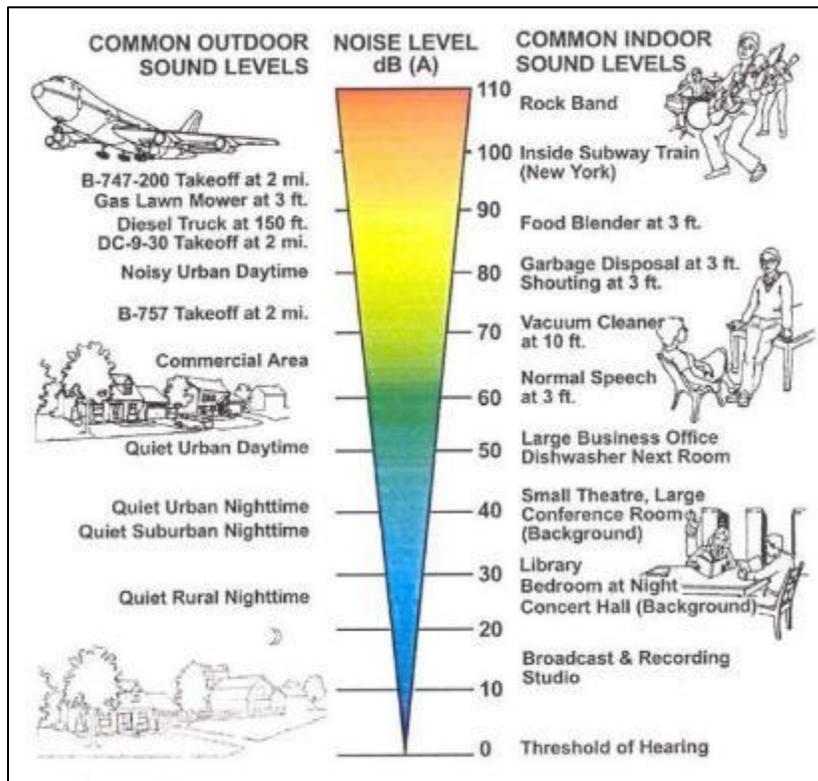


Figure 2-1 Typical Indoor and Outdoor A-Weighted Sound Levels



### 3. Noise Standards

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The pad is subject to the regulations of the Colorado Oil and Gas Conservation Commission (COGCC). The COGCC publishes rules regulating oil and gas operations with rules relating to noise found in Rule 423.

#### 3.1 Colorado Oil and Gas Conservation Commission (COGCC)

The COGCC 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 3-1.

**Table 3-1 COGCC 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, Operator will measure sound levels at 25 feet from the complainant's occupied structure towards the noise source for low frequency (dB<sub>C</sub>) indicated issues. For high frequency (dB<sub>A</sub>) 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 dB<sub>C</sub> and 5 dB<sub>A</sub> between 7:00 p.m. and 7:00 a.m. or 7 dB<sub>C</sub> and 7 dB<sub>A</sub> 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**

<b>LAND USE</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	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)

**3.2 Summary of COGCC 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 COGCC Rule 423, the allowable noise level limits applicable to the site are as follows:

**Table 3-2 Unadjusted Maximum Permissible Noise Levels**

<b>Operation</b>	<b>Applicable Zoning</b>	<b>Noise Limits (dBA)</b>	<b>Noise Limits (dBC)</b>
Drilling	Agricultural/Commercial	65 day / 60 night	65 day and night
Completions	Agricultural/Commercial	65 day / 60 night	65 day and night
Production	Agricultural/Commercial	60 day / 55 night	60 day and night

**3.3 Operator Agreement between KMOG and the Town of Johnstown**

KMOG and the Town of Johnstown have entered into an Operator Agreement (OA). Per the OA, the operator, KMOG, will develop and implement in consultation with the Town, Johnstown, a Noise Mitigation and Monitoring Plan that provides for continuous monitoring and modeling from four (4) sides of the facility at least 350 feet from the sound wall where possible provided that approval from surrounding surface owners can be obtained. The plan should identify site-specific noise mitigation techniques such as dirt moving to attenuate noise, and source-based noise mitigation.

This report is intended to satisfy the requirements of both the COGCC and the OA. In this case, the requirements of the COGCC are at least as strict as that of the OA and therefore are compliant with the COGCC regulations should inherently constitute compliance with the OA as well. To ensure noise compliance, a sound survey has been conducted on the rig type utilized to anticipate any additional effective noise mitigation once a drilling rig is operating. At a minimum, pending a safety review after construction of the location, sound mitigation barriers will be erected as shown in this document and utilized for placement of the well pad location to dampen noise and minimize impacts to the nearby residences during drilling and completions activity. Ambient monitoring has been conducted prior to surface drilling operation on this pad. Where possible continuous sound monitoring equipment will be placed at 350 ft from the sound wall on all sides where a residential building unit is located within 2,000 ft. of the well pad during drilling, and completion operations to determine cumulative sound impacts and levels. A quiet completions fleet will also be used for completions operations. Exhaust from all engines, motors and related equipment, shall be vented in a direction away from occupied buildings where practical. Additionally, Figure 3-1 shown below outlines the proposed continuous monitoring locations to satisfy the OA.





## 4. Ambient Sound Level Survey

### 4.1 Ambient Sound Level Survey Procedure

Three Type 1 SVANTEK SVAN 971 sound level meters were utilized to conduct an ambient sound level survey adjacent to the Point Three 11-16HZ pad. The sound level meters conform to Type 1 as per ANSI S1.4 Specification for Sound Level Meters. The sound level meter was calibrated before and after the measurement period. The sound monitoring period began on Friday, August 2, 2019 with the meter programmed to continuously monitor and record A-weighted and C-weighted sound levels. The monitoring period ended on Monday, August 5, 2019. The locations of the sound level meters used to conduct the ambient survey can be seen in Figure 4-1 below.

### 4.2 Ambient Sound Level Survey Results

The measured A-weighted and C-weighted hourly average  $L_{eq}$  for each monitoring location can be seen in Figure 4-2 through Figure 4-4. The measured A-weighted and C-weighted daytime and nighttime average sound levels for Monitoring Locations 1, 2, and 3 are shown in Table 4-1 below. Weather data was collected using a Larson Davis Technologies Vantage Vue Weather Station.

The measured ambient dBC levels at Location 1 and Location 2 are high enough that the allowable drilling and completions noise level of 65 dBC is exceeded for the majority of the time and therefore should be considered in a compliance assessment should a complaint be made in that direction.

**Table 4-1 Daily Average and Cumulative Ambient Sound Level Data for Point Three 11-16HZPad**

Day	Location 1				Location 2				Location 3			
	Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels		Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels		Daytime Leq Ambient Noise Levels		Nighttime Leq Ambient Noise Levels	
	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC	dBA	dBC
1*	66	76	60	66	49	76	44	66	46	65	51	63
2	64	75	58	67	48	73	42	65	42	63	51	63
3	63	71	60	67	50	72	47	77	45	65	48	66
4**	65	74			45	72			39	58		
Overall Leq	66	74	59	67	48	73	45	73	44	63	50	64

\*Day 1 Daytime is an Leq (logarithmic average) from 2pm until 7pm.

\*\*Day 4 Daytime is an Leq (logarithmic average) from 7am until 2pm.



**Figure 4-1 Ambient Monitoring Locations for Point Three 11-16HZ**

**4.3 Maximum Adjusted Noise Levels**

The measured ambient sound levels already exceed the maximum permissible noise thresholds identified in COGCC Table 423-1 at Monitoring Location 3. Based on COGCC Rule 423.d.(2), for drilling and completions operations, the operational noise levels at the site will be limited to the measured ambient noise level plus 5 dBC during nighttime and 7 dBC during daytime. The following table presents the adjusted allowable noise levels for the site.

**Table 4-2 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Drilling and Completions**

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
<b>Location 1</b> (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 1)	66/67 dBC	73/72 dBC
<b>Location 2</b> (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 2)	73/73 dBC	80/78 dBC



**Table 4-3 Adjusted Allowable Daytime and Nighttime Noise Level Limits for Production**

Noise Point of Compliance	Measured Ambient day/night	Adjusted Allowable Day/Night
<b>Location 1</b> (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 1)	66/67 dBC	73/70 dBC
<b>Location 2</b> (This adjusted allowable sound level applies to noise points of compliance in the direction of Monitoring Location 2)	73/73 dBC	75/70 dBC

Note: Maximum adjusted production cumulative noise levels capped at 75/70 day/night dBC

The drilling, completions, and production operations are planned to occur 24 hours a day, as such, the stricter nighttime allowable level will be utilized in the noise modeling analysis.

# Behrens and Associates, Inc.

Environmental Noise Control

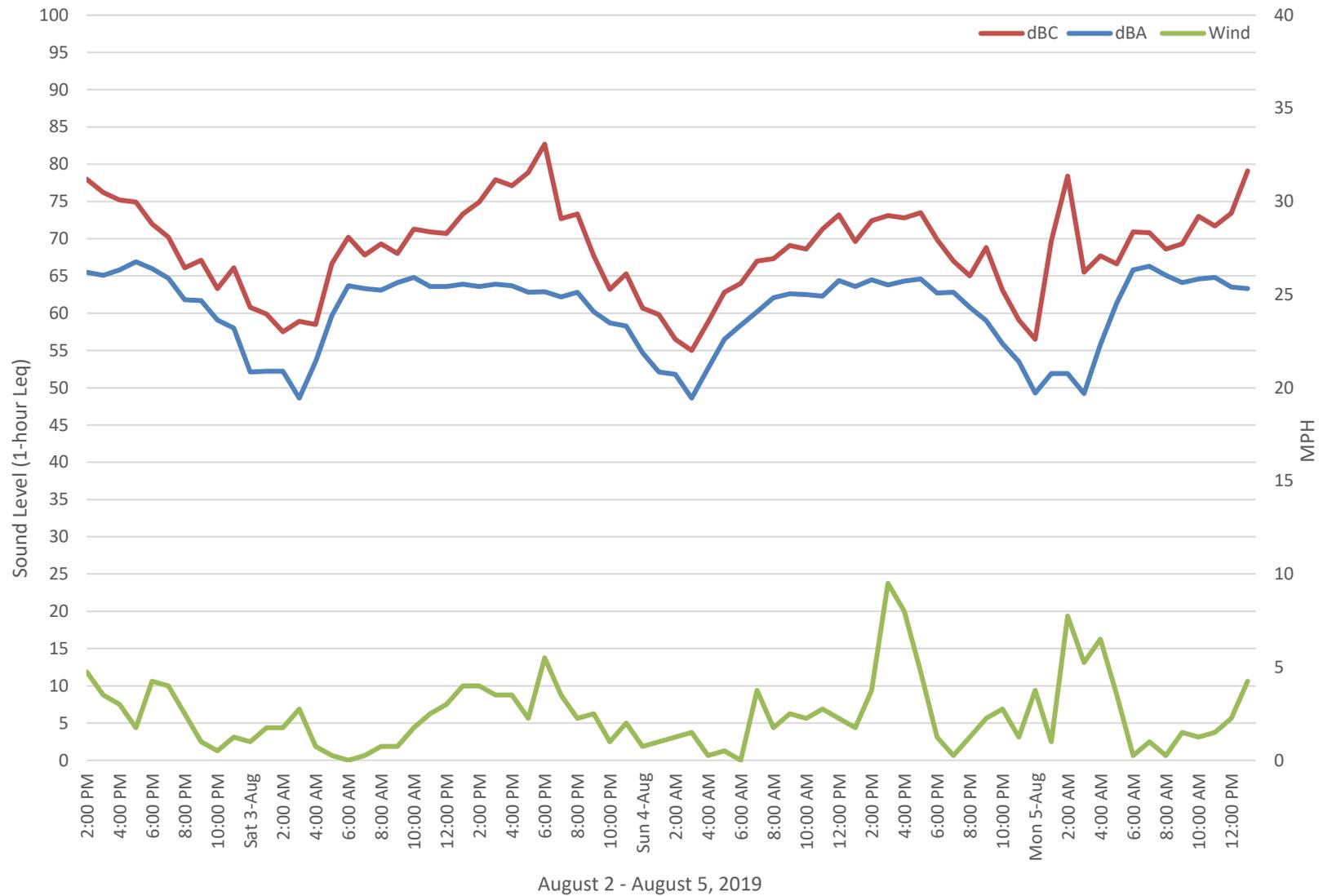


Figure 4-2 Ambient Sound Level Survey Location 1 (Hourly Average Leq)

# Behrens and Associates, Inc.

Environmental Noise Control

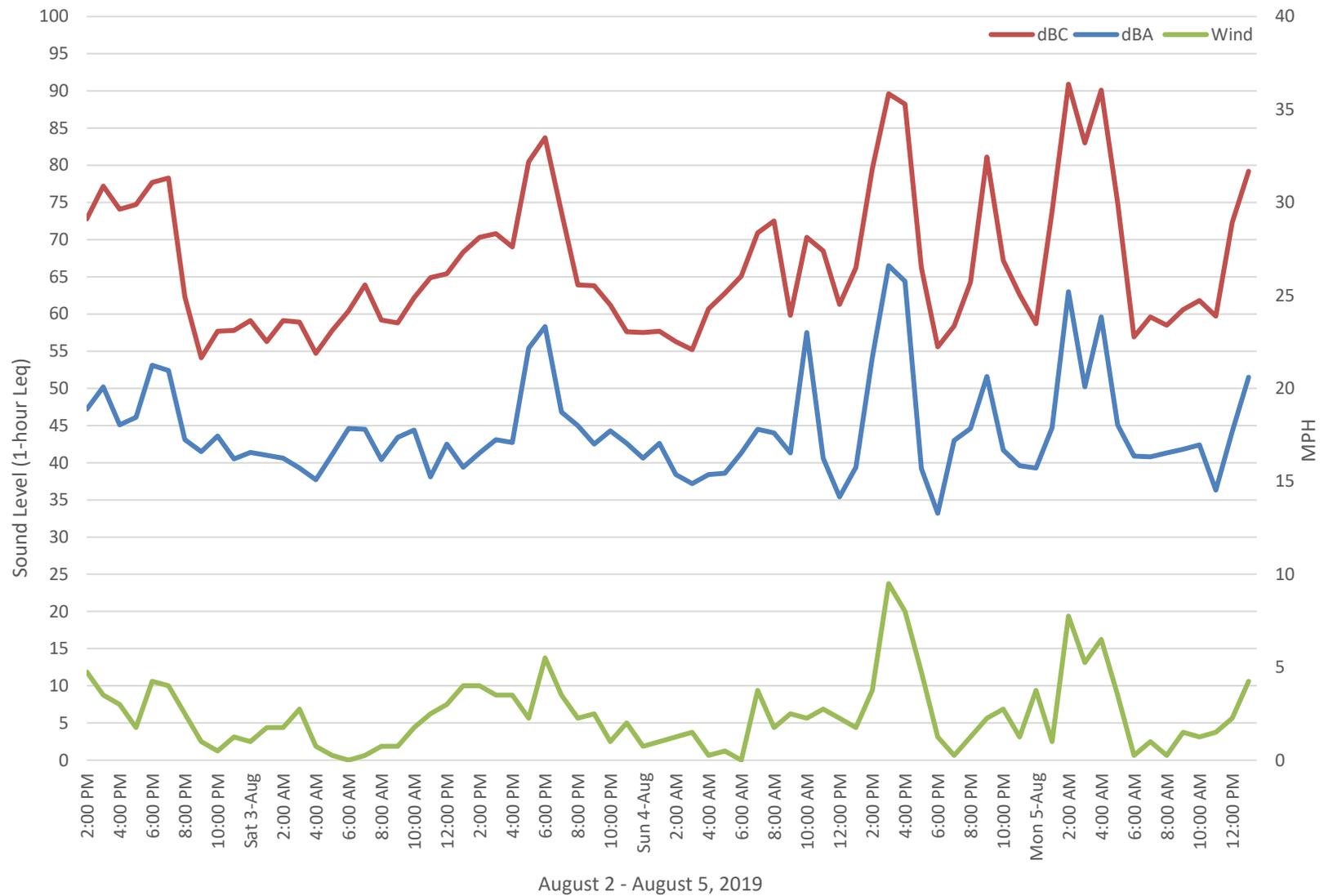


Figure 4-3 Ambient Sound Level Survey Location 2 (Hourly Average Leq)

# Behrens and Associates, Inc.

Environmental Noise Control

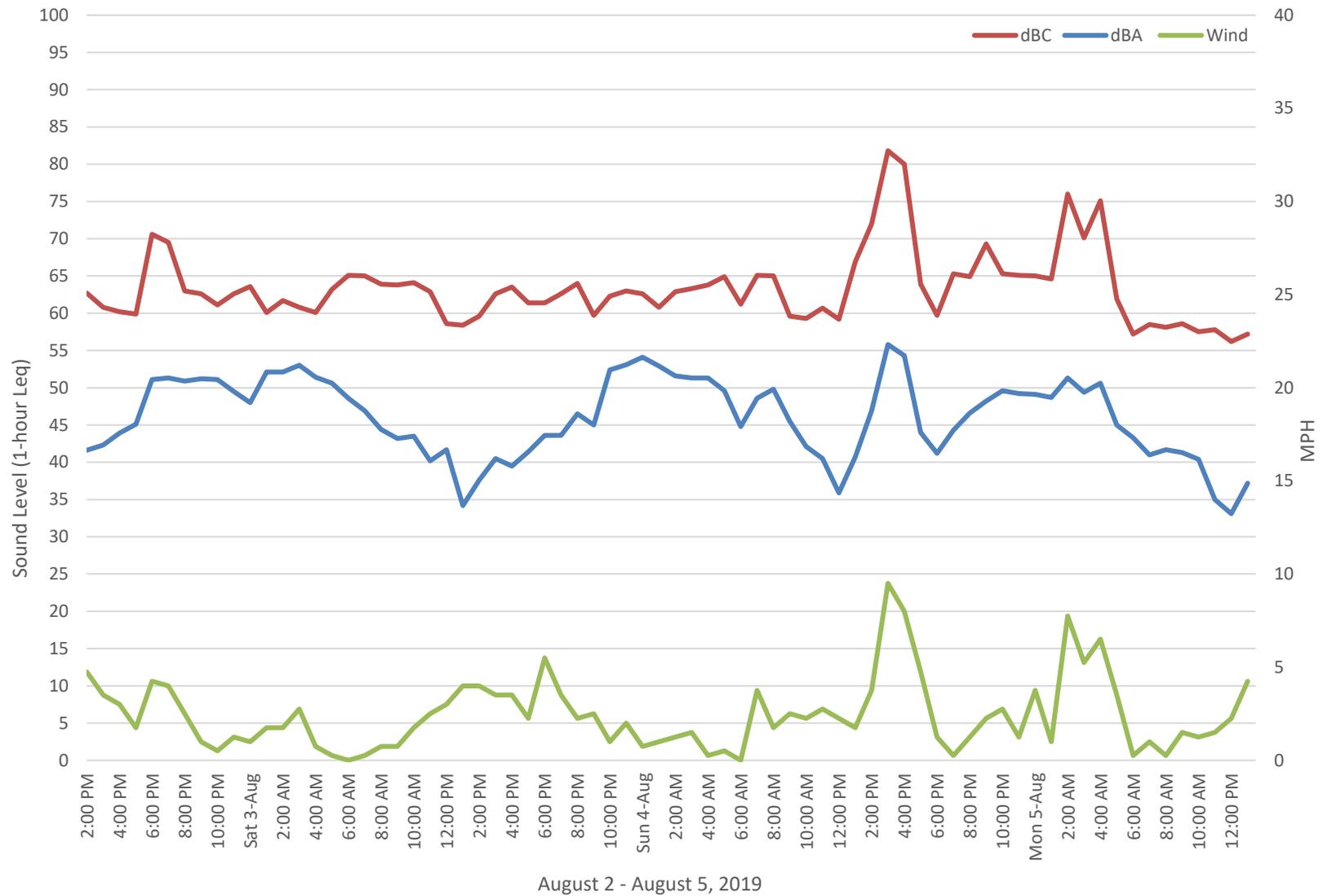


Figure 4-4 Ambient Sound Level Survey Location 3 (Hourly Average Leq)



## 5. Point Three 11-16HZ Pad Noise Modeling

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### 5.1 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 8.1 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 drilling, completions and production facility 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 northeast. Rig placement and orientation was coordinated with KMOG and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

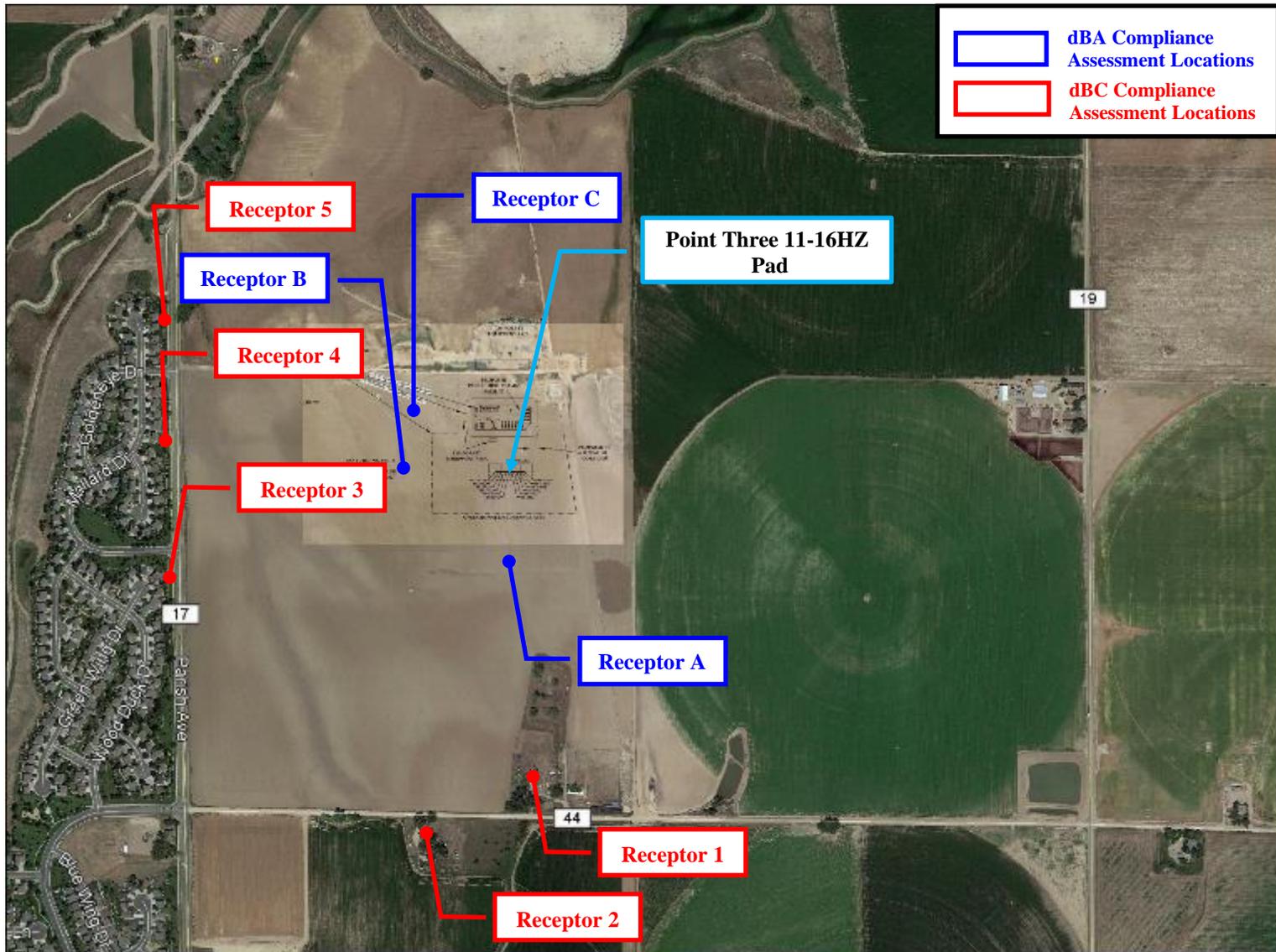
Sound level data utilized in the completions model was based on file data of the Halliburton Quiet Fleet completions crew collected by BAENC. The model consists of 12 completions trucks positioned south of the well heads. Completions equipment placement and orientation was coordinated with KMOG and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

Sound level data utilized in the production model was based on file data collected by BAENC of an operational production facility. The production facility equipment and orientation were supplied by KMOG Production equipment placement and orientation was coordinated and oriented to minimize noise impact when possible. The predicted modeling results are dependent on equipment and mitigation orientation as indicated.

The operator has the ability to utilize an equivalent drilling rig, completions fleet, and/or production equipment at the time operations commence as needed with substantially similarly equipment with an equal or less sound signature.

### 5.2 Noise Sensitive Receptors

The noise sensitive receptors utilized in the drilling and completions modeling were positioned to be consistent with the requirements of the COGCC 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 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 5-1 shows the dBA and dBC noise sensitive receptor locations.



**Figure 5-1 Noise Sensitive Receptor Locations**



## 5.3 Unmitigated Noise Modeling Results

The unmitigated modeling is based off of current drilling and completions 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 5-1 and Table 5-2. The locations in the tables correspond to the locations identified in Figure 5-1. The predicted noise levels represent only the contribution of the drilling and completions operations and do not include ambient noise or noise from other facilities. Figure 5-2 and Figure 5-3 show the Unmitigated Drilling Noise Contour Maps in dBA and dBC, respectively. Figure 5-4 and Figure 5-5 show the Unmitigated Completions Noise Contour Maps 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.

The results of the unmitigated noise modeling indicate that the drilling operations will comply with the COGCC A-weighted and C-weighted noise limits at all modeled receptors. The results of the unmitigated noise modeling indicate that the completions operations will comply with the COGCC C-weighted noise limits at all modeled receptors. However, the results of the unmitigated noise modeling indicate that completions operations will exceed COGCC A-weighted noise limits. Therefore, mitigation will be utilized for completions operations.

Mitigation is not required for drilling operations based upon the modeling results, however a mitigated modeling scenario has been created for drilling operations to investigate the possible reductions from a southern and western perimeter wall agreed to by Kerr-McGee Oil & Gas Onshore, LP per the Operator’s Agreement (OA) with Johnstown.

**Table 5-1 Unmitigated Noise Modeling Results (dBA)**

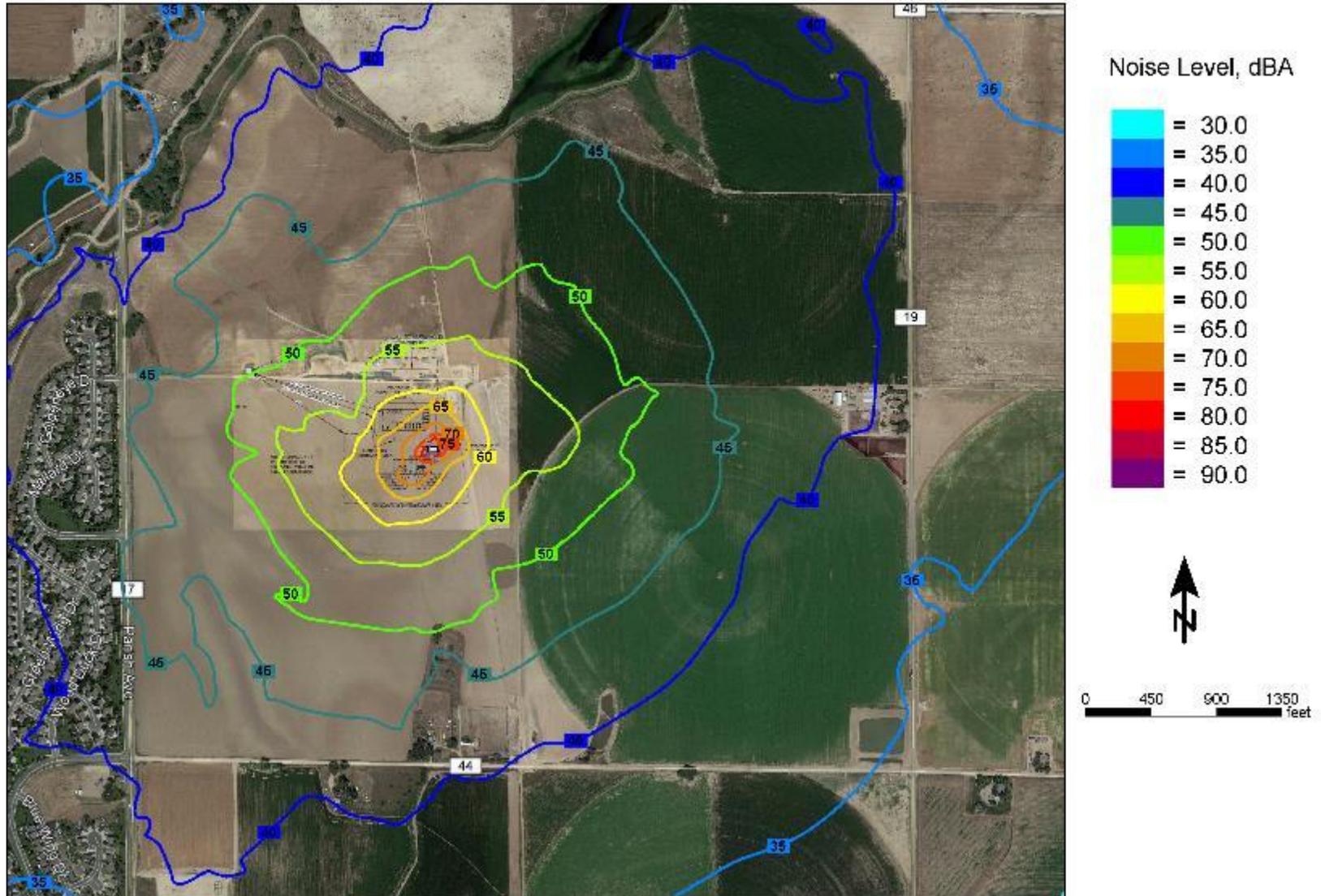
Receptor	Location Description	PD 461	Halliburton (Quiet)
Location A	350 ft. South of Pad	57	63
Location B	350 ft. West of Pad	58	62
Location C	350 ft. Northwest of Pad	55	60
<b>COGCC Noise Limit</b>	<b>350 ft. from the working pad surface</b>	<b>65 Day / 60 Night</b>	<b>65 Day / 60 Night</b>

**Table 5-2 Unmitigated Noise Modeling Results (dBC)**

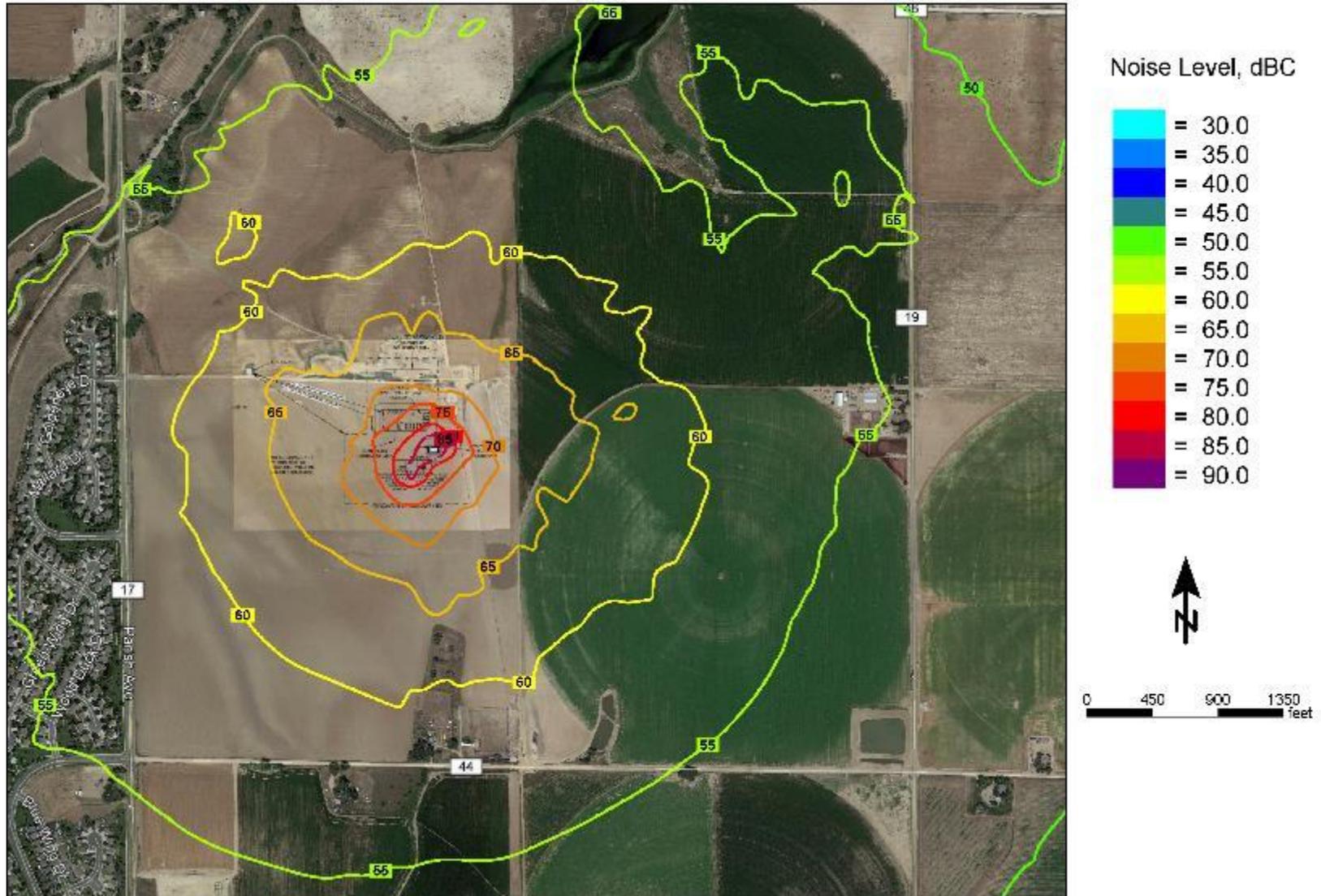
Receptor	Location Description	PD 461	Halliburton (Quiet)
Location 1**	South Residence 1	59	61
Location 2**	South Residence 2	57	60
Location 3*	Southwest Residence 2	58	61
Location 4*	West Residence	59	60
Location 5*	Northwest Residence 1	58	60
<b>COGCC Noise Limit</b>	<b>25 ft. from the exterior wall of a residence or occupied structure towards the noise source</b>	<b>65.0</b>	

\*Locations 3-5 are subject to adjusted allowable limits of 73 Day/72 Night dBC for drilling and completions

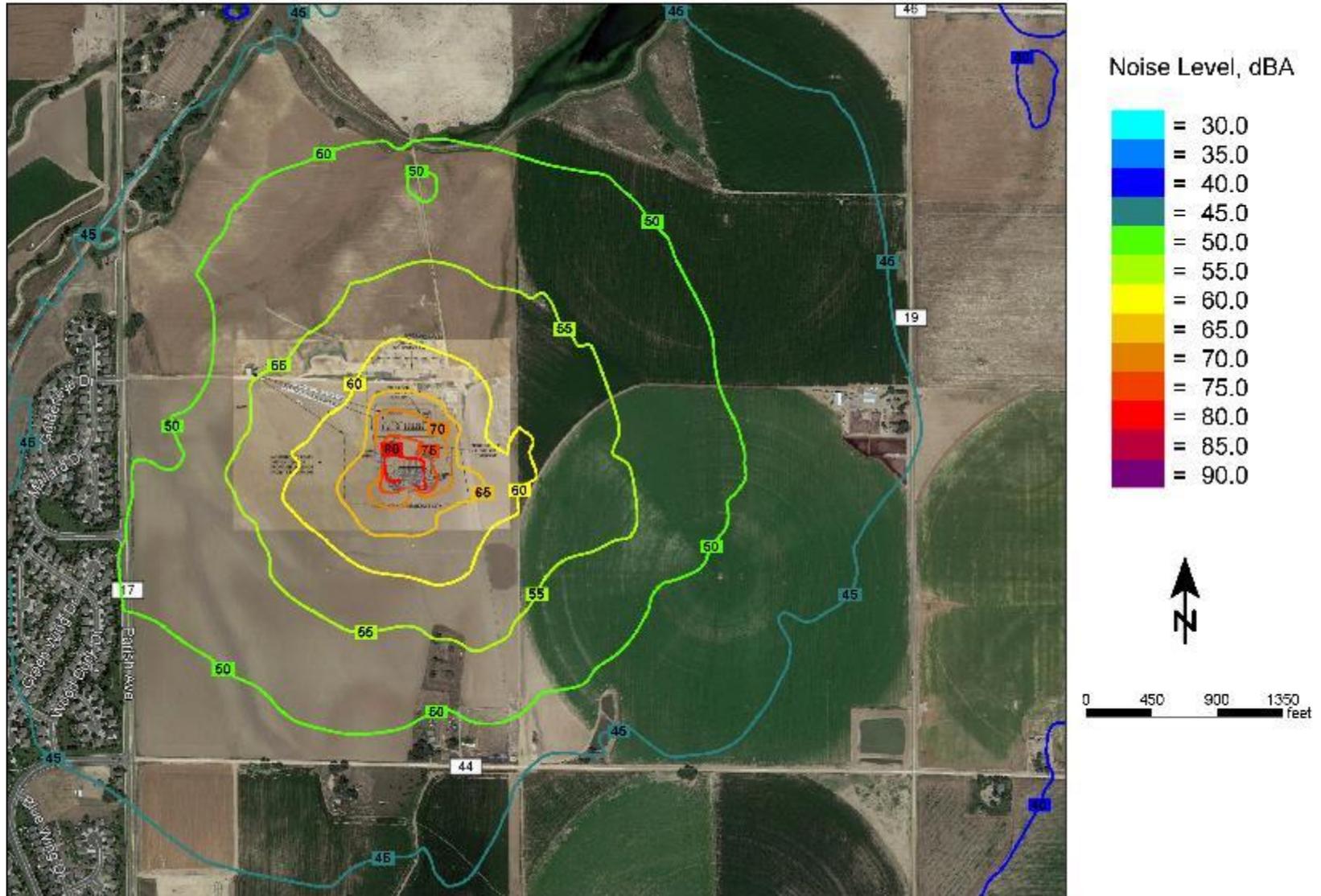
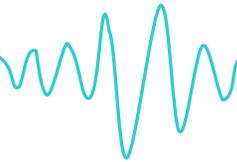
\*\*Locations 1-2 are subject to adjusted allowable limits of 80 Day/78 Night dBC for drilling and completions



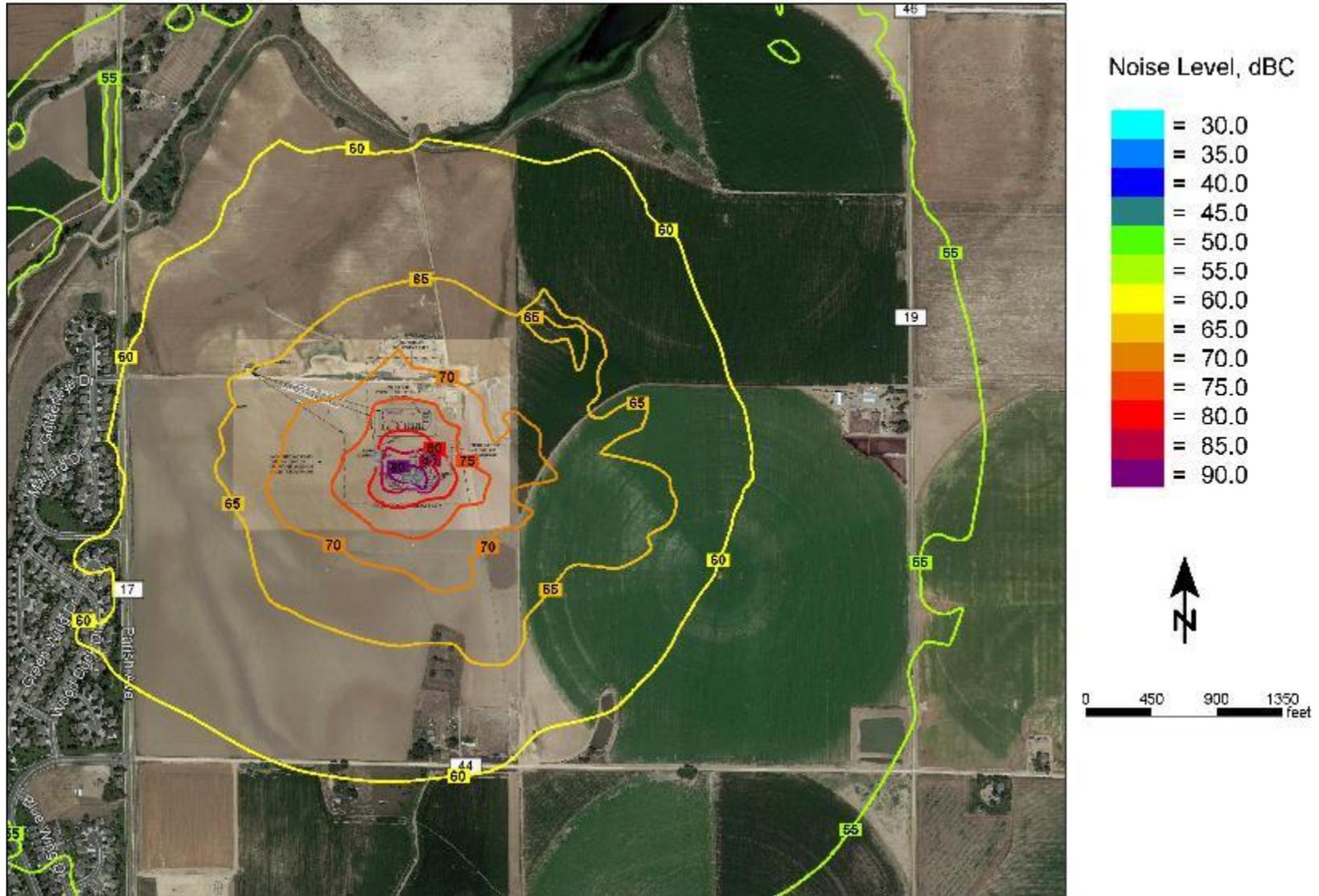
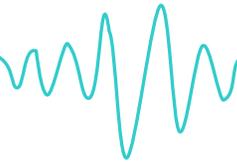
**Figure 5-2 Unmitigated Drilling Noise Contour Map (dBA)**



**Figure 5-3 Unmitigated Drilling Noise Contour Map (dBC)**



**Figure 5-4 Unmitigated Completions Noise Contour Map (dBA)**



**Figure 5-5 Unmitigated Completions Noise Contour Map (dBC)**

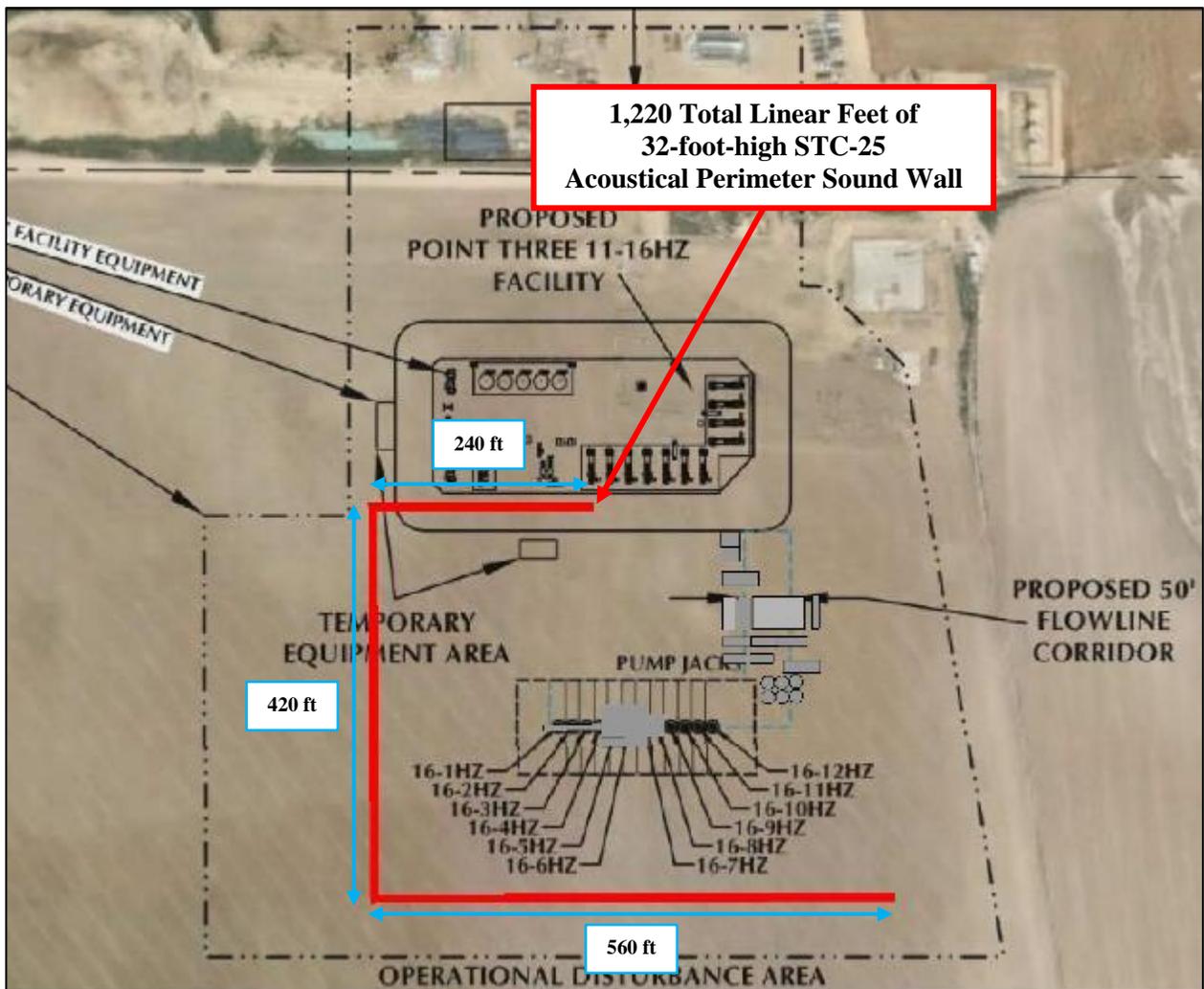


### 5.4 Drilling Mitigation

Noise mitigation for PD 461 drilling operations has been included in the modeling to reduce noise levels in the surrounding environment. The noise mitigation included in the modeling is described below:

- Approximately 1,220 total linear feet of 32-foot-high, Sound Transmission Class (STC) 25 acoustical wall installed on the perimeter of the site.

The layout for the mitigation scenario is shown in Figure 5-6.



**Figure 5-6 PD 461 Mitigation Layout**



## 5.5 Mitigated Drilling Noise Modeling Results

The mitigated modeling includes the acoustical mitigation shown in Figure 5-6. The results of the mitigated noise modeling are presented in Table 5-3 and Table 5-4. The locations in the tables correspond to the locations identified in Figure 5-1. The predicted noise levels represent only the contribution of the drilling 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.

**Table 5-3 Drilling Noise Modeling Results (dBA)**

Receptor	Location Description	Unmitigated	Mitigated
Location A	350 ft. South of Pad	57	50
Location B	350 ft. West of Pad	58	50
Location C	350 ft. Northwest of Pad	55	48
<b>COGCC Noise Limit</b>	<b>350 ft. from the working pad surface</b>	<b>65 Day /60 Night</b>	

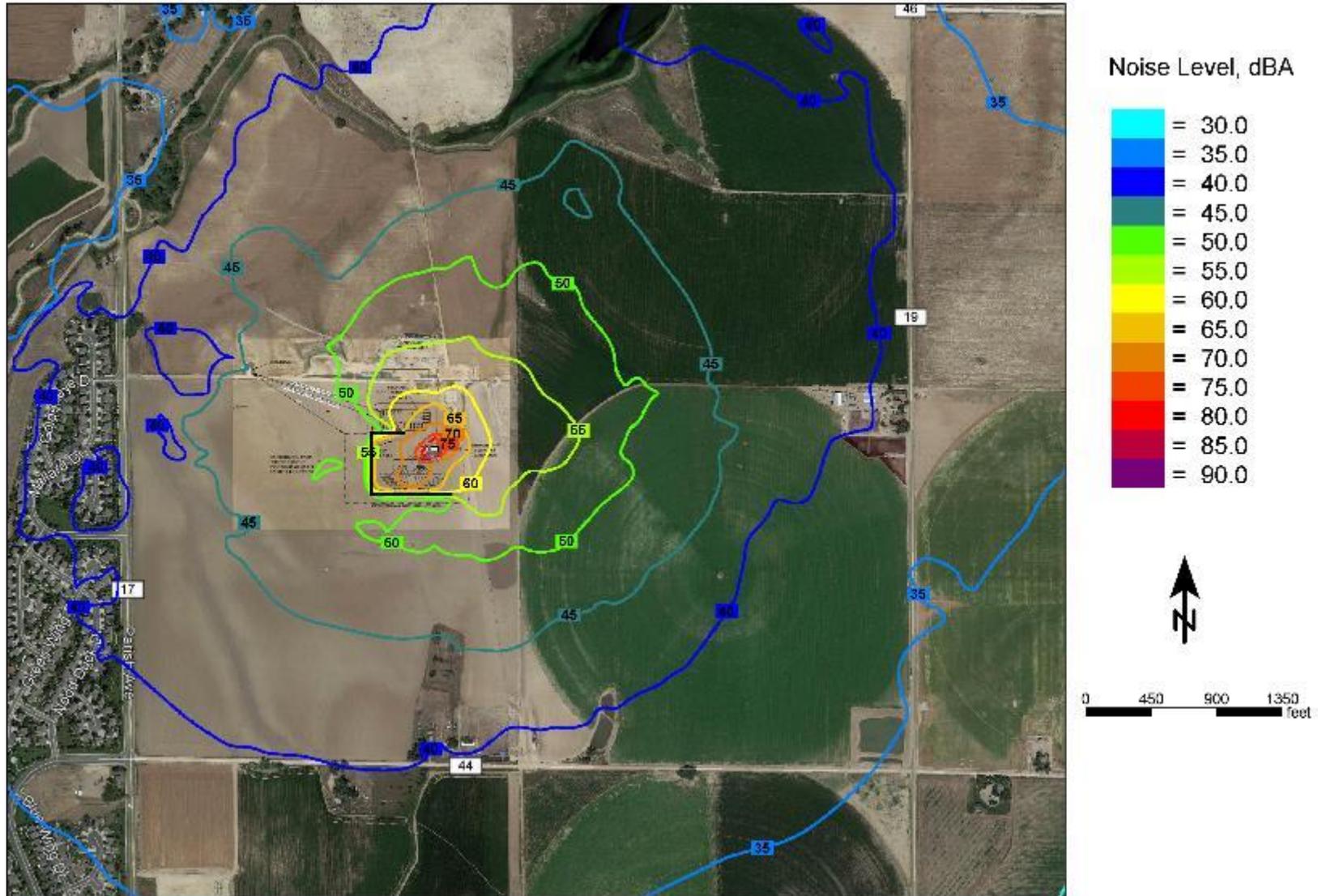
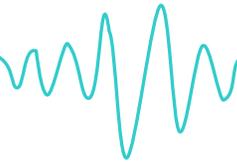
**Table 5-4 Drilling Noise Modeling Results (dBC)**

Receptor	Location Description	Unmitigated	Mitigated
Location 1**	South Residence 1	59	57
Location 2**	South Residence 2	57	57
Location 3*	Southwest Residence 2	58	57
Location 4*	West Residence	59	58
Location 5*	Northwest Residence 1	58	57
<b>COGCC Noise Limit</b>	<b>25 ft. from the exterior wall of a residence or occupied structure towards the noise source</b>	<b>65.0</b>	

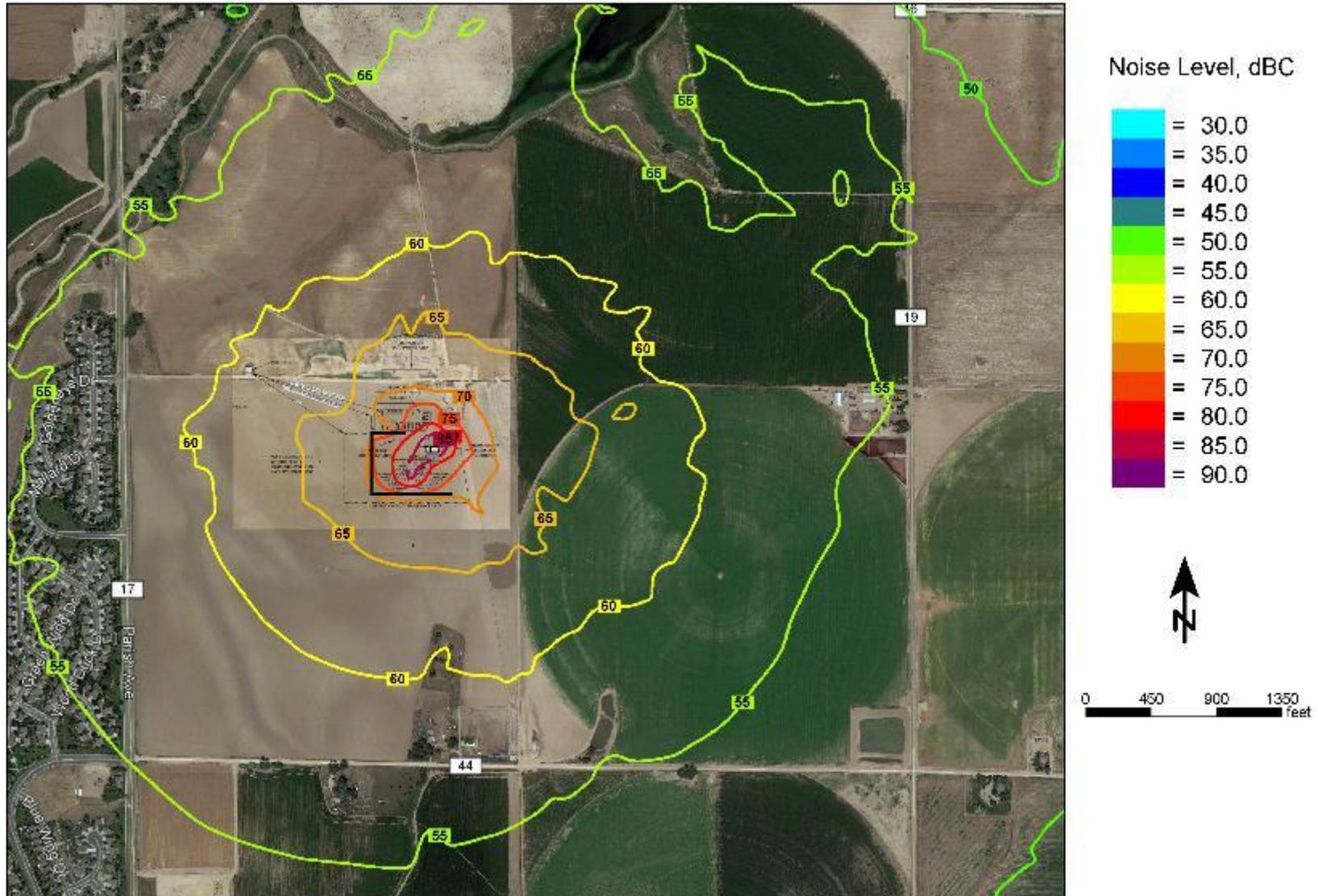
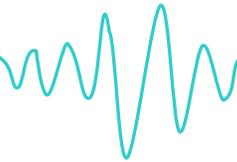
\*Locations 3-5 are subject to adjusted allowable limits of 73 Day/72 Night dBC for drilling and completions

\*\*Locations 1-2 are subject to adjusted allowable limits of 80 Day/78 Night dBC for drilling and completions

The results of the mitigated noise modeling indicate that with the implementation of the mitigation the proposed drilling operations are predicted to comply with the allowable COGCC A-weighted and C-weighted noise limits and associated limits of the Johnstown OA. The results of the mitigated noise modeling are also shown as noise contour maps. Figure 5-7 shows the Mitigated Drilling Noise Contour Map in the A-weighted scale and Figure 5-8 shows the Mitigated Drilling Noise Contour Map in the C-weighted scale.



**Figure 5-7 Mitigated Drilling Noise Contour Map (dBA)**



**Figure 5-8 Mitigated Drilling Noise Contour Map (dBC)**

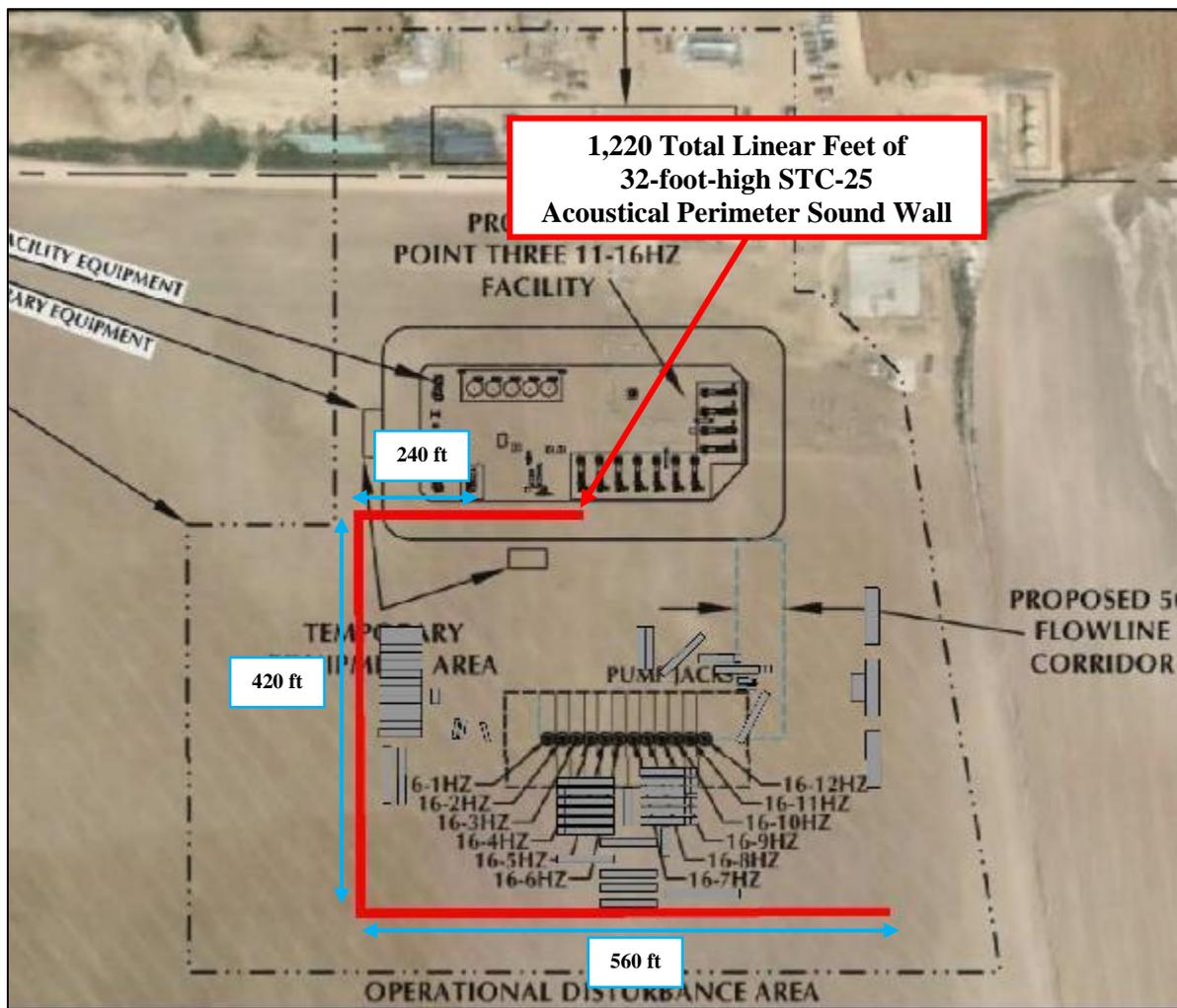


### 5.6 Completions Mitigation

Noise mitigation for the completions operations has been included in the modeling to reduce noise levels in the surrounding environment. The noise mitigation included in the modeling is described below:

- Approximately 1,220 total linear feet of 32-foot-high, Sound Transmission Class (STC) 25 acoustical wall installed on the perimeter of the site.

The layout for the mitigation scenario is shown in Figure 5-9.



**Figure 5-9 Halliburton Quiet Fleet Mitigation Layout**



**5.7 Mitigated Completions Noise Modeling Results**

The mitigated modeling includes the acoustical mitigation shown in Figure 5-9. The results of the mitigated noise modeling are presented in Table 5-5 and Table 5-6. The locations in the tables correspond to the locations identified in Figure 5-1. The predicted noise levels represent only the contribution of the completions 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.

**Table 5-5 Completions Noise Modeling Results (dBA)**

<b>Receptor</b>	<b>Location Description</b>	<b>Unmitigated</b>	<b>Mitigated</b>
Location A	350 ft. South of Pad	63	54
Location B	350 ft. West of Pad	62	56
Location C	350 ft. Northwest of Pad	60	54
<b>COGCC Noise Limit</b>	<b>350 ft. from the working pad surface</b>	<b>65 Day /60 Night</b>	

**Table 5-6 Completions Noise Modeling Results (dBC)**

<b>Receptor</b>	<b>Location Description</b>	<b>Unmitigated</b>	<b>Mitigated</b>
Location 1**	South Residence 1	61	59
Location 2**	South Residence 2	60	59
Location 3*	Southwest Residence 2	61	60
Location 4*	West Residence	60	60
Location 5*	Northwest Residence 1	60	59
<b>COGCC Noise Limit</b>	<b>25 ft. from the exterior wall of a residence or occupied structure towards the noise source</b>	<b>65.0</b>	

\*Locations 3-5 are subject to adjusted allowable limits of 73 Day/72 Night dBC for drilling and completions

\*\*Locations 1-2 are subject to adjusted allowable limits of 80 Day/78 Night dBC for drilling and completions

The results of the mitigated noise modeling indicate that with the implementation of the mitigation the proposed completions operations will comply with the COGCC A-weighted and C-weighted noise limit and associated limits of the Johnstown OA at all modeled receptors. The results of the mitigated noise modeling are also shown as noise contour maps. Figure 5-10 shows the Mitigated Completions Noise Contour Map in the A-weighted scale and Figure 5-11 shows the Mitigated Completions Noise Contour Map in the C-weighted scale.

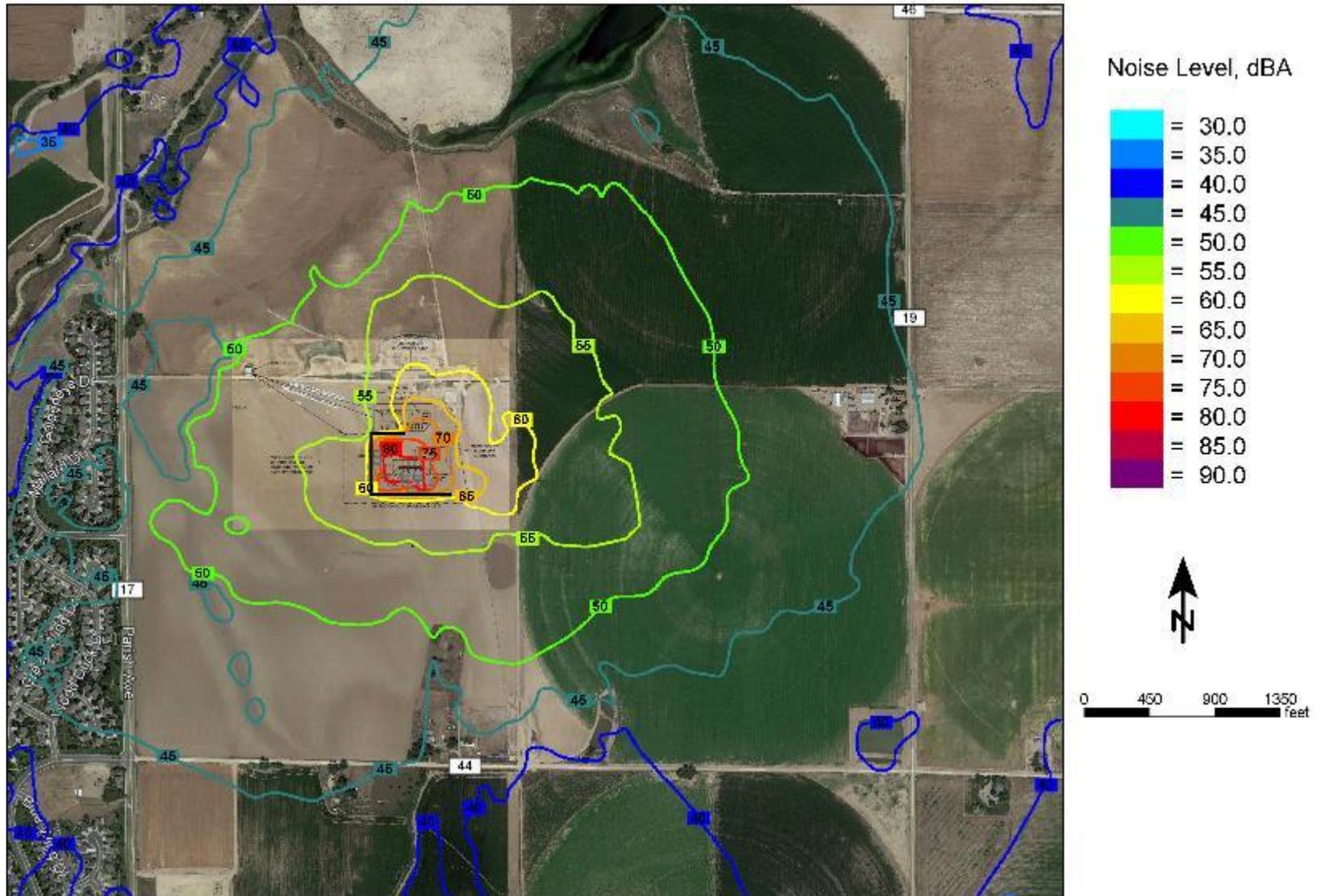
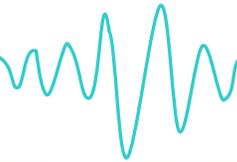
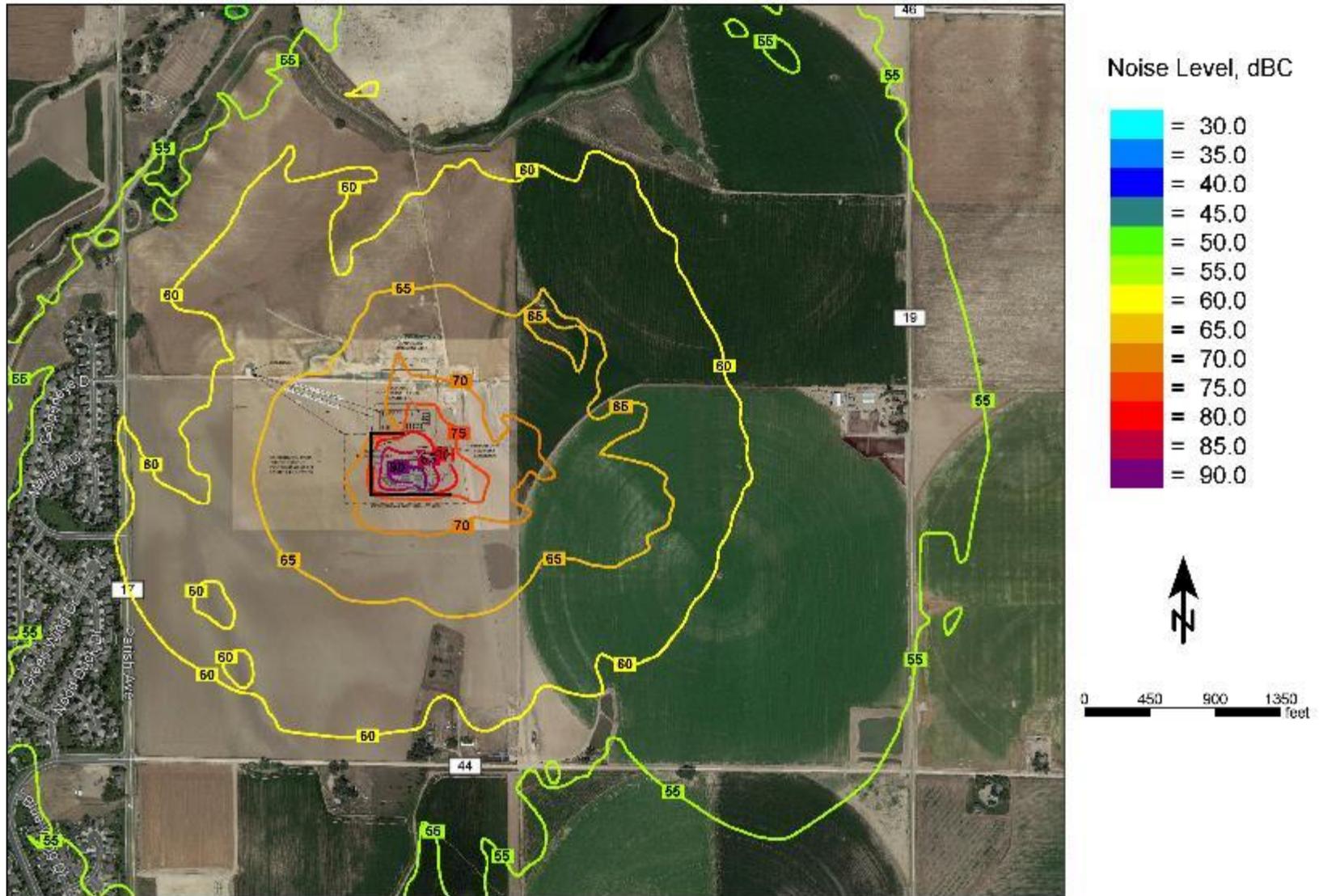
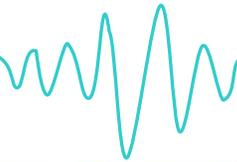


Figure 5-10 Mitigated Completions Noise Contour Map (dBA)



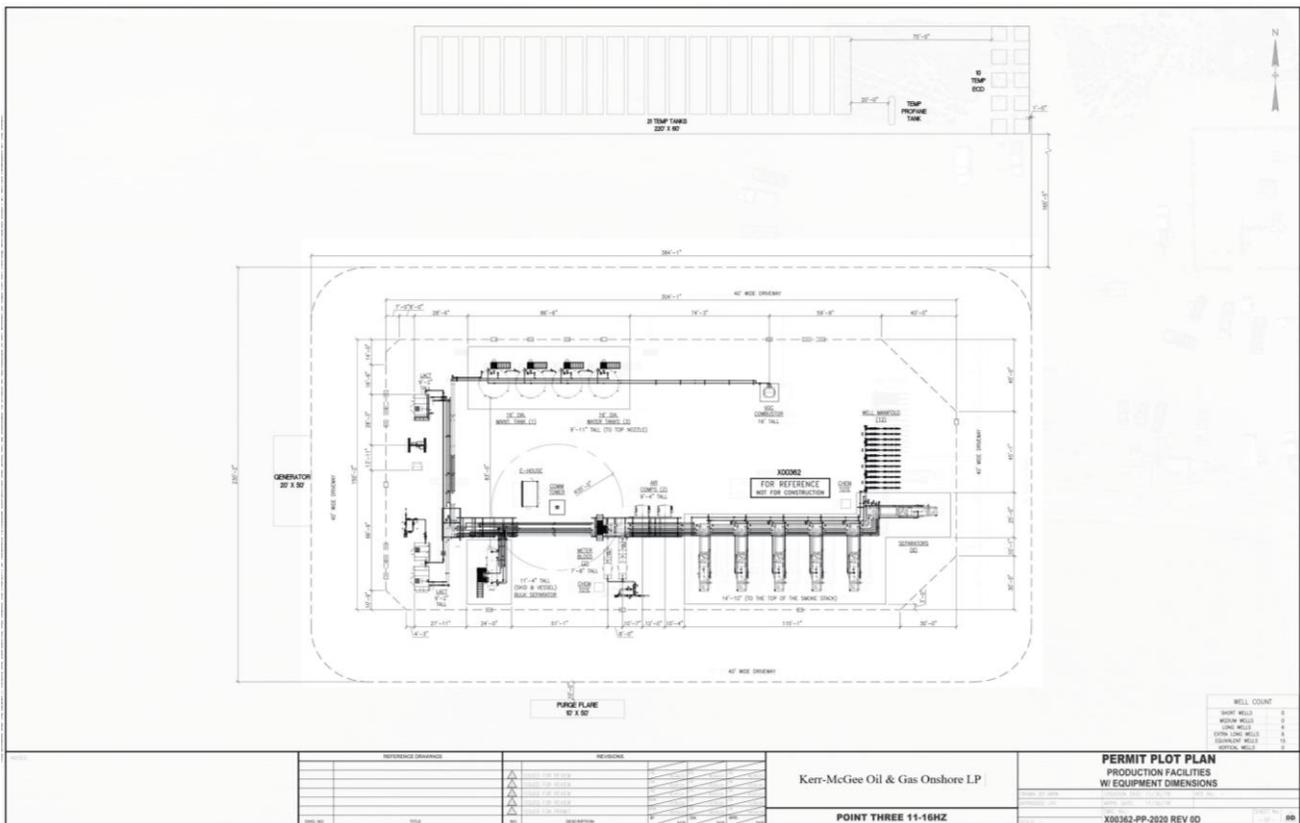
**Figure 5-11 Mitigated Completions Noise Contour Map (dBC)**



## 6. Point Three 11-16HZ Pad Production Facility Noise Modeling

### 6.1 Unmitigated Production Facility Noise Modeling Results

The unmitigated modeling is based off of 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 Point Three 11-16HZ 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 KMOG production facility with similar equipment. The production facility equipment list and equipment orientation were supplied by KMOG and can be seen Figure 6-1. The predicted modeling results are dependent on equipment and orientation as indicated.

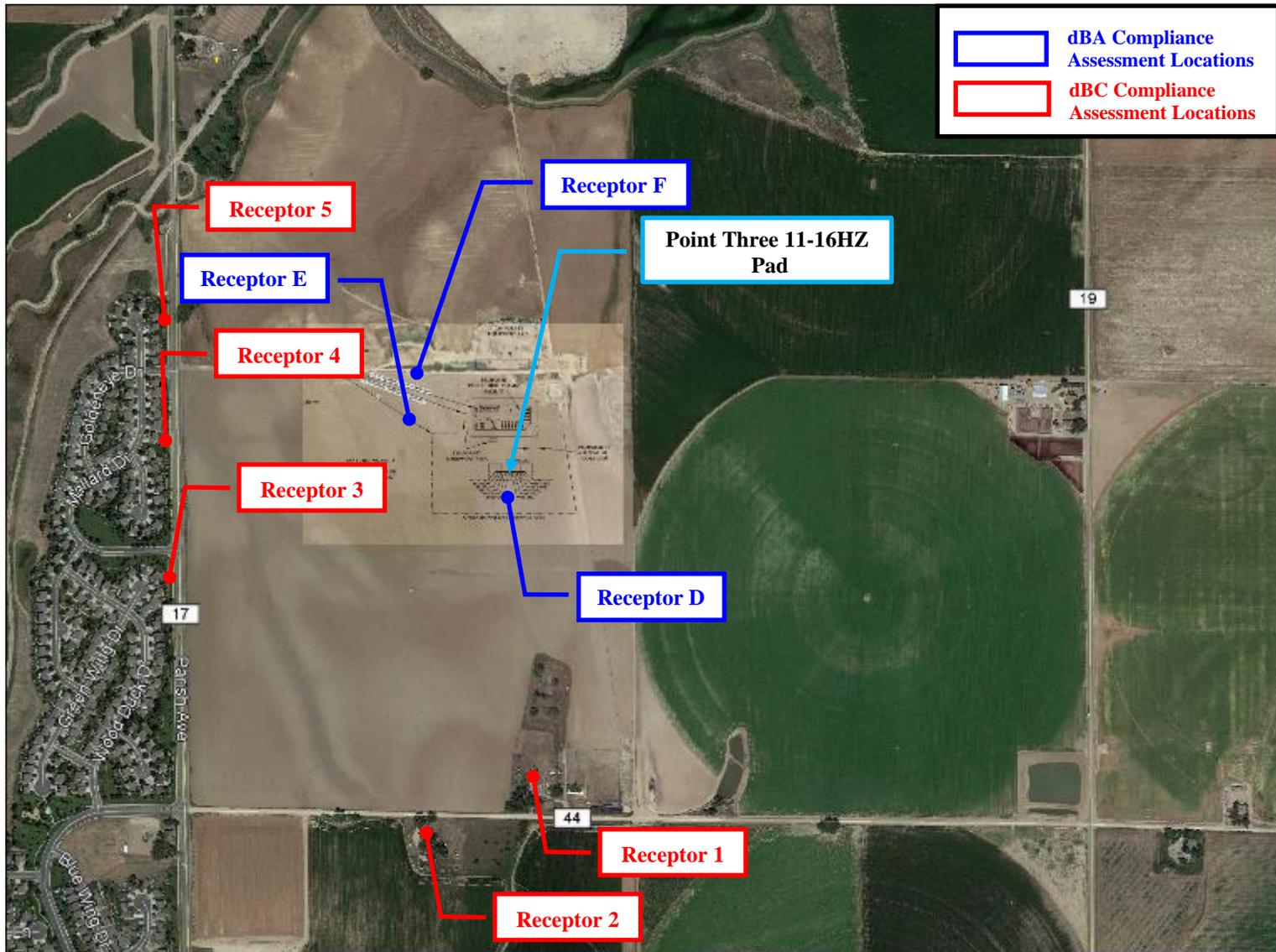


**Figure 6-1 Modeled Point Three 11-16HZ Production Facility Layout (Revised 11/30/2018)**

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 6-1, 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 COGCC 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 6-2 shows the dBA and dBC noise sensitive receptor locations.



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



The predicted modeling results are dependent on equipment and mitigation orientation as indicated and are only inclusive of the equipment listed in Table 6-1.

**Table 6-1 Production Facility Major Noise Emitting Equipment Included in Model**

Equipment	Quantity
Air Compressor	2
Electrical Panel/Box	2
LACT Skid	2
Meter Building Gas Piping	1
Separator	6
Bulk Separator	1
Burner	2
VOC Combustor	1

The results of the unmitigated production facility noise modeling are presented in Table 6-2 and Table 6-3. The locations in the tables correspond to the locations identified in Figure 6-2. The predicted noise levels represent only the contribution of the production operations and do not include ambient noise or noise from other facilities. Figure 6-3 and Figure 6-4 shows 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. The results of the unmitigated noise modeling indicate that the production operations will comply with the COGCC A-weighted and C-weighted noise level limits and associated limits of the Johnstown OA.

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

Receptor	Location Description	Production Facility
Location D	350 ft. South of Pad	45
Location E	350 ft. West of Pad	42
Location F	350 ft. Northwest of Pad	38
<b>COGCC Noise Limit</b>	<b>350 ft. from the working pad surface</b>	<b>60 Day / 55 Night</b>

**Table 6-3 Unmitigated Noise Modeling Results (dBC)**

Receptor	Location Description	Production Facility
Location 1**	South Residence 1	53
Location 2**	South Residence 2	51
Location 3*	Southwest Residence 2	52
Location 4*	West Residence	53
Location 5*	Northwest Residence 1	52
<b>COGCC Noise Limit</b>	<b>25 ft. from the exterior wall of a residence or occupied structure towards the noise source</b>	<b>60</b>

\*Locations 3-5 are subject to adjusted allowable limits of 73 Day/70 Night dBC for production

\*\*Locations 1-2 are subject to adjusted allowable limits of 75 Day/70 Night dBC for production



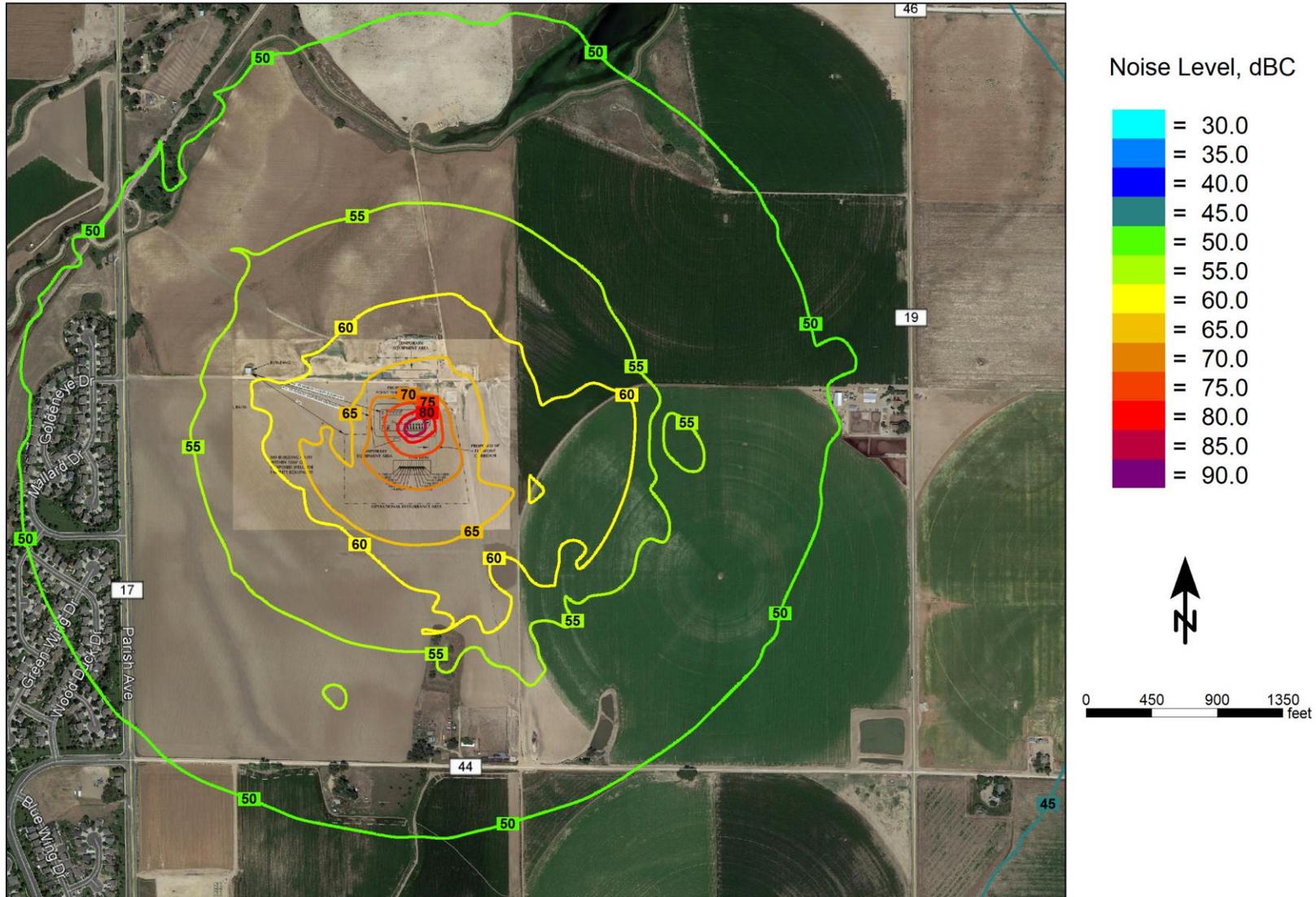


Figure 6-4 Production Facility Unmitigated Noise Contour Map (dBC)



## 7. Conclusion

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A noise model representing the proposed operations at the Point Three 11-16HZ pad was created to assess the predicted operational noise levels with the COGCC allowable dBA and dBC noise limits. The results of the unmitigated noise modeling indicate that the drilling operations will comply with the COGCC A-weighted and C-weighted noise limits at all modeled receptors. The results of the unmitigated noise modeling indicate that the completions operations will comply with the COGCC C-weighted noise limits at all modeled receptors. However, the results of the unmitigated noise modeling indicate that completions operations will exceed COGCC A-weighted noise limits. Therefore, mitigation was utilized for completions operations.

Mitigation was not required for drilling operations based upon the noise modeling results, however a mitigated modeling scenario has been created for drilling operations to investigate the possible reductions from a southern and western perimeter wall agreed to by Kerr-McGee Oil & Gas Onshore, LP per the Operator's Agreement (OA) with Johnstown.

The results of the mitigated noise modeling indicate that with the implementation of the mitigation the proposed drilling and completions operations are predicted to comply with the allowable COGCC A-weighted and C-weighted noise limits and associated limits of the Johnstown OA.

The results of the unmitigated noise modeling indicate that the Point Three production facility operations will comply with the COGCC A-weighted and C-weighted noise limits and associated limits of the Johnstown OA at all modeled receptors.