APPENDIX J:
NOISE IMPACT ASSESSMENT & NOISE SURVEY

NOISE IMPACT ASSESSMENT & NOISE SURVEY

Nobles Grade and Tamiami Prospects

Prepared By:

TRINITY CONSULTANTS
919 Lake Baldwin Lane
Suite B
Orlando, FL 32814
(407) 982-2891

August 2021

Project 200601.0086

TABLE OF CONTENTS

TABLE OF CONTENTS I

1. INTRODUCTION 2
   Fundamentals of Environmental Noise 2

2. SITE DESCRIPTION & NOISE SOURCE SUMMARY 4
   2.1 Construction Phase 4
   2.2 Operational Phase 7
   2.3 Noise Generated from Access Roads 8

3. EXISTING NOISE ENVIRONMENT 9

4. SENSITIVE RECEPTORS & SOUND LEVEL METHODOLOGY 13
   4.1 Procedure Used to Assess Sound Levels at Receptors 13
   4.2 List of Parameters & Assumptions Used in Calculations Model 13
   4.3 Predictable Worst-Case Operating Scenario – Construction Phases 14
   4.4 Predictable Worst-Case Operating Scenario – Operational Phases 15

5. RESULTS & DISCUSSION 16
   5.1 Sound Levels – Construction Phase I 16
   5.2 Sound Levels – Drilling 16
   5.3 Sound Levels – Construction Phase II 17
   5.4 Sound Levels – Completion Phase 17
   5.5 Sound Levels - Operational Phase 18

10. CONCLUSIONS 19

APPENDIX A: FIGURES 20

APPENDIX B: CALCULATIONS & EQUIPMENT SPECIFICATIONS 21

1. INTRODUCTION

Trinity Consultants, Inc. (Trinity) was retained by Burnett Oil Company, Inc. (Burnett) to assess the noise emissions associated with the proposed construction and operation of oil and gas extraction sites at Nobles Grade and Tamiami Prospects in the Big Cypress National Preserve in Collier County, Florida (Project). This assessment report supports the National Park Service's (NPS) requirement which is the lead agency for the National Environmental Policy Act (NEPA) environmental review process for various stages of the project.

Figure 1 in Appendix A shows the proposed Project location and sensitive receptors. The scope of the acoustic assessment involved the following aspects:

- Review of monitored sound levels summarized in the report titled "Baseline Ambient Sound Levels in Big Cypress National Preserve – November 2012" at the current site to quantify the existing ambient sound levels.
- Identification of all sources of noise associated with the construction and operational phases of the Project.
- Obtaining sound data for the proposed mechanical equipment at the facility from manufacturer data provided by the Applicant or estimated using engineering calculations.
- Obtaining sound data for the proposed construction equipment at the facility from the U.S Department of Transportation – Federal Highway Administration – Roadway Construction Noise Model User Guide.
- Predicting the overall noise impact at sensitive points of reception during the worst-case operating scenarios.
- Assessing whether the noise impacts at the points of reception met the applicable noise limit criteria.[1]

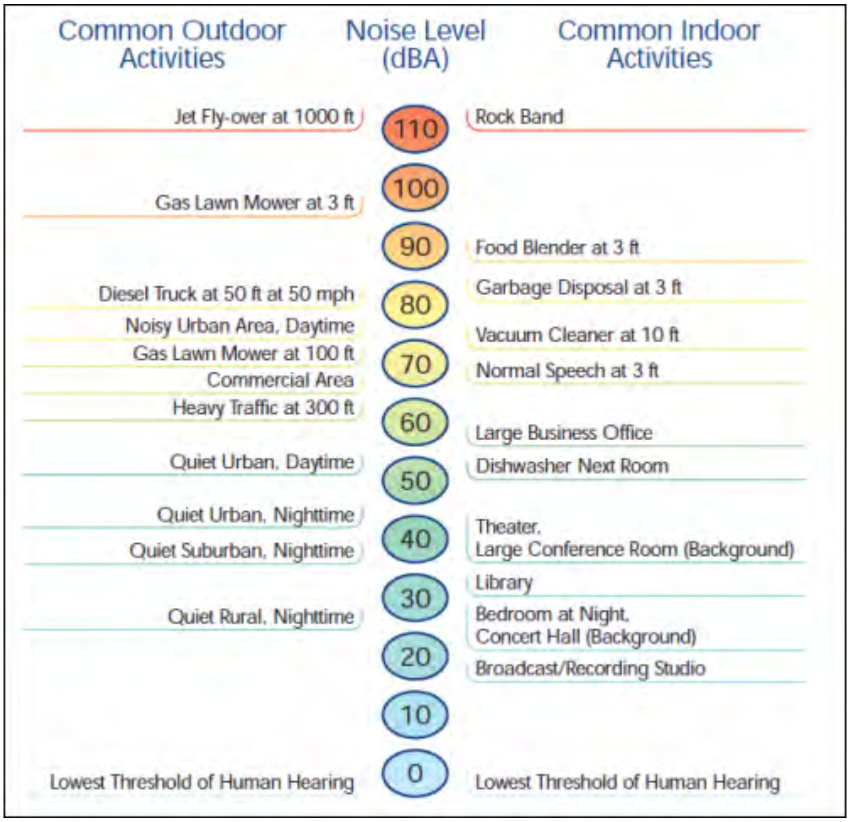
Fundamentals of Environmental Noise

Sound is caused by vibrations that generate waves of minute pressure fluctuations in the surrounding air. Sound levels are typically measured using a logarithmic decibel (dB) scale. Sound that causes disturbance or annoyance, or unwanted sound, is often called "noise." The terms sound and noise are used interchangeably in this analysis.

Human hearing varies in sensitivity for different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hertz (Hz) and is least sensitive to sound frequencies below 400 Hz or above 12,500 Hz. Consequently, several different frequency weighting schemes have been used to approximate the way the human ear responds to noise levels. The "A-weighted" decibel scale (dBA) is the most widely used for this purpose. A list of typical sound levels for example sound sources is presented in Figure A1 below.

[1] Results of modeling will be compared to several threshold values outlined in Section 10 of this report.

Figure A1 -Sound Levels of Typical noise Sources



Source: Caltrans2014

Varying sound levels often are described in terms of an equivalent constant decibel level. Equivalent sound levels (Leq) are not a simple averaging of decibel values but are based on the cumulative acoustical energy associated with the variable sound levels. Leq values sometimes are referred to as energy-averaged sound levels. As a consequence of the calculation procedure, high dB events contribute more to the Leq value than do low dB events. Leq values are used to develop single-value descriptions of average sound exposure over various periods of time. The Leq data used for average sound exposure descriptors are generally based on A-weighted sound level measurements (expressed as dBA), which include adjustments to the unweighted values to account for the variation in human hearing sensitivity across the audible frequencies.

Certain statistical noise values are sometimes used to describe the allowable sound levels, or limits, at noise-sensitive areas (NSAs). The L1, L10, and L50 statistical noise level descriptors are the noise levels that are equaled or exceeded a stated percentage of the time during a given hour. For example, an L10 = 60 dBA implies that in any hour of the day, a noise level of 60 dBA is equaled or exceeded 10 percent of the time, or for 6 minutes. The L50, the noise level exceeded 50 percent of the time, is commonly known as the "median noise level."

Sound intensity attenuates with distance as it propagates over a larger area, generally in a spherical spreading pattern, away from a point source where the sound waves were generated. Generally speaking, the sound pressure level emitted from a point source decreases by approximately 6 dBA for each doubling of distance from the source. Sound emitted from a line of point sources attenuates in a cylindrical spreading pattern and decreases approximately 3 dBA for each doubling of distance from the source.

2. SITE DESCRIPTION & NOISE SOURCE SUMMARY

The sites at Tamiami & Nobles Grade will be used for oil and gas extraction. Noise generating equipment are associated with this Project during the construction and operational phases.

2.1 Construction Phase

The construction phase of the project is further divided into Phase I (initial site preparation), drilling, completion, and Phase II construction (final site preparation and improvements after well completion). A brief description of each phase is provided below.

Construction

All surface disturbance and construction at both the Noble Grade and the Tamiami prospects will be conducted when dry season conditions exist and upon approval by NPS. Fill material will be used to bring elevation of lime rock roads and pads above storm water levels.

The anticipated equipment to be used during construction will consist of typical and customary construction equipment such as an excavator for clearing operations, dozers, rollers, and a tub grinder for mulching cleared hardwood.

It is anticipated that construction activities will occur over a duration of 120 days.

Drilling

Burnett Oil plans to employ Rapad Rig 33 or equivalent to conduct the conventional drilling operations at both Nobles Grade and Tamiami prospects. One crane will be used to aid in rig up operations.

The diesel-electric rig will be powered by three CAT generators, which will be the main source of noise generation. Other associated rig equipment will be powered by electric motors. There will be trucks present during different parts of the operation to haul equipment, deliver casing, pump cement, etc.

It is estimated that drilling operations will have a duration of 55 days per production well, and 25 days per saltwater disposal (SWD) well.

Completion

A workover rig and associated equipment will be used to carry out completion operations. No hydraulic fracturing will occur.

Description of each construction phase and the corresponding noise generating equipment used at Tamiami & Nobles Grade are provided in Table 1 and Table 2, respectively. Sound levels were obtained from the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM), estimated from manufacturer specifications, or obtained from Trinity's sound level library for similar sized equipment.

Table 1 – Construction Phases, Equipment and Sound Levels – Tamiami

Construction Activity	Equipment	Quantity of Equipment	Sound Pressure @ 50 feet Leq (dBA)	Sound Power Level (dBA)
Construction Phase I	Excavator	1	81	113
	Dozer	1	82	114
	Compactor	1	83	115
	Haul Truck	1	76	108
	Loader	1	79	111
	Skid Steer	1	79	111
	Grader	1	85	117
	Grinder	1	86	118
Drilling Phase	Crane	1	81	113
	Compressor (air)	1	78	110
	Generator	1	81	113
	Caterpillar 3512 Engines	3	75*	100
	Trac Hoe	1	78	110
Completion	Crane	1	81	113
	Compressor (air)	1	78	110
	Generator	1	81	113
	Caterpillar 3406C	1	75*	100
	Trac Hoe	1	78	110
Construction Phase II	Excavator	1	81	113
	Dozer	1	82	114
	Compactor	1	83	115
	Haul Truck	1	76	108
	Loader	1	79	111
	Skid Steer	1	79	111
	Grader	1	85	117
	Grinder	1	86**	118

Source: U.S. Department of Transportation – Federal Highway Administration (FHWA) – Roadway Construction Noise Model User Guide

NA: Sound levels not provided in FWHA construction model. Sound power levels obtained from Trinity Sound level library.

*Manufacturer data was used which provides 75 dBA at 7 meters.

**Manufacturer data for a mobile grinder was used from Trinity's sound level library.

Table 2 – Construction Phases, Equipment and Sound Levels – Nobles Grade

Construction Activity	Equipment	Quantity of Equipment	Sound Pressure @ 50 feet Leq (dBA)	Sound Power Level (dBA)
Construction Phase I	Excavator	1	81	113
	Dozer	1	82	114
	Compactor	1	83	115
	Haul Truck	1	76	108
	Loader	1	79	111
	Skid Steer	1	79	111
	Grader	1	85	117
	Grinder	1	86	118
Drilling Phase	Crane	1	81	113
	Compressor (air)	1	78	110
	Generator	1	81	113
	Caterpillar 3512 Engines	3	75*	100
	Trac Hoe	1	78	110
Completion	Crane	1	81	113
	Compressor (air)	1	78	110
	Generator	1	81	113
	Caterpillar 3406C	1	75*	100
	Trac Hoe	1	78	110
Construction Phase II	Excavator	1	81	113
	Dozer	1	82	114
	Compactor	1	83	115
	Haul Truck	1	76	108
	Loader	1	79	111
	Skid Steer	1	79	111
	Grader	1	85	117
	Grinder	1	86**	118

Source: U.S. Department of Transportation – Federal Highway Administration (FHWA) – Roadway Construction Noise Model User Guide

NA: Sound levels not provided in FWHA construction model. Sound power levels obtained from Trinity Sound level library.

*Manufacturer data was used which provides 75 dBA at 7 meters.

**Manufacturer data for a mobile grinder was used from Trinity's sound level library.

Figure 2.1 – Figure 2.3 provide the locations of the modeled noise sources during each construction phase at Tamiami. Figure 2.4 provides the location of the modeled access roads.

Figure 2.5 – Figure 2.7 provide the locations of the modeled noise sources during each construction phase at Nobles Grade. Figure 2.8 provides the location of the modeled access roads.

2.2 Operational Phase

In general, the day-to-day operations at the Nobles Grade and Tamiami prospects will entail separation of oil/water/gas, pumping and transfer, storage of oil and produced water, combustion of surplus gas (in rare occurrences), and loading of oil products in tank trucks.

Equipment on location to be used for daily operation includes natural gas generators, separators, heater treaters, pumps, vapor recovery units, storage tanks, and combustors. All motors used, aside from the generators, will be electric.

Oil will be transferred to a Burnett Oil operated off-lease loading station. Gas will not be sold due to low volumes and lack of sales options but will be used for power generation. Oil will be transferred to off-lease loading stations via pipelines as described in previous sections.

Finally, engines (and generators) will be used as the primary source of power for the day-to-day operations.

Significant noise generating equipment and the corresponding sound power levels for the proposed operational equipment at Tamiami, and Nobles Grade are summarized in Table 3 and Table 4, respectively.

Table 3 - Operational Equipment – Tamiami

Equipment Description	Quantity	Sound Power Level (dBA)
LACT Pump – 30 HP	1	94.3
Circulation Pump – 3 HP	1	84.3
VRU – 20 HP	1	92.5
Mesa Solutions 350 kW Generator	3	100

Table 4 - Operational Equipment – Nobles Grade

Equipment Description	Quantity	Sound Power Level (dBA)
SWD Primary Pump – 50 HP	1	96.5
Oil Transfer Primary Pump – 15 HP	1	91.3
Circulation Pump – 3 HP	1	84.3
VRU – 20 HP	1	92.5
Mesa Solutions 350 kW Generator	3	100

Pump sound power levels were calculated based on the horsepower rating using published methodology. Detailed calculations are provided in Appendix B. Sound power levels for the generators were obtained from the manufacturer specification sheets.

- The following sources were deemed insignificant due to the low sound power associated with the equipment, or the absence of noise generating mechanical components:
- Oil and Water Tanks
- Gunbarrel Separators
- Oil Loading
- Combustion Equipment – typical sound power levels range from 60 – 70 dBA which are insignificant relative to the other operational equipment
- Combustion equipment – Sound power level: 45 dBA

Figure 2.9 and Figure 2.10 in Appendix A provide the location of the operational noise sources for Tamiami and Nobles Grade, respectively.

2.3 Noise Generated from Access Roads

Haul trucks travelling along the proposed access roads were assessed during every construction and operational phase at Tamiami & Nobles Grade. Figure 2.4 and Figure 2.8 in Appendix A show the location of the access roads.

An ambient sound survey was conducted in November 2012 at various locations in the Big Cypress National Preserve. Sound monitoring locations from the report titled "Baseline Ambient Sound Levels in Big Cypress National Preserve – November 2012" are summarized Table 5. Table 6 summarizes the equivalent continuous sound levels (L_{eq}) at every monitoring locations. Both winter and summertime data is presented.

Table 5 – Summary of 2012 Sound Monitoring Survey Locations

Site ID	Site Name	National Land Cover Database Classification	NPS Vegetation Type	Latitude (decimal degrees)	Longitude (decimal degrees)	Altitude (ft)	# Days of Data	
							Summer	Winter
BICY001	Sweetwater Strand	Woody Wetlands	Cypress	25.82268°	81.10184°	4	29	29
BICY002	Fire Prairie Trail	Emergent Herbaceous Wetlands	Wet Prairie	26.07847°	81.29279°	10	25	29
BICY003	Nobles Grade	Evergreen Forest	Pine Flatwoods	26.23178°	81.04912°	16	23	28
BICY004	Lime Tree Hydro	Emergent Herbaceous Wetlands	Marsh	25.67708°	80.92766°	3	28	0
BICY005	Austin Strand Concho Trail	Woody Wetlands	Hammock	25.99250°	81.173539°	9	26	0
BICY006	Oil Pad #5, Raccoon Point	Developed	Disturbed	26.0011°*	80.9137°	9	1	0
BICY007	Oil Pad #5 Entrance, Raccoon Point	Developed	Disturbed	26.0019°*	80.9118°	10	1	0
BICY008	Dade-Collier Jetport	Developed	Disturbed	25.6218°	80.9508°	2	16	0

* Latitude updated to 26.011° and 26.0019° for BICY006 & BICY007 respectively instead of 25.011° and 26.0019°

Table 6 - Summary of 2012 Sound Survey

Acoustic Zone	Site Name	Site ID	Existing Ambient		Natural Ambient	
			Daytime	Night-time	Daytime	Night-time
			L_{Aeq} (dBA)		L_{Aeq} (dBA)	
Woody Wetlands	Sweetwater Strand	BICY001	50.2	49.1	39.4	46.5
Emergent Herbaceous Wetlands	Fire Prairie Trail	BICY002	49.8	47.6	38.5	44.2
Evergreen Forest	Nobles Grade	BICY003	54.0	50.6	42.4	46.9
Emergent Herbaceous Wetlands	Lime Tree Hydro	BICY004	46.5	56.7	37.9	49.2
Woody Wetlands	Austin Strand Concho Trail	BICY005	54.2	55.7	36.9	54.4
Developed	Oil Pad #5, Raccoon Point	BICY006	51.2	N/A	N/A	N/A
Developed	Oil Pad #5 Entrance, Raccoon Point	BICY007	69.8	N/A	N/A	N/A
Developed	Dade-Collier Jetport	BICY008	52.0	55.6	29.8	43.2

The data presented in Table 6 was used for assessment of compliance of the modeled noise impacts generated during the construction and operational activities.

Trinity conducted sound monitoring at the Tamiami and Nobles Grade locations. The purpose of monitoring was to confirm whether values obtained during the 2012 survey are still representative of actual conditions.

Table 7 - Summary of 2021 Noise Monitoring Locations

Site ID	Latitude (decimal degrees)	Longitude (decimal degrees)	Altitude (ft)
Tamiami	25.98187°	80.87959°	15
Nobles Grade	26.13828°	81.11289°	15

Tamiami Monitor

Nobles Grade Monitor

Trinity conducted monitoring with a Larson Model 831C sound level meter, coupled with a pre-polarized low noise preamplifier and microphone (378A04) capable of measuring noise levels as low as 6.5 dB A-weighted. Power was provided by a lithium-ion battery, which was recharged by a 60-watt solar panel. The meter and battery were housed inside an environmental enclosure (Pelican-type case). The microphone was placed at a height of approximately 5-feet above ground.

Results of noise measurements are summarized in the tables below. Noise data associated with equipment setup and recovery activities were excluded from the analysis.

Table 8 - Tamiami Measured Levels

	4/14/2021	4/15/2021	4/16/2021	4/17/2021	4/18/2021	4/19/2021	4/20/2021
L_{Aeq}	50.1	50.6	49.2	51.6	50.5	54.7	54.6
L_{50}	45.8	44.8	45.2	48.8	48.6	49.8	49.8
L_{90}	40.6	37.3	40.4	44.3	42.1	44.4	44.4

Table 9 - Nobles Grade Measured Levels

	4/14/2021	4/15/2021	4/16/2021	4/17/2021	4/18/2021	4/19/2021	4/20/2021
L_{Aeq}	45.5	44.8	43.9	45.0	46.6	52.0	48.3
L_{50}	39.3	39.7	39.2	38.2	38.4	40.5	40.7
L_{90}	32.7	33.9	31.5	33.2	32.3	32.5	34.3

A comparison of L_{Aeq} values from the 2012 survey to those obtained during the 2021 survey indicate that sound levels at the proposed Tamiami and Nobles Grades locations are similar to the existing ambient values obtained in 2012. The higher values obtained for the Tamiami monitor could be associated with noise contributions from nearby industrial operations.

4. SENSITIVE RECEPTORS & SOUND LEVEL METHODOLOGY

Burnett identified the sensitive noise receptors in the project area and provided Trinity with the coordinates of each receptor. Receptors are shown in Figure 1 in Appendix A and are summarized in Table 10.

Table 10 - Noise Sensitive Receptor Descriptions & Locations

Receptor	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
Tamiami		
FNST @ Tamiami	25.973565°	-80.974652°
10-mile Camp	25.964333°	-80.986304°
WOST nest site	25.967126°	-80.849850°
Private Camp	25.973899°	-80.884865°
Visual Point	25.984474°	-80.879839°
Nobles Grade		
FNST @ Nobles Grade	26.139018°	-81.071629°
Ivy Camp	26.128368°	-81.060330°
Oak Hill Camp	26.084608°	-81.036231°
Stump Camp	26.087335°	-81.123648°

4.1 Procedure Used to Assess Sound Levels at Receptors

To assess the sound levels associated with the proposed Project, it is important to define the various potential modes of operation. For example, during the operational phase, all the equipment will operate 24/7. However, during the construction phases, different equipment will operate during the lifetime of the construction project and will be operational only during the daytime.

Sound power levels were used as input to the acoustic computer model Cadna-A (Computer Aided Noise Abatement). The model is based on ISO Standard 9613-2 "Acoustics – Attenuation of sound during Propagation Outdoors" the ISO based model accounts for reduction in sound level due to increased distance and geometrical spreading, air absorption, ground attenuation, and acoustical shielding by intervening structures, topography and brush. The model is considered conservative since it represents atmospheric conditions that promote propagation of sound from source to receiver.

4.2 List of Parameters & Assumptions Used in Calculations Model

The following assumptions were used in the calculations:
Stationary sources were modeled as point sources
Mobile sources such as truck traffic on access roads were modeled using moving point sources
Model Configuration and parameters include:

- Lateral diffraction and second order reflection
- Ground absorption coefficient was set to 1.0 in the model since the site is dominated by absorptive, vegetative ground

4.3 Predictable Worst-Case Operating Scenario – Construction Phases

The equipment and sound power levels modeled for each construction phase are provided in Table 1 and Table in Section 2.1. Table 11 and Table 12 below provide the worst-case operating scenarios for the construction operations at Tamiami and Nobles Grade, respectively.

Table 11 – Summary of Worst-Case Operating Scenarios – Construction Operation - Tamiami

Construction Phase	Daytime Worst-Case 1-Hour Period	Night-time Worst-Case 1-Hour Period
Construction Phase I	All construction phase equipment operating continuously & simultaneously	Not operating
Drilling Equipment	All drilling phase equipment operating continuously & simultaneously	All drilling phase equipment operating continuously & simultaneously
Completion Phase	All completion phase equipment operating continuously & simultaneously	Not operating
Construction Phase II	All construction phase equipment operating continuously & simultaneously	Not operating
Haul Trucks on Access Roads	2 trucks travelling on each access road per hour	Not operating

Table 12 Summary of Worst-Case Operating Scenarios – Construction Operation – Nobles Grade

Construction Phase	Daytime Worst-Case 1-Hour Period	Night-time Worst-Case 1-Hour Period
Construction Phase I	All construction phase equipment operating continuously & simultaneously	Not operating
Drilling Equipment	All drilling phase equipment operating continuously & simultaneously	All drilling phase equipment operating continuously & simultaneously
Completion Phase	All completion phase equipment operating continuously & simultaneously	Not operating
Construction Phase II	All construction phase equipment operating continuously & simultaneously	Not operating
Haul Trucks on Access Roads	2 trucks travelling on each access road per hour	Not operating

4.4 Predictable Worst-Case Operating Scenario – Operational Phases

The equipment and sound power levels modeled for the operational phases are provided in Table 3 and Table 4 in Section 2.2. Table 13 and Table 14 below provide the worst-case operating scenarios for the operational phases at Tamiami and Nobles Grades, respectively.

Table 13- Summary of Worst-Case Operating Scenarios – Operational Phase – Tamiami

Sources	Daytime Worst-Case 1-Hour Period	Night-time Worst-Case 1-Hour Period
Pumps	All pumps operating continuously & simultaneously	All pumps operating continuously & simultaneously
Generators	All generators operating continuously & simultaneously	All generators operating continuously & simultaneously

Table 14 – Summary of Worst-Case Operating Scenarios – Operational Phase – Nobles Grade

Sources	Daytime Worst-Case 1-Hour Period	Night-time Worst-Case 1-Hour Period
Pumps	All pumps operating continuously & simultaneously	All pumps operating continuously & simultaneously
Generators	All generators operating continuously & simultaneously	All generators operating continuously & simultaneously

Sound levels were determined for each project phase. Sound level values included in the following tables represent absolute noise level at the modeled receptor location. Insignificant noise impact denotes no impacts from proposed activities, i.e., existing sound levels will not be altered by proposed activities.

5.1 Sound Levels – Construction Phase I

Figure 3.1 and Figure 3.6 in Appendix A show the sound level contours generated by the proposed project during the Construction I phase at Tamiami and Nobles Grade, respectively. Modeled sound levels are summarized in Table 15 at every noise sensitive receptor.

Table 15 – Sound Level – Construction I Phase

Receptor	Sound Level L_{eq} (dBA)[2]
Tamiami	
FNST @ Tamiami	Insignificant
10-mile Camp	Insignificant
WOST nest site	Insignificant
Private Camp	42
Visual Point	60
Nobles Grade	
FNST @ Nobles Grade	7
Ivy Camp	Insignificant
Oak Hill Camp	Insignificant
Stump Camp	Insignificant

5.2 Sound Levels – Drilling

Figure 3.2 and Figure 3.7 in Appendix A show the sound level contours generated by the proposed Project during the Drilling phase at Tamiamil and Nobles Grade, respectively. Modeled sound levels are summarized in Table 16 at every noise sensitive receptor.

Table 16 – Sound Level – Drilling Phase

Receptor	Sound Level L_{eq} (dBA)
Tamiami	
FNST @ Tamiami	Insignificant
10-mile Camp	Insignificant
WOST nest site	Insignificant
Private Camp	37
Visual Point	56

[2] Model output for Cadna-A represents negligible sound levels from a modeled source as negative numbers (e.g., -37 dBA). The use of the term insignificant in the report is meant to be aligned with the model output.

Nobles Grade	
FNST @ Nobles Grade	7
Ivy Camp	Insignificant
Oak Hill Camp	Insignificant
Stump Camp	Insignificant

5.3 Sound Levels – Construction Phase II

Figure 3.3 and Figure 3.8 in Appendix A show the sound level contours generated by the proposed Project during the Construction II phase at Tamiami and Nobles Grade, respectively. Modeled sound levels are summarized in Table 17 at every noise sensitive receptor.

Table 17– Sound Level – Construction II Phase

Receptor	Sound Level L_{eq} (dBA)
Tamiami	
FNST @ Tamiami	Insignificant
10-mile Camp	Insignificant
WOST nest site	Insignificant
Private Camp	42
Visual Point	60
Nobles Grade	
FNST @ Nobles Grade	7
Ivy Camp	Insignificant
Oak Hill Camp	Insignificant
Stump Camp	Insignificant

5.4 Sound Levels – Completion Phase

Figure 3.4 and Figure 3.9 in Appendix A show the sound level contours generated by the proposed Project during the Well Completion phase at Tamiami and Nobles Grade, respectively. Modeled sound levels are summarized in Table 18 at every noise sensitive receptor.

Table 18– Sound Level – Completion Phase

Receptor	Sound Level L_{eq} (dBA)
Tamiami	
FNST @ Tamiami	Insignificant
10-mile Camp	Insignificant
WOST nest site	Insignificant
Private Camp	37
Visual Point	56
Nobles Grade	
FNST @ Nobles Grade	7
Ivy Camp	Insignificant
Oak Hill Camp	Insignificant
Stump Camp	Insignificant

5.5 Sound Levels - Operational Phase

Figure 3.5 and Figure 3.10 in Appendix A show the sound level contours generated by the proposed Project during the Operational phase at Tamiami and Nobles Grade, respectively. Modeled sound levels are summarized in Table 19 at every noise sensitive receptor.

Table 19 – Sound Level Impacts – Operational Phase

Receptor	Sound Level L_{eq} (dBA)
Tamiami	
FNST @ Tamiami	Insignificant
10-mile Camp	Insignificant
WOST nest site	Insignificant
Private Camp	29
Visual Point	44
Nobles Grade	
FNST @ Nobles Grade	7
Ivy Camp	Insignificant
Oak Hill Camp	Insignificant
Stump Camp	Insignificant

10. CONCLUSIONS

Trinity Consultants, Inc. (Trinity) was retained by Burnett Oil Company, Inc. (Burnett) to assess the sound level emissions associated with the proposed construction and operation of oil and gas extraction sites at Nobles Grade and Tamiami Prospects in the Big Cypress National Preserve in Collier County, Florida (Project).

All significant sources of sound associated with the construction and operational phases of the Project were identified and the corresponding sound data was entered in to the Cadna-A noise model to calculate sound levels in the area.

The resulting sound levels were compared to the sound monitoring data summarized in the report titled "Baseline Ambient Sound Levels in Big Cypress National Preserve – November 2012" at the current site, and with data collected by Trinity in April 2021.

Modeled sound levels at Nobles Grade were found to be below existing ambient levels, as well as selected threshold levels for all phases of the proposed project.

Modeled sound levels at Tamiami were found to be below existing noise levels for most receptors, except for the Visual Point receptor. Modeled sound levels for both construction phases, drilling, and completion at the Visual Point receptor exceed the lowest noise level (L_{Aeq}) obtained during the 2021 monitoring (49.2 dBA). Modeled sound levels for the operations phase are below the lowest noise level obtained for Tamiami during the 2021 monitoring.

The modeled values were also compared to several published threshold values. Haralabidis et al. (2008) suggest that sound events as low as 35 dBA can have adverse effects on blood pressure in sleeping humans (2008). This is also the desired background sound level in classrooms (ANSI S12.60-2002). The World Health Organization recommends that noise levels inside bedrooms remain below 45 dBA (L_{Aeq},1s) (Berglund et al. 1999). The U.S. Environmental Protection Agency's has suggested a value of 52 dBA as the speech interference threshold for speaking in a raised voice to an audience at 10 meters.[3] A value of 60 dBA is used for estimating impacts on normal conversations at a distance of 1 meter.[4]

Modeled sound levels for the drilling, and completion phases exceed the 35 dBA threshold at the Visual Point receptor and the Private Camp. Modeled sound levels for the construction phases exceed the 35 dBA threshold at the Private Camp and Visual Point. Modeled sound levels for the operations phase are below the lowest noise level obtained for Tamiami during the 2021 monitoring, and do not exceed any of the referenced thresholds at the Private Camp. The sound level at the Visual Point remains below 45 dBA for the operational phase.

Due to the nature of the sound sources and operations, sound levels exceeding selected thresholds will be of a temporary nature. All long-term activities (operational phase) associated with the Tamiami and Nobles Grade prospects result in sound levels below existing ambient levels or selected thresholds.

---

[3] U.S. EPA. Informatio on Levels of Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety. March 1974.

[4] National Park Service. Baseline Ambientl Sould levels in Big Cypress National Preserve. November 2012.

APPENDIX A: FIGURES

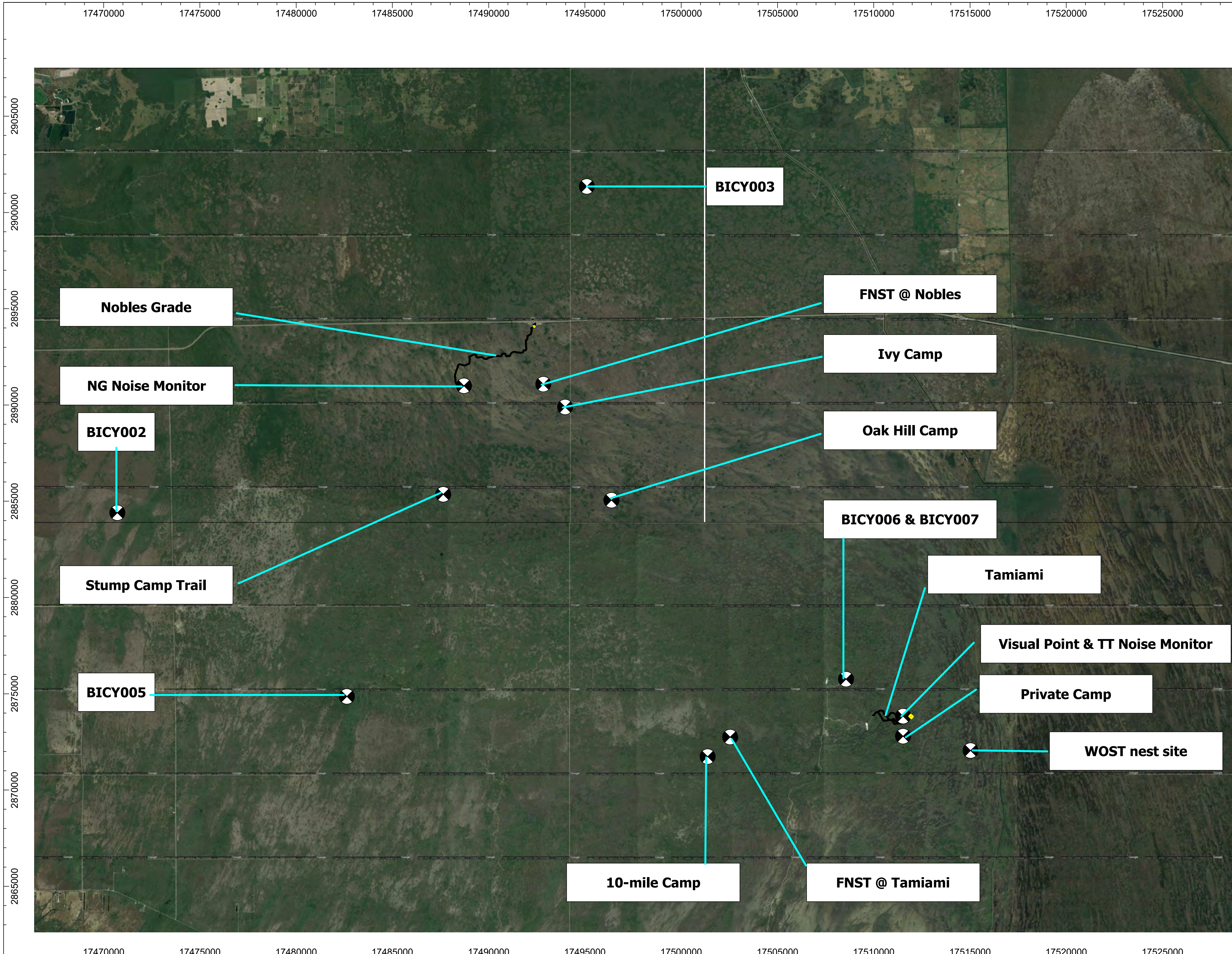


Figure 1

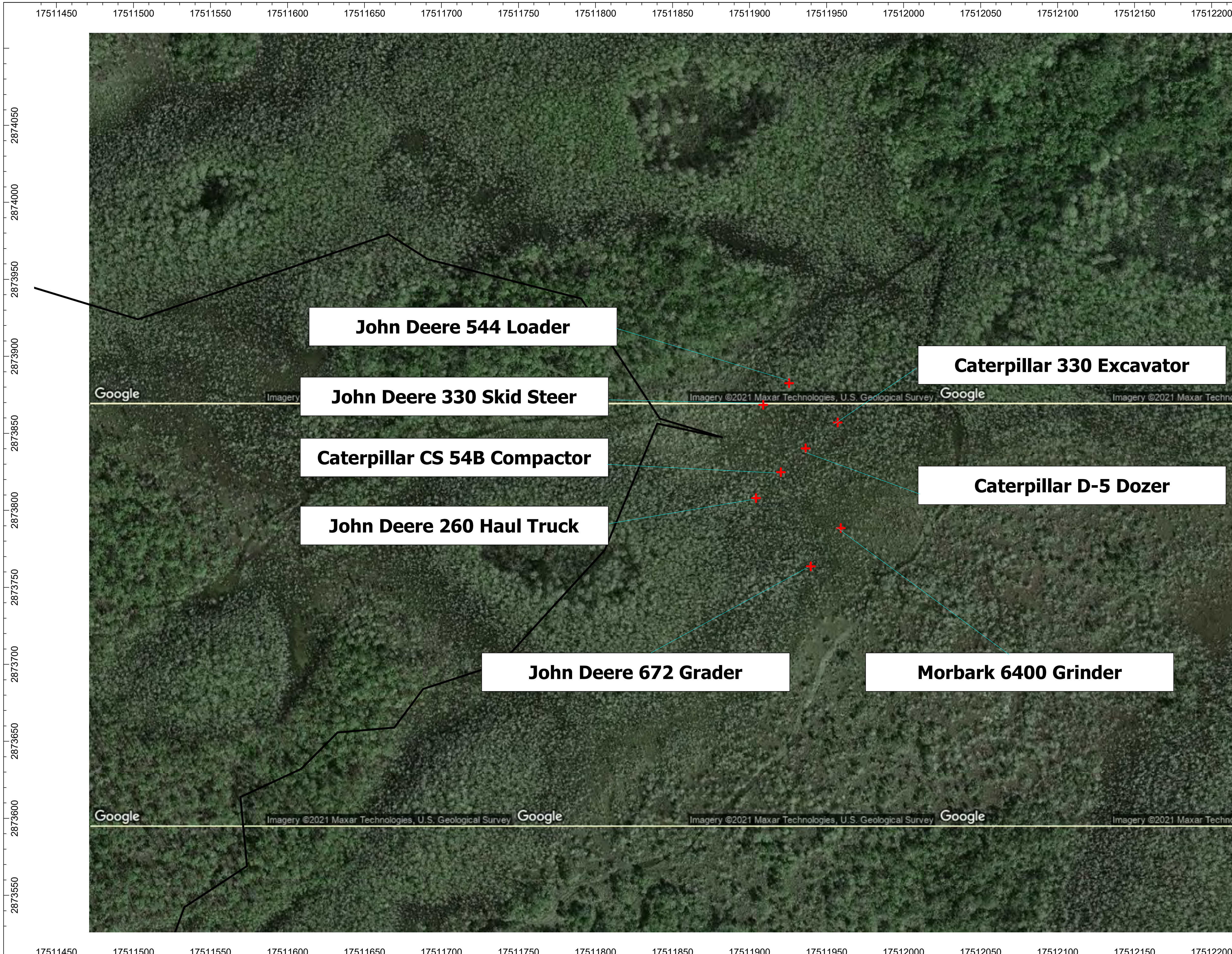
Scaled Area Location Plan & Sensitive Noise Receptors

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

+ Point Source
Line Source
Building
Receiver



Trinity Consultants

Figure 2.1

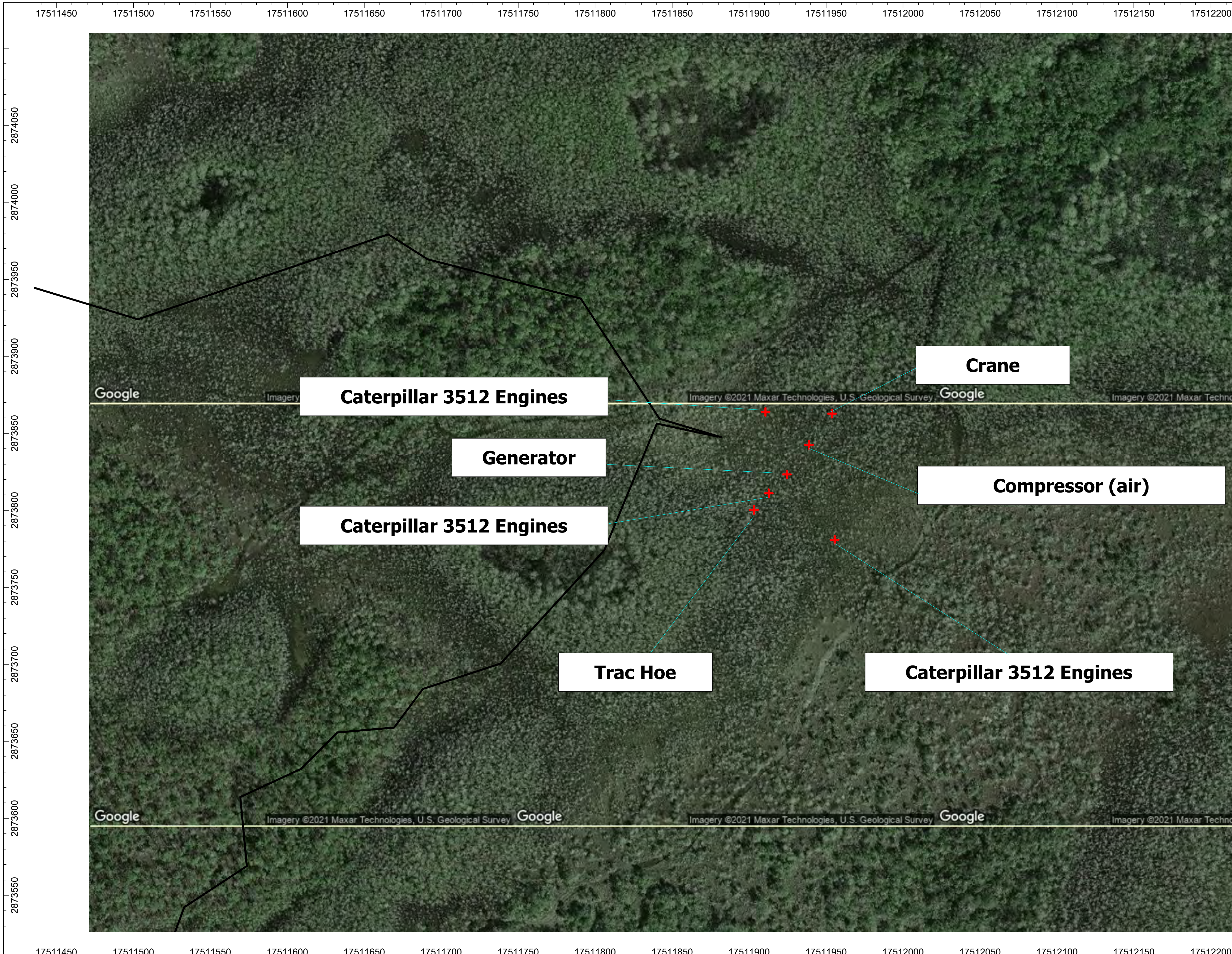
Tamiami Trail Construction I & II Phases Noise Source Locations

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

+ Point Source
— Line Source
Receiver



Trinity Consultants

Figure 2.2

Tamiami Trail
Drilling Phase
Noise Source Locations

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

Point Source
Line Source
Receiver

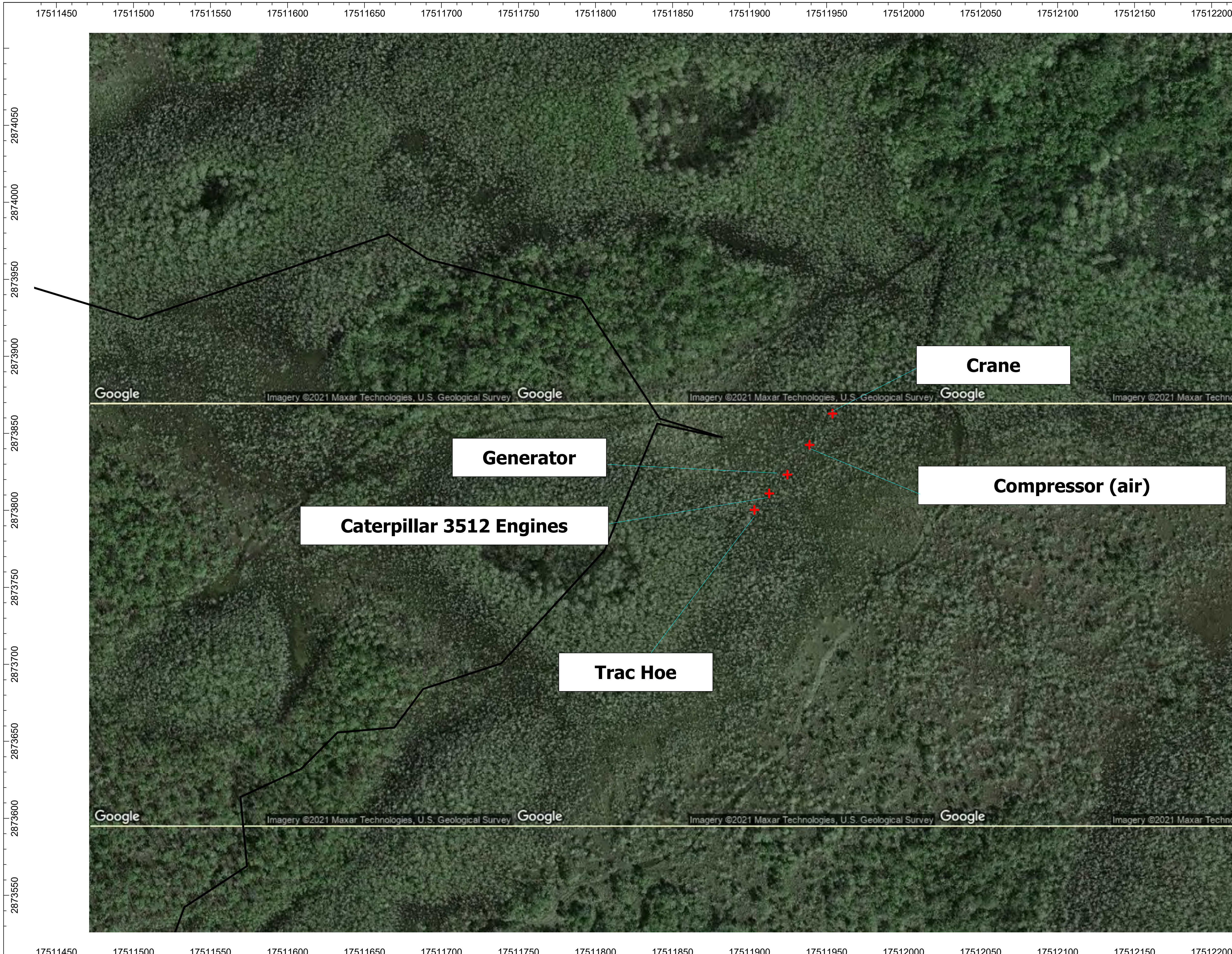


Figure 2.3

Tamiami Trail
Completion Phase
Noise Source Locations

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

+ Point Source
— Line Source
Receiver

Figure 2.4

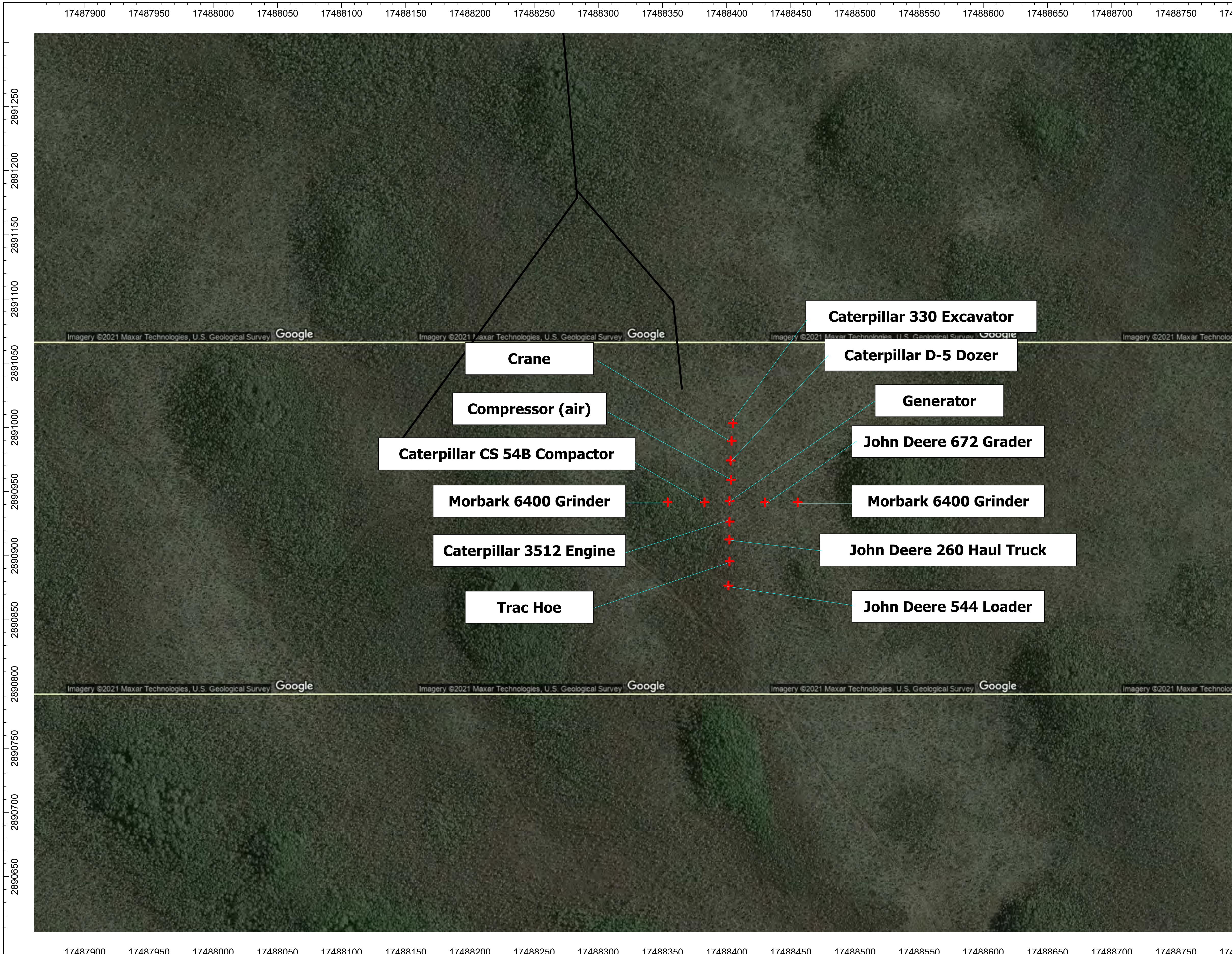
Tamiami Trail
Location of Modeled
Truck Traffic
on Access Roads

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

\+ Point Source
Line Source
Building
Receiver



Trinity Consultants

Figure 2.5

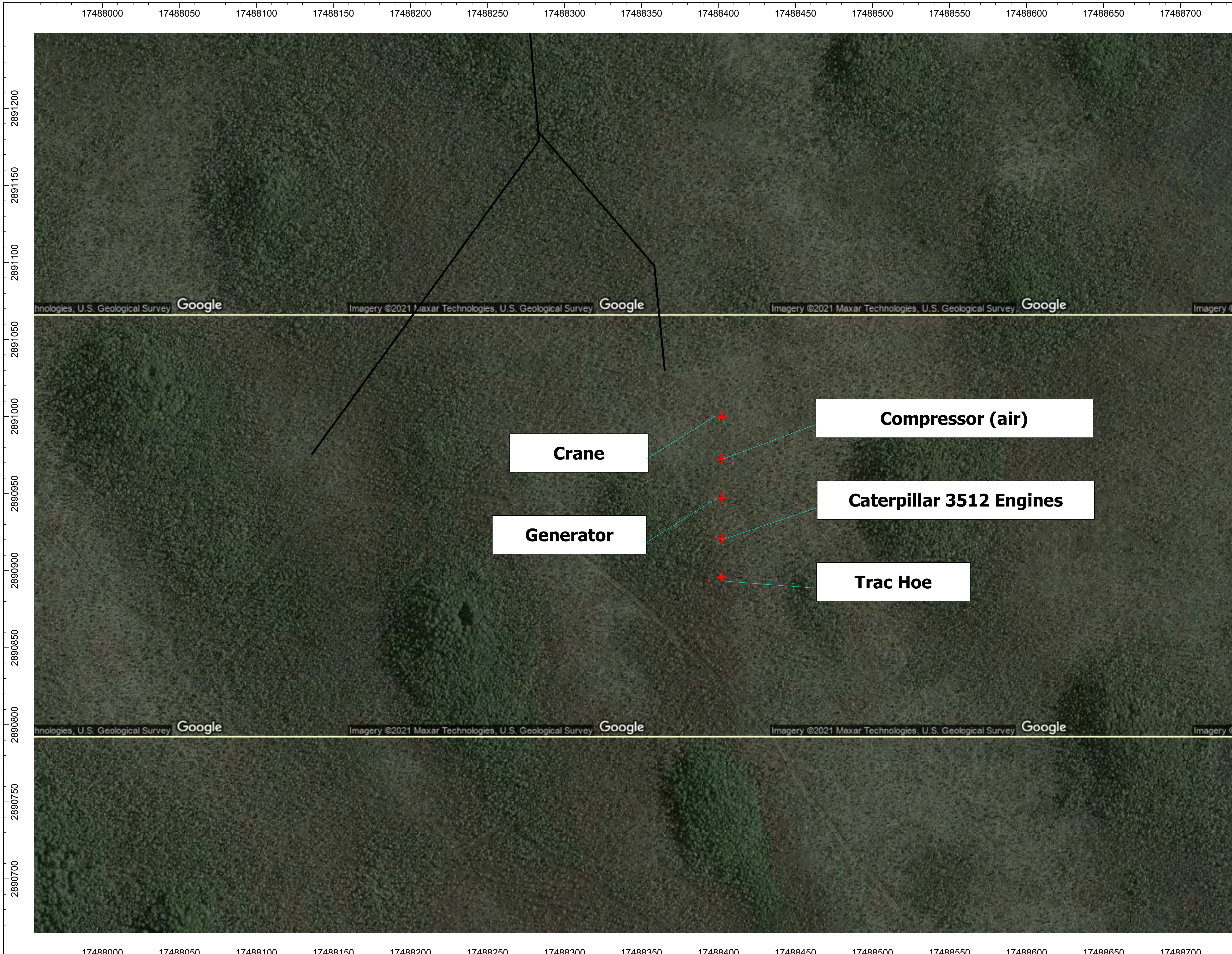
Nobles Grade
Construction I & II Phases
Noise Source Locations

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

Point Source
Line Source
Receiver



Trinity Consultants

Figure 2.6

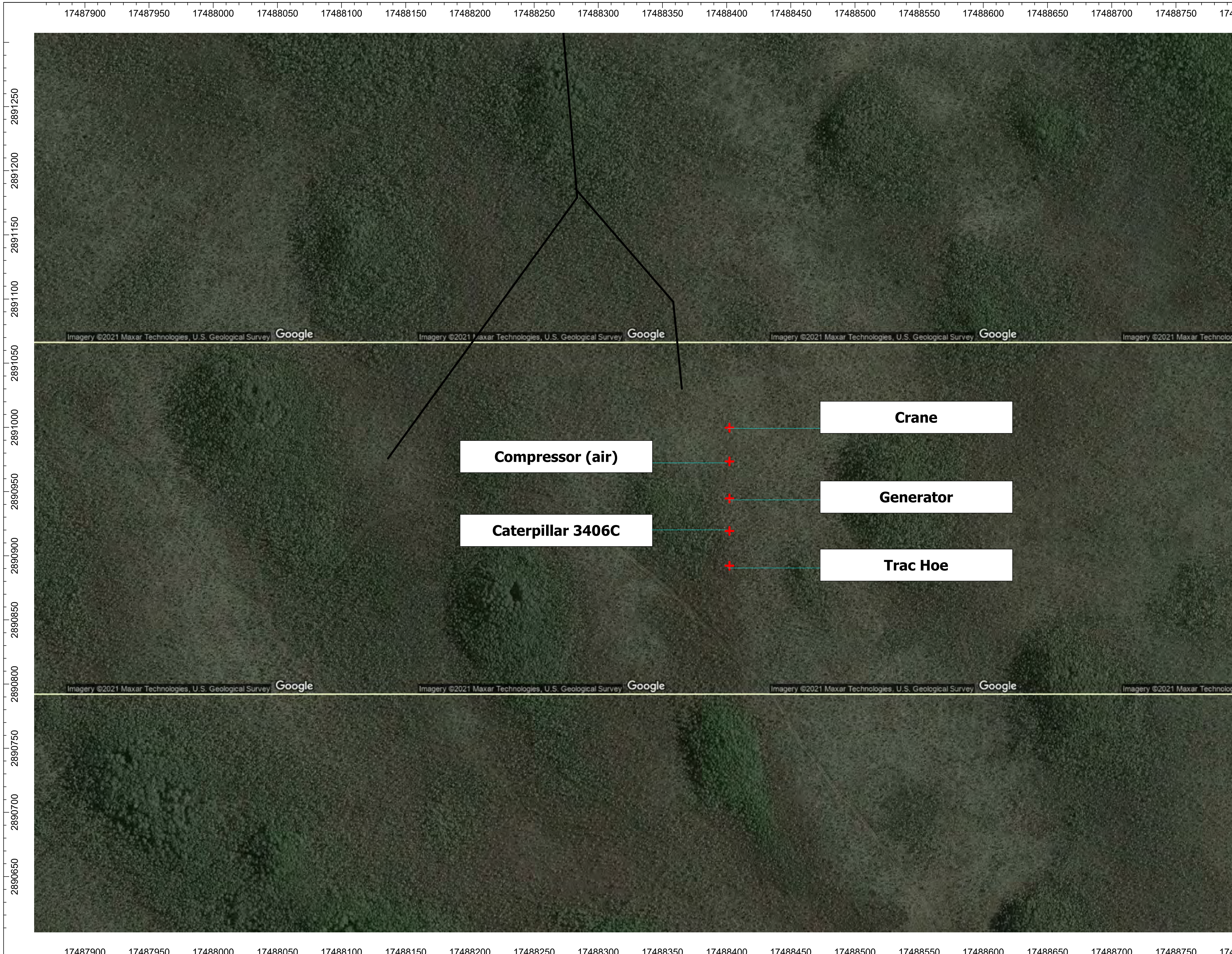
Nobles Grade
Drilling Phase
Noise Source Locations

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

+ Point Source
Line Source
Receiver



Trinity Consultants

Figure 2.7

Nobles Grade
Completion Phase
Noise Source Locations

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

\+ Point Source
— Line Source
Receiver

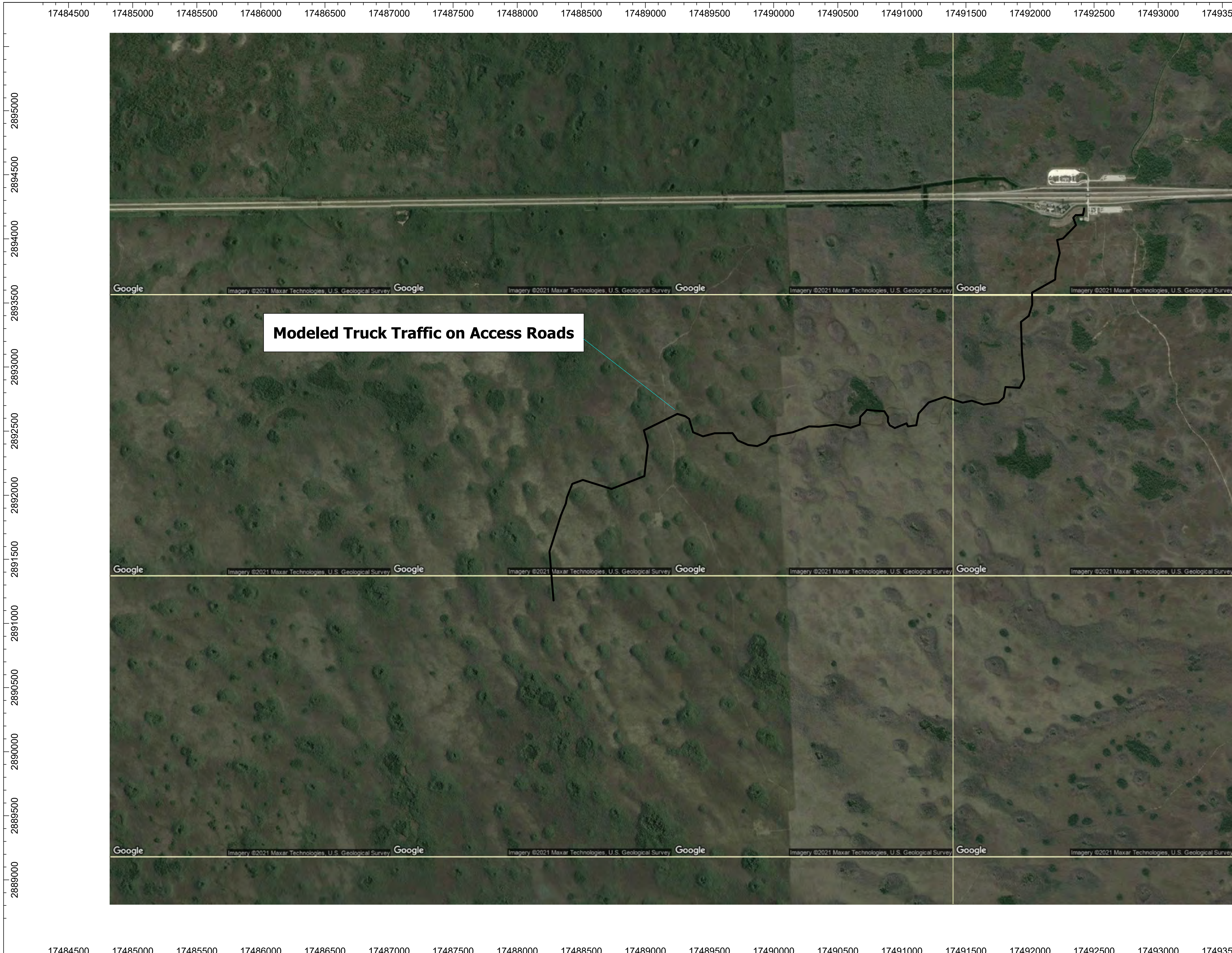


Figure 2.8

Nobles Grade
Location of Modeled
Truck Traffic
on Access Roads

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

+ Point Source
Line Source
Receiver

Trinity Consultants

Figure 2.9

Tamiami Trail
Operational Phase
Noise Source Locations

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

+ Point Source
Line Source
Building
Receiver

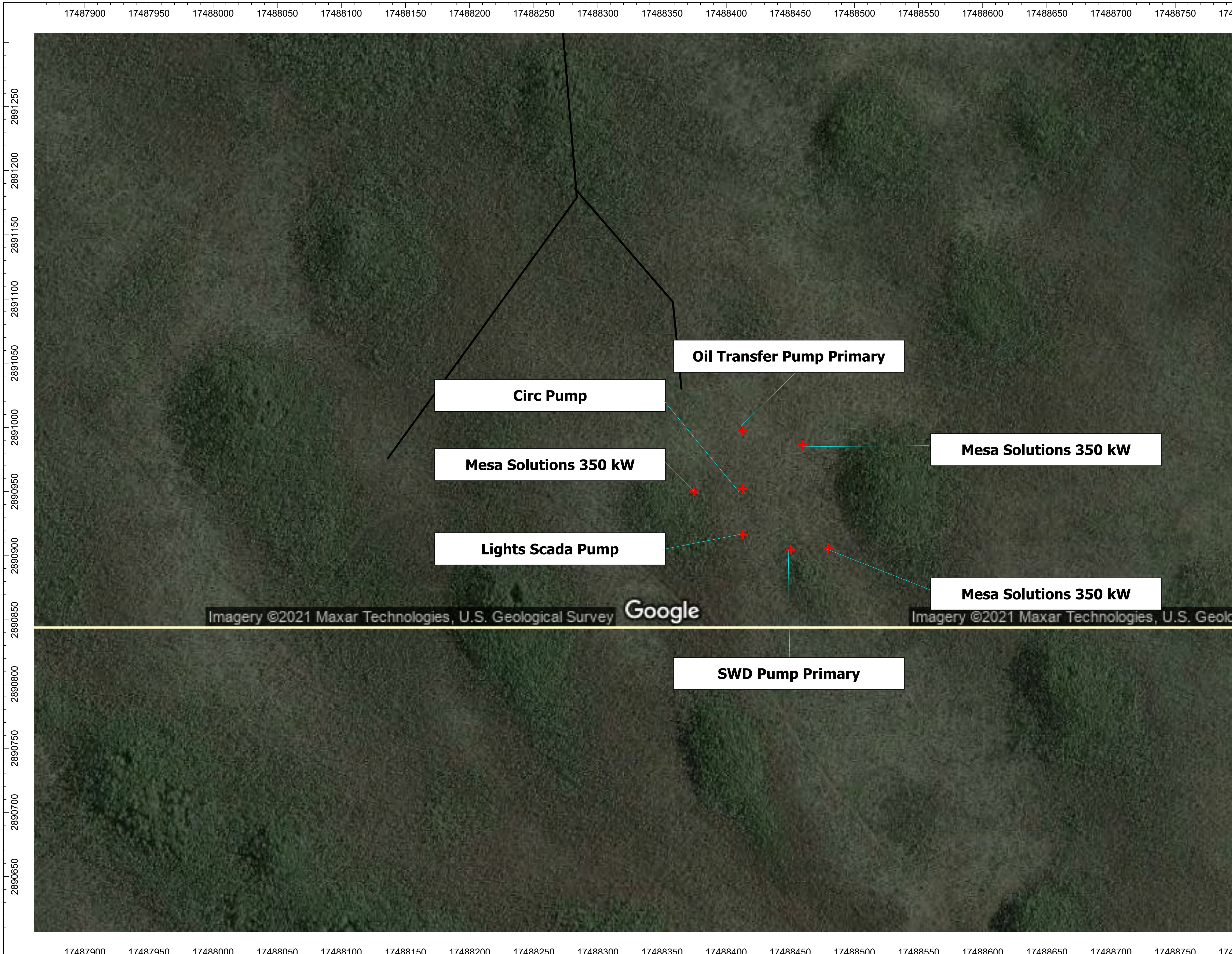


Figure 2.10

Nobles Grade
Operational Phase
Noise Source Locations

Acoustic Assessment Report

Burnett Oil Company, Inc.

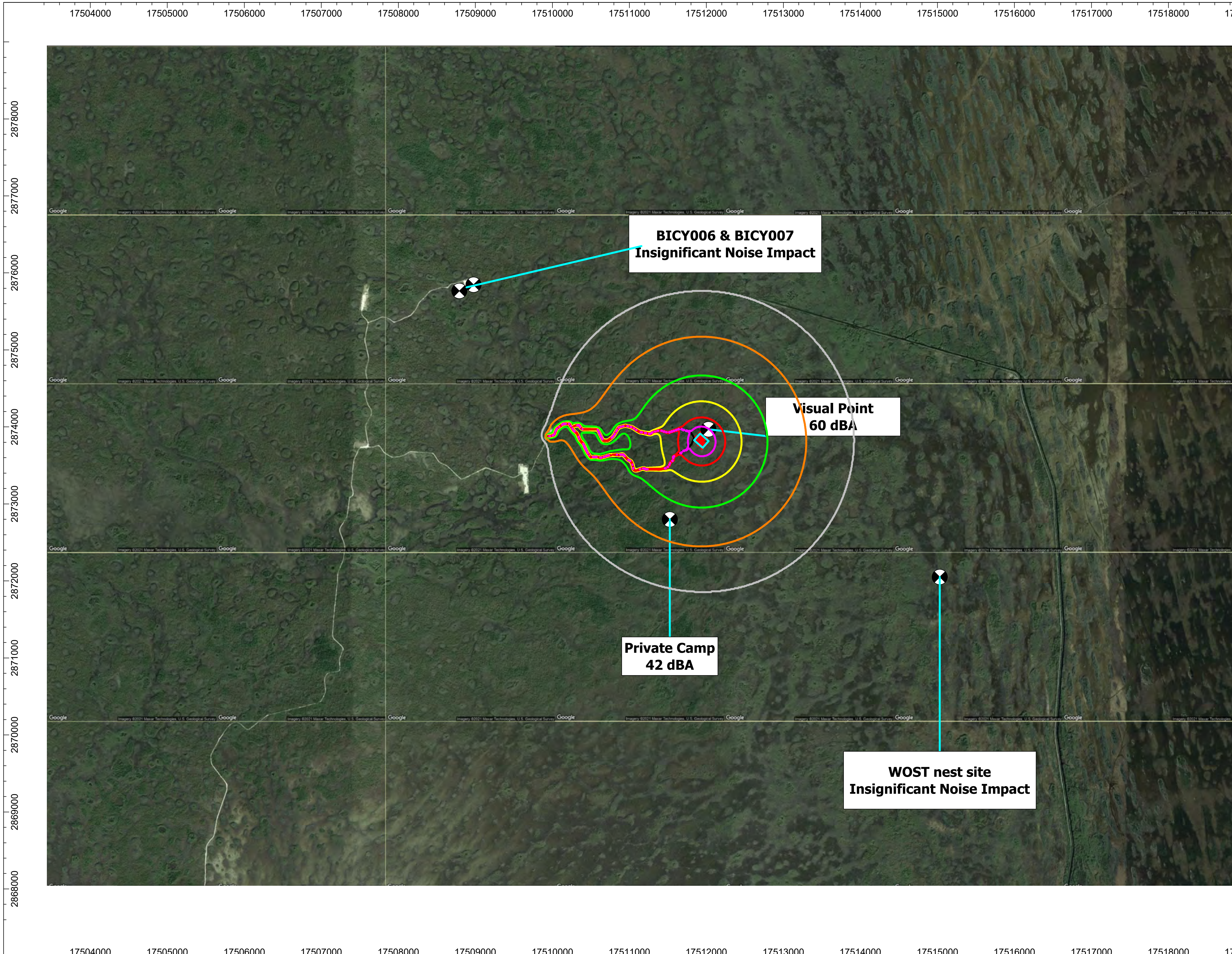


Figure 3.1

Tamiami Construction I Phase

Worst-Case Absolute Sound Level

Acoustic Assessment Report

Burnett Oil Company, Inc.

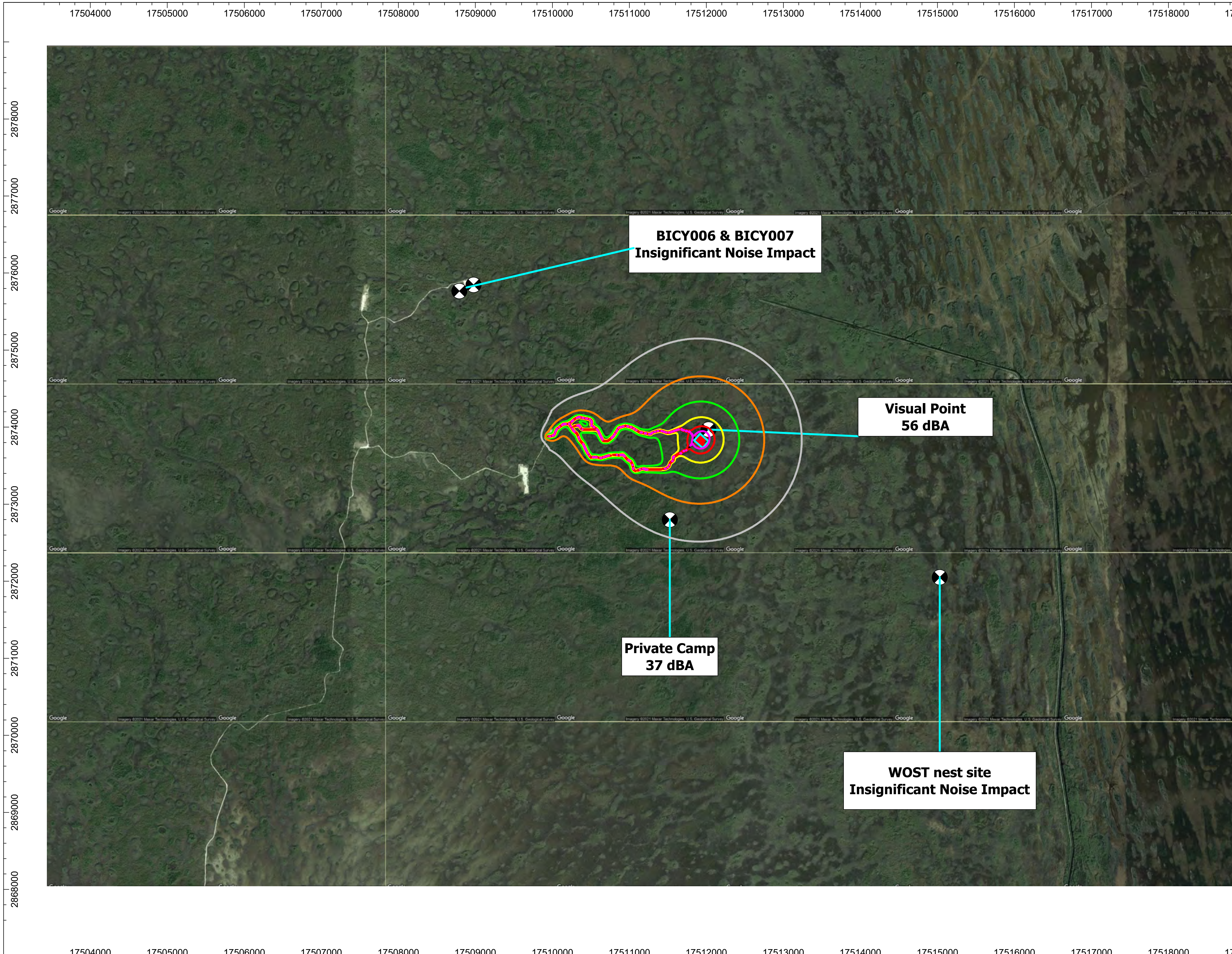


Figure 3.2

Tamiami
Drilling Phase

Worst-Case Absolute
Sound Level

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

35
40
45
50
55
60

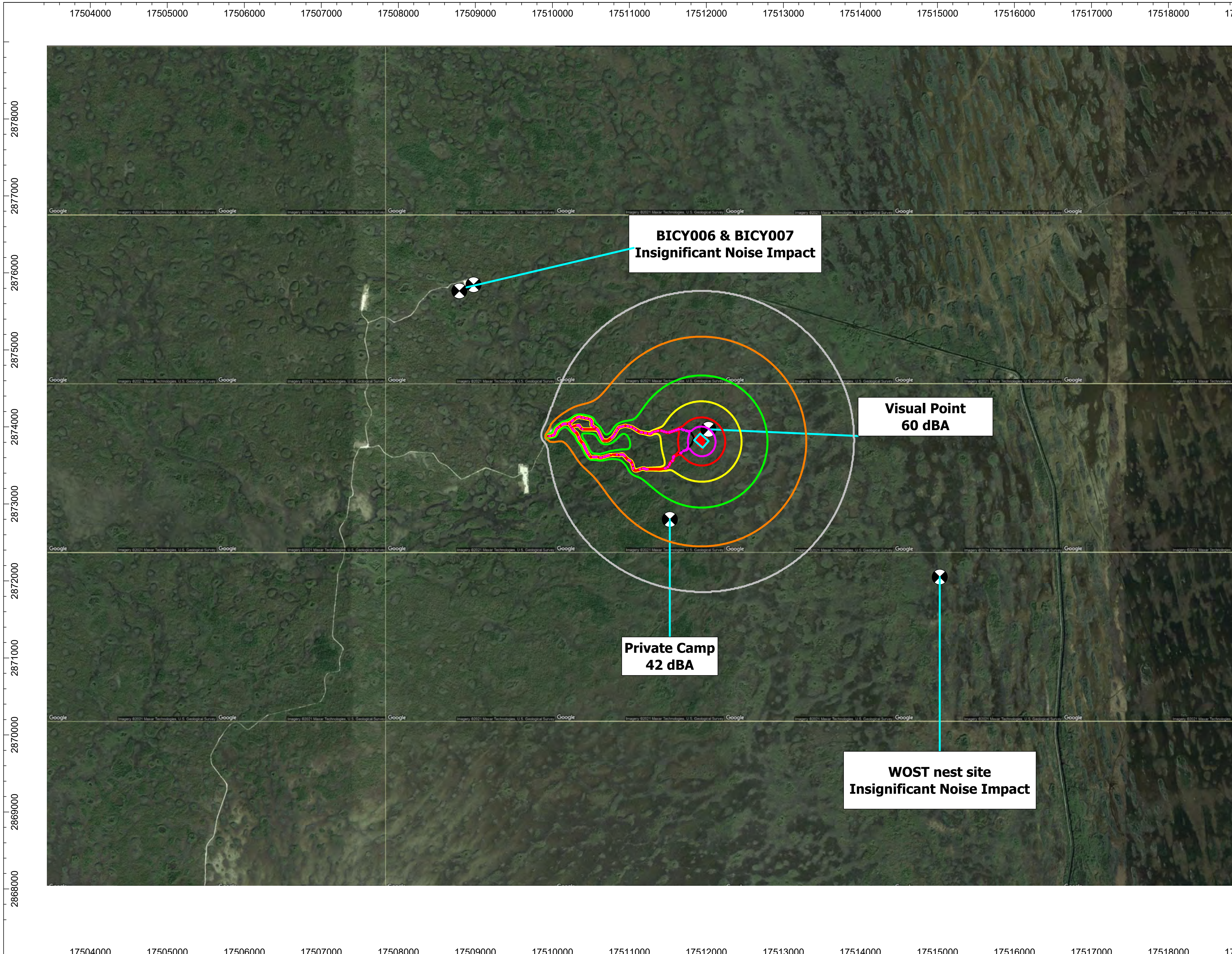


Figure 3.3

Tamiami Construction II Phase

Worst-Case Absolute Sound Level

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

35
40
45
50
55
60

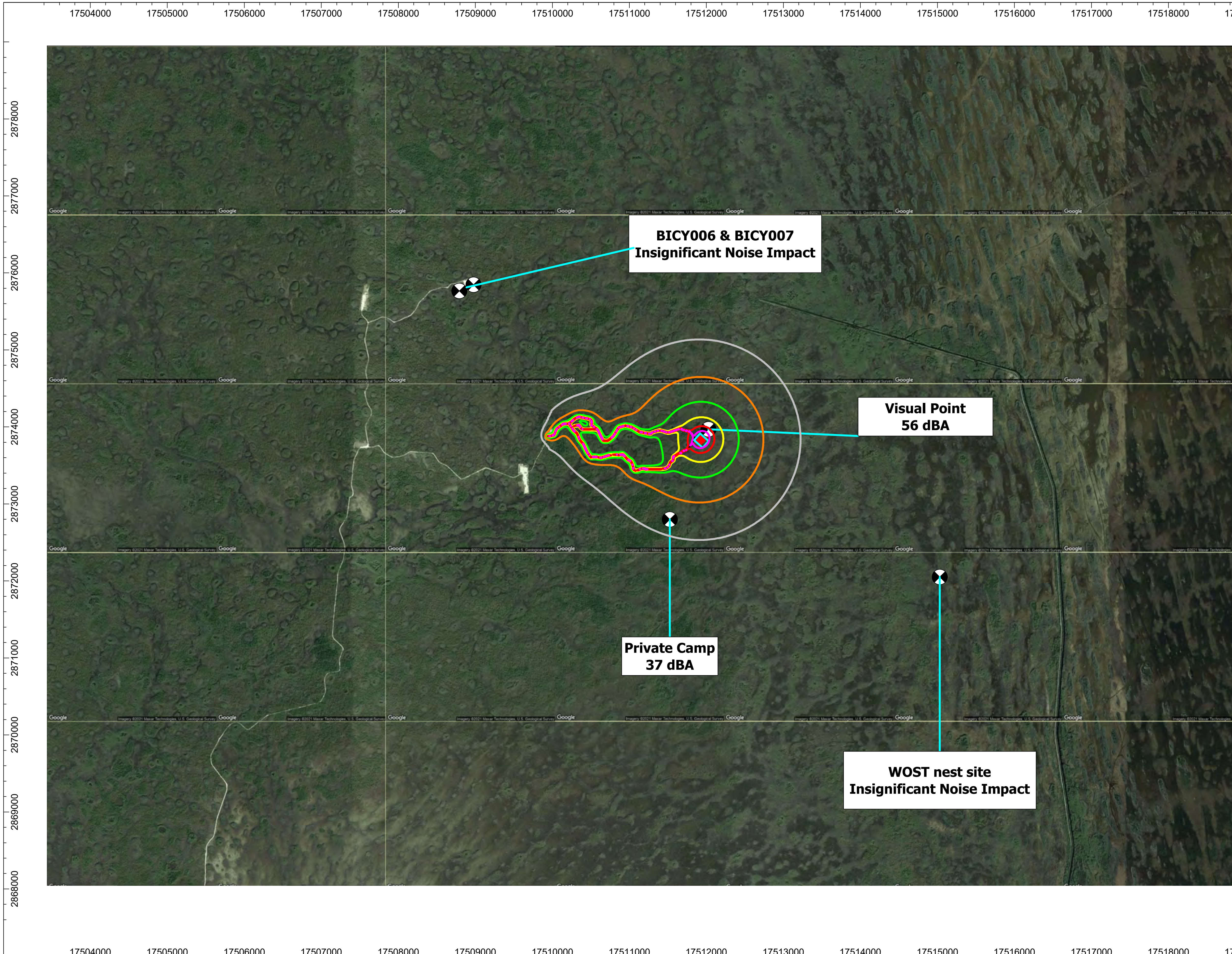


Figure 3.4

Tamiami
Completion Phase

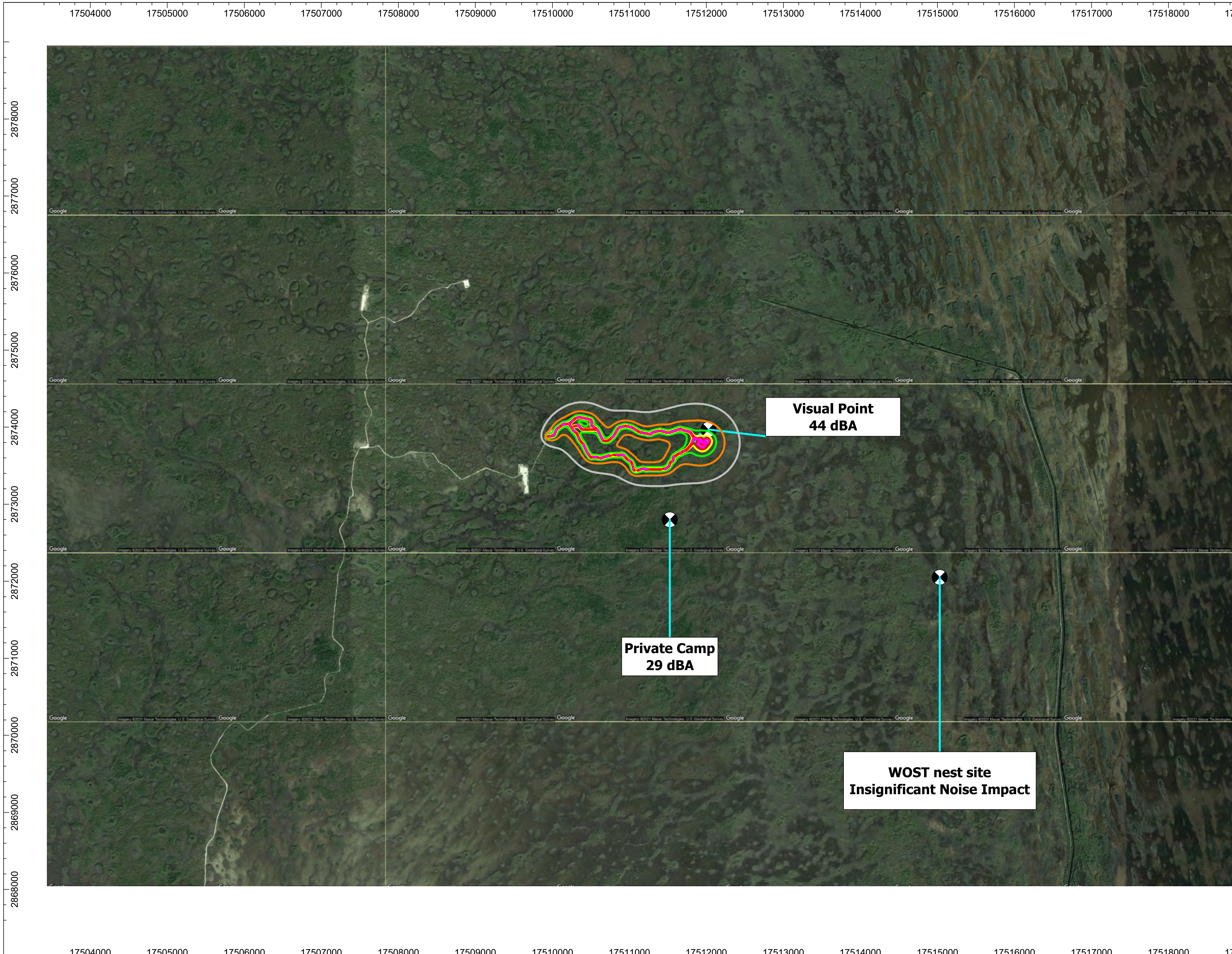
Worst-Case Absolute
Sound Level

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

35
40
45
50
55
60



Trinity Consultants

Figure 3.5

Tamiami Trail
Operational Phase

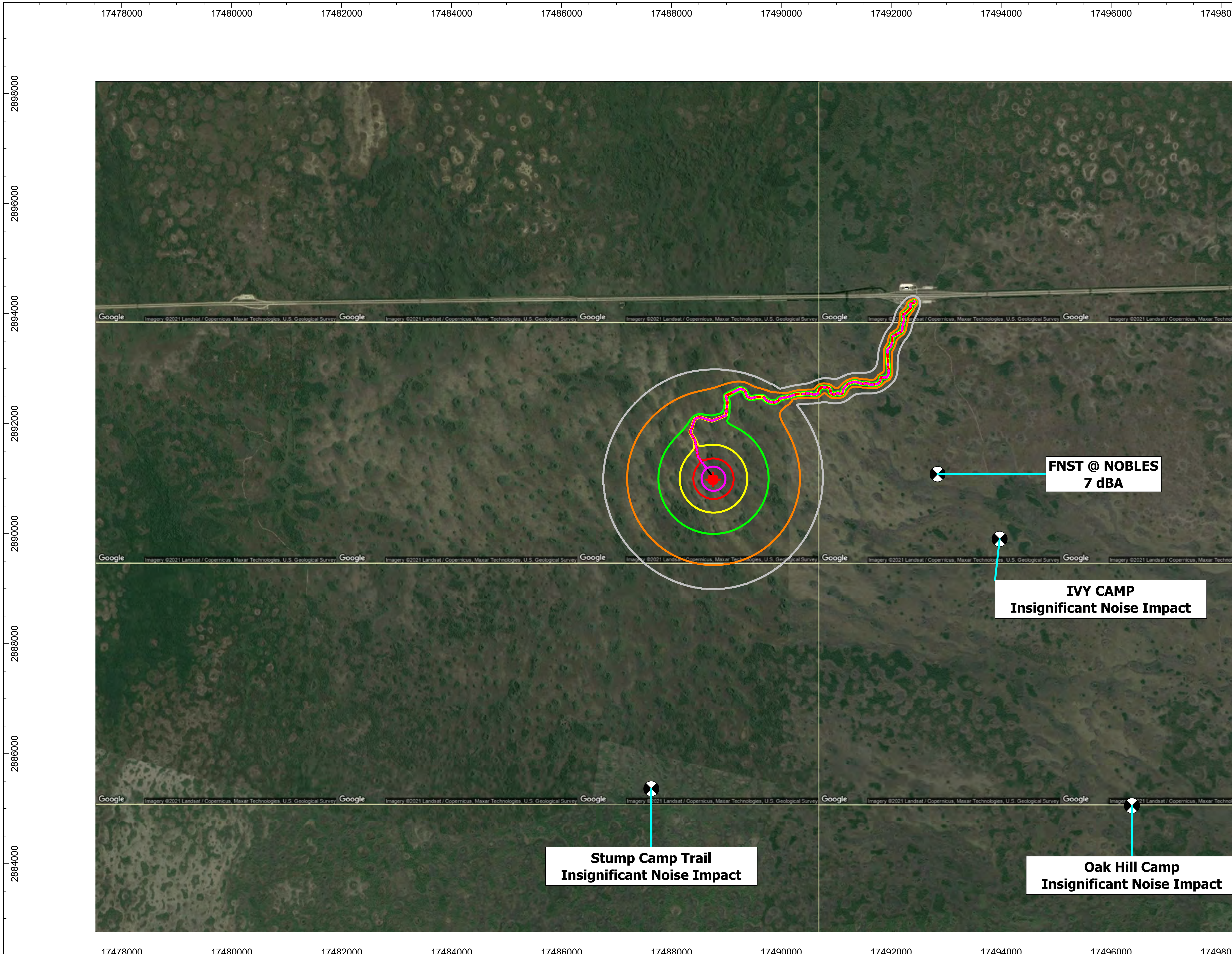
Worst-Case Absolute
Sound Level

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

35
40
45
50
55
60



Trinity Consultants

Figure 3.6

Nobles Grade Construction I Phase

Worst-Case Absolute Sound Level

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

35
40
45
50
55
60

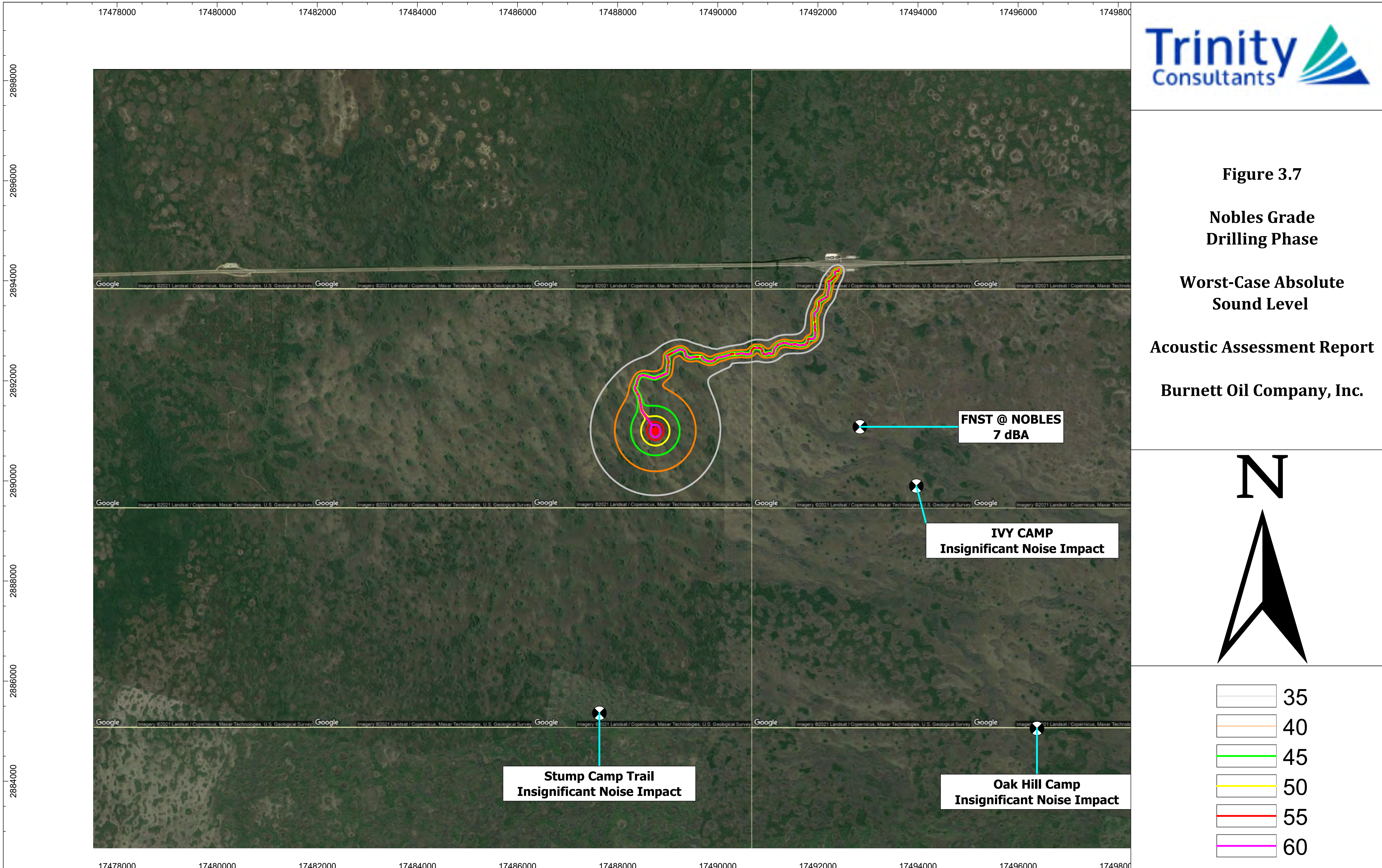


Figure 3.7

Nobles Grade
Drilling Phase

Worst-Case Absolute
Sound Level

Acoustic Assessment Report

Burnett Oil Company, Inc.

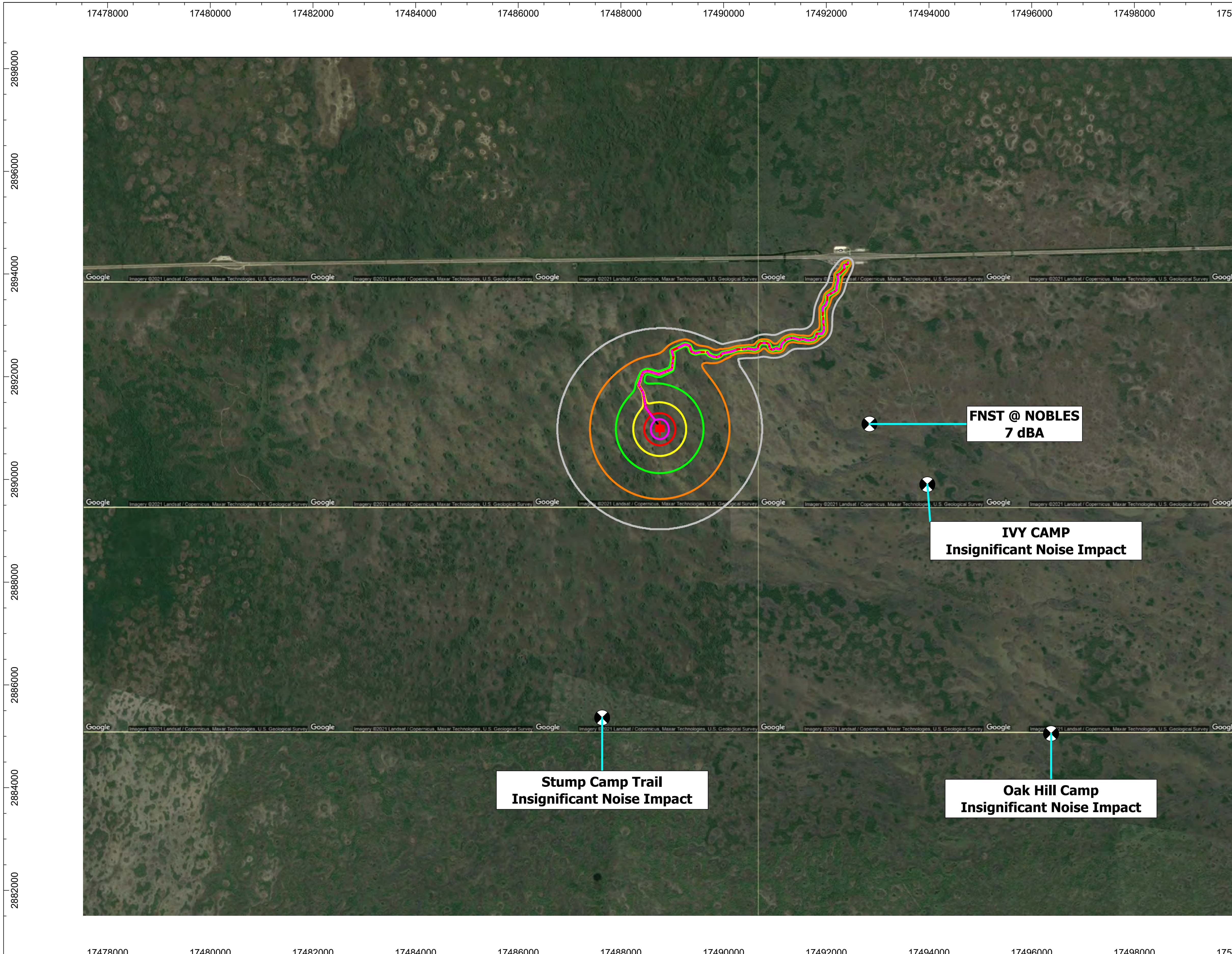


Figure 3.8

Nobles Grade Construction II Phase

Worst-Case Absolute Sound Level

Acoustic Assessment Report

Burnett Oil Company, Inc.

N

	35
	40
	45
	50
	55
	60

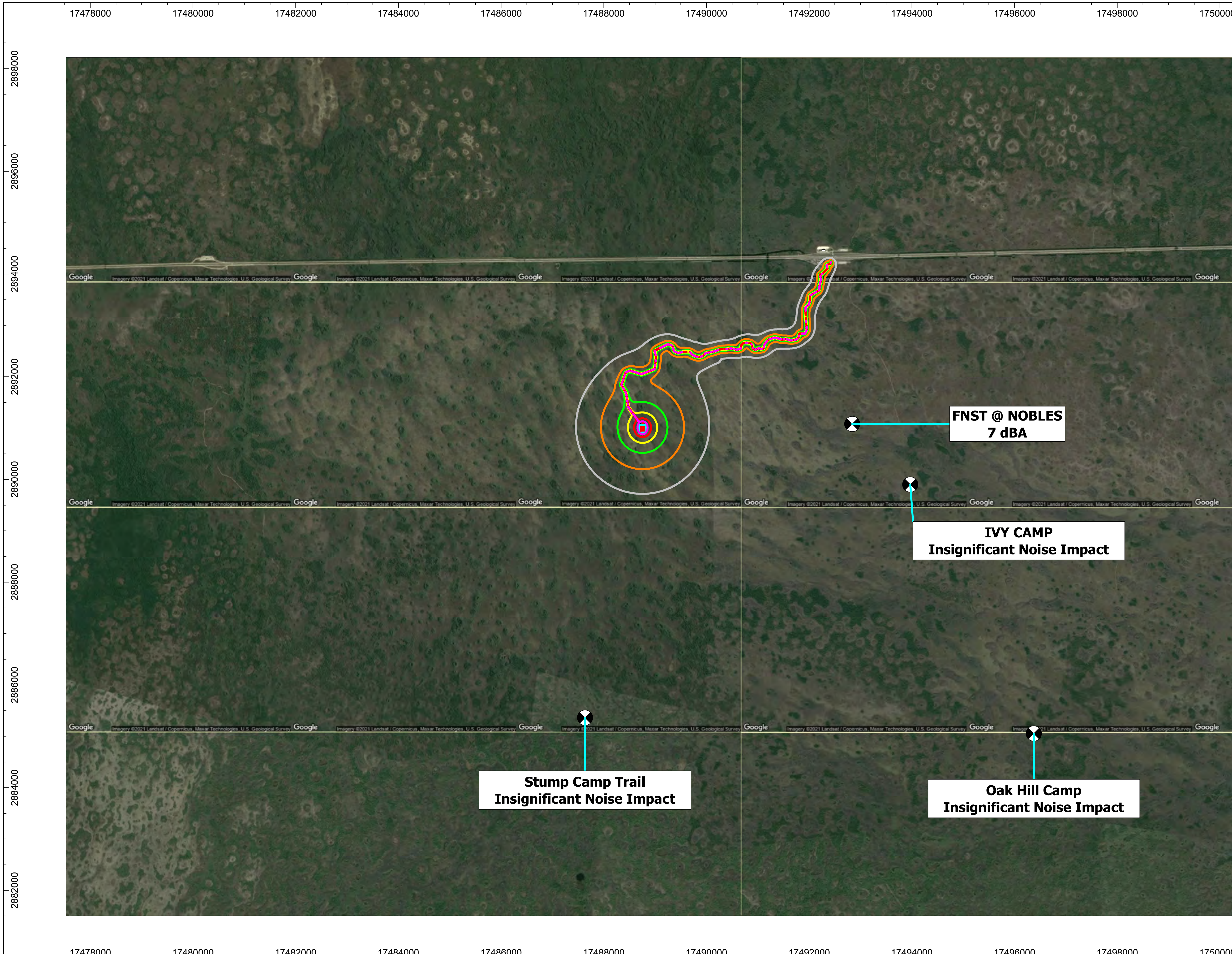
Figure 3.9

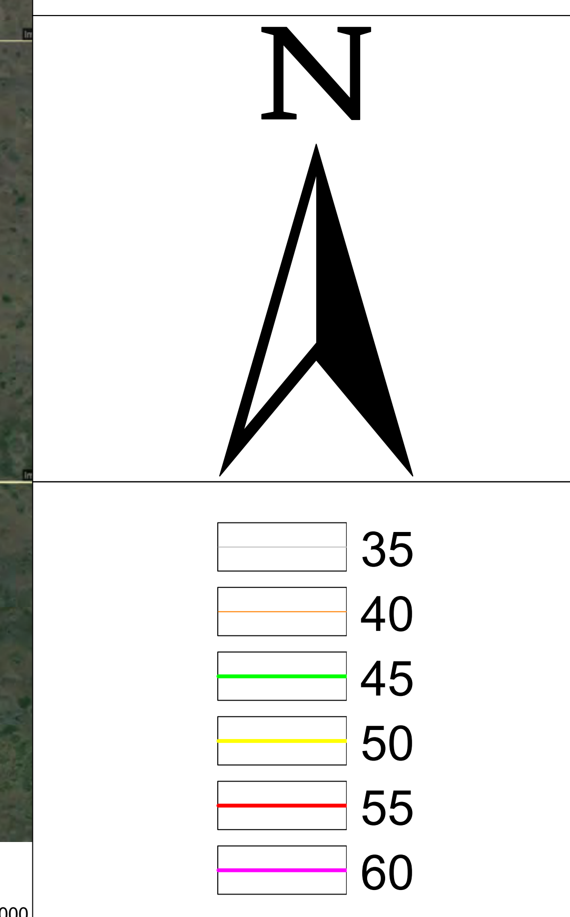
Nobles Grade Completion Phase

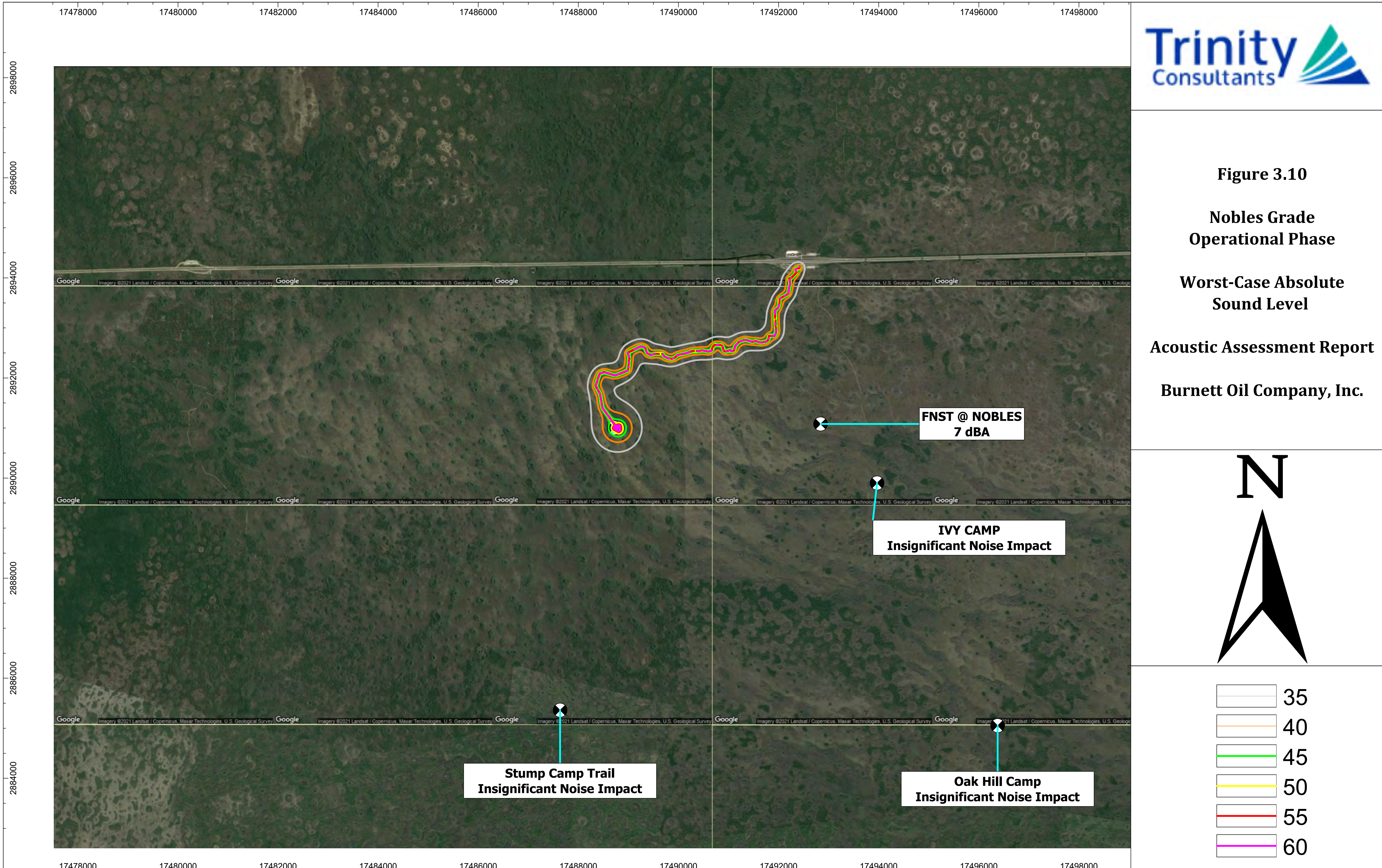
Worst-Case Absolute Sound Level

Acoustic Assessment Report

Burnett Oil Company, Inc.







Trinity Consultants

Figure 3.10

Nobles Grade Operational Phase

Worst-Case Absolute Sound Level

Acoustic Assessment Report

Burnett Oil Company, Inc.

APPENDIX B: CALCULATIONS & EQUIPMENT SPECIFICATIONS

Burnett Oil Company, Inc. - Nobles Grade

Pump Sound Pressure & Power Level Calculations

Reference: Noise Control for Buildings and Manufacturing Plants - Hoover & Keith Inc.

for Pumps Under 100 hp, Sound Pressure Level (SPL) at 3 ft = 74 + 10log(hp)

for Pumps Above 100 hp, Sound Pressure Level (SPL) at 3 ft = 88 + 3log(hp)

			Octave Band Center Frequency (Hz)								
			32	63	125	250	500	1000	2000	4000	8000
SPL Spectrum Adjustment			-13	-12	-11	-9	-9	-6	-9	-13	-19
Pump ID	HP	SPL @ 3ft									
ESP WELL1	200	95	82	83	84	86	86	89	86	82	76
ESP WELL2	200	95	82	83	84	86	86	89	86	82	76
ESP WELL3	200	95	82	83	84	86	86	89	86	82	76
ESP WELL4	200	95	78	79	80	82	82	85	82	78	72
LACT Pump	30	89	73	74	75	77	77	80	77	73	67
Circ Pump	3	79	66	67	68	70	70	73	70	66	60
Lights, SCADA	20	87	74	75	76	78	78	81	78	74	68

Pump ID	Distance (ft)	Calculated Sound Pressure Levels (1/1 Octave Band Levels)									Total SPL (dBA)	Calculated Sound Power Levels (1/1 Octave Band Levels)								Total PWL (dBA)
		32	63	125	250	500	1000	2000	4000	8000		63	125	250	500	1000	2000	4000	8000	
ESP WELL1	3.0	81.90	82.90	83.90	85.90	85.90	88.90	85.90	81.90	75.90	92.5	90.9	91.9	93.9	93.9	96.9	93.9	89.9	83.9	**100.4**
ESP WELL2	3.0	81.90	82.90	83.90	85.90	85.90	88.90	85.90	81.90	75.90	92.5	90.9	91.9	93.9	93.9	96.9	93.9	89.9	83.9	**100.4**
ESP WELL3	3.0	81.90	82.90	83.90	85.90	85.90	88.90	85.90	81.90	75.90	92.5	90.9	91.9	93.9	93.9	96.9	93.9	89.9	83.9	**100.4**
ESP WELL4	3.0	77.99	78.99	79.99	81.99	81.99	84.99	81.99	77.99	71.99	88.5	87.0	88.0	90.0	90.0	93.0	90.0	86.0	80.0	**96.5**
LACT Pump	3.0	72.76	73.76	74.76	76.76	76.76	79.76	76.76	72.76	66.76	83.3	81.7	82.7	84.7	84.7	87.7	84.7	80.7	74.7	**91.3**
Circ Pump	3.0	65.77	66.77	67.77	69.77	69.77	72.77	69.77	65.77	59.77	76.3	74.8	75.8	77.8	77.8	80.8	77.8	73.8	67.8	**84.3**
Lights, SCADA	3.0	74.01	75.01	76.01	78.01	78.01	81.01	78.01	74.01	68.01	84.6	83.0	84.0	86.0	86.0	89.0	86.0	82.0	76.0	**92.5**

Burnett Oil Company, Inc. - Tamiami Trail

Pump Sound Pressure & Power Level Calculations

Reference: Noise Control for Buildings and Manufacturing Plants - Hoover & Keith Inc.

for Pumps Under 100 hp, Sound Pressure Level (SPL) at 3 ft = 74 + 10log(hp)

for Pumps Above 100 hp, Sound Pressure Level (SPL) at 3 ft = 88 + 3log(hp)

			Octave Band Center Frequency (Hz)								
			32	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
SPL Spectrum Adjustment			-13	-12	-11	-9	-9	-6	-9	-13	-19
Pump ID	**HP**	**SPL @ 3ft**									
ESP WELL1	200	95	82	83	84	86	86	89	86	82	76
ESP WELL2	200	95	82	83	84	86	86	89	86	82	76
ESP WELL3	200	95	82	83	84	86	86	89	86	82	76
ESP WELL4	200	95	82	83	84	86	86	89	86	82	76
LACT Pump	30	89	76	77	78	80	80	83	80	76	70
Circ Pump	3	79	66	67	68	70	70	73	70	66	60
Lights, SCADA	20	87	74	75	76	78	78	81	78	74	68

Pump ID	**Distance (ft)**	**Calculated Sound Pressure Levels (1/1 Octave Band Levels)**									**Total SPL (dBA)**	**Calculated Sound Power Levels (1/1 Octave Band Levels)**								**Total PWL (dBA)**
		32	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**		**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
ESP WELL1	3.0	81.90	82.90	83.90	85.90	85.90	88.90	85.90	81.90	75.90	92.5	90.9	91.9	93.9	93.9	96.9	93.9	89.9	83.9	**100.4**
ESP WELL2	3.0	81.90	82.90	83.90	85.90	85.90	88.90	85.90	81.90	75.90	92.5	90.9	91.9	93.9	93.9	96.9	93.9	89.9	83.9	**100.4**
ESP WELL3	3.0	81.90	82.90	83.90	85.90	85.90	88.90	85.90	81.90	75.90	92.5	90.9	91.9	93.9	93.9	96.9	93.9	89.9	83.9	**100.4**
ESP WELL4	3.0	81.90	82.90	83.90	85.90	85.90	88.90	85.90	81.90	75.90	92.5	90.9	91.9	93.9	93.9	96.9	93.9	89.9	83.9	**100.4**
LACT Pump	3.0	75.77	76.77	77.77	79.77	79.77	82.77	79.77	75.77	69.77	86.3	84.8	85.8	87.8	87.8	90.8	87.8	83.8	77.8	**94.3**
Circ Pump	3.0	65.77	66.77	67.77	69.77	69.77	72.77	69.77	65.77	59.77	76.3	74.8	75.8	77.8	77.8	80.8	77.8	73.8	67.8	**84.3**
Lights, SCADA	3.0	74.01	75.01	76.01	78.01	78.01	81.01	78.01	74.01	68.01	84.6	83.0	84.0	86.0	86.0	89.0	86.0	82.0	76.0	**92.5**

350kW NG/LP Dual Fuel Mobile Generator Set

Specifications

Frequency	Voltage	Continuous kW (kVA)	Speed rpm
60 Hz	480/277	350 (437)	1800

PSI Heavy Duty 21.9L Natural Gas/LP Engine	Metric	Imperial (English)
Number of Cylinders	V12	
Type	4 Stroke Cycle	
Bore	128 mm	5.04 in
Stroke	142 mm	5.59 in
Displacement	21.9 L	1338 in^3
Compression Ratio	10.5	
Engine Speed rpm	1800	
Aspiration	Turbo Charged, Air Cooled	
Fuel	Natural Gas (CNG, LNG), Liquid Propane	
Generator Set Data		
Continuous Rated Power	350 kW	
kVA rating	437 kVA	
Rated power factor	0.8 pf	
Frequency	60 Hz	

MESA SOLUTIONS

Specifications (continued)

Stamford Alternator	
Frame size	S4L1D-G
Pitch	2/3
No. of Poles	4
Excitation	PMG excited
Constructions	Single bearing
Insulation	UL 1446 Class H
Enclosure	Drip-proof IP23
Temperature rise	105 Degrees C
Alignment	Close coupled
Wave form deviation	Less than 5%
Telephone Influence Factor (TIF)	Less than 50
Harmonic Distortion (THD)	Less than 5%

Performance Specification		
		Units
Engine power	434 (581)	kW (bhp)
BSFC	11.35 (8,028)	MJ/kWh (Btu/bhp-hr)
Induction air flow rate	27 (968)	m^3/min (ft^3/min)
Cooling air flow rate	1,133 (40,000)	m^3/min (ft^3/min)
Max exhaust stack temperature	732 (1350)	C° (F°)
Exhaust flow rate	273	ft/s
Engine oil system capacity	40 (10.5)	L (gal)
Engine coolant capacity	52 (11)	L (gal)
Radiator coolant capacity	176 (39)	L (gal)
Oil change interval	1100	Hours

Weight and Dimensions

Model	Length (ft)	Width (ft)	Height (ft)	Weight with Lube oil and Coolant (lbs.)
350kW Mobile Generator	23’ 7”	8’	9’ 11”	17,060

MESA SOLUTIONS

Standard Features

Stamford Alternator

- UL listed S4L1D-G
- Cont. F - 105/40°C Rating
- 510kVA, 408kW, 93.9% Efficiency
- 4-pole, Permanent Magnet Generator (PMG)

Voltage Regulation

- Field-Proven MX341 base regulation
- 3-phase digital sensing (RMS) and adjustments through bias adjustment from DSE8610 MKII

Load Sharing

- DSE 8610MKII provides fully automated voltage bias and governor control
- Parallel capable
- High-speed CANBUS load share communications between generators
- Standard kW and kVAR sharing balanced between generators
- Other options included: Fixed Export, Fixed PF control, Power vs Frequency (IEEE 1547 curves), and Reactive Power vs Voltage (IEEE 1547 curves)

Control Panel

- Onboard Deep Sea 8610 MKII parallel controller
- Idle/rated switch
- 3 Fuel Control Modes: NG, LP, Auto
- Generator protection features: 27, 32 L/R, 37 P, 40, 46, 50 P, 51 P/G, 59, 81 O/R/U
- Metering display: voltage, current frequency, power factor, kW, WHM, and kVAR
- Panel illumination light and emergency stop switch
- Start/stop switch with cool down timer
- RS485, Modbus over ethernet capable

Sound Attenuated Container

- Temperature controlled enclosure for harsh climates
- Sound attenuated air intake system
- Three lockable doors with panic release
- External hookups for oil and coolant, drain and fill
- Meets 75 dB(A) at 7 meters sound performance
- Full spill containment of onboard engine fluids with easy drain access
- Low-draw LED work-lighting
- Custom paint scheme available

Distribution Panel

- 480/277V, 3-phase
- Door safety switch for breaker trip
- 690A Camlock per phase, 400A Camlock ground
- 4 conductor terminals, double set-screw 2AWG - 600MCM per phase and ground

Side Customer Access

- Separate control panel, distribution panel, and circuit access doors
- External emergency stop push button
- Remote start/stop contacts
- Lock out tag out switch

Telemetry

- Dual-carrier satellite and cellular access

MESA SOLUTIONS

Standard Features (continued)

Circuit Breaker

- 600A fixed type, 3 poles, generator set mounted, electrically operated
- 50 kAIC
- Shunt trip

Current Transformers

- CTs rated 800:5

Starting System

- Single electric starting motor, 24VDC
- Dual 12V maintenance free batteries with lock out tag out disconnect switch, battery rack, and cables

Trailer Features

- 2 - 5/16 ball hook up
- 2 - 8,000 lb axle
- 4 - way leveling jacks

Cooling System

- Provides 49 C° (104 F°) ambient capability at 100% continuous rating before de-rating

Auxiliary Distribution System

- 120V 20A GFCI power outlet
- Remote start/stop terminals
- 120V battery charger input

Fuel System

- Natural Gas (CNG, LNG), Liquid Propane
- Onboard LP vaporization and automatic, seamless switch between LP and natural gas under an electrical load
- Stoichiometric air fuel mixture with NSCR catalyst

Emissions

	PSI Heavy Duty 21.9L Engine (NG)	PSI Heavy Duty 21.9L Engine (LP)
	g/HP-hr	g/HP-hr
CO	0.17	0.251
VOC	0.000	0.035
NOx	0.01	0.024