

## Acoustic Assessment Report

Spencer Pit

Prepared for: Tri City Lands Ltd.

**Conestoga-Rovers & Associates**

651 Colby Drive  
Waterloo, Ontario N2V 1C2

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## Section 1.0 Introduction

Conestoga-Rovers & Associates (CRA) was retained to prepare an Acoustic Assessment Report (AAR) for the proposed Tri City Lands Ltd. (Tri City) Spencer Pit site (Site) located at the border of Cambridge and Guelph, Ontario, in accordance with the Aggregate Resources Act (ARA) administered by the Ministry of Natural Resources (MNR), and the Environmental Protection Act (EPA) administered by the Ontario Ministry of the Environment (MOE).

The ARA requires an AAR to be submitted along with the Category 3 Class 'A' License Application. This AAR also fulfills the acoustic assessment requirement under the EPA.

Tri City is planning to operate an aggregate (sand and gravel) extraction and processing site located at 6939 Wellington Road 124 in Guelph, Ontario (Site). The Site has 5 separate extraction areas referred to as "Area 1", "Area 2", "Area 3", "Area 4A", and "Area 4B", as well as a "Temporary Plant Site" and a "Permanent Plant Site", where the wash pond and scrap storage will be located. The "Temporary Plant Site" will be located as indicated on Figure 1a. The "Permanent Plant Site" will be constructed as indicated on Figure 1b. Operations will start in "Area 1" and progress to "Area 4B" and may occur at any of these areas simultaneously. The operations will involve a front end loader moving material to a screener to separate material into sizes, which will then be transported via trucks to a set of impact and cone crushers where the material will be reduced to smaller sizes. Products will then be washed and transported off-site for delivery to customers.

The Site may operate Monday through Friday from 7:00 a.m. to 7:00 p.m. Shipping is expected to occur Monday through Friday from 6:00 a.m. until 7:00 p.m. as well as Saturdays from 6:00 a.m. until 6:00 p.m.

The AAR presented herein provides an evaluation of the potential off-site noise impacts from the Site's significant environmental noise sources during normal operations. The AAR was prepared consistent with the following MOE guidance:

- NPC-233, "Information to be Submitted for Approval of Stationary Sources of Sound", October 1995
- "Appendix A – Supporting Information for an Acoustic Assessment Report or Vibration Assessment Report Required by a Basic Comprehensive C of A" as specified in the MOE guidance entitled "Basic Comprehensive Certificates of Approval (Air) – User Guide", April 2004
- NPC-300, "Stationary and Transportation Sources – Approval and Planning", October 2013
- NPC-103, "Procedures", August 1978

The Site is located on land currently zoned for Agricultural use. The lands surrounding the Site are designated as Agricultural, Mineral Aggregate Area, Hazard and Extractive Industrial and Mineral Aggregate Resources Areas Land uses. A zoning map and definitions are provided in Appendix A.

The Site is located in an Acoustical Class 1 area based on heavy traffic observed along Hespeler Road/Wellington Road 124.

The Site topography was included in this analysis.

## **Section 2.0 Noise Source Summary**

This AAR focused on the sound emissions from the noise sources identified at the Site with the potential to adversely impact the sensitive receptors. The Noise Source Summary is provided in Table 1 and the significant noise source locations are identified on Figures 1a and 1b. CRA evaluated the following significant noise sources identified by the Cadna modelling ID number:

- Three truck travel routes (Sources T1, T2, and T4)
- Front end loader travel routes (Sources T3, T5 – T8 )
- One wash plant (Source S1)
- One impact crusher (Source S2)
- One cone crusher (Source S3)
- One screener (Source S4)
- One idling truck at scale (Source T6 or T9 depending on operating scenario)

All significant steady-state noise sources have been included in this AAR. There are no expected sources of impulse noise or vibration at the Facility.

## **Section 3.0 Point-of-Reception Summary**

The identification of appropriate sensitive point(s)-of-reception is necessary to conduct the assessment for the Site. A "point-of-reception" is any point on the premises of a person where sound, originating from other than those premises, is received. The point-of-reception may be located on permanent or seasonal residences, hotels/motels, nursing/retirement homes, rental residences, hospitals, campgrounds, schools, or places of worship.

The objective of this AAR is to determine the predictable worst-case 1-hour equivalent sound level (1-hour Leq) at the worst-case point(s)-of-reception. The worst-case point(s)-of-reception is (are)

defined as the sensitive receptor(s) with the greatest potential exposure to the Site noise sources due to proximity and direct line-of-sight exposure.

The worst-case sensitive point(s)-of-reception (POR) are:

- POR1 – nearest façade of a single-storey residence on Hespeler Road approximately 200 metres (m) south west of the site (1.5 m above grade [AG])
- POR1A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR2 – nearest façade of a two-storey residence on Hespeler Road approximately 40 m south west of the site (4.5 m AG)
- POR2A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR3 – nearest façade of a single-storey residence at the intersection of Hespeler Road and Kossuth Road approximately 100 m north west of the site (1.5 m AG)
- POR3A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR4 – nearest façade of a two-storey residence on Hespeler Road approximately 100 m west of the site (4.5 m AG)
- POR4A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR5 – nearest façade of a two-storey residence on Hespeler Road approximately 40 m north west of the site (4.5 m AG)
- POR5A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR6 – nearest façade of a single-storey residence on Hespeler Road approximately 40 m north west of the site (1.5 m AG)
- POR6A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR8 – nearest façade of a single-storey residence on Hespeler Road approximately 40 m north west of the site (1.5 m AG)
- POR8A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR9 – nearest façade of a single-storey residence on Hespeler Road approximately 120 m north of the site (1.5 m AG)
- POR9A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR10 – nearest façade of a single-storey residence on Hespeler Road approximately 200 m north of the site (1.5 m AG)
- POR10A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)

The locations of the worst-case PORs are identified on Figures 1a and 1b.

To be conservative, all POR locations within 1,000 m of the Site were considered; however, the noise impact at the worst-case and most exposed PORs are presented herein.

## **Section 4.0 Sound Level Data**

### **4.1 Noise Specifications**

Noise data for the trucks and front-end loaders travel routes was obtained from the Department for Environment Food and Rural Affairs (DEFRA) document titled "Construction Noise Database (Phase 3) – Database of noise emissions from equipment used on construction and open sites", dated September 2008. Data specific to sand and gravel operations was used for consistency.

### **4.2 Short-Term Steady State Sound Level Measurements**

Short-term sound level measurements were necessary in order to assess the worst-case off-site potential noise impact since manufacturer specifications were not available.

Short-term sound level measurements of representative equipment located at Tri City's Petersburg site were taken using a Bruel-Kjaer 2250 System inclusive of a Type 1 Precision Sound Level Meter (SLM), Model 2250 (Serial Number 2619795); and a 1/2-inch free field condenser microphone Model 4189 (Serial Number 2616511). The SLM was calibrated and checked at 114 decibels (dBA) before and after each measurement period using a Bruel-Kjaer Type 4231 Acoustic Calibrator (Serial Number 2477782).

The sound descriptor used in the impact evaluation is the 1-hour Leq, which is a time weighted energy average of the source. The Leq sound measurements consisted of short-term readings taken over an observation time of 15 second intervals with the detector in slow response using A-weighting, such that the sound levels are reported in units of dBA. All measurements were recorded and stored in the SLM. In accordance with NPC-103 "*Procedures, August 1978*" (NPC-103), at least three measurements were taken for each of the Site noise sources.

Sound level measurements were taken at a reference distance depending on the height of the source(s) being measured and proximity to other noise sources. The location and reference distance were selected to ensure that the measurement was a valid representation of the dominant source(s) being measured. The measurement location was selected in order to measure the sound emitted in the direction of the worst-case exposure in line with the nearby sensitive receptors wherever possible and/or to minimize the influence of other noise sources and directivity issues.

The noise measurement data is summarized in Table C.1.

### 4.3 Baseline Noise Assessment

A Baseline Noise Assessment (BNA) was conducted at a suitable location along Hespeler Road/Wellington Road 124 and was situated between all receptors in order to quantify the existing background sound levels.

The BNA was conducted using a Larson-Davis 820 Long-Term SLM, Model 820 (Serial Number 1949); and a ½ - inch free field condenser microphone Model 2560 (Serial Number 3390). The system was calibrated and checked at 114 decibels (dBA) before and after the measurement period using a Larson-Davis CAL200 Acoustic Calibrator (Serial Number 4206). The equipment continuously monitors sound and generates sound levels and statistics of interest for each one-hour measurement interval.

Unattended continuous monitoring was conducted for a period of over 7 days and included a full weekend. Noise data was collected at Location 1 (L1) from September 11, 2013, to September 19, 2013. Location L1 was approximately 2 m above grade and is presented on Figure 1A and 1B.

The background sound levels were significantly elevated due to traffic along Hespeler Road/Wellington Road 124.

Short-term sound level measurements were also taken along Hespeler Road/Wellington Road 124 in front of POR1/POR2, POR3 and POR8. Measurements were consistent with the long-term measurement data.

Short-term sound level measurements along Hespeler Road/Wellington Road 124 were taken using a Bruel-Kjaer 2250 System inclusive of a Type 1 Precision Sound Level Meter (SLM), Model 2250 (Serial Number 2619795); and a 1/2-inch free field condenser microphone Model 4189 (Serial Number 2616511). The SLM was calibrated and checked at 114 decibels (dBA) before and after each measurement period using a Bruel-Kjaer Type 4231 Acoustic Calibrator (Serial Number 2477782).

Meteorological weather conditions during the noise-monitoring period were obtained from the Environment Canada website. The Guelph Turfgrass weather station data was used to estimate adverse weather conditions that could have affected the sound level measurements and were considered in validating the minimum background levels.

The measurement data is presented in Table B.1.

### Section 5.0 Assessment Criteria

Assessment criteria may be determined for a POR based on the MOE's minimum exclusionary sound level limits in comparison to the background sound levels experienced in the area. The "background



sound level" is defined as the sound level present in the environment that is produced by noise sources other than those from the Site, and would include traffic sound levels and sound from neighboring industrial/commercial activity. The higher of the two assessment criteria is selected for purpose of assessment.

The Site is located in an Acoustic Class 1 Area based on the proximity to Hespeler Road/Wellington Road 124.

Class 1 Areas have the following generic minimum sound level limits expressed as a 1-hour Leq:

<i>Time of Day</i>	<i>Minimum Sound Level</i>
7:00 a.m. to 11:00 p.m.	50 dBA
11:00 p.m. to 7:00 a.m.	45 dBA

Since the BNA conducted showed that the existing 1-hour Leq values are significantly elevated due to heavy traffic, the following site specific site limits were used for the purpose of the AAR:

<i>Point-of-Reception</i>	<i>Time of day</i>	
	<i>7:00 a.m. – 7:00 p.m.</i>	<i>7:00 p.m. – 7:00 a.m.</i>
POR1	64 dBA	58 dBA
POR1A	67 dBA	61 dBA
POR2	64 dBA	58 dBA
POR2A	67 dBA	61 dBA
POR3	61 dBA	55 dBA
POR3A	63 dBA	57 dBA
POR4	63 dBA	57 dBA
POR4A	65 dBA	59 dBA
POR5	64 dBA	58 dBA
POR5A	67 dBA	61 dBA
POR6	64 dBA	58 dBA
POR6A	68 dBA	62 dBA
POR8	66 dBA	60 dBA
POR8A	75 dBA	69 dBA
POR9	63 dBA	57 dBA
POR9A	66 dBA	60 dBA
POR10	64 dBA	58 dBA
POR10A	68 dBA	62 dBA

Site specific limits were determined based on the lowest measured 1-hour Leq for both the daytime and nighttime periods as shown in Table B.2. The lowest measurements were recorded on Sunday, September 15, 2013, at 4:00 a.m. and 7:00 a.m. The above site-specific limits are considered to be conservative as there is typically less traffic on weekends and no overnight Site operations except for loading and shipping for special public contracts. When the Site would typically operate, the 1-hour Leq sound levels were higher than these two data points that were selected, therefore the assessment was highly conservative.

## Section 6.0 Impact Assessment

The worst-case assessment of steady-state noise sources at the selected points-of-reception was based on representative noise specifications and measured sound level data. Cadna A Acoustical Modelling Software (Cadna A), version 4.4, was used to model the potential impacts of the significant noise sources. Cadna A calculates sound level emissions based on the ISO 9613-2 standard "Acoustics – Attenuation of Sound during Propagation Outdoors".

The worst-case cumulative unattenuated sound levels estimated at the receptor(s) included attenuation affects due to geometric divergence, atmospheric attenuation, barriers/berms, ground absorption and directivity, as applicable for all significant noise sources off-site buildings were input as intervening structures.

Cadna A modelling assumptions used in this AAR included:

- Noise Sources: All sources were modelled using the 1/1 octave band data from source measurements or approved reference materials. Moving point-line sources are based on the input sound level data and the physical dimensions of the travel path for the mobile sources.
- Noise Source Elevation: The heights of the sources are summarized in Table C.1 of Appendix C.
- Reflection Order: A maximum reflection order of 1.0 was used to evaluate indirect noise impact from one reflecting surface.
- Ground Absorption: An absorption value of 1.0 was used to represent the ground cover for areas surrounding the Site and a value of 0.5 was used for gravel cover on the Site. Absorption values of 0.25 and 0 were used to represent paved roads and adjacent quarry ponds.
- Receptor elevation: POR receptor heights were modelled appropriately to represent the worst-case elevation as detailed in Section 3.
- Time-weighted Adjustment: No time-weighted adjustments were applied to any sources.
- Tonality: Sources S1 to S4 were observed to be tonal and assigned a 5 dBA penalty.

CRA acknowledges the potential for nighttime deliveries at this Site, therefore, two operational scenarios were evaluated:

- Normal daytime extraction activities (7:00 a.m. to 7:00 p.m.) – Areas 1 to 4B
- Nighttime shipping activities (6:00 a.m. to 7:00 p.m.) – Main truck route, front end loader and scalehouse (Sources T1, T7, and T9)

The cumulative worst-case attenuated one-hour Leq sound levels were estimated at the PORs for Areas 1 through 4B and the shipping operations are summarized in Tables 2A through 2F, respectively. The estimated sound levels meet the criteria outlined in Section 5.0 and are based on the construction of a 4 m tall berm along the Site's property line. For the purposes of the AAR, it was assumed that the equipment was operating at the worst-case location in relation to the nearest POR and within 40 m of the boundary of each area.

The berm will be constructed in sections depending on the location of the operations. Berm sections 1 and 3, as indicated on Figures 1a and 1b, will be constructed prior to start of Site operations and will remain in place until the end of operations. Berm section 2 will be constructed prior to start of operations in Area 3 and will remain until the end of Site operations. The berm construction and other site preparation activities are exempt from ECA approval requirements. The extent, heights and location of the berm sections are presented on Figures 1a and 1b.

## Section 7.0 Conclusions

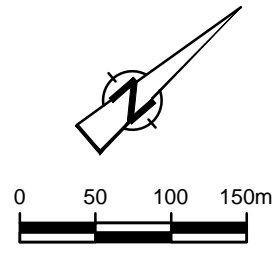
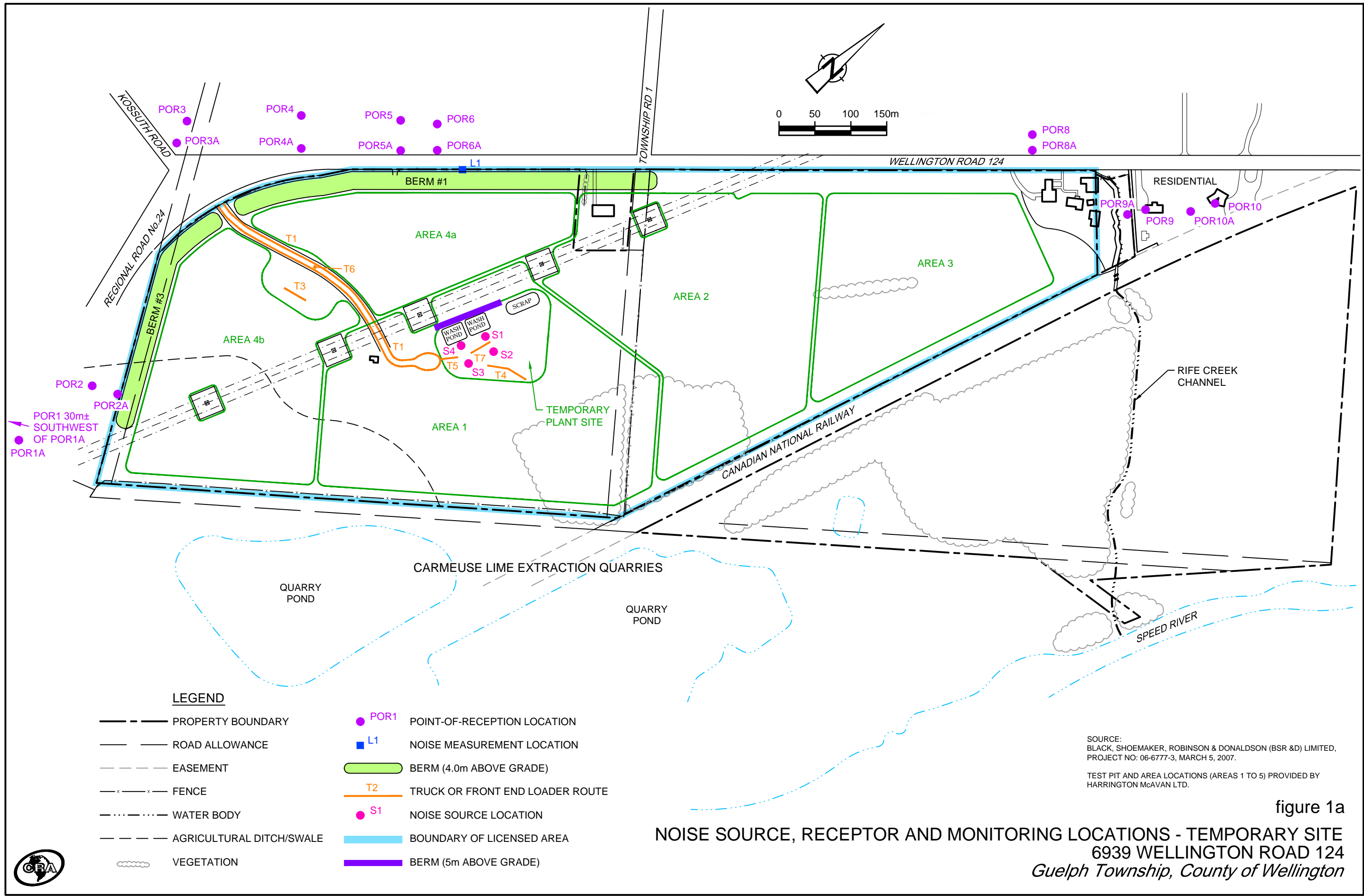
The attenuated steady-state sound levels estimated at the existing PORs are below the site-specific sound level limits, as summarized in Table 3.

## Section 8.0 Technical Recommendations

The following list outlines CRA's technical recommendations that are necessary to ensure that the on-site noise generation and the off-site environmental noise impacts meet and do not exceed the levels that were conservatively estimated in this report. An updated environmental noise analysis and summary report is required should any of the Site construction, operations, activities or conceptual layout as detailed in this report and/or summarized in the following Technical Recommendations be modified.

1. **Construction of perimeter berms/staged operations** – berms shall be constructed along the license boundary/limit of extraction as outlined in the site plans prepared by Harrington McAvan Ltd.

2. **Berms 1 and 3 Construction** – constructed to the required height and prior to the start of Site extraction operations and shall remain until the end of operations.
3. **Berm 2 Construction** –constructed to the required height and prior to start of extraction operations in Area 3 and shall remain until the end of Site operations.
4. **Time of Operations** – daily extraction activities commence at 7:00 a.m. and must cease not later than 7:00 p.m.
5. **Process equipment** – any changes to the equipment used on the site which might increase noise generation will be reviewed and approved by a competent professional prior to operation.



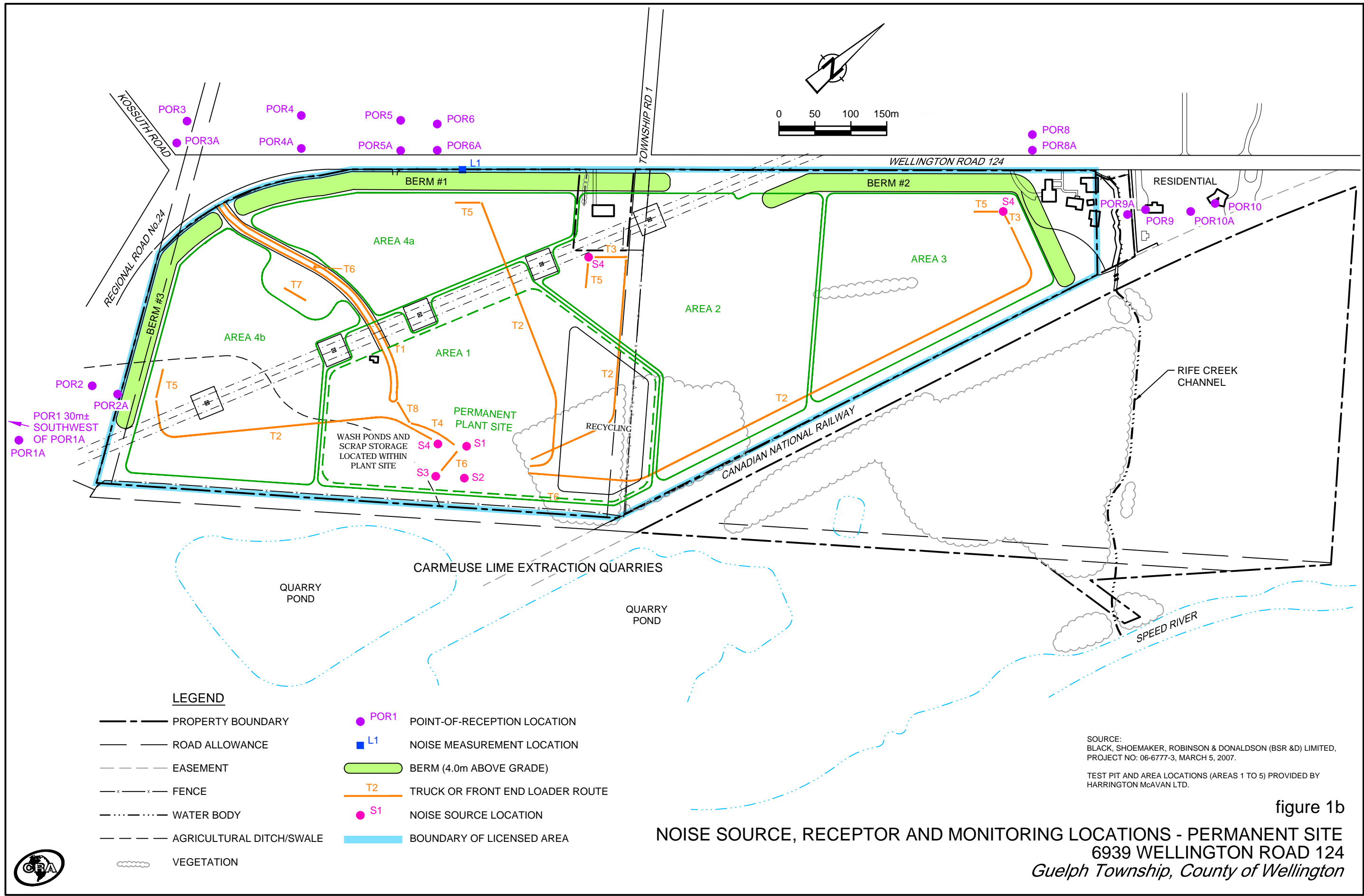
**LEGEND**

- PROPERTY BOUNDARY
- ROAD ALLOWANCE
- EASEMENT
- x-x- FENCE
- .-.- WATER BODY
- - - AGRICULTURAL DITCH/SWALE
- ~~~~~ VEGETATION
- POR1 POINT-OF-RECEPTION LOCATION
- L1 NOISE MEASUREMENT LOCATION
- █ BERM (4.0m ABOVE GRADE)
- T2 TRUCK OR FRONT END LOADER ROUTE
- S1 NOISE SOURCE LOCATION
- █ BOUNDARY OF LICENSED AREA
- █ BERM (5m ABOVE GRADE)

SOURCE:  
 BLACK, SHOEMAKER, ROBINSON & DONALDSON (BSR &D) LIMITED,  
 PROJECT NO: 06-6777-3, MARCH 5, 2007.  
 TEST PIT AND AREA LOCATIONS (AREAS 1 TO 5) PROVIDED BY  
 HARRINGTON McAVAN LTD.

**figure 1a**  
**NOISE SOURCE, RECEPTOR AND MONITORING LOCATIONS - TEMPORARY SITE**  
**6939 WELLINGTON ROAD 124**  
**Guelph Township, County of Wellington**



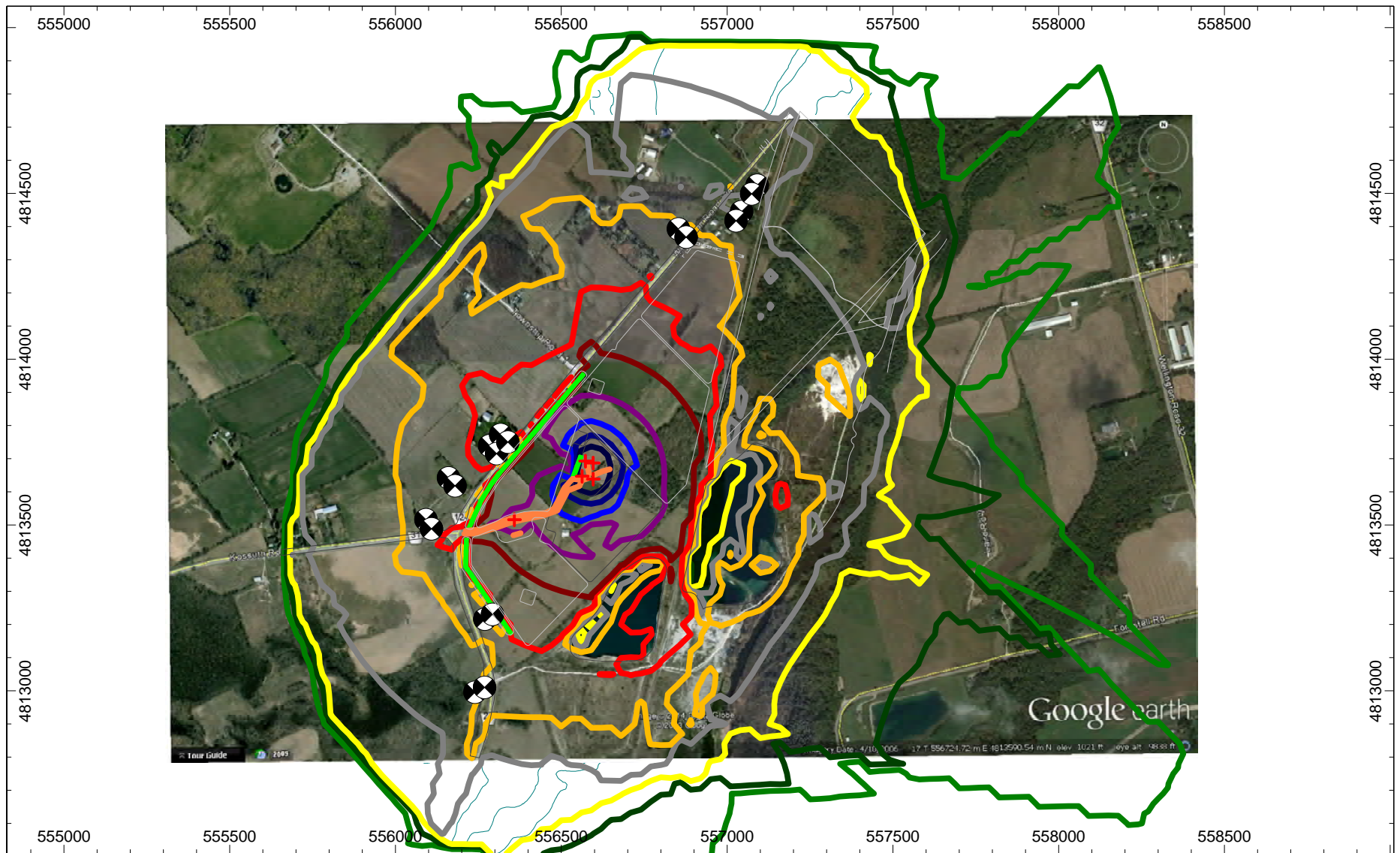


SOURCE:  
 BLACK, SHOEMAKER, ROBINSON & DONALDSON (BSR &D) LIMITED,  
 PROJECT NO: 06-6777-3, MARCH 5, 2007.  
 TEST PIT AND AREA LOCATIONS (AREAS 1 TO 5) PROVIDED BY  
 HARRINGTON McAVAN LTD.

figure 1b

**NOISE SOURCE, RECEPTOR AND MONITORING LOCATIONS - PERMANENT SITE**  
 6939 WELLINGTON ROAD 124  
 Guelph Township, County of Wellington

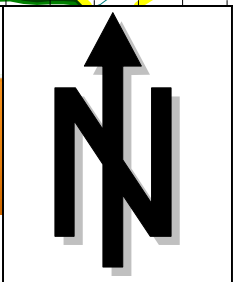
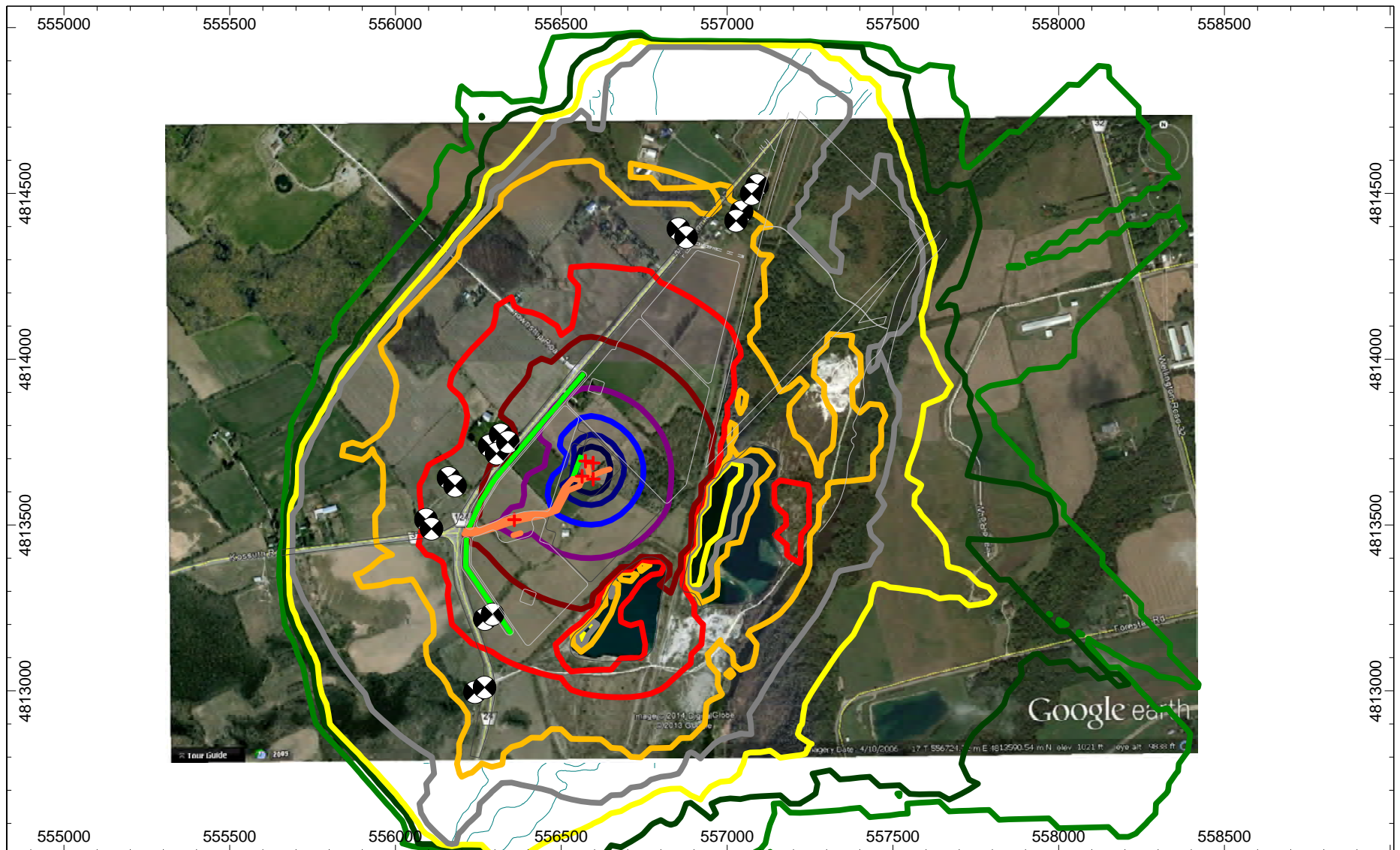




- > -99.0 dB
- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

ACOUSTIC ASSESSMENT REPORT  
 TRI CITY MATERIALS - GUELPH, ONTARIO

FIGURE 2A  
 AREA 1 OPERATIONS - 1.5 M NOISE CONTOURS



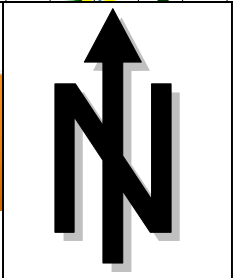
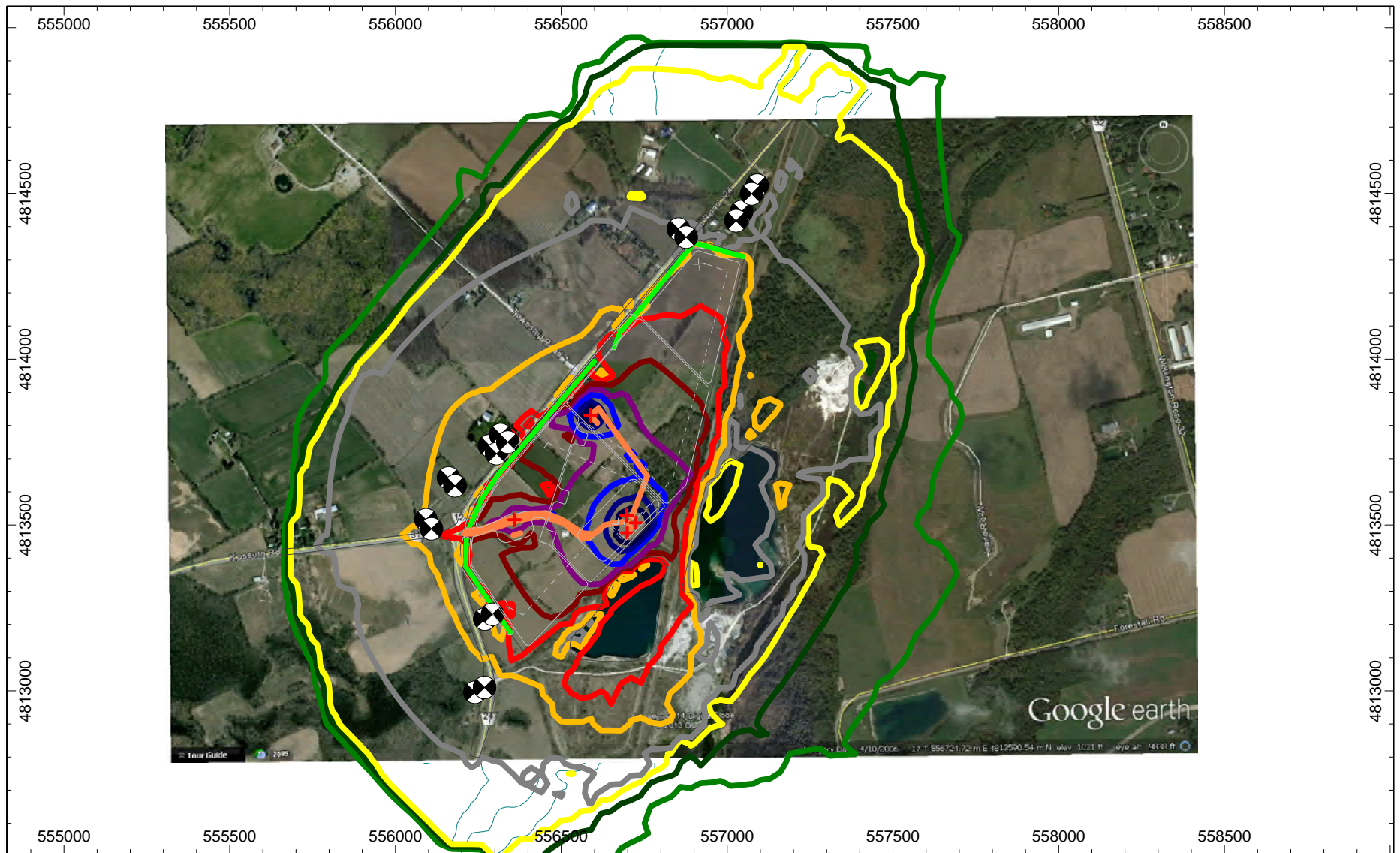
	> 85.0 dB
	> 80.0 dB
	> 75.0 dB
	> 70.0 dB
	> 65.0 dB
	> 60.0 dB
	> 55.0 dB
	> 50.0 dB
	> 45.0 dB
	> 40.0 dB
	> 35.0 dB
	> 30.0 dB

ACOUSTIC ASSESSMENT REPORT  
 TRI CITY MATERIALS - GUELPH, ONTARIO

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FIGURE 2B  
 AREA 1 OPERATIONS - 4.5 M NOISE CONTOURS

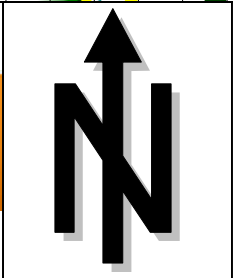
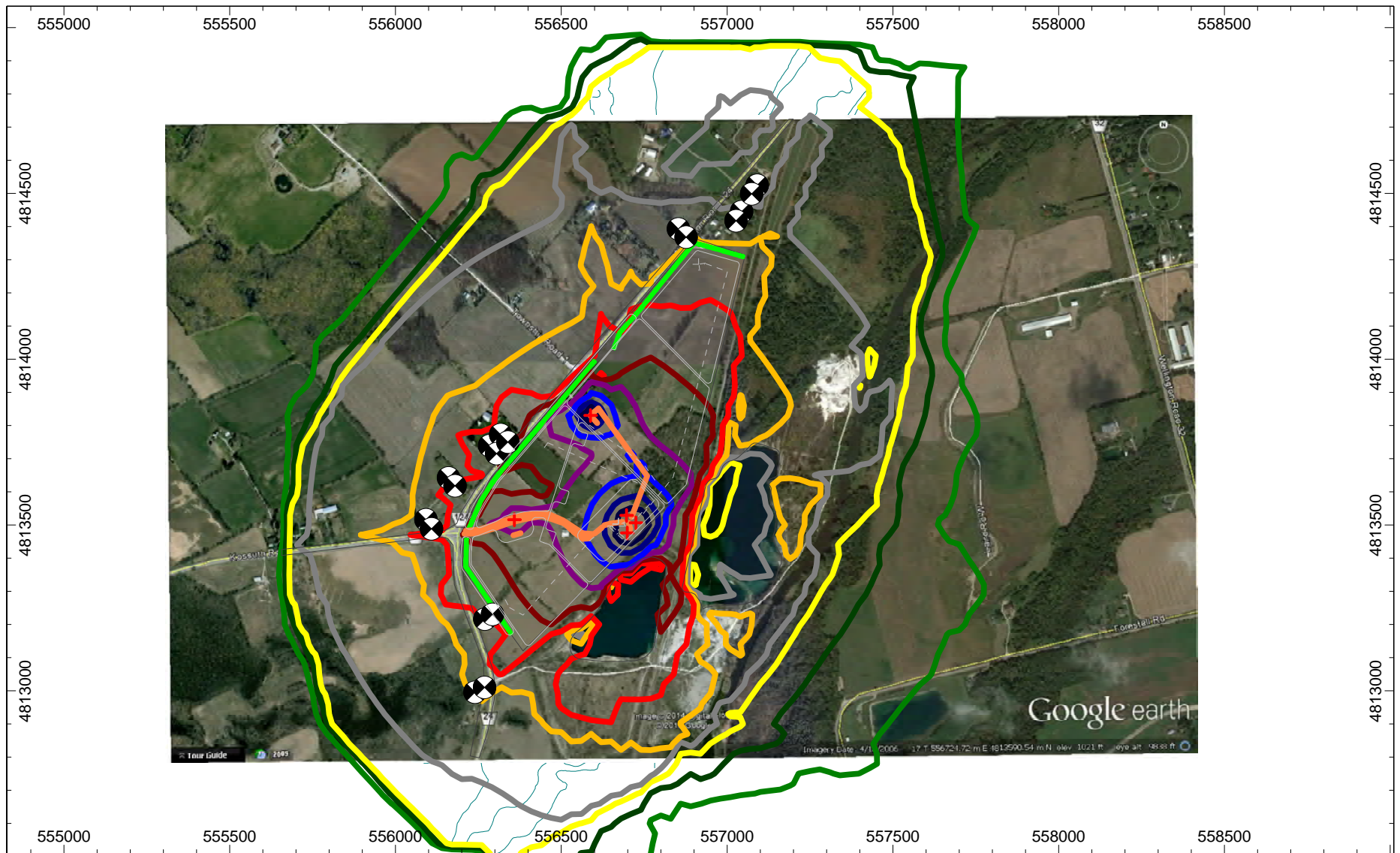




- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

ACOUSTIC ASSESSMENT REPORT  
 TRI CITY LANDS - GUELPH, ONTARIO

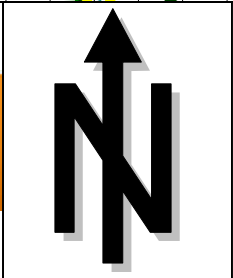
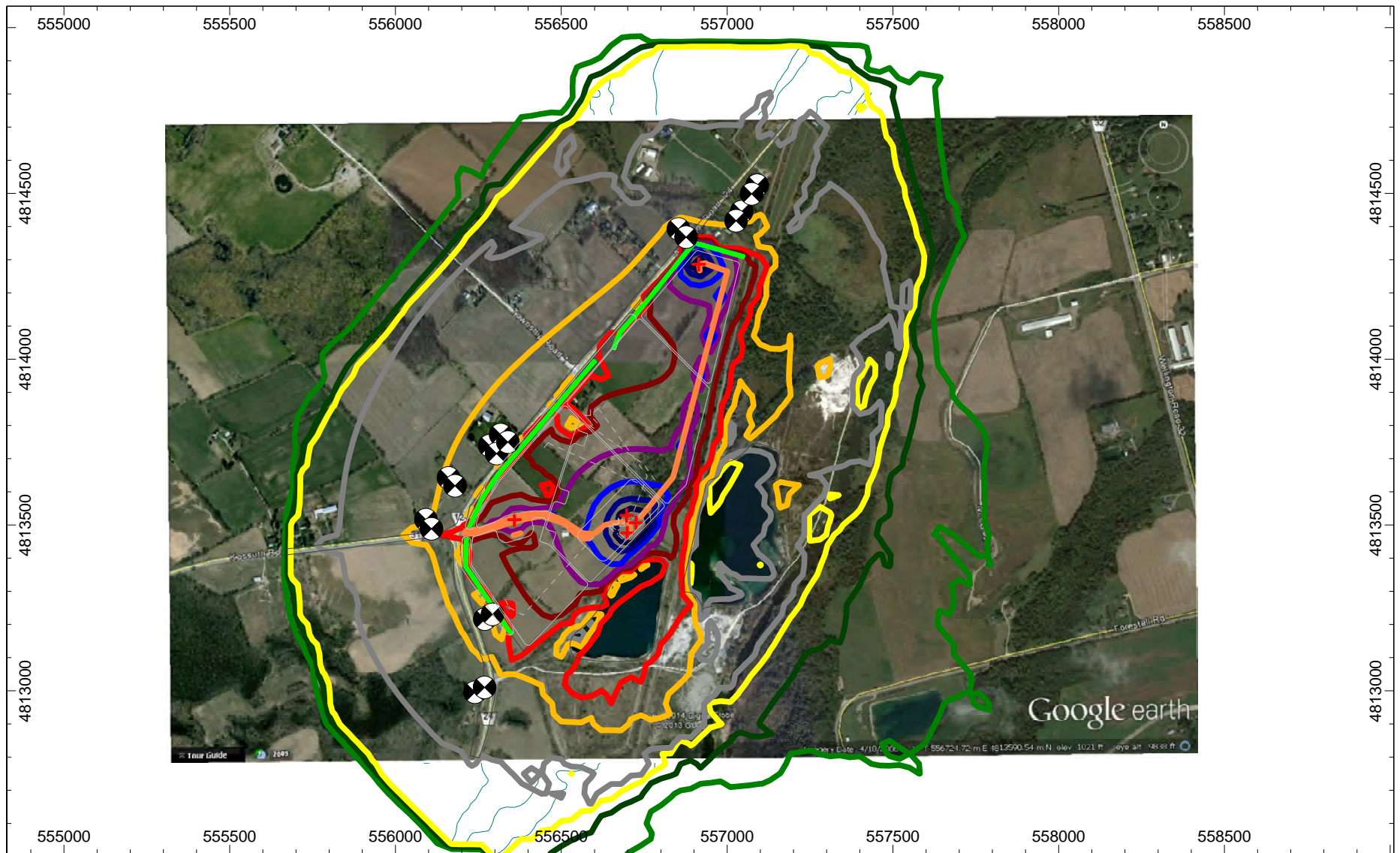
FIGURE 3A  
 AREA 2 OPERATIONS - 1.5 M NOISE CONTOURS



- > -99.0 dB
- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

ACOUSTIC ASSESSMENT REPORT  
 TRI CITY LANDS - GUELPH, ONTARIO

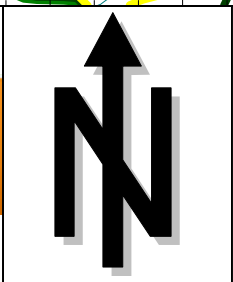
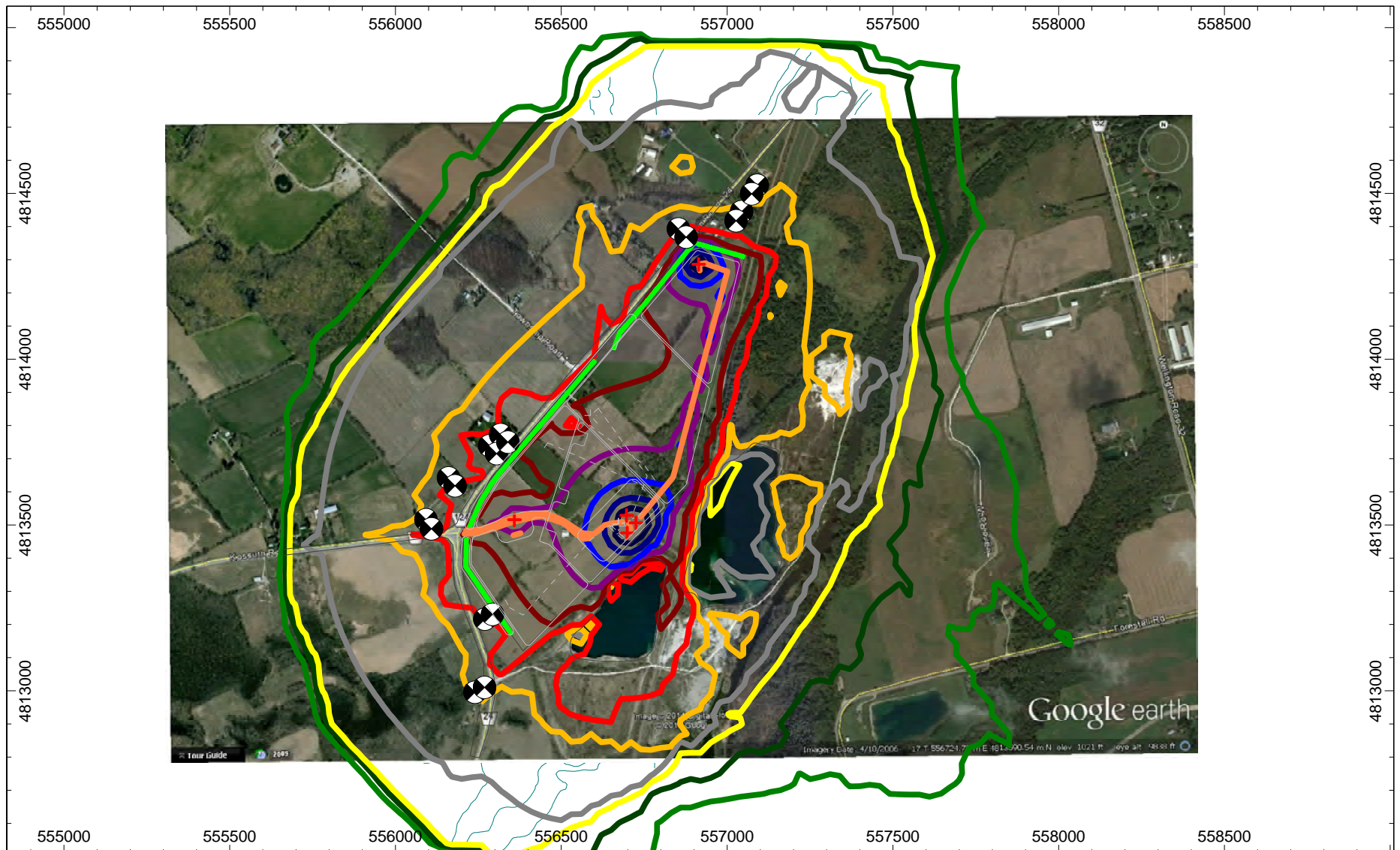
FIGURE 3B  
 AREA 2 OPERATIONS - 4.5 M NOISE CONTOURS



- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

ACOUSTIC ASSESSMENT REPORT  
 TRI CITY LANDS - GUELPH, ONTARIO

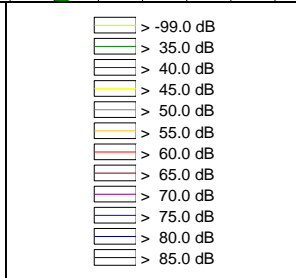
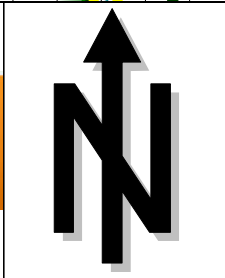
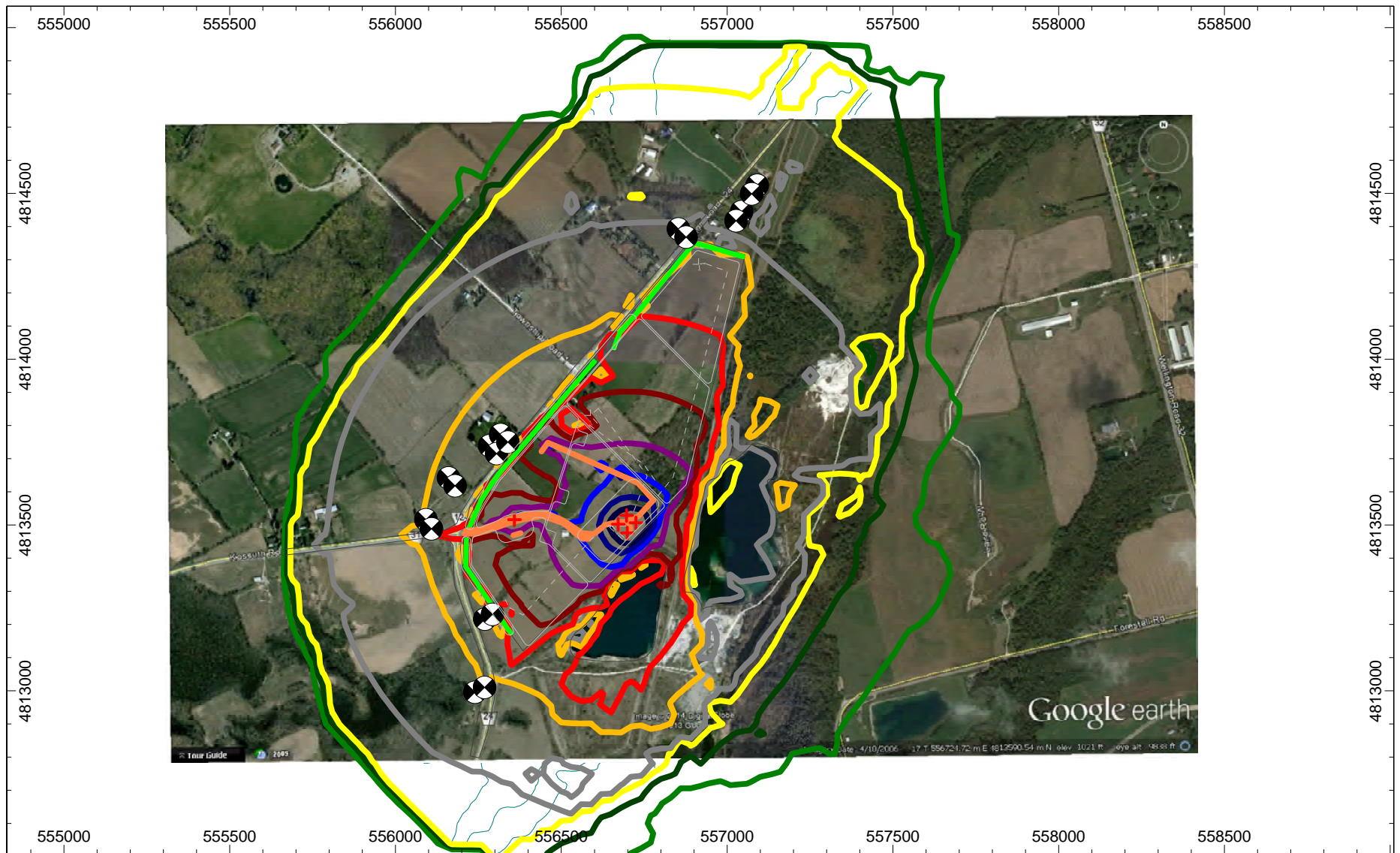
FIGURE 4A  
 AREA 3 OPERATIONS - 1.5 M NOISE CONTOURS



- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

ACOUSTIC ASSESSMENT REPORT  
 TRI CITY LANDS - GUELPH, ONTARIO

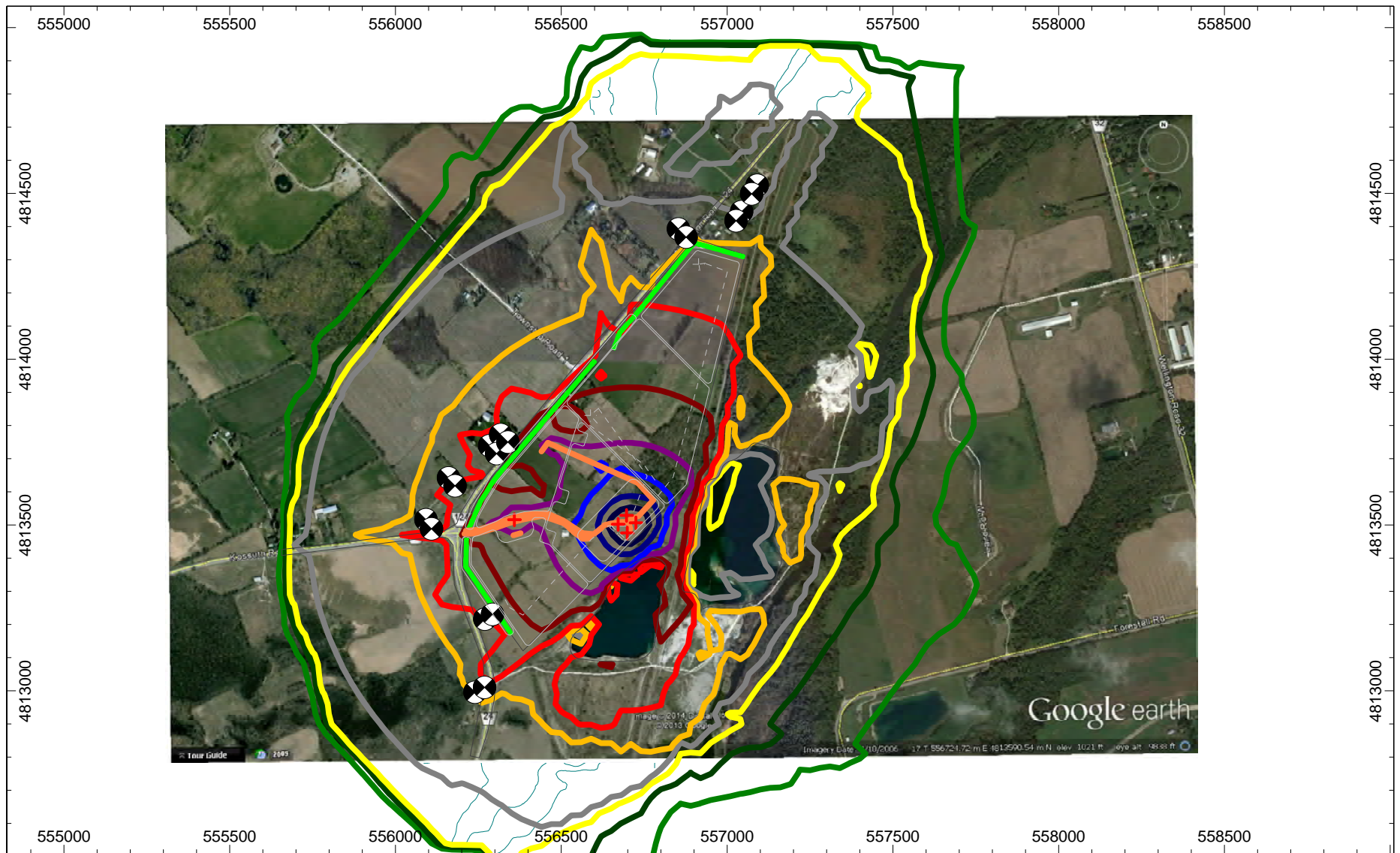
FIGURE 4B  
 AREA 3 OPERATIONS - 4.5 M NOISE CONTOURS



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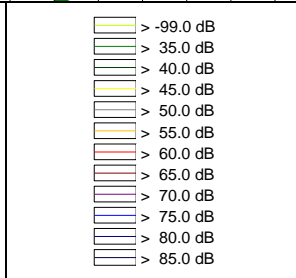
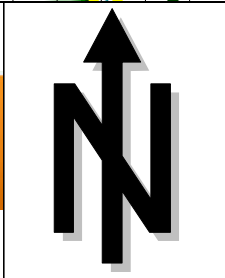
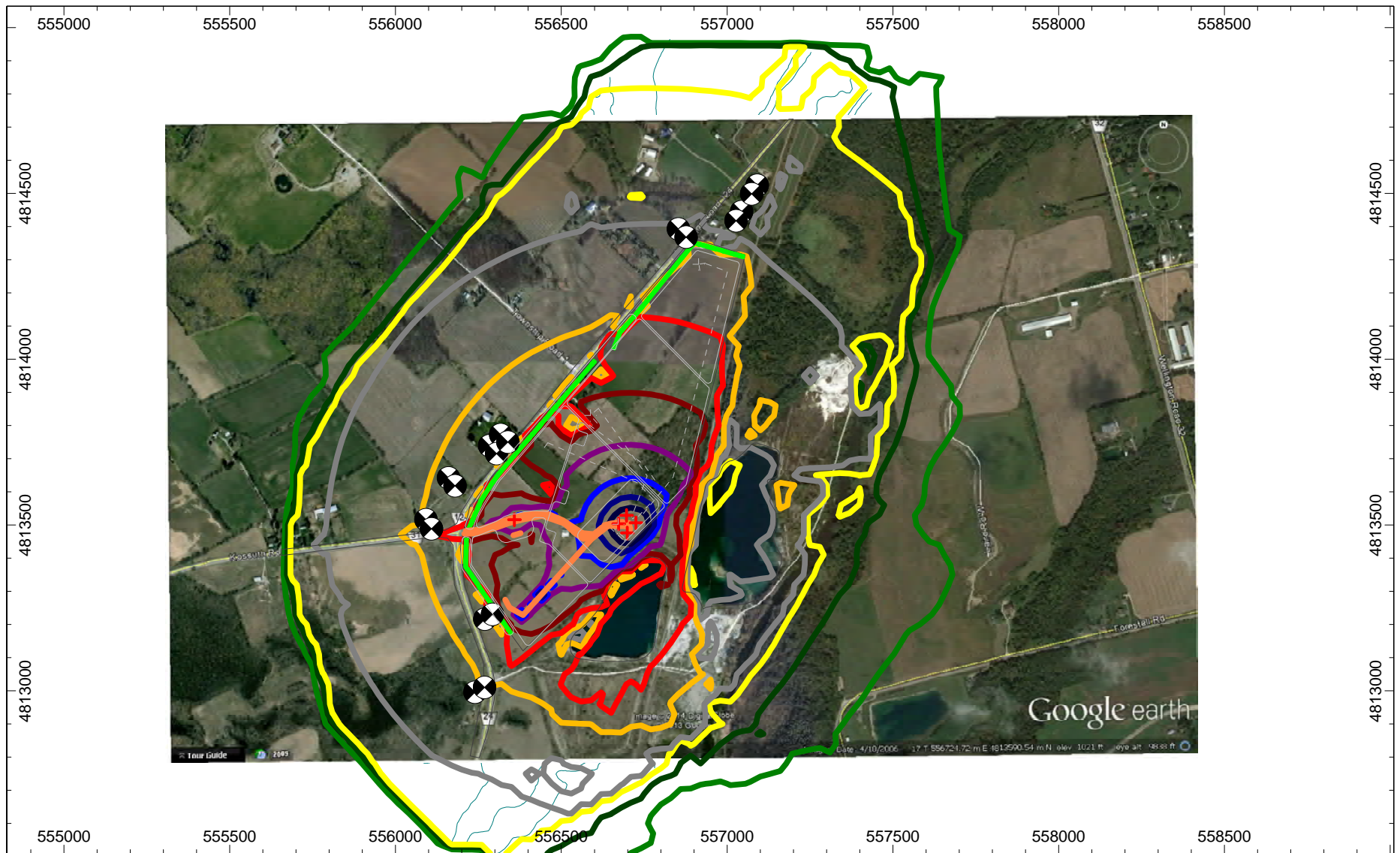
FIGURE 5A  
 AREA 4A OPERATIONS - 1.5 M NOISE CONTOURS



- > 99.0 dB
- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

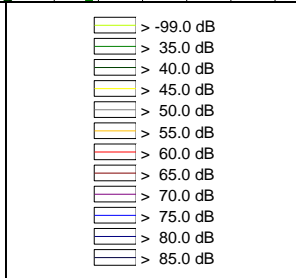
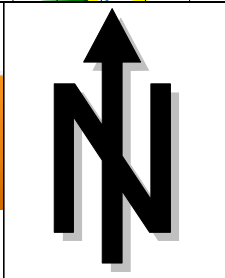
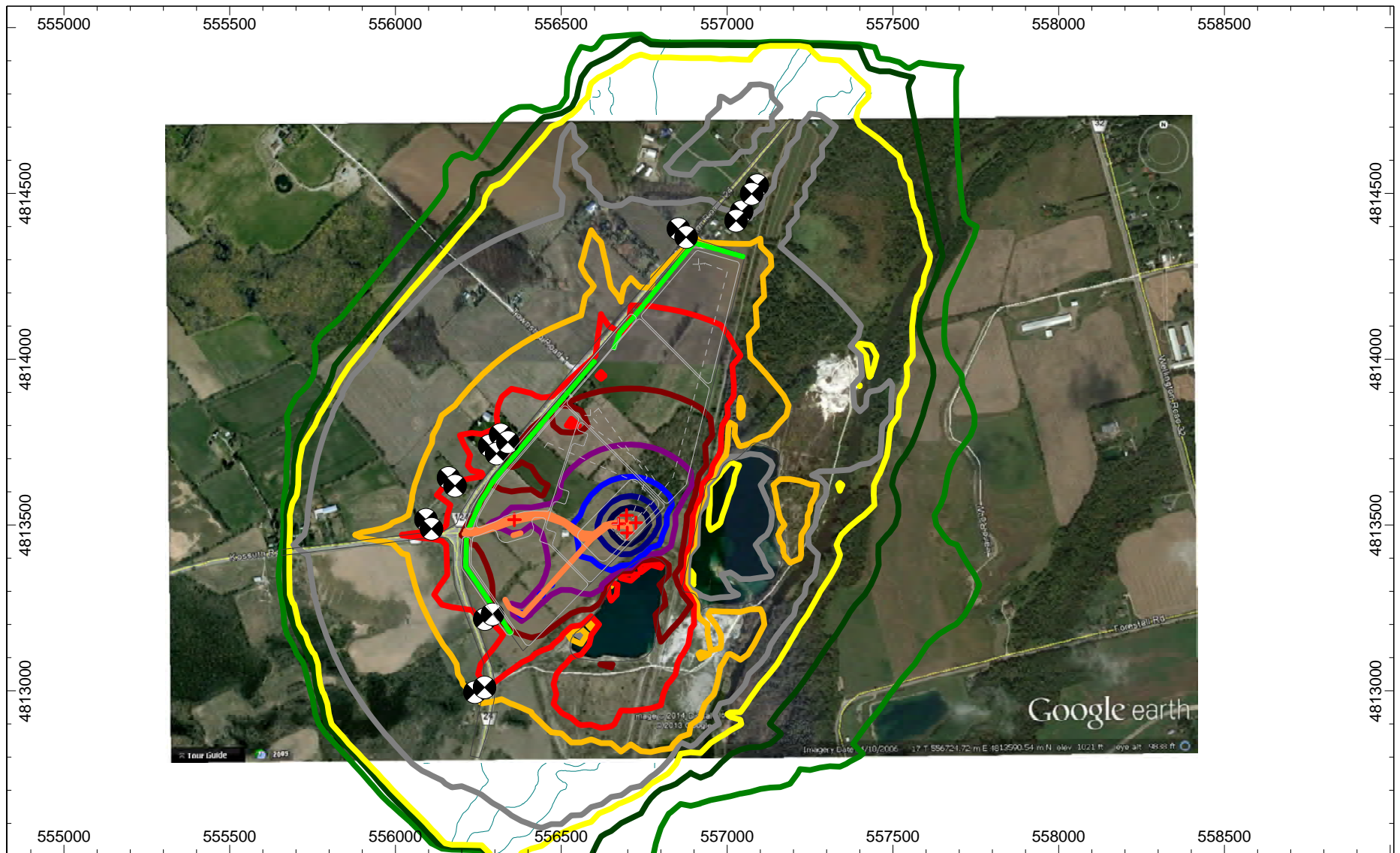
ACOUSTIC ASSESSMENT REPORT  
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FIGURE 5B  
AREA 4A OPERATIONS - 4.5 M NOISE CONTOURS



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FIGURE 6A  
 AREA 4B OPERATIONS - 1.5 M NOISE CONTOURS

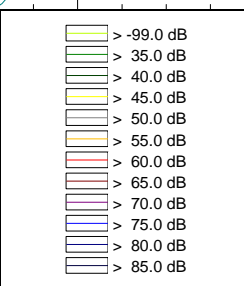
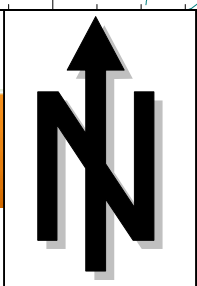
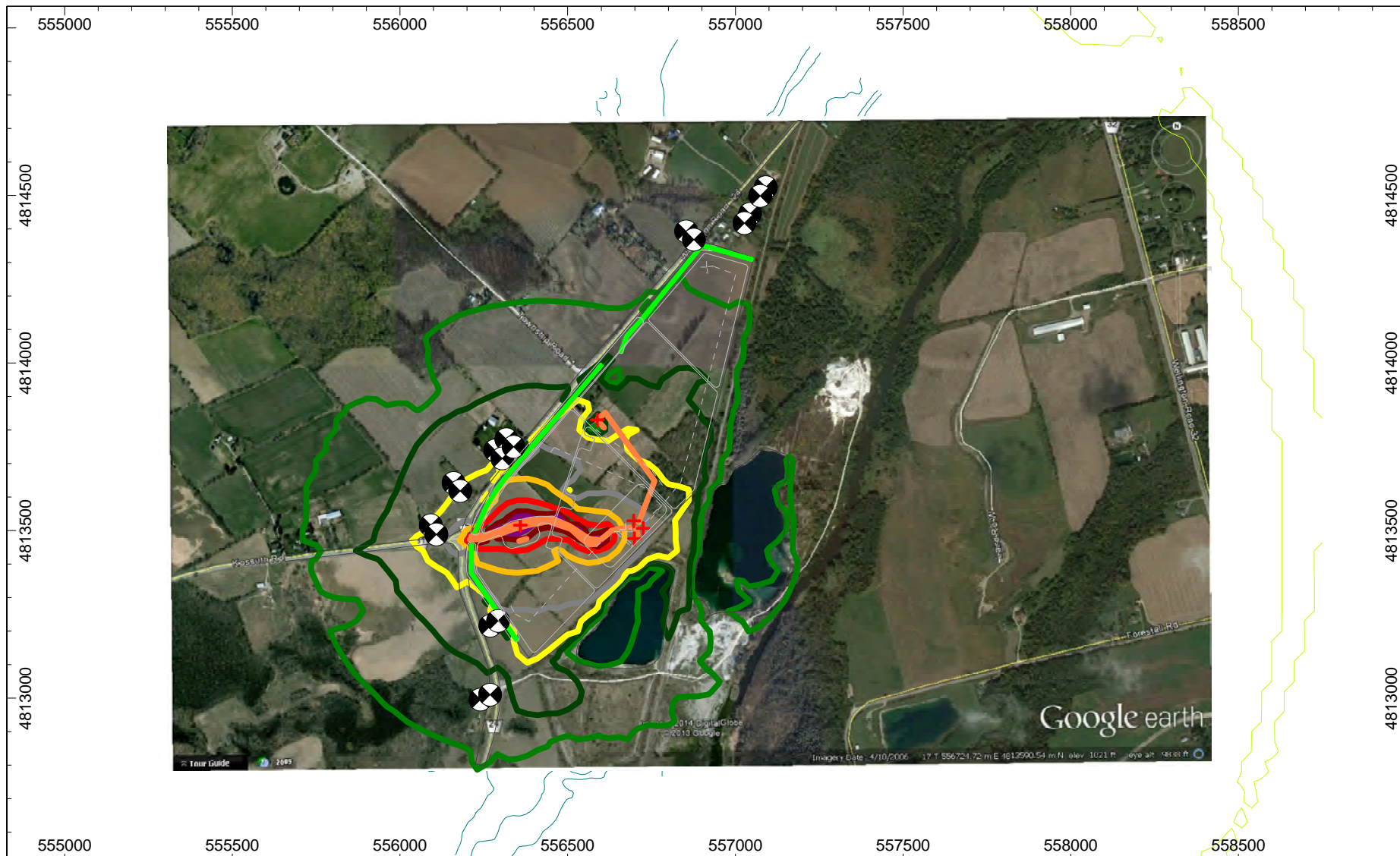


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FIGURE 6B  
 AREA 4B OPERATIONS - 4.5 M NOISE CONTOURS

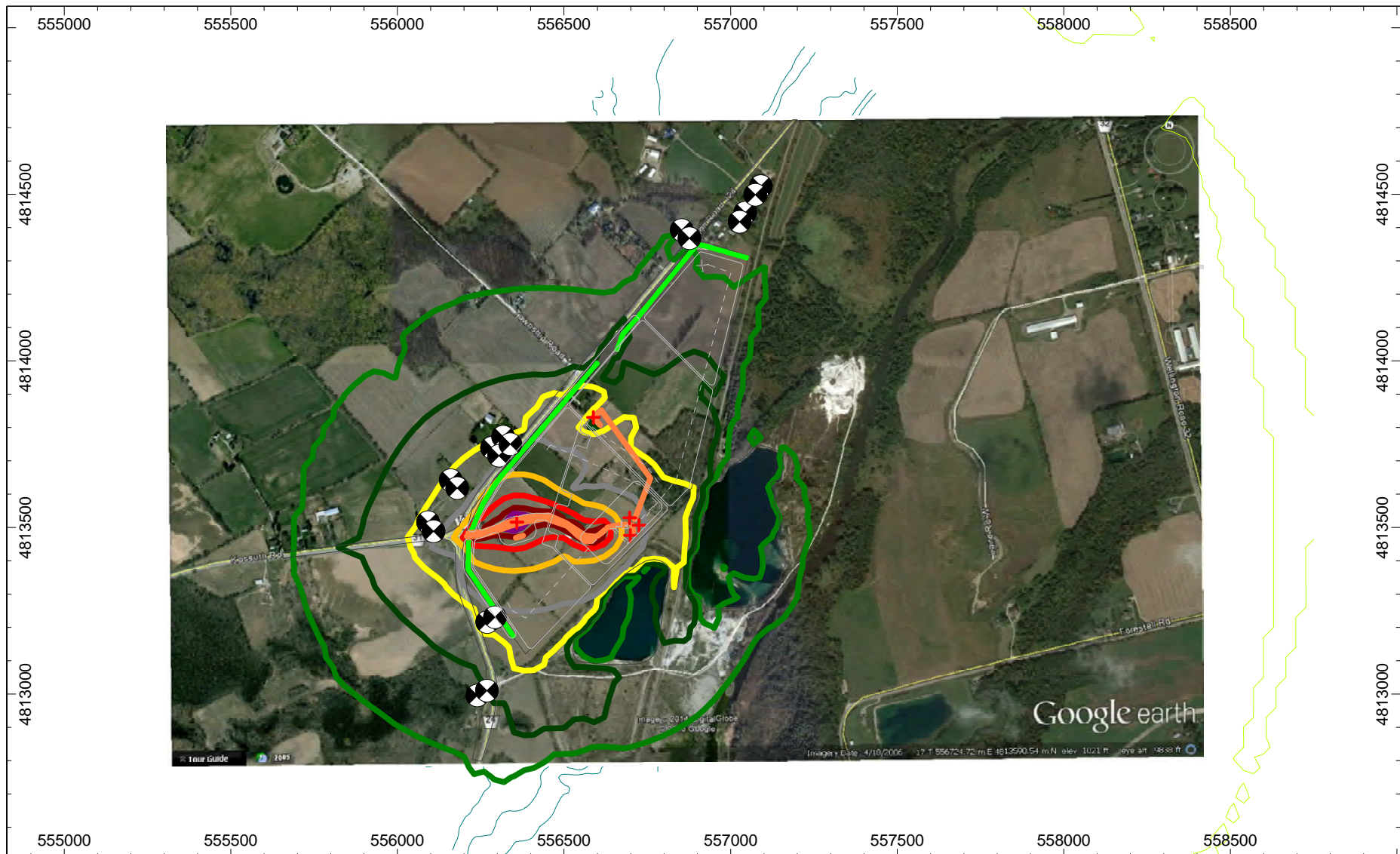




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 TRI CITY LANDS - GUELPH, ONTARIO

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FIGURE 7A  
 SHIPPING OPERATIONS - PERMANENT SITE - 1.5 M NOISE CONTOURS



- > 99.0 dB
- > 85.0 dB
- > 80.0 dB
- > 75.0 dB
- > 70.0 dB
- > 65.0 dB
- > 60.0 dB
- > 55.0 dB
- > 50.0 dB
- > 45.0 dB
- > 40.0 dB
- > 35.0 dB

ACOUSTIC ASSESSMENT REPORT  
TRI CITY LANDS - GUELPH, ONTARIO

FIGURE 7B  
SHIPPING OPERATIONS - PERMANENT SITE - 4.5 M NOISE CONTOURS

**TABLE 1**  
**NOISE SOURCE SUMMARY**  
**SPENCER PIT**  
**GUELPH, ONTARIO**

<i>Cadna A ID</i>	<i>Source Description</i>	<i>Source Type</i>	<i>Sound Power Level (1) (dBA)</i>	<i>Source Location (2)</i>	<i>Sound Characteristics (3)</i>	<i>Noise Control Measures (4)</i>
S1	Wash Plant	Point	117.4	O	S,T	B
S2	Impact Crusher	Point	125.9	O	S,T	B
S3	Cone Crusher	Point	124.0	O	S,T	B
S4	Screener	Point	121.6	O	S,T	B
T1	Truck Route	Moving Point - Line	109.9	O	S	B
T2	Material Truck Route	Moving Point - Line	113.6	O	S	B
T3	Front End Loader Route 1	Moving Point - Line	112.5	O	S	B
T4	Material Truck Route	Moving Point - Line	113.6	O	S	B
T5	Front End Loader Route 2	Moving Point - Line	113.6	O	S	B
T6	Plant Site Front End Loader Route	Moving Point - Line	113.6	O	S	B
T7	Direct Sales Front End Loader	Moving Point - Line	113.6	O	S	B
T8	Front End Loader Route 3	Moving Point - Line	113.6	O	S	B
T9	Scale	Point	109.9	O	S	B

## Notes:

(1) Sound Power Level (PWL) in dBA calculated from sound pressure level and reference distance and includes + 5 dBA tonal penalty if applicable.  
Resulting PWL based on dimensions of vertical area source or travel path and equipment movements for moving point line/area sources.

(2) Source Location:

- O - located/installed outside of building
- I - located/installed inside of building

(3) Sound Characteristics:

- S - Steady
- Q - Quasi Steady Impulsive
- I - Impulsive
- B - Buzzing
- T - Tonal
- C - Cyclic

(4) Noise Control Measures:

- S - silencer, acoustic louvre, muffler
- A - acoustic lining, plenum
- B - barrier, berm, screening
- L - lagging
- E - acoustic enclosure
- O - other
- U - uncontrolled
- AC - administrative control

TABLE 2A  
POINT-OF-RECEPTION NOISE IMPACT - AREA 1 OPERATIONS  
SPENCER PIT  
GUELPH, ONTARIO

Cadna A ID	Source Description	Residence on Hespeler Road POR1		Residence on Hespeler Road POR2		Residence on Kossuth Road POR3		Residence on Hespeler Road POR4		Residence on Hespeler Road POR5		Residence on Hespeler Road POR6		Residence on Hespeler Road POR8		Residence on Hespeler Road POR9		Residence on Hespeler Road POR10	
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
S1	Wash Plant	635	37.6 dBA	424	46.3 dBA	447	42.0 dBA	395	49.5 dBA	336	53.5 dBA	336	54.0 dBA	912	41.7 dBA	1034	35.2 dBA	1115	38.0 dBA
S2	Impact Crusher	639	48.9 dBA	431	57.8 dBA	472	52.6 dBA	422	55.3 dBA	362	58.8 dBA	360	59.2 dBA	914	52.5 dBA	1032	46.4 dBA	1113	48.9 dBA
S3	Cone Crusher	599	48.7 dBA	393	57.0 dBA	460	51.8 dBA	424	51.8 dBA	379	57.2 dBA	382	57.3 dBA	955	51.0 dBA	1073	45.3 dBA	1154	47.9 dBA
S4	Screener	597	44.0 dBA	386	53.2 dBA	429	48.2 dBA	389	55.6 dBA	346	54.2 dBA	350	53.7 dBA	949	47.1 dBA	1072	41.0 dBA	1153	43.6 dBA
T6	Scale	558	33.0 dBA	339	43.1 dBA	322	40.1 dBA	291	42.2 dBA	279	42.2 dBA	295	39.9 dBA	985	29.0 dBA	1121	24.1 dBA	1202	23.1 dBA
T1	Truck Route	479	33.2 dBA	261	43.1 dBA	298	43.5 dBA	306	42.7 dBA	332	43.8 dBA	356	40.4 dBA	1064	30.7 dBA	1199	25.7 dBA	1281	24.7 dBA
T3	Front End Loader Route 1	681	24.0 dBA	471	34.6 dBA	489	30.5 dBA	426	31.2 dBA	350	30.8 dBA	343	28.8 dBA	871	18.7 dBA	989	13.8 dBA	1071	12.9 dBA
T4	Material Truck Route	704	24.2 dBA	492	31.4 dBA	479	26.2 dBA	405	29.2 dBA	309	31.7 dBA	309	31.7 dBA	842	26.2 dBA	965	20.5 dBA	1046	23.1 dBA
T5	Front End Loader Route 2	512	21.2 dBA	294	29.7 dBA	270	24.5 dBA	265	31.7 dBA	288	30.6 dBA	313	26.8 dBA	1037	23.2 dBA	1177	18.1 dBA	1258	17.0 dBA
T7	Plant Site Front End Loader Route	626	22.8 dBA	416	31.3 dBA	451	25.5 dBA	403	28.7 dBA	348	28.7 dBA	348	31.6 dBA	923	25.4 dBA	1044	20.3 dBA	1125	19.2 dBA
	<b>Total Facility Sound Level (1-hour Leq):</b>		<b>52.7 dBA</b>		<b>61.5 dBA</b>		<b>56.5 dBA</b>		<b>62.1 dBA</b>		<b>62.6 dBA</b>		<b>62.7 dBA</b>		<b>55.7 dBA</b>		<b>49.7 dBA</b>		<b>52.3 dBA</b>

Cadna A ID	Source Description	Residence on Hespeler Road - OLA POR1A		Residence on Hespeler Road - OLA POR2A		Residence on Kossuth Road - OLA POR3A		Residence on Hespeler Road - OLA POR4A		Residence on Hespeler Road - OLA POR5A		Residence on Hespeler Road - OLA POR6A		Residence on Hespeler Road - OLA POR8A		Residence on Hespeler Road - OLA POR9A		Residence on Hespeler Road - OLA POR10A	
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
S1	Wash Plant	612	40.5 dBA	396	37.9 dBA	439	42.2 dBA	368	45.0 dBA	305	49.8 dBA	305	51.0 dBA	904	43.5 dBA	1005	35.7 dBA	1085	38.4 dBA
S2	Impact Crusher	615	55.4 dBA	402	49.1 dBA	463	52.8 dBA	396	54.9 dBA	331	57.7 dBA	330	57.5 dBA	905	54.6 dBA	1003	46.9 dBA	1083	49.4 dBA
S3	Cone Crusher	575	54.6 dBA	363	48.6 dBA	449	52.0 dBA	396	54.1 dBA	348	56.6 dBA	352	56.6 dBA	946	53.3 dBA	1044	45.7 dBA	1124	48.3 dBA
S4	Screener	574	47.8 dBA	358	44.5 dBA	419	48.5 dBA	362	48.5 dBA	316	51.0 dBA	321	50.4 dBA	941	49.2 dBA	1043	41.5 dBA	1123	44.0 dBA
T6	Scale	538	34.9 dBA	314	36.4 dBA	312	40.9 dBA	262	41.8 dBA	250	41.7 dBA	270	40.7 dBA	980	30.7 dBA	1092	24.4 dBA	1172	23.4 dBA
T1	Truck Route	460	35.5 dBA	236	36.8 dBA	282	45.8 dBA	277	42.6 dBA	306	42.0 dBA	333	41.4 dBA	1059	32.6 dBA	1171	26.1 dBA	1251	25.0 dBA
T3	Front End Loader Route 1	657	26.2 dBA	443	27.3 dBA	482	34.7 dBA	400	31.1 dBA	319	30.6 dBA	312	29.6 dBA	862	20.6 dBA	960	14.1 dBA	1041	13.2 dBA
T4	Material Truck Route	681	29.1 dBA	463	23.3 dBA	474	26.4 dBA	381	28.3 dBA	289	30.8 dBA	279	30.7 dBA	834	28.2 dBA	936	20.9 dBA	1016	23.5 dBA
T5	Front End Loader Route 2	495	26.7 dBA	271	22.1 dBA	257	24.8 dBA	235	26.9 dBA	263	27.8 dBA	291	26.8 dBA	1033	25.9 dBA	1148	18.5 dBA	1228	17.3 dBA
T7	Plant Site Front End Loader Route	602	27.7 dBA	387	23.7 dBA	441	25.7 dBA	376	26.5 dBA	317	28.5 dBA	318	28.6 dBA	915	28.2 dBA	1015	20.7 dBA	1095	19.5 dBA
	<b>Total Facility Sound Level (1-hour Leq):</b>		<b>58.5 dBA</b>		<b>53.0 dBA</b>		<b>56.9 dBA</b>		<b>58.8 dBA</b>		<b>61.1 dBA</b>		<b>61.1 dBA</b>		<b>57.9 dBA</b>		<b>50.2 dBA</b>		<b>52.7 dBA</b>

Notes:  
(1) Sound Level at the Receptor was calculated using Cadna A Acoustical Modelling Software.

TABLE 2B  
POINT-OF-RECEPTION NOISE IMPACT - AREA 2 OPERATIONS  
SPENCER PIT  
GUELPH, ONTARIO

Cadna A ID	Source Description	Residence on Hesspeler Road POR1		Residence on Hesspeler Road POR2		Residence on Kossuth Road POR3		Residence on Hesspeler Road POR4		Residence on Hesspeler Road POR5		Residence on Hesspeler Road POR6		Residence on Hesspeler Road POR8		Residence on Hesspeler Road POR9		Residence on Hesspeler Road POR10			
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
		S1	Wash Plant	697	39.1 dBA	508	48.1 dBA	606	40.9 dBA	558	42.7 dBA	487	49.6 dBA	479	44.5 dBA	911	36.3 dBA	1007	34.7 dBA	1087	33.4 dBA
S2	Impact Crusher	701	49.8 dBA	519	58.6 dBA	636	51.0 dBA	592	52.9 dBA	523	59.4 dBA	515	54.1 dBA	929	46.9 dBA	1020	45.5 dBA	1099	44.3 dBA	1099	44.3 dBA
S3	Cone Crusher	661	49.3 dBA	481	53.4 dBA	613	50.4 dBA	578	50.4 dBA	520	58.3 dBA	515	52.9 dBA	962	45.4 dBA	1056	44.1 dBA	1136	43.0 dBA	1136	43.0 dBA
S4	Screeners	888	36.9 dBA	671	45.2 dBA	564	46.7 dBA	444	49.8 dBA	301	54.2 dBA	266	54.8 dBA	653	40.8 dBA	788	40.7 dBA	869	41.2 dBA	869	41.2 dBA
T1	Truck Route	515	34.5 dBA	297	44.6 dBA	322	43.3 dBA	317	42.4 dBA	317	42.2 dBA	336	40.1 dBA	1027	28.1 dBA	1160	26.1 dBA	1242	25.3 dBA	1242	25.3 dBA
T2	Material Truck Route	807	33.2 dBA	603	40.0 dBA	612	36.1 dBA	530	38.3 dBA	423	44.1 dBA	403	40.8 dBA	769	35.1 dBA	873	33.4 dBA	954	32.1 dBA	954	32.1 dBA
T3	Front End Loader Route 1	917	17.0 dBA	700	23.6 dBA	595	24.3 dBA	474	27.4 dBA	327	31.3 dBA	291	30.8 dBA	624	20.3 dBA	757	19.2 dBA	838	19.4 dBA	838	19.4 dBA
T4	Material Truck Route	650	24.6 dBA	459	28.7 dBA	565	26.4 dBA	526	27.8 dBA	467	29.8 dBA	463	28.8 dBA	943	21.0 dBA	1045	19.6 dBA	1126	18.5 dBA	1126	18.5 dBA
T5	Front End Loader Route 2	621	15.3 dBA	427	22.4 dBA	536	20.9 dBA	501	27.6 dBA	451	31.7 dBA	449	31.9 dBA	961	22.8 dBA	1067	21.9 dBA	1148	20.5 dBA	1148	20.5 dBA
T6	Plant Site Front End Loader Route	686	21.7 dBA	501	25.7 dBA	614	22.9 dBA	571	24.6 dBA	505	30.7 dBA	498	25.5 dBA	931	18.4 dBA	1026	17.2 dBA	1106	16.1 dBA	1106	16.1 dBA
T7	Direct Sales Front End Loader	479	25.4 dBA	261	36.8 dBA	298	31.1 dBA	306	32.3 dBA	332	32.1 dBA	356	29.9 dBA	1064	17.4 dBA	1199	15.9 dBA	1281	14.9 dBA	1281	14.9 dBA
T8	Front End Loader Route	621	24.3 dBA	427	29.0 dBA	536	26.0 dBA	501	27.8 dBA	451	29.4 dBA	449	26.9 dBA	961	19.6 dBA	1067	18.2 dBA	1148	17.2 dBA	1148	17.2 dBA
T9	Scale	512	34.4 dBA	294	45.3 dBA	270	40.2 dBA	265	42.9 dBA	288	43.1 dBA	313	40.5 dBA	1037	27.5 dBA	1177	25.9 dBA	1258	24.9 dBA	1258	24.9 dBA
<b>Total Facility Sound Level (1-hour Leq):</b>			<b>53.1 dBA</b>		<b>60.5 dBA</b>		<b>55.2 dBA</b>		<b>57.1 dBA</b>		<b>62.9 dBA</b>		<b>59.1 dBA</b>		<b>50.2 dBA</b>		<b>49.0 dBA</b>		<b>48.1 dBA</b>		<b>48.1 dBA</b>
Cadna A ID	Source Description	Residence on Hesspeler Road - OLA POR1A		Residence on Hesspeler Road - OLA POR2A		Residence on Kossuth Road - OLA POR3A		Residence on Hesspeler Road - OLA POR4A		Residence on Hesspeler Road - OLA POR5A		Residence on Hesspeler Road - OLA POR6A		Residence on Hesspeler Road - OLA POR8A		Residence on Hesspeler Road - OLA POR9A		Residence on Hesspeler Road - OLA POR10A			
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
		S1	Wash Plant	671	40.7 dBA	479	39.4 dBA	596	42.0 dBA	532	42.7 dBA	457	45.3 dBA	449	45.7 dBA	898	37.5 dBA	978	35.2 dBA	1057	33.9 dBA
S2	Impact Crusher	674	51.4 dBA	489	50.0 dBA	624	53.6 dBA	565	52.6 dBA	493	54.9 dBA	485	55.3 dBA	916	48.1 dBA	991	46.0 dBA	1070	44.7 dBA	1070	44.7 dBA
S3	Cone Crusher	634	50.9 dBA	452	49.7 dBA	601	50.7 dBA	551	51.6 dBA	489	53.8 dBA	485	53.9 dBA	950	46.6 dBA	1028	44.6 dBA	1106	43.4 dBA	1106	43.4 dBA
S4	Screeners	866	38.8 dBA	644	33.7 dBA	568	46.2 dBA	431	49.5 dBA	282	54.3 dBA	244	56.0 dBA	647	42.0 dBA	759	40.1 dBA	839	41.5 dBA	839	41.5 dBA
T1	Truck Route	495	35.9 dBA	271	38.7 dBA	309	45.4 dBA	282	42.3 dBA	289	41.7 dBA	311	40.8 dBA	1021	29.2 dBA	1131	26.4 dBA	1212	25.6 dBA	1212	25.6 dBA
T2	Material Truck Route	782	34.6 dBA	573	33.2 dBA	608	36.4 dBA	508	38.2 dBA	395	40.1 dBA	374	41.4 dBA	757	36.3 dBA	844	33.9 dBA	924	32.5 dBA	924	32.5 dBA
T3	Front End Loader Route 1	895	18.7 dBA	674	14.5 dBA	599	24.1 dBA	461	26.9 dBA	310	31.3 dBA	271	31.3 dBA	618	20.7 dBA	728	18.9 dBA	808	19.6 dBA	808	19.6 dBA
T4	Material Truck Route	623	26.0 dBA	429	25.5 dBA	554	28.7 dBA	499	27.8 dBA	437	28.2 dBA	433	29.3 dBA	932	22.0 dBA	1017	20.0 dBA	1096	18.9 dBA	1096	18.9 dBA
T5	Front End Loader Route 2	595	17.6 dBA	398	13.2 dBA	523	20.3 dBA	474	24.9 dBA	420	30.3 dBA	419	32.8 dBA	950	24.4 dBA	1039	22.4 dBA	1118	21.0 dBA	1118	21.0 dBA
T6	Plant Site Front End Loader Route	659	23.3 dBA	472	22.8 dBA	603	26.1 dBA	544	24.2 dBA	475	26.6 dBA	467	26.8 dBA	919	19.8 dBA	997	17.6 dBA	1076	16.5 dBA	1076	16.5 dBA
T7	Direct Sales Front End Loader	460	27.3 dBA	236	30.1 dBA	282	32.3 dBA	277	32.0 dBA	306	31.7 dBA	333	31.1 dBA	1059	16.2 dBA	1171	15.2 dBA	1251	15.2 dBA	1251	15.2 dBA
T8	Front End Loader Route	595	26.1 dBA	398	25.8 dBA	523	26.5 dBA	474	27.5 dBA	420	26.5 dBA	419	26.7 dBA	950	21.0 dBA	1039	18.6 dBA	1118	17.5 dBA	1118	17.5 dBA
T9	Scale	495	35.9 dBA	271	38.6 dBA	257	40.9 dBA	235	42.4 dBA	263	42.1 dBA	291	41.4 dBA	1033	28.4 dBA	1148	26.2 dBA	1228	25.2 dBA	1228	25.2 dBA
<b>Total Facility Sound Level (1-hour Leq):</b>			<b>54.7 dBA</b>		<b>53.5 dBA</b>		<b>56.6 dBA</b>		<b>56.8 dBA</b>		<b>59.5 dBA</b>		<b>60.3 dBA</b>		<b>51.4 dBA</b>		<b>49.3 dBA</b>		<b>48.5 dBA</b>		<b>48.5 dBA</b>

Notes:

(1) Sound Level at the Receptor was calculated using Cadna A Acoustical Modelling Software.

TABLE 2C  
POINT-OF-RECEPTION NOISE IMPACT - AREA 3 OPERATIONS  
SPENCER PIT  
GUELPH, ONTARIO

Cadna A ID	Source Description	Residence on Hespeler Road POR1		Residence on Hespeler Road POR2		Residence on Kossuth Road POR3		Residence on Hespeler Road POR4		Residence on Hespeler Road POR5		Residence on Hespeler Road POR6		Residence on Hespeler Road POR8		Residence on Hespeler Road POR9		Residence on Hespeler Road POR10	
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
		S1	Wash Plant	697	39.1 dBA	508	48.1 dBA	606	40.9 dBA	558	42.7 dBA	487	49.6 dBA	479	44.5 dBA	911	36.3 dBA	1007	34.7 dBA
S2	Impact Crusher	701	49.8 dBA	519	58.6 dBA	636	51.0 dBA	592	52.9 dBA	523	59.4 dBA	515	54.1 dBA	929	46.9 dBA	1020	45.5 dBA	1099	44.3 dBA
S3	Cone Crusher	661	49.3 dBA	481	53.4 dBA	613	50.4 dBA	578	52.0 dBA	520	58.3 dBA	515	52.9 dBA	962	45.4 dBA	1056	44.1 dBA	1136	43.0 dBA
S4	Screeners	1442	35.2 dBA	1228	43.5 dBA	1095	38.4 dBA	954	40.8 dBA	794	43.2 dBA	750	43.1 dBA	151	55.5 dBA	227	52.0 dBA	309	50.1 dBA
T1	Truck Route	515	34.5 dBA	297	44.6 dBA	322	43.3 dBA	312	42.4 dBA	317	42.2 dBA	336	40.1 dBA	1027	28.1 dBA	1160	26.1 dBA	1242	25.3 dBA
T2	Material Truck Route	1124	34.1 dBA	919	42.0 dBA	869	36.2 dBA	752	40.2 dBA	604	44.5 dBA	566	40.3 dBA	493	44.4 dBA	566	43.4 dBA	646	41.7 dBA
T3	Front End Loader Route	1455	12.1 dBA	1242	19.8 dBA	1113	14.9 dBA	973	17.4 dBA	813	19.4 dBA	768	19.1 dBA	157	32.0 dBA	213	28.2 dBA	295	25.8 dBA
T4	Material Truck Route	650	24.6 dBA	459	28.7 dBA	565	26.4 dBA	526	27.8 dBA	467	29.8 dBA	463	28.8 dBA	943	21.0 dBA	1045	19.6 dBA	1126	18.5 dBA
T5	Front End Loader Route	621	11.8 dBA	427	19.5 dBA	536	14.7 dBA	501	17.2 dBA	451	19.2 dBA	449	19.0 dBA	961	31.1 dBA	1067	27.7 dBA	1148	25.6 dBA
T6	Plant Site Front End Loader Route	686	21.7 dBA	501	25.7 dBA	614	22.9 dBA	571	24.6 dBA	505	30.7 dBA	498	25.5 dBA	931	18.4 dBA	1026	17.2 dBA	1106	16.1 dBA
T7	Direct Sales Front End Loader	479	25.4 dBA	261	36.8 dBA	298	31.1 dBA	306	32.3 dBA	332	32.1 dBA	356	29.9 dBA	1064	17.4 dBA	1199	15.9 dBA	1281	14.9 dBA
T8	Front End Loader Route	621	24.3 dBA	427	29.0 dBA	536	26.0 dBA	501	27.8 dBA	451	29.4 dBA	449	26.9 dBA	961	19.6 dBA	1067	18.2 dBA	1148	17.2 dBA
T9	Scale	512	34.4 dBA	294	45.3 dBA	270	40.2 dBA	265	42.9 dBA	288	43.1 dBA	313	40.5 dBA	1037	27.5 dBA	1177	25.9 dBA	1258	24.9 dBA
<b>Total Facility Sound Level (1-hour Leq):</b>			<b>53.0 dBA</b>		<b>60.5 dBA</b>		<b>54.7 dBA</b>		<b>56.4 dBA</b>		<b>62.4 dBA</b>		<b>57.3 dBA</b>		<b>56.8 dBA</b>		<b>53.9 dBA</b>		<b>52.2 dBA</b>

Cadna A ID	Source Description	Residence on Hespeler Road - OLA POR1A		Residence on Hespeler Road - OLA POR2A		Residence on Kossuth Road - OLA POR3A		Residence on Hespeler Road - OLA POR4A		Residence on Hespeler Road - OLA POR5A		Residence on Hespeler Road - OLA POR6A		Residence on Hespeler Road - OLA POR8A		Residence on Hespeler Road - OLA POR9A		Residence on Hespeler Road - OLA POR10A	
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
		S1	Wash Plant	671	40.7 dBA	479	39.4 dBA	596	42.0 dBA	532	42.7 dBA	457	45.3 dBA	449	45.7 dBA	898	37.5 dBA	978	35.2 dBA
S2	Impact Crusher	674	51.4 dBA	489	50.0 dBA	624	53.6 dBA	565	52.6 dBA	493	54.9 dBA	485	55.3 dBA	916	48.1 dBA	991	46.0 dBA	1070	44.7 dBA
S3	Cone Crusher	634	50.9 dBA	452	49.7 dBA	601	50.7 dBA	551	51.6 dBA	489	53.8 dBA	485	53.9 dBA	950	46.6 dBA	1028	44.6 dBA	1106	43.4 dBA
S4	Screeners	1419	37.0 dBA	1200	37.9 dBA	1105	38.5 dBA	950	40.1 dBA	790	42.6 dBA	744	43.4 dBA	128	58.5 dBA	198	52.9 dBA	278	50.8 dBA
T1	Truck Route	495	35.9 dBA	271	38.7 dBA	309	45.4 dBA	282	42.3 dBA	289	41.7 dBA	311	40.8 dBA	1021	29.2 dBA	1131	26.4 dBA	1212	25.6 dBA
T2	Material Truck Route	1100	35.3 dBA	890	35.6 dBA	871	36.5 dBA	738	37.8 dBA	588	40.5 dBA	548	41.2 dBA	476	45.3 dBA	538	44.0 dBA	616	42.3 dBA
T3	Front End Loader Route	1432	13.8 dBA	1214	15.0 dBA	1123	15.0 dBA	968	16.4 dBA	808	18.6 dBA	762	19.3 dBA	133	34.7 dBA	185	29.5 dBA	265	26.6 dBA
T4	Material Truck Route	623	26.0 dBA	429	25.5 dBA	554	28.7 dBA	499	27.8 dBA	437	28.2 dBA	433	29.3 dBA	932	22.0 dBA	1017	20.0 dBA	1096	18.9 dBA
T5	Front End Loader Route	595	13.6 dBA	398	14.7 dBA	523	14.8 dBA	474	16.2 dBA	420	18.4 dBA	419	19.2 dBA	950	33.6 dBA	1039	28.7 dBA	1118	26.3 dBA
T6	Plant Site Front End Loader Route	659	23.3 dBA	472	22.8 dBA	603	26.1 dBA	544	24.2 dBA	475	26.6 dBA	467	26.8 dBA	919	19.8 dBA	997	17.6 dBA	1076	16.5 dBA
T7	Direct Sales Front End Loader	460	27.3 dBA	236	30.1 dBA	282	32.3 dBA	277	32.0 dBA	306	31.7 dBA	333	31.1 dBA	1059	18.8 dBA	1171	16.2 dBA	1251	15.2 dBA
T8	Front End Loader Route	595	26.1 dBA	398	25.8 dBA	523	26.5 dBA	474	27.5 dBA	420	26.5 dBA	419	26.7 dBA	950	21.0 dBA	1039	18.6 dBA	1118	17.5 dBA
T9	Scale	495	35.9 dBA	271	38.6 dBA	257	40.9 dBA	235	42.4 dBA	263	42.1 dBA	291	41.4 dBA	1033	28.4 dBA	1148	26.2 dBA	1228	25.2 dBA
<b>Total Facility Sound Level (1-hour Leq):</b>			<b>54.6 dBA</b>		<b>53.6 dBA</b>		<b>56.3 dBA</b>		<b>56.0 dBA</b>		<b>58.1 dBA</b>		<b>58.4 dBA</b>		<b>59.4 dBA</b>		<b>54.7 dBA</b>		<b>52.9 dBA</b>

Notes:  
(1) Sound Level at the Receptor was calculated using Cadna A Acoustical Modelling Software.

TABLE 2D  
POINT-OF-RECEPTION NOISE IMPACT - AREA 4A OPERATIONS  
SPENCER PIT  
GUELPH, ONTARIO

Cadna A ID	Source Description	Residence on Hespeler Road POR1		Residence on Hespeler Road POR2		Residence on Kossuth Road POR3		Residence on Hespeler Road POR4		Residence on Hespeler Road POR5		Residence on Hespeler Road POR6		Residence on Hespeler Road POR8		Residence on Hespeler Road POR9		Residence on Hespeler Road POR10	
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
		S1	Wash Plant	697	39.1 dBA	508	48.1 dBA	606	40.9 dBA	558	42.7 dBA	487	49.6 dBA	479	44.5 dBA	911	36.3 dBA	1007	34.7 dBA
S2	Impact Crusher	701	49.8 dBA	519	58.6 dBA	636	51.0 dBA	592	52.9 dBA	523	59.4 dBA	515	54.1 dBA	929	46.9 dBA	1020	45.5 dBA	1099	44.3 dBA
S3	Cone Crusher	661	49.3 dBA	481	53.4 dBA	613	50.4 dBA	578	52.0 dBA	520	58.3 dBA	515	52.9 dBA	962	45.4 dBA	1056	44.1 dBA	1136	43.0 dBA
S4	Screener	660	45.4 dBA	472	54.6 dBA	582	47.1 dBA	543	48.8 dBA	482	55.4 dBA	477	50.1 dBA	942	41.5 dBA	1041	40.1 dBA	1122	38.8 dBA
T1	Truck Route	515	34.5 dBA	297	44.6 dBA	322	43.3 dBA	312	42.4 dBA	317	42.2 dBA	336	40.1 dBA	1027	28.1 dBA	1160	26.1 dBA	1242	25.3 dBA
T2	Material Truck Route	745	34.4 dBA	541	41.3 dBA	568	38.1 dBA	497	40.6 dBA	405	45.4 dBA	391	43.6 dBA	825	34.6 dBA	933	33.0 dBA	1014	31.8 dBA
T3	Front End Loader Route	669	25.3 dBA	482	29.4 dBA	594	26.7 dBA	553	28.5 dBA	490	34.7 dBA	484	29.6 dBA	937	22.5 dBA	1035	21.2 dBA	1115	20.1 dBA
T4	Material Truck Route	650	24.6 dBA	459	28.7 dBA	565	26.4 dBA	526	27.8 dBA	467	29.8 dBA	463	28.8 dBA	943	21.0 dBA	1045	19.6 dBA	1126	18.5 dBA
T5	Front End Loader Route	764	22.3 dBA	545	31.7 dBA	411	28.3 dBA	299	31.6 dBA	176	35.9 dBA	158	34.4 dBA	785	22.3 dBA	930	19.6 dBA	1011	19.1 dBA
T6	Plant Site Front End Loader Route	686	21.7 dBA	501	25.7 dBA	614	22.9 dBA	571	24.6 dBA	505	30.7 dBA	498	25.5 dBA	931	18.4 dBA	1026	17.2 dBA	1106	16.1 dBA
T7	Direct Sales Front End Loader	479	25.4 dBA	261	36.8 dBA	298	31.1 dBA	306	32.3 dBA	332	32.1 dBA	356	29.9 dBA	1064	17.4 dBA	1199	15.9 dBA	1281	14.9 dBA
T8	Front End Loader Route	621	24.3 dBA	427	29.0 dBA	536	26.0 dBA	501	27.8 dBA	451	29.4 dBA	449	26.9 dBA	961	19.6 dBA	1067	18.2 dBA	1148	17.2 dBA
T9	Scale	512	34.4 dBA	294	45.3 dBA	270	40.2 dBA	265	42.9 dBA	288	43.1 dBA	313	40.5 dBA	1037	27.5 dBA	1177	25.9 dBA	1258	24.9 dBA
<b>Total Facility Sound Level (1-hour Leq):</b>			<b>53.7 dBA</b>		<b>61.4 dBA</b>		<b>55.3 dBA</b>		<b>57.0 dBA</b>		<b>63.2 dBA</b>		<b>58.0 dBA</b>		<b>50.3 dBA</b>		<b>48.9 dBA</b>		<b>47.7 dBA</b>

Cadna A ID	Source Description	Residence on Hespeler Road - OLA POR1A		Residence on Hespeler Road - OLA POR2A		Residence on Kossuth Road - OLA POR3A		Residence on Hespeler Road - OLA POR4A		Residence on Hespeler Road - OLA POR5A		Residence on Hespeler Road - OLA POR6A		Residence on Hespeler Road - OLA POR8A		Residence on Hespeler Road - OLA POR9A		Residence on Hespeler Road - OLA POR10A	
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
		S1	Wash Plant	671	40.7 dBA	479	39.4 dBA	596	42.0 dBA	532	42.7 dBA	457	45.3 dBA	449	45.7 dBA	898	37.5 dBA	978	35.2 dBA
S2	Impact Crusher	674	51.4 dBA	489	50.0 dBA	624	53.6 dBA	565	52.6 dBA	493	54.9 dBA	485	55.3 dBA	916	48.1 dBA	991	46.0 dBA	1070	44.7 dBA
S3	Cone Crusher	634	50.9 dBA	452	49.7 dBA	601	50.7 dBA	551	51.6 dBA	489	53.8 dBA	485	53.9 dBA	950	46.8 dBA	1028	44.6 dBA	1106	43.4 dBA
S4	Screener	633	47.1 dBA	442	45.7 dBA	571	49.9 dBA	515	48.6 dBA	451	49.5 dBA	446	51.1 dBA	930	42.8 dBA	1012	40.5 dBA	1092	39.2 dBA
T1	Truck Route	495	35.9 dBA	271	38.7 dBA	309	45.4 dBA	282	42.3 dBA	289	41.7 dBA	311	40.8 dBA	1021	29.2 dBA	1131	26.4 dBA	1212	25.6 dBA
T2	Material Truck Route	720	35.9 dBA	512	34.7 dBA	561	38.4 dBA	473	40.5 dBA	376	43.9 dBA	360	44.5 dBA	814	35.8 dBA	904	33.4 dBA	984	32.2 dBA
T3	Front End Loader Route	643	26.9 dBA	453	26.5 dBA	582	28.3 dBA	525	28.0 dBA	459	30.6 dBA	453	30.9 dBA	925	23.8 dBA	1006	21.6 dBA	1085	20.4 dBA
T4	Material Truck Route	623	26.0 dBA	429	25.5 dBA	554	28.7 dBA	499	27.8 dBA	437	28.2 dBA	433	29.3 dBA	932	22.0 dBA	1017	20.0 dBA	1096	18.9 dBA
T5	Front End Loader Route	745	24.1 dBA	521	25.9 dBA	415	28.6 dBA	283	30.6 dBA	150	35.4 dBA	128	36.4 dBA	782	23.7 dBA	902	19.4 dBA	981	19.4 dBA
T6	Plant Site Front End Loader Route	659	23.3 dBA	472	22.8 dBA	603	26.1 dBA	544	24.2 dBA	475	26.6 dBA	467	26.8 dBA	919	19.8 dBA	997	17.6 dBA	1076	16.5 dBA
T7	Direct Sales Front End Loader	460	27.3 dBA	236	30.1 dBA	282	32.3 dBA	277	32.0 dBA	306	31.7 dBA	333	31.1 dBA	1059	18.8 dBA	1171	16.2 dBA	1251	15.2 dBA
T8	Front End Loader Route	595	26.1 dBA	398	25.8 dBA	523	26.5 dBA	474	27.5 dBA	420	26.5 dBA	419	26.7 dBA	950	21.0 dBA	1039	18.6 dBA	1118	17.5 dBA
T9	Scale	495	35.9 dBA	271	38.6 dBA	257	40.9 dBA	235	42.4 dBA	263	42.1 dBA	291	41.4 dBA	1033	28.4 dBA	1148	26.2 dBA	1228	25.2 dBA
<b>Total Facility Sound Level (1-hour Leq):</b>			<b>55.3 dBA</b>		<b>54.1 dBA</b>		<b>57.1 dBA</b>		<b>56.7 dBA</b>		<b>58.7 dBA</b>		<b>59.1 dBA</b>		<b>51.5 dBA</b>		<b>49.4 dBA</b>		<b>48.1 dBA</b>

Notes:  
(1) Sound Level at the Receptor was calculated using Cadna A Acoustical Modelling Software.

TABLE 2E  
 POINT-OF-RECEPTION NOISE IMPACT - AREA 4B OPERATIONS  
 SPENCER PIT  
 GUELPH, ONTARIO

Cadna A ID	Source Description	Residence on Hespeler Road POR1		Residence on Hespeler Road POR2		Residence on Kossuth Road POR3		Residence on Hespeler Road POR4		Residence on Hespeler Road POR5		Residence on Hespeler Road POR6		Residence on Hespeler Road POR8		Residence on Hespeler Road POR9		Residence on Hespeler Road POR10	
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
		S1	Wash Plant	697	39.1 dBA	508	48.1 dBA	606	40.9 dBA	558	42.7 dBA	487	49.6 dBA	479	44.5 dBA	911	36.3 dBA	1007	34.7 dBA
S2	Impact Crusher	701	49.8 dBA	519	58.6 dBA	636	51.0 dBA	592	52.9 dBA	523	59.4 dBA	515	54.1 dBA	929	46.9 dBA	1020	45.5 dBA	1099	44.3 dBA
S3	Cone Crusher	661	49.3 dBA	481	53.4 dBA	613	50.4 dBA	578	52.0 dBA	520	58.3 dBA	515	52.9 dBA	962	45.4 dBA	1056	44.1 dBA	1136	43.0 dBA
S4	Screenner	660	45.4 dBA	472	54.5 dBA	582	47.0 dBA	543	48.8 dBA	482	55.4 dBA	477	50.1 dBA	942	41.6 dBA	1041	40.1 dBA	1122	38.9 dBA
T1	Truck Route	515	34.5 dBA	297	44.6 dBA	322	43.3 dBA	312	42.4 dBA	317	42.2 dBA	336	40.1 dBA	1027	28.1 dBA	1160	26.1 dBA	1242	25.3 dBA
T2	Material Truck Route	1358	41.4 dBA	1545	49.4 dBA	1669	42.4 dBA	1820	41.0 dBA	1973	42.1 dBA	2017	40.1 dBA	2817	31.3 dBA	2969	30.0 dBA	3050	29.0 dBA
T3	Front End Loader Route	671	19.9 dBA	487	24.0 dBA	606	21.3 dBA	566	23.1 dBA	504	29.2 dBA	498	24.0 dBA	944	16.6 dBA	1040	15.3 dBA	1120	14.3 dBA
T4	Material Truck Route	650	24.6 dBA	459	28.7 dBA	565	26.4 dBA	526	27.8 dBA	467	29.8 dBA	463	28.8 dBA	943	21.0 dBA	1045	19.6 dBA	1126	18.5 dBA
T5	Front End Loader Route	276	30.0 dBA	63	42.9 dBA	374	29.2 dBA	453	28.2 dBA	523	27.1 dBA	552	25.4 dBA	1265	15.4 dBA	1394	14.2 dBA	1476	13.3 dBA
T6	Plant Site Front End Loader Route	686	21.7 dBA	501	25.7 dBA	614	22.9 dBA	571	24.6 dBA	505	30.7 dBA	498	25.5 dBA	931	18.4 dBA	1026	17.2 dBA	1106	16.1 dBA
T7	Direct Sales Front End Loader	479	25.4 dBA	261	36.8 dBA	298	31.1 dBA	306	32.3 dBA	332	32.1 dBA	356	29.9 dBA	1064	17.4 dBA	1199	15.9 dBA	1281	14.9 dBA
T8	Front End Loader Route	621	24.3 dBA	427	29.0 dBA	536	26.0 dBA	501	27.8 dBA	451	29.4 dBA	449	26.9 dBA	961	19.6 dBA	1067	18.2 dBA	1148	17.2 dBA
T9	Scale	512	34.4 dBA	294	45.3 dBA	270	40.2 dBA	265	42.9 dBA	288	43.1 dBA	313	40.5 dBA	1037	27.5 dBA	1177	25.9 dBA	1258	24.9 dBA
<b>Total Facility Sound Level (1-hour Leq):</b>			<b>53.9 dBA</b>		<b>61.7 dBA</b>		<b>55.4 dBA</b>		<b>57.0 dBA</b>		<b>63.1 dBA</b>		<b>57.9 dBA</b>		<b>50.2 dBA</b>		<b>48.8 dBA</b>		<b>47.7 dBA</b>

Cadna A ID	Source Description	Residence on Hespeler Road - OLA POR1A		Residence on Hespeler Road - OLA POR2A		Residence on Kossuth Road - OLA POR3A		Residence on Hespeler Road - OLA POR4A		Residence on Hespeler Road - OLA POR5A		Residence on Hespeler Road - OLA POR6A		Residence on Hespeler Road - OLA POR8A		Residence on Hespeler Road - OLA POR9A		Residence on Hespeler Road - OLA POR10A	
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
		S1	Wash Plant	671	40.7 dBA	479	39.4 dBA	596	42.0 dBA	532	42.7 dBA	457	45.3 dBA	449	45.7 dBA	898	37.5 dBA	978	35.2 dBA
S2	Impact Crusher	674	51.4 dBA	489	50.0 dBA	624	53.6 dBA	565	52.6 dBA	493	54.9 dBA	485	55.3 dBA	916	48.1 dBA	991	46.0 dBA	1070	44.7 dBA
S3	Cone Crusher	634	50.9 dBA	452	49.7 dBA	601	50.7 dBA	551	51.6 dBA	489	53.8 dBA	485	53.9 dBA	950	46.8 dBA	1028	44.6 dBA	1106	43.4 dBA
S4	Screenner	633	47.1 dBA	442	45.7 dBA	571	49.7 dBA	515	48.6 dBA	451	51.0 dBA	446	51.1 dBA	930	42.8 dBA	1012	40.5 dBA	1092	39.3 dBA
T1	Truck Route	495	35.9 dBA	271	38.7 dBA	309	45.4 dBA	282	42.3 dBA	289	41.7 dBA	311	40.8 dBA	1021	29.2 dBA	1131	26.4 dBA	1212	25.6 dBA
T2	Material Truck Route	1386	43.1 dBA	1574	45.4 dBA	1654	43.7 dBA	1815	41.1 dBA	1969	41.3 dBA	2015	41.1 dBA	2816	32.3 dBA	2941	30.3 dBA	3020	29.3 dBA
T3	Front End Loader Route	644	21.5 dBA	457	21.2 dBA	594	24.0 dBA	539	22.6 dBA	473	25.1 dBA	468	25.2 dBA	932	18.0 dBA	1011	15.7 dBA	1090	14.6 dBA
T4	Material Truck Route	623	26.0 dBA	429	25.5 dBA	554	28.7 dBA	499	27.8 dBA	437	28.2 dBA	433	29.3 dBA	932	22.0 dBA	1017	20.0 dBA	1096	18.9 dBA
T5	Front End Loader Route	255	32.1 dBA	34	40.5 dBA	349	30.8 dBA	427	28.3 dBA	501	27.3 dBA	532	26.8 dBA	1259	16.8 dBA	1366	14.5 dBA	1446	13.6 dBA
T6	Plant Site Front End Loader Route	659	23.3 dBA	472	22.8 dBA	603	26.1 dBA	544	24.2 dBA	475	26.6 dBA	467	26.8 dBA	919	19.8 dBA	997	17.6 dBA	1076	16.5 dBA
T7	Direct Sales Front End Loader	460	27.3 dBA	236	30.1 dBA	282	32.3 dBA	277	32.0 dBA	306	31.7 dBA	333	31.1 dBA	1059	18.8 dBA	1171	16.2 dBA	1251	15.2 dBA
T8	Front End Loader Route	595	26.1 dBA	398	25.8 dBA	523	26.5 dBA	474	27.5 dBA	420	26.5 dBA	419	26.7 dBA	950	21.0 dBA	1039	18.6 dBA	1118	17.5 dBA
T9	Scale	495	35.9 dBA	271	38.6 dBA	257	40.9 dBA	235	42.4 dBA	263	42.1 dBA	291	41.4 dBA	1033	28.4 dBA	1148	26.2 dBA	1228	25.2 dBA
<b>Total Facility Sound Level (1-hour Leq):</b>			<b>55.5 dBA</b>		<b>54.8 dBA</b>		<b>57.3 dBA</b>		<b>56.7 dBA</b>		<b>58.8 dBA</b>		<b>59.0 dBA</b>		<b>51.4 dBA</b>		<b>49.3 dBA</b>		<b>48.1 dBA</b>

Notes:  
 (1) Sound Level at the Receptor was calculated using Cadna A Acoustical Modelling Software.



TABLE 2F  
 POINT-OF-RECEPTION NOISE IMPACT - SHIPPING OPERATIONS  
 SPENCER PIT  
 GUELPH, ONTARIO

Cadna A ID	Source Description	Residence on Hespeler Road POR1		Residence on Hespeler Road POR2		Residence on Kossuth Road POR3		Residence on Hespeler Road POR4		Residence on Hespeler Road POR5		Residence on Hespeler Road POR6		Residence on Hespeler Road POR8		Residence on Hespeler Road POR9		Residence on Hespeler Road POR10			
		Distance to Receptor (m)	Nighttime 6 a.m. - 7 a.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Nighttime 6 a.m. - 7 a.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Nighttime 6 a.m. - 7 a.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Nighttime 6 a.m. - 7 a.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Nighttime 6 a.m. - 7 a.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Nighttime 6 a.m. - 7 a.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Nighttime 6 a.m. - 7 a.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Nighttime 6 a.m. - 7 a.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Nighttime 6 a.m. - 7 a.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Nighttime 6 a.m. - 7 a.m. Sound Level (1) (Leq)
		T1	Truck Route	515	34.5 dBA	297	44.6 dBA	322	43.3 dBA	312	42.4 dBA	317	42.2 dBA	336	40.1 dBA	1027	28.1 dBA	1160	26.1 dBA	1242	25.3 dBA
T8	Front End Loader Route	621	24.3 dBA	427	29.0 dBA	536	26.0 dBA	501	27.8 dBA	451	29.4 dBA	449	26.9 dBA	961	19.6 dBA	1067	18.2 dBA	1148	17.2 dBA		
T9	Scale	512	34.4 dBA	294	45.3 dBA	270	40.2 dBA	265	42.9 dBA	288	43.1 dBA	313	40.5 dBA	1037	27.5 dBA	1177	25.9 dBA	1258	24.9 dBA		
<b>Total Facility Sound Level (1-hour Leq):</b>			<b>37.7 dBA</b>		<b>48.0 dBA</b>		<b>45.1 dBA</b>		<b>45.7 dBA</b>		<b>45.8 dBA</b>		<b>43.4 dBA</b>		<b>31.1 dBA</b>		<b>29.4 dBA</b>		<b>28.5 dBA</b>		

Cadna A ID	Source Description	Residence on Hespeler Road - OLA POR1A		Residence on Hespeler Road - OLA POR2A		Residence on Kossuth Road - OLA POR3A		Residence on Hespeler Road - OLA POR4A		Residence on Hespeler Road - OLA POR5A		Residence on Hespeler Road - OLA POR6A		Residence on Hespeler Road - OLA POR8A		Residence on Hespeler Road - OLA POR9A		Residence on Hespeler Road - OLA POR10A	
		Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)	Distance to Receptor (m)	Daytime 7 a.m. - 7 p.m. Sound Level (1) (Leq)
		T1	Truck Route	538	35.9 dBA	314	38.7 dBA	312	45.4 dBA	262	42.3 dBA	250	41.7 dBA	270	40.8 dBA	980	29.2 dBA	1092	26.4 dBA
T8	Front End Loader Route	595	26.1 dBA	398	25.8 dBA	523	26.5 dBA	474	27.5 dBA	420	26.5 dBA	419	26.7 dBA	950	21.0 dBA	1039	18.6 dBA	1118	17.5 dBA
T9	Scale	495	35.9 dBA	271	38.6 dBA	257	40.9 dBA	235	42.4 dBA	263	42.1 dBA	291	41.4 dBA	1033	28.4 dBA	1148	26.2 dBA	1228	25.2 dBA
<b>Total Facility Sound Level (1-hour Leq):</b>			<b>39.1 dBA</b>		<b>41.8 dBA</b>		<b>46.8 dBA</b>		<b>45.4 dBA</b>		<b>45.0 dBA</b>		<b>44.2 dBA</b>		<b>32.2 dBA</b>		<b>29.7 dBA</b>		<b>28.8 dBA</b>

Notes:  
 (1) Sound Level at the Receptor was calculated using Cadna A Acoustical Modelling Software.

**TABLE 3**  
**ACOUSTIC ASSESSMENT SUMMARY - STEADY STATE SOUND LEVELS**  
**SPENCER PIT**  
**GUELPH, ONTARIO**

<i>Point-of-Reception ID</i>	<i>Point-of-Reception Description</i>	<i>Sound Level at Point-of-Reception Predicted (Leq)</i>	<i>Verified by Acoustic Audit (Yes/No)</i>	<i>Performance Limit (1) (Leq)</i>	<i>Compliance with Performance Limit (Yes/No)</i>
<b>Area 1 Operations - 7:00 a.m. - 11:00 p.m.</b>					
POR1	Residence on Hespeler Road	52.7 (dBA)	No	64 (dBA)	Yes
POR1A	Residence on Hespeler Road - OLA	58.5 (dBA)	No	67 (dBA)	Yes
POR2	Residence on Hespeler Road	61.5 (dBA)	No	64 (dBA)	Yes
POR2A	Residence on Hespeler Road - OLA	53.0 (dBA)	No	67 (dBA)	Yes
POR3	Residence on Kossuth Road	56.5 (dBA)	No	61 (dBA)	Yes
POR3A	Residence on Kossuth Road - OLA	56.9 (dBA)	No	63 (dBA)	Yes
POR4	Residence on Hespeler Road	62.1 (dBA)	No	63 (dBA)	Yes
POR4A	Residence on Hespeler Road - OLA	58.8 (dBA)	No	65 (dBA)	Yes
POR5	Residence on Hespeler Road	62.6 (dBA)	No	64 (dBA)	Yes
POR5A	Residence on Hespeler Road - OLA	61.1 (dBA)	No	67 (dBA)	Yes
POR6	Residence on Hespeler Road	62.7 (dBA)	No	64 (dBA)	Yes
POR6A	Residence on Hespeler Road - OLA	61.1 (dBA)	No	68 (dBA)	Yes
POR8	Residence on Hespeler Road	55.7 (dBA)	No	66 (dBA)	Yes
POR8A	Residence on Hespeler Road - OLA	57.9 (dBA)	No	75 (dBA)	Yes
POR9	Residence on Hespeler Road	49.7 (dBA)	No	63 (dBA)	Yes
POR9A	Residence on Hespeler Road - OLA	50.2 (dBA)	No	66 (dBA)	Yes
POR10	Residence on Hespeler Road	52.3 (dBA)	No	64 (dBA)	Yes
POR10A	Residence on Hespeler Road - OLA	52.7 (dBA)	No	68 (dBA)	Yes
<b>Area 2 Operations - 7:00 a.m. - 11:00 p.m.</b>					
POR1	Residence on Hespeler Road	53.1 (dBA)	No	64 (dBA)	Yes
POR1A	Residence on Hespeler Road - OLA	54.7 (dBA)	No	67 (dBA)	Yes
POR2	Residence on Hespeler Road	60.5 (dBA)	No	64 (dBA)	Yes
POR2A	Residence on Hespeler Road - OLA	53.5 (dBA)	No	67 (dBA)	Yes
POR3	Residence on Kossuth Road	55.2 (dBA)	No	61 (dBA)	Yes
POR3A	Residence on Kossuth Road - OLA	56.6 (dBA)	No	63 (dBA)	Yes
POR4	Residence on Hespeler Road	57.1 (dBA)	No	63 (dBA)	Yes
POR4A	Residence on Hespeler Road - OLA	56.8 (dBA)	No	65 (dBA)	Yes
POR5	Residence on Hespeler Road	62.9 (dBA)	No	64 (dBA)	Yes
POR5A	Residence on Hespeler Road - OLA	59.5 (dBA)	No	67 (dBA)	Yes
POR6	Residence on Hespeler Road	59.1 (dBA)	No	64 (dBA)	Yes
POR6A	Residence on Hespeler Road - OLA	60.3 (dBA)	No	68 (dBA)	Yes
POR8	Residence on Hespeler Road	50.2 (dBA)	No	66 (dBA)	Yes
POR8A	Residence on Hespeler Road - OLA	51.4 (dBA)	No	75 (dBA)	Yes
POR9	Residence on Hespeler Road	49.0 (dBA)	No	63 (dBA)	Yes
POR9A	Residence on Hespeler Road - OLA	49.3 (dBA)	No	66 (dBA)	Yes
POR10	Residence on Hespeler Road	48.1 (dBA)	No	64 (dBA)	Yes
POR10A	Residence on Hespeler Road - OLA	48.5 (dBA)	No	68 (dBA)	Yes

**TABLE 3**  
**ACOUSTIC ASSESSMENT SUMMARY - STEADY STATE SOUND LEVELS**  
**SPENCER PIT**  
**GUELPH, ONTARIO**

<i>Point-of-Reception ID</i>	<i>Point-of-Reception Description</i>	<i>Sound Level at Point-of-Reception Predicted (Leq)</i>	<i>Verified by Acoustic Audit (Yes/No)</i>	<i>Performance Limit (1) (Leq)</i>	<i>Compliance with Performance Limit (Yes/No)</i>
<b>Area 3 Operations - 7:00 a.m. - 11:00 p.m.</b>					
POR1	Residence on Hesspeler Road	53.0 (dBA)	No	64 (dBA)	Yes
POR1A	Residence on Hesspeler Road - OLA	54.6 (dBA)	No	67 (dBA)	Yes
POR2	Residence on Hesspeler Road	60.5 (dBA)	No	64 (dBA)	Yes
POR2A	Residence on Hesspeler Road - OLA	53.6 (dBA)	No	67 (dBA)	Yes
POR3	Residence on Kossuth Road	54.7 (dBA)	No	61 (dBA)	Yes
POR3A	Residence on Kossuth Road - OLA	56.3 (dBA)	No	63 (dBA)	Yes
POR4	Residence on Hesspeler Road	56.4 (dBA)	No	63 (dBA)	Yes
POR4A	Residence on Hesspeler Road - OLA	56.0 (dBA)	No	65 (dBA)	Yes
POR5	Residence on Hesspeler Road	62.4 (dBA)	No	64 (dBA)	Yes
POR5A	Residence on Hesspeler Road - OLA	58.1 (dBA)	No	67 (dBA)	Yes
POR6	Residence on Hesspeler Road	57.3 (dBA)	No	64 (dBA)	Yes
POR6A	Residence on Hesspeler Road - OLA	58.4 (dBA)	No	68 (dBA)	Yes
POR8	Residence on Hesspeler Road	56.8 (dBA)	No	66 (dBA)	Yes
POR8A	Residence on Hesspeler Road - OLA	59.4 (dBA)	No	75 (dBA)	Yes
POR9	Residence on Hesspeler Road	53.9 (dBA)	No	63 (dBA)	Yes
POR9A	Residence on Hesspeler Road - OLA	54.7 (dBA)	No	66 (dBA)	Yes
POR10	Residence on Hesspeler Road	52.2 (dBA)	No	64 (dBA)	Yes
POR10A	Residence on Hesspeler Road - OLA	52.9 (dBA)	No	68 (dBA)	Yes
<b>Area 4A Operations - 7:00 a.m. - 11:00 p.m.</b>					
POR1	Residence on Hesspeler Road	53.7 (dBA)	No	64 (dBA)	Yes
POR1A	Residence on Hesspeler Road - OLA	55.3 (dBA)	No	67 (dBA)	Yes
POR2	Residence on Hesspeler Road	61.4 (dBA)	No	64 (dBA)	Yes
POR2A	Residence on Hesspeler Road - OLA	54.1 (dBA)	No	67 (dBA)	Yes
POR3	Residence on Kossuth Road	55.3 (dBA)	No	61 (dBA)	Yes
POR3A	Residence on Kossuth Road - OLA	57.1 (dBA)	No	63 (dBA)	Yes
POR4	Residence on Hesspeler Road	57.0 (dBA)	No	63 (dBA)	Yes
POR4A	Residence on Hesspeler Road - OLA	56.7 (dBA)	No	65 (dBA)	Yes
POR5	Residence on Hesspeler Road	63.2 (dBA)	No	64 (dBA)	Yes
POR5A	Residence on Hesspeler Road - OLA	58.7 (dBA)	No	67 (dBA)	Yes
POR6	Residence on Hesspeler Road	58.0 (dBA)	No	64 (dBA)	Yes
POR6A	Residence on Hesspeler Road - OLA	59.1 (dBA)	No	68 (dBA)	Yes
POR8	Residence on Hesspeler Road	50.3 (dBA)	No	66 (dBA)	Yes
POR8A	Residence on Hesspeler Road - OLA	51.5 (dBA)	No	75 (dBA)	Yes
POR9	Residence on Hesspeler Road	48.9 (dBA)	No	63 (dBA)	Yes
POR9A	Residence on Hesspeler Road - OLA	49.4 (dBA)	No	66 (dBA)	Yes
POR10	Residence on Hesspeler Road	47.7 (dBA)	No	64 (dBA)	Yes
POR10A	Residence on Hesspeler Road - OLA	48.1 (dBA)	No	68 (dBA)	Yes

**TABLE 3**  
**ACOUSTIC ASSESSMENT SUMMARY - STEADY STATE SOUND LEVELS**  
**SPENCER PIT**  
**GUELPH, ONTARIO**

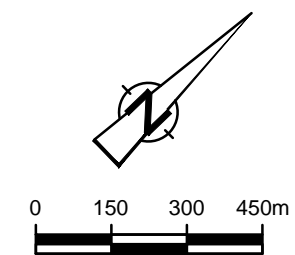
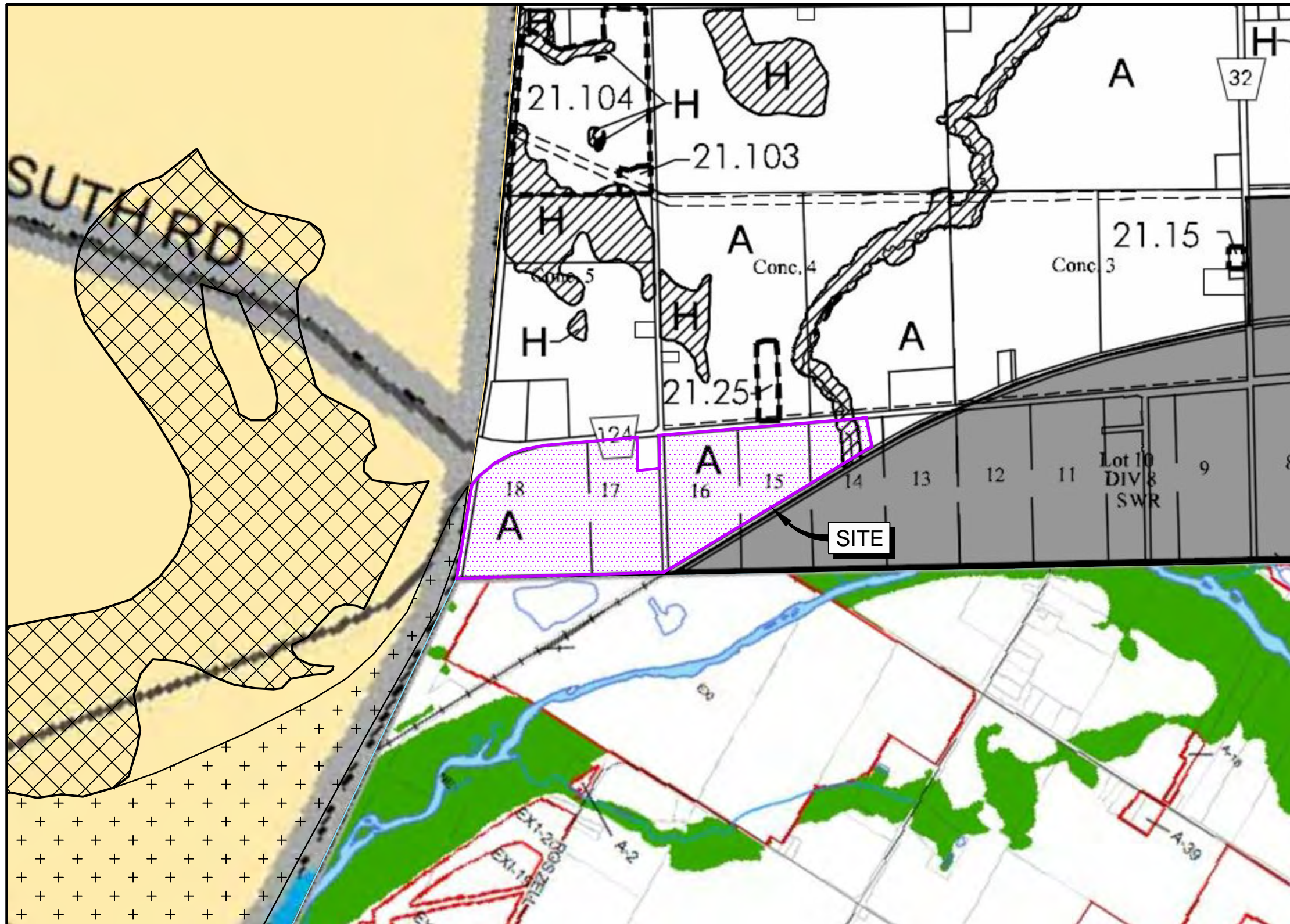
<i>Point-of- Reception ID</i>	<i>Point-of-Reception Description</i>	<i>Sound Level at Point-of-Reception Predicted (Leq)</i>	<i>Verified by Acoustic Audit (Yes/No)</i>	<i>Performance Limit (1) (Leq)</i>	<i>Compliance with Performance Limit (Yes/No)</i>
<b>Area 4B Operations - 7:00 a.m. - 11:00 p.m.</b>					
POR1	Residence on Hespeler Road	53.9 (dBA)	No	64 (dBA)	Yes
POR1A	Residence on Hespeler Road - OLA	55.5 (dBA)	No	67 (dBA)	Yes
POR2	Residence on Hespeler Road	61.7 (dBA)	No	64 (dBA)	Yes
POR2A	Residence on Hespeler Road - OLA	54.8 (dBA)	No	67 (dBA)	Yes
POR3	Residence on Kossuth Road	55.4 (dBA)	No	61 (dBA)	Yes
POR3A	Residence on Kossuth Road - OLA	57.3 (dBA)	No	63 (dBA)	Yes
POR4	Residence on Hespeler Road	57.0 (dBA)	No	63 (dBA)	Yes
POR4A	Residence on Hespeler Road - OLA	56.7 (dBA)	No	65 (dBA)	Yes
POR5	Residence on Hespeler Road	63.1 (dBA)	No	64 (dBA)	Yes
POR5A	Residence on Hespeler Road - OLA	58.8 (dBA)	No	67 (dBA)	Yes
POR6	Residence on Hespeler Road	57.9 (dBA)	No	64 (dBA)	Yes
POR6A	Residence on Hespeler Road - OLA	59.0 (dBA)	No	68 (dBA)	Yes
POR8	Residence on Hespeler Road	50.2 (dBA)	No	66 (dBA)	Yes
POR8A	Residence on Hespeler Road - OLA	51.4 (dBA)	No	75 (dBA)	Yes
POR9	Residence on Hespeler Road	48.8 (dBA)	No	63 (dBA)	Yes
POR9A	Residence on Hespeler Road - OLA	49.3 (dBA)	No	66 (dBA)	Yes
POR10	Residence on Hespeler Road	47.7 (dBA)	No	64 (dBA)	Yes
POR10A	Residence on Hespeler Road - OLA	48.1 (dBA)	No	68 (dBA)	Yes
<b>Shipping Operations - 6:00 a.m. - 7:00 a.m.</b>					
POR1	Residence on Hespeler Road	34.5 (dBA)	No	58 (dBA)	Yes
POR1A	Residence on Hespeler Road - OLA	35.9 (dBA)	No	58 (dBA)	Yes
POR2	Residence on Hespeler Road	44.6 (dBA)	No	55 (dBA)	Yes
POR2A	Residence on Hespeler Road - OLA	38.7 (dBA)	No	57 (dBA)	Yes
POR3	Residence on Kossuth Road	43.3 (dBA)	No	58 (dBA)	Yes
POR3A	Residence on Kossuth Road - OLA	45.4 (dBA)	No	58 (dBA)	Yes
POR4	Residence on Hespeler Road	42.4 (dBA)	No	57 (dBA)	Yes
POR4A	Residence on Hespeler Road - OLA	42.3 (dBA)	No	60 (dBA)	Yes
POR5	Residence on Hespeler Road	42.2 (dBA)	No	57 (dBA)	Yes
POR5A	Residence on Hespeler Road - OLA	41.7 (dBA)	No	58 (dBA)	Yes
POR6	Residence on Hespeler Road	40.1 (dBA)	No	58 (dBA)	Yes
POR6A	Residence on Hespeler Road - OLA	40.8 (dBA)	No	58 (dBA)	Yes
POR8	Residence on Hespeler Road	28.1 (dBA)	No	58 (dBA)	Yes
POR8A	Residence on Hespeler Road - OLA	29.2 (dBA)	No	58 (dBA)	Yes
POR9	Residence on Hespeler Road	26.1 (dBA)	No	58 (dBA)	Yes
POR9A	Residence on Hespeler Road - OLA	26.4 (dBA)	No	58 (dBA)	Yes
POR10	Residence on Hespeler Road	25.3 (dBA)	No	58 (dBA)	Yes
POR10A	Residence on Hespeler Road - OLA	25.6 (dBA)	No	58 (dBA)	Yes

Note:

- (1) Site-specific noise limits determined by background sound level assessment.

# Appendix A

## Land Use Zoning Designation Plan



- REGION OF WATERLOO**
- PRIME AGRICULTURAL AREA
  - MINERAL AGGREGATE RESOURCE AREAS
  - AGGREGATE BEDROCK DEPOSITS
- TOWNSHIP OF GUELPH/ERAMOSA**
- A AGRICULTURE
  - HAZARD
- TOWNSHIP OF PUSLINCH**
- A AGRICULTURAL ZONE
  - NATURAL ENVIRONMENT ZONE
  - EXI EXTRACTIVE INDUSTRIAL ZONE

- SOURCES:
1. TOWNSHIP OF GUELPH/ERAMOSA ZONING BY-LAW, SCHEDULE "A" TO BY-LAW NUMBER 57/1999, MAP 1.
  2. REGION OF WATERLOO, REGIONAL OFFICIAL PLAN, MAP 7, THE COUNTRYSIDE
  3. REGION OF WATERLOO, REGIONAL OFFICIAL PLAN, MAP 8, MINERAL AGGREGATE RESOURCE AREAS AND AGGREGATE BEDROCK DEPOSITS
  4. TOWNSHIP OF PUSLINCH, ZONING BY-LAW No. 19/85, SCHEDULE "A"



figure A.1  
**LAND USE ZONING MAP**  
**6939 WELLINGTON ROAD 124**  
*Guelph Township, County of Wellington*

## **Appendix B**

### **Site-Specific Ambient Background Noise Measurements**

TABLE B.1  
 ENVIRONMENTAL SOUND LEVEL MEASUREMENTS, LEQ - VALIDATED BACKGROUND MEASUREMENTS  
 SPENCER PIT  
 GUELPH, ONTARIO

Date	Time	Leq (dBA)	Wind Speed (kph) (1)	Weather (1)	Comments
Wednesday, September 11, 2013	14:13:41	77.4	11	-	Not used, partial measurement
Wednesday, September 11, 2013	15:00:00	78	13	-	
Wednesday, September 11, 2013	16:00:00	78.3	7	-	
Wednesday, September 11, 2013	17:00:00	77.6	6	-	
Wednesday, September 11, 2013	18:00:00	77.4	6	-	
Wednesday, September 11, 2013	19:00:00	76.1	2	-	
Wednesday, September 11, 2013	20:00:00	75.5	6	-	
Wednesday, September 11, 2013	21:00:00	75.4	13	-	
Wednesday, September 11, 2013	22:00:00	74.4	11	-	
Wednesday, September 11, 2013	23:00:00	73.7	2	-	
Thursday, September 12, 2013	0:00:00	71.7	6	-	
Thursday, September 12, 2013	1:00:00	71.6	7	-	
Thursday, September 12, 2013	2:00:00	69.8	7	-	
Thursday, September 12, 2013	3:00:00	71.4	6	-	
Thursday, September 12, 2013	4:00:00	72.1	9	-	
Thursday, September 12, 2013	5:00:00	75.5	7	-	
Thursday, September 12, 2013	6:00:00	77.5	6	-	
Thursday, September 12, 2013	7:00:00	78	7	-	
Thursday, September 12, 2013	8:00:00	78.1	11	-	
Thursday, September 12, 2013	9:00:00	77.7	11	-	
Thursday, September 12, 2013	10:00:00	77.7	13	-	
Thursday, September 12, 2013	11:00:00	77.6	9	-	
Thursday, September 12, 2013	12:00:00	77.6	17	-	
Thursday, September 12, 2013	13:00:00	77.6	17	-	
Thursday, September 12, 2013	14:00:00	77.8	20	-	
Thursday, September 12, 2013	15:00:00	78.1	19	-	
Thursday, September 12, 2013	16:00:00	78.4	20	-	
Thursday, September 12, 2013	17:00:00	77.8	20	-	
Thursday, September 12, 2013	18:00:00	78	17	-	
Thursday, September 12, 2013	19:00:00	76.9	9	-	
Thursday, September 12, 2013	20:00:00	75.7	9	-	
Thursday, September 12, 2013	21:00:00	75.6	7	-	
Thursday, September 12, 2013	22:00:00	74.7	9	-	
Thursday, September 12, 2013	23:00:00	74.5	11	-	
Friday, September 13, 2013	0:00:00	72	7	-	
Friday, September 13, 2013	1:00:00	70.2	11	-	
Friday, September 13, 2013	2:00:00	69.7	7	-	
Friday, September 13, 2013	3:00:00	71.4	13	-	
Friday, September 13, 2013	4:00:00	71.6	15	-	
Friday, September 13, 2013	5:00:00	75.3	13	-	
Friday, September 13, 2013	6:00:00	77.4	9	-	
Friday, September 13, 2013	7:00:00	78.4	17	-	
Friday, September 13, 2013	8:00:00	78.8	15	-	
Friday, September 13, 2013	9:00:00	78.5	17	-	
Friday, September 13, 2013	10:00:00	78.6	19	-	
Friday, September 13, 2013	11:00:00	78.3	17	-	
Friday, September 13, 2013	12:00:00	78.2	17	-	
Friday, September 13, 2013	13:00:00	78.4	15	-	
Friday, September 13, 2013	14:00:00	78.6	17	-	
Friday, September 13, 2013	15:00:00	78.8	15	-	
Friday, September 13, 2013	16:00:00	77.4	19	-	
Friday, September 13, 2013	17:00:00	77.4	11	-	
Friday, September 13, 2013	18:00:00	78.5	13	-	
Friday, September 13, 2013	19:00:00	77.8	11	-	
Friday, September 13, 2013	20:00:00	76.7	9	-	
Friday, September 13, 2013	21:00:00	75.9	7	-	
Friday, September 13, 2013	22:00:00	75.1	6	-	
Friday, September 13, 2013	23:00:00	74.5	6	-	
Saturday, September 14, 2013	0:00:00	72.8	0	-	
Saturday, September 14, 2013	1:00:00	71.4	0	-	
Saturday, September 14, 2013	2:00:00	69.5	0	-	
Saturday, September 14, 2013	3:00:00	69.7	0	-	
Saturday, September 14, 2013	4:00:00	69.2	2	-	
Saturday, September 14, 2013	5:00:00	71.8	2	-	
Saturday, September 14, 2013	6:00:00	74.6	4	-	
Saturday, September 14, 2013	7:00:00	75.6	2	-	
Saturday, September 14, 2013	8:00:00	76.5	6	-	
Saturday, September 14, 2013	9:00:00	76.9	9	-	
Saturday, September 14, 2013	10:00:00	77.1	11	-	
Saturday, September 14, 2013	11:00:00	77.6	11	-	
Saturday, September 14, 2013	12:00:00	77.4	7	-	
Saturday, September 14, 2013	13:00:00	77.4	9	-	
Saturday, September 14, 2013	14:00:00	77.1	7	-	
Saturday, September 14, 2013	15:00:00	77.4	9	-	
Saturday, September 14, 2013	16:00:00	77.3	11	-	
Saturday, September 14, 2013	17:00:00	76.9	9	-	
Saturday, September 14, 2013	18:00:00	76.3	11	-	



TABLE B.1  
 ENVIRONMENTAL SOUND LEVEL MEASUREMENTS, LEQ - VALIDATED BACKGROUND MEASUREMENTS  
 SPENCER PIT  
 GUELPH, ONTARIO

Date	Time	Leq (dBA)	Wind Speed (kph) (1)	Weather (1)	Comments
Saturday, September 14, 2013	19:00:00	75.2	9	-	
Saturday, September 14, 2013	20:00:00	74.8	6	-	
Saturday, September 14, 2013	21:00:00	74.5	2	-	
Saturday, September 14, 2013	22:00:00	73.4	6	-	
Saturday, September 14, 2013	23:00:00	73	4	-	
Sunday, September 15, 2013	0:00:00	71.5	4	-	
Sunday, September 15, 2013	1:00:00	69.9	2	-	
Sunday, September 15, 2013	2:00:00	68.8	2	-	
Sunday, September 15, 2013	3:00:00	66.7	4	-	
Sunday, September 15, 2013	4:00:00	65.6	2	-	
Sunday, September 15, 2013	5:00:00	66.5	0	-	
Sunday, September 15, 2013	6:00:00	71.7	0	-	
Sunday, September 15, 2013	7:00:00	71.6	0	-	
Sunday, September 15, 2013	8:00:00	73.1	2	-	
Sunday, September 15, 2013	9:00:00	75.2	7	-	
Sunday, September 15, 2013	10:00:00	76	7	-	
Sunday, September 15, 2013	11:00:00	76.5	9	-	
Sunday, September 15, 2013	12:00:00	76.8	9	-	
Sunday, September 15, 2013	13:00:00	76.7	11	-	
Sunday, September 15, 2013	14:00:00	76.7	9	-	
Sunday, September 15, 2013	15:00:00	76.8	9	-	
Sunday, September 15, 2013	16:00:00	76.6	7	-	
Sunday, September 15, 2013	17:00:00	76.6	9	-	
Sunday, September 15, 2013	18:00:00	76.3	9	-	
Sunday, September 15, 2013	19:00:00	75.5	7	-	
Sunday, September 15, 2013	20:00:00	75.2	17	-	
Sunday, September 15, 2013	21:00:00	73.8	6	-	
Sunday, September 15, 2013	22:00:00	73.3	6	-	
Sunday, September 15, 2013	23:00:00	72.1	4	-	
Monday, September 16, 2013	0:00:00	69.4	4	-	
Monday, September 16, 2013	1:00:00	68.5	6	-	
Monday, September 16, 2013	2:00:00	68.6	6	-	
Monday, September 16, 2013	3:00:00	67.4	0	-	
Monday, September 16, 2013	4:00:00	71.2	2	-	
Monday, September 16, 2013	5:00:00	75.8	4	-	
Monday, September 16, 2013	6:00:00	77.9	11	-	
Monday, September 16, 2013	7:00:00	78.5	13	-	
Monday, September 16, 2013	8:00:00	78.7	15	-	
Monday, September 16, 2013	9:00:00	78.4	15	-	
Monday, September 16, 2013	10:00:00	77.4	15	-	
Monday, September 16, 2013	11:00:00	77.8	13	-	
Monday, September 16, 2013	12:00:00	78.2	11	-	
Monday, September 16, 2013	13:00:00	77.9	11	-	
Monday, September 16, 2013	14:00:00	77.8	13	-	
Monday, September 16, 2013	15:00:00	78.5	9	-	
Monday, September 16, 2013	16:00:00	78.4	11	-	
Monday, September 16, 2013	17:00:00	78.4	9	-	
Monday, September 16, 2013	18:00:00	77.8	13	-	
Monday, September 16, 2013	19:00:00	76.7	7	-	
Monday, September 16, 2013	20:00:00	76	6	-	
Monday, September 16, 2013	21:00:00	75.7	4	-	
Monday, September 16, 2013	22:00:00	74.8	4	-	
Monday, September 16, 2013	23:00:00	73.8	4	-	
Tuesday, September 17, 2013	0:00:00	72.3	6	-	
Tuesday, September 17, 2013	1:00:00	70.4	0	-	
Tuesday, September 17, 2013	2:00:00	69.9	4	-	
Tuesday, September 17, 2013	3:00:00	72.2	0	-	
Tuesday, September 17, 2013	4:00:00	72	0	-	
Tuesday, September 17, 2013	5:00:00	76.2	4	-	
Tuesday, September 17, 2013	6:00:00	78.5	0	-	
Tuesday, September 17, 2013	7:00:00	79.1	2	-	
Tuesday, September 17, 2013	8:00:00	79	6	-	
Tuesday, September 17, 2013	9:00:00	78.8	11	-	
Tuesday, September 17, 2013	10:00:00	77.8	9	-	
Tuesday, September 17, 2013	11:00:00	77.8	7	-	
Tuesday, September 17, 2013	12:00:00	78	9	-	
Tuesday, September 17, 2013	13:00:00	77.9	9	-	
Tuesday, September 17, 2013	14:00:00	78.1	9	-	
Tuesday, September 17, 2013	15:00:00	78.3	9	-	
Tuesday, September 17, 2013	16:00:00	78.2	9	-	
Tuesday, September 17, 2013	17:00:00	78.2	7	-	
Tuesday, September 17, 2013	18:00:00	78	6	-	
Tuesday, September 17, 2013	19:00:00	76.6	6	-	
Tuesday, September 17, 2013	20:00:00	75.9	6	-	
Tuesday, September 17, 2013	21:00:00	75.6	6	-	
Tuesday, September 17, 2013	22:00:00	74.8	6	-	
Tuesday, September 17, 2013	23:00:00	74	2	-	
Wednesday, September 18, 2013	0:00:00	72.4	2	-	
Wednesday, September 18, 2013	1:00:00	71.3	0	-	
Wednesday, September 18, 2013	2:00:00	69.5	2	-	
Wednesday, September 18, 2013	3:00:00	72	2	-	
Wednesday, September 18, 2013	4:00:00	72.3	0	-	
Wednesday, September 18, 2013	5:00:00	75.6	0	-	
Wednesday, September 18, 2013	6:00:00	78	4	-	

TABLE B.1  
 ENVIRONMENTAL SOUND LEVEL MEASUREMENTS, LEQ - VALIDATED BACKGROUND MEASUREMENTS  
 SPENCER PIT  
 GUELPH, ONTARIO

Date	Time	Leq (dBA)	Wind Speed (kph) (1)	Weather (1)	Comments
Wednesday, September 18, 2013	7:00:00	78.8	4	-	
Wednesday, September 18, 2013	8:00:00	79.1		-	
Wednesday, September 18, 2013	9:00:00	78.5		-	
Wednesday, September 18, 2013	10:00:00	77.7	7	-	
Wednesday, September 18, 2013	11:00:00	77.8	7	-	
Wednesday, September 18, 2013	12:00:00	77.9	7	-	
Wednesday, September 18, 2013	13:00:00	77.5	7	-	
Wednesday, September 18, 2013	14:00:00	77.9	11	-	
Wednesday, September 18, 2013	15:00:00	78.4	9	-	
Wednesday, September 18, 2013	16:00:00	78.1	9	-	
Wednesday, September 18, 2013	17:00:00	77.9	9	-	
Wednesday, September 18, 2013	18:00:00	77.9	9	-	
Wednesday, September 18, 2013	19:00:00	76.6	6	-	
Wednesday, September 18, 2013	20:00:00	75.8	6	-	
Wednesday, September 18, 2013	21:00:00	75.7	2	-	
Wednesday, September 18, 2013	22:00:00	75.7	0	-	
Wednesday, September 18, 2013	23:00:00	74.3	2	-	
Thursday, September 19, 2013	0:00:00	71.4	2	-	
Thursday, September 19, 2013	1:00:00	70.6	4	-	
Thursday, September 19, 2013	2:00:00	70.9	2	-	
Thursday, September 19, 2013	3:00:00	71.7	2	-	
Thursday, September 19, 2013	4:00:00	72.3	2	-	
Thursday, September 19, 2013	5:00:00	75.1	2	-	
Thursday, September 19, 2013	6:00:00	78	0	-	
Thursday, September 19, 2013	7:00:00	78.2	2	-	
Thursday, September 19, 2013	8:00:00	78.7	0	-	
Thursday, September 19, 2013	9:00:00	78.3	2	-	
Thursday, September 19, 2013	10:00:00	77.9	9	-	
Thursday, September 19, 2013	11:00:00	77.8	11	-	
Thursday, September 19, 2013	12:00:00	78	9	-	
Thursday, September 19, 2013	13:00:00	78.1	9	-	
Thursday, September 19, 2013	14:00:00	77.8	11	-	Not used, partial measurement
Lowest Daytime one-hour Leq (7 a.m. to 11 p.m.):		71.60			
Lowest Nighttime one-hour Leq (11 p.m. to 7 a.m.):		65.60			

## Note:

- (1) Weather data provided by Environment Canada's Guelph Turfgrass Station.  
 (2) Boxed data represents the lowest measured Leq during the respective monitoring time period.

**TABLE B.2**  
**BACKGROUND SOUND LEVEL EVALUATION SUMMARY**  
**SPENCER PIT**  
**GUELPH, ONTARIO**

<i>Point-of-Reception</i>	<i>Measurement Location Number</i>	<i>Measurement Reference Distance (1) (m)</i>	<i>Source-to-Receptor Distance (2) (m)</i>	<i>Daytime</i>		<i>Nighttime</i>	
				<i>Measured Leq at Measurement Location (3) (dBA)</i>	<i>Estimated Background at PORs (dBA)</i>	<i>Measured Leq at Measurement Location (3) (dBA)</i>	<i>Estimated Background at PORs (dBA)</i>
POR1	L1	9.0	55.0	71.6	63.7	65.6	57.7
POR1A	L1	9.0	25.0	71.6	67.2	65.6	61.2
POR2	L1	9.0	56.0	71.6	63.7	65.6	57.7
POR2A	L1	9.0	26.0	71.6	67.0	65.6	61.0
POR3	L1	9.0	102.0	71.6	61.1	65.6	55.1
POR3A	L1	9.0	72.0	71.6	62.6	65.6	56.6
POR4	L1	9.0	68.0	71.6	62.8	65.6	56.8
POR4A	L1	9.0	38.0	71.6	65.3	65.6	59.3
POR5	L1	9.0	56.0	71.6	63.7	65.6	57.7
POR5A	L1	9.0	26.0	71.6	67.0	65.6	61.0
POR6	L1	9.0	53.0	71.6	63.9	65.6	57.9
POR6A	L1	9.0	23.0	71.6	67.5	65.6	61.5
POR7	L1	9.0	64.0	71.6	63.1	65.6	57.1
POR7A	L1	9.0	34.0	71.6	65.8	65.6	59.8
POR8	L1	9.0	34.0	71.6	65.8	65.6	59.8
POR8A	L1	9.0	4.0	71.6	75.1	65.6	69.1
POR9	L1	9.0	61.0	71.6	63.3	65.6	57.3
POR9A	L1	9.0	31.0	71.6	66.2	65.6	60.2
POR10	L1	9.0	49.0	71.6	64.2	65.6	58.2
POR10A	L1	9.0	19.0	71.6	68.4	65.6	62.4

## Notes:

- (1) Reference distance based on distance from LT measurement location to the center of Wellington Road 124  
(2) Source-to-receptor distance based on distance from the center of Wellington Road 124 to the selected POR.  
(3) Lowest daytime and nighttime Leq measured at L1 during the period noted in Table B.1.

# Appendix C

## Noise Specification and Worst-Case Simultaneous Operations Summary

TABLE C.1  
ACOUSTIC ASSESSMENT SUMMARY - STEADY STATE SOUND LEVELS  
SPENCER PIT  
GUELPH, ONTARIO

Cadna ID	Noise Source Description	Data Quality	1/1 Octave Band Data								Unadjusted Total Sound Power Level (dBA)	Tonal Penalty Assessment	Height			Time-weighted Operation Reductions		Equipment Movements		Speed (km/h)	Reference/Comments		
			31.5	63	125	250	500	1K	2K	4K			8K	Absolute (m)	Above Roof (m)	Area (m <sup>2</sup> )	Day (min)	Night (min)	Day (#/Hour)			Night (#/Hour)	
			PWL (dB)	PWL (dB)	PWL (dB)	PWL (dB)	PWL (dB)	PWL (dB)	PWL (dB)	PWL (dB)			PWL (dB)	(dBA)	dB(A)	(m)	(m)	(m <sup>2</sup> )	(min)			(min)	(#/Hour)
S1	Wash Plant	PWL (dB)	114.7	106.3	101.6	102.0	101.8	104.6	106.7	106.2	104.1	117.2	YES	5	320.10	5.10	NA	60	0	NA	NA	NA	CRA Measurement LM#711
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1												
		PWL (dBA)	75.3	80.1	85.5	93.4	98.6	104.6	107.9	107.2	103.0	112.4											
S2	Impact Crusher	PWL (dB)	113.4	116.9	116.0	112.7	115.2	115.5	115.7	111.4	101.2	124.0	YES	5	318.00	3.00	NA	60	0	NA	NA	NA	CRA Measurement LM#720
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1												
		PWL (dBA)	74.0	90.7	99.9	104.1	112.0	115.5	116.9	112.4	100.1	120.9											
S3	Cone Crusher	PWL (dB)	114.1	121.2	117.1	114.3	114.5	114.7	112.4	107.9	99.3	125.0	YES	5	318.00	3.00	NA	60	0	NA	NA	NA	CRA Measurement LM#726
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1												
		PWL (dBA)	74.7	95.0	101.0	105.7	111.3	114.7	113.6	108.9	98.2	119.0											
S4	Screener	PWL (dB)	109.6	106.4	110.4	110.7	109.8	109.8	111.3	109.0	103.2	119.0	YES	5	318.00	3.00	NA	60	0	NA	NA	NA	CRA Measurement LM#730
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1												
		PWL (dBA)	70.2	80.2	94.3	102.1	106.6	109.8	112.5	110.0	102.1	116.6											
T6	Scale	PWL (dB)	31	117	112	105	107	104	103	100	91	119.0	NO	0	317.21	2.00	NA	30	30	NA	NA	NA	Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw DEFRA Table 1(c) #16
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1												
		PWL (dBA)	-8.4	90.8	95.9	96.4	103.8	104.0	104.2	101.0	89.9	109.9											
T1	Truck Route	PWL (dB)	31	117	112	105	107	104	103	100	91	119.0	NO	0	318.15	2.00	NA	NA	NA	10	10	15	Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw DEFRA Table 1(c) #16
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1												
		PWL (dBA)	-8.4	90.8	95.9	96.4	103.8	104.0	104.2	101.0	89.9	109.9											
T3, T5 - T8	Front End Loader Routes	PWL (dB)	31	123	113	107	109	108	107	105	99	123.9	NO	0	317.00	2.00	NA	NA	NA	20	0	15	Representative of sources T3, T5 - T8. Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction and Open Sites Noise document Wheeled Loader - 23 ton - Loading Pebbles in Dump Truck - DEFRA-Table1B#12
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1												
		PWL (dBA)	-8.4	96.8	96.9	98.4	105.8	108.0	108.2	106.0	97.9	113.6											
T2, T4	Material Truck Routes	PWL (dB)	31	118	115	113	108	107	105	101	96	121.2	NO	0	317.00	2.00	NA	NA	NA	10	0	15	Representative of sources T2 and T4 Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction and Open Sites Noise document Lorry - 29 ton - Distributing of Material DEFRA-Table1(c)#6 - Lorry movements on access road
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1												
		PWL (dBA)	-8.4	91.8	98.9	104.4	104.8	107.0	106.2	102.0	94.9	112.5											

Notes:  
Equipment specifications as provided by Tri City and/or as measured at Tri City's Petersburg site

## Appendix D

### CADNA/A Sample Calculation for POR5 – Area 2

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (m)	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (m)	1000.00
Min. Length of Section (m)	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	60.00
Reference Time Night (min)	60.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	6.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	1
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rcvr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	
	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (°C)	10
rel. Humidity (%)	70
Ground Absorption G	1.00
Wind Speed for Dir. (m/s)	3.0
Roads (???)	
Railways (???)	
Aircraft (???)	
Strictly acc. to AzB	

## Receiver

Name: Residence on Hesspeler Road

ID: POR7

X: 556562.36

Y: 4813912.20

Z: 1.50

Point Source, ISO 9613, Name: "Washbay", ID: "S1"

Nr.	X	Y	Z	Refl.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	556620.97	4813710.85	5.10	0	0	117.4	-88.0	0.0	0.0	57.4	3.2	1.2	0.0	0.0	8.2	-0.0	-0.0	47.4	-88.0

Point Source, ISO 9613, Name: "Impact Crusher", ID: "S2"

Nr.	X	Y	Z	Refl.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	556634.14	4813726.24	3.00	0	0	125.9	-88.0	0.0	0.0	57.0	1.7	1.5	0.0	0.0	7.3	-0.0	-0.0	58.4	-88.0

Point Source, ISO 9613, Name: "Cone Crusher", ID: "S3"

Nr.	X	Y	Z	Refl.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	556645.90	4813718.26	3.00	0	0	124.0	-88.0	0.0	0.0	57.5	1.4	2.0	0.0	0.0	6.1	-0.0	-0.0	56.9	-88.0

Point Source, ISO 9613, Name: "Screener", ID: "S4"

Nr.	X	Y	Z	Refl.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	556599.71	4813809.99	3.00	0	0	121.6	-88.0	0.0	0.0	51.7	1.3	3.0	0.0	0.0	8.8	-0.0	-0.0	56.7	-88.0

Line Source, ISO 9613, Name: "Truck Route", ID: "T1"

Nr.	X	Y	Z	Refl.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	556551.00	4813592.59	2.00	0	0	95.1	95.1	0.0	0.0	61.1	1.9	2.6	0.0	0.0	6.0	-0.0	-0.0	23.5	23.5
2	556517.66	4813566.13	2.00	0	0	93.5	93.5	0.0	0.0	61.9	2.1	2.5	0.0	0.0	6.1	-0.0	-0.0	21.0	21.0
3	556401.76	4813573.01	2.00	0	0	92.6	92.6	0.0	0.0	62.5	2.2	2.0	0.0	0.0	6.8	-0.0	-0.0	19.0	19.0
4	556440.93	4813587.30	2.00	0	0	92.0	92.0	0.0	0.0	61.8	2.0	2.3	0.0	0.0	6.8	-0.0	-0.0	19.1	19.1
5	556341.43	4813565.07	2.00	0	0	92.8	92.8	0.0	0.0	63.3	2.3	2.2	0.0	0.0	6.6	-0.0	-0.0	18.4	18.4
6	556392.77	4813580.95	2.00	0	0	92.1	92.1	0.0	0.0	62.4	2.2	2.2	0.0	0.0	6.8	-0.0	-0.0	18.4	18.4
7	556619.80	4813591.00	2.00	0	0	91.1	91.1	0.0	0.0	61.3	2.0	2.5	0.0	0.0	5.1	-0.0	-0.0	20.2	20.2
8	556572.70	4813549.72	2.00	0	0	91.8	91.8	0.0	0.0	62.2	2.1	2.5	0.0	0.0	5.4	-0.0	-0.0	19.6	19.6
9	556483.26	4813588.88	2.00	0	0	90.7	90.7	0.0	0.0	61.4	2.0	2.4	0.0	0.0	6.6	-0.0	-0.0	18.3	18.3
10	556308.62	4813543.37	2.00	0	0	92.8	92.8	0.0	0.0	64.0	2.5	2.2	0.0	0.0	6.3	-0.0	-0.0	17.8	17.8
11	556646.79	4813571.42	2.00	0	0	90.5	90.5	0.0	0.0	61.9	2.1	2.4	0.0	0.0	4.6	-0.0	-0.0	19.6	19.6
12	556355.19	4813560.31	2.00	0	0	91.3	91.3	0.0	0.0	63.2	2.3	2.2	0.0	0.0	6.6	-0.0	-0.0	16.9	16.9
13	556639.91	4813546.02	2.00	0	0	90.7	90.7	0.0	0.0	62.5	2.2	2.4	0.0	0.0	4.5	-0.0	-0.0	19.1	19.1
14	556444.10	4813578.30	2.00	0	0	89.9	89.9	0.0	0.0	62.0	2.1	2.4	0.0	0.0	6.6	-0.0	-0.0	16.8	16.8
15	556609.74	4813538.61	2.00	0	0	90.1	90.1	0.0	0.0	62.5	2.2	2.4	0.0	0.0	4.9	-0.0	-0.0	18.0	18.0
16	556471.62	4813576.18	2.00	0	0	89.3	89.3	0.0	0.0	61.8	2.1	2.4	0.0	0.0	6.5	-0.0	-0.0	16.5	16.5
17	556295.39	4813547.08	2.00	0	0	91.2	91.2	0.0	0.0	64.1	2.5	2.2	0.0	0.0	6.4	-0.0	-0.0	16.1	16.1
18	556258.35	4813528.02	2.00	0	0	91.9	91.9	0.0	0.0	64.8	2.6	2.0	0.0	0.0	6.3	-0.0	-0.0	16.2	16.2
19	556226.10	4813537.07	2.00	0	0	90.5	90.5	0.0	0.0	65.0	2.7	2.1	0.0	0.0	6.0	-0.0	-0.0	14.6	14.6
20	556205.46	4813539.72	2.00	0	0	83.9	83.9	0.0	0.0	65.3	2.7	3.3	0.0	0.0	12.9	-0.0	-0.0	-0.2	-0.2
21	556259.94	4813537.02	2.00	0	0	90.5	90.5	0.0	0.0	64.7	2.6	2.2	0.0	0.0	6.2	-0.0	-0.0	14.9	14.9
22	556198.97	4813530.34	2.00	0	0	80.0	80.0	0.0	0.0	65.4	2.8	3.1	0.0	0.0	12.5	-0.0	-0.0	-3.8	-3.8
23	556218.03	4813526.11	2.00	0	0	90.7	90.7	0.0	0.0	65.3	2.7	2.1	0.0	0.0	5.9	-0.0	-0.0	14.6	14.6

Line Source, ISO 9613, Name: "Material Truck Route", ID: "T2"

Nr.	X	Y	Z	Refl.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	556597.94	4813757.52	2.00	0	0	99.8	-10.2	0.0	0.0	55.0	1.4	2.3	0.0	0.0	7.7	-0.0	-0.0	33.4	-76.6

Line Source, ISO 9613, Name: "Front End Loader Route", ID: "T3"

Nr.	X	Y	Z	Refl.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	556589.46	4813796.73	2.00	0	0	97.4	-15.6	0.0	0.0	52.5	0.8	5.1	0.0	0.0	5.5	-0.0	-0.0	33.5	-79.5



Line Source, ISO 9613, Name: "Material Truck Route", ID: "T4"																			
Nr.	X	Y	Z	Refl.	Freq.	LxT	LxN	K0	Dc	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	LrT	LrN
	(m)	(m)	(m)		(Hz)	dB(A)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)	dB(A)
1	556659.41	4813644.29	2.00	0	0	103.1	-6.9	0.0	0.0	60.1	2.2	1.5	0.0	0.0	5.4	-0.0	-0.0	33.9	-76.1
2	556666.22	4813550.60	2.00	0	0	100.2	-9.8	0.0	0.0	62.5	2.6	1.4	0.0	0.0	4.9	-0.0	-0.0	28.8	-81.2

# Appendix E

## Curricula Vitae

**EDUCATION**

B.E.S. Honors with Distinguished Academic Achievement, Environment and Resource Studies, Ecology Focus and Geography Minor, University of Waterloo, 2002

**Other Training**

Noise Control for Buildings, Manufacturing Plants, Equipment and Products, Hoover & Keith Inc.  
Cadna A Acoustic Modelling Advanced Seminar, Datakustic

**EMPLOYMENT HISTORY**

2002- Associate  
Present Conestoga-Rovers & Associates, Waterloo, ON  
Named CRA Associate, 2011

**PROFESSIONAL REGISTRATIONS/AFFILIATIONS**

Member, Canadian Acoustical Association (CAA)  
Member, Air & Waste Management Association (AWMA)  
Member, AWMA Noise Practitioners Group and Noise Best Practices Committee

**PROFILE OF PROFESSIONAL ACTIVITIES**

**Noise Compliance, Permitting, and Control Assessments**

- Ongoing development of Conestoga-Rovers & Associates Noise & Vibration Services Group.
- Acoustic specialist and acoustic modelling expert.
- Design of numerous Noise Abatement Action Plans for a variety of clients including the specification of noise controls such as silencers, enclosures, earthen berms/barrier walls, acoustic treatments or special buildings components, equipment replacement and administrative/operator controls.
- Noise control analysis for tonal sources including gas-fired generators, radiators, transformer units and jet turbines.
- Acoustic assessments for large development projects in accordance with Environmental Impact Statements (US - EIS) and Environmental Assessments (Canadian - EA).
- Noise Impact Assessments for wind farms including acoustic modelling and monitoring of proposed and existing wind farm projects in Barrie, Ontario and New York State in accordance with applicable State noise guidelines and town bylaws and regulations.
- Noise assessment of mobile road and rail traffic corridors using MOE Stamson software programs including Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) and Sound from Trains Environmental Analysis Method (STEAM).
- Noise Impact Studies for stationary and mobile sources in support of land use development projects to meet Ontario Ministry of the Environment (MOE), Canadian National Rail (CNR), state and/or municipal bylaw requirements.

- Land Use Compatibility Assessments for proposed commercial, industrial or residential development based on MOE Guidelines D-1 and D-6.
- Acoustic Assessments and for industrial, commercial, power generation and construction clients to meet Ontario noise publications policies and standards in support of Section 9 Approvals under C of A (Air & Noise) Applications.
- Acoustic Assessments for aggregate industry clients in support of Aggregate Resources Act license applications for proposed or expanding quarries/pit extraction sites.
- Field measurements using established acoustical engineering methods and Type 1 precision sound pressure level meters.
- Type 1 precision sound intensity measurements using established acoustical engineering methods.
- Ambient background sound level evaluations and negotiation of site-specific sound level limits.
- Noise assessments for proposed residential developments in accordance with US Housing and Urban Development (HUD) requirements.
- Acoustic Assessment for proposed US compressor stations and abatement designed to demonstrate compliance with Federal Energy Regulatory Commission (FERC) regulations.
- Peer review of noise impact assessments, acoustic assessment and audits for a variety of projects including land use development proposals, industrial/commercial compliance and wind energy projects in North America.
- Evaluation of mechanical noise generating equipment to strict scientific and laboratory standards in order to provide manufacturer noise specification documentation.

#### **Vibration Assessment**

- Vibration Impact Studies in support of C of A (Air & Noise) Applications, LU-131 land use development proposals for municipal approval.
- Vibration due to Blasting assessment in support of Aggregate License applications.
- Vibration Audits for industrial stamping facilities to demonstrate compliance with conditions of Certificate of Approvals (C of A) (Air & Noise).

#### **Other**

- Performance of various air related field activities including flow rate, odour, formaldehyde analysis and moisture sampling of industrial stacks.
- Spill prevention and contingency planning in accordance with Sections 3 and 14 of the Canadian Environmental Protection Act (EPA), the draft MOE document, "*Planning for Spill Contingencies*" (February 2000), the Canadian Standards Association (CSA) document, "*Emergency Preparedness and Response*" (October 2003), and the British Columbia Ministry of the Environment, Land and Parks document, "*Guidelines for Industry Emergency Response Contingency Plans*".
- ISO 9001 2002 Quality Systems Auditor.

#### **Project Profiles**

- Transportation Corridor Noise Impact Assessments. CRA conducts traffic noise impact modelling for road and/or rail corridors using a variety of approved acoustic models in North America. Direct measurement and noise monitoring is often conducted to support the model predictions and to evaluate the net change between the existing and future noise exposure conditions. Practical

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mitigation measures are designed to meet regulatory requirements and noise reduction targets. Sample projects include:

- Enfield Road Area Noise Study – Rail traffic noise impact assessment for the City of Burlington
- Northfield Drive Expansion Study – Road traffic noise was evaluated for a two lane expansion
- QEW Noise Study – Road traffic noise and mitigation study for two lane expansion in Burlington
- Power Generation Facilities. Acoustic Assessments and Noise Abatement Action Plans are prepared in support of Applications for Certificates of Approval (Air & Noise), EA/EIS or FERC approval for existing or proposed power generation facilities. This work requires advanced noise measurement techniques and complex acoustic modelling of stationary indoor and outdoor noise sources and mobile heavy equipment. Indoor noise propagation is evaluated through wall, roof and window construction elements based on the transmission loss and sound absorption co-efficient qualities of the construction materials. Noise abatement including discrete controls such as silencers, enclosures and barrier walls or construction materials with enhanced acoustic qualities are designed to meet the applicable standards. Sample projects include:
  - Houston Hub Gas Storage, Houston, Texas, US.
  - Index Energy Ajax Steamplant, Ajax, Ontario.
  - Hydro One Inc. Transformer Stations, Ontario.
  - Toromont Energy Limited Power Generation Plant, Waterloo Landfill, Waterloo, Ontario.
  - Petrolia Landfill Gas Utilization Facility, Petrolia Landfill, Thunder Bay, Ontario.
  - Proposed Site Global Power Generation Facility, Sluse Road, Holland Landing, Ontario.
- Renewable Energy Projects – Solar and Wind.
  - Noise Assessment completed in support of the Certificate of Approval Application and Renewable Energy Approvals for project sites that provide between 500 kW to 10.0 MW of ground mounted solar energy in Ontario.
  - Cumulative Noise Impact Study prepared for the proposed construction of a 250 wind turbine project proposed by two independent developers in New York State.
  - Cumulative Noise Impact Study prepared for the proposed construction of a 125 wind turbine project proposed by an independent developer in New York State.
  - Peer review of Environmental Noise Survey and Noise Impact Assessments and Communication and Microwave Studies for proposed wind energy projects under the State Environmental Quality Review Act (SEQR) for project Sites in the Towns of Arkwright, Allegany and Centerville, Towns of Clinton, Altona and Ellenburg, Town of Wethersfield, Town of Eagle and Towns of Chateaugay and Bellmont.
  - Site-wide acoustic modelling of proposed wind turbines and transformers to evaluate off-site noise impacts respective of site-specific imagery, geometry and terrain conditions to determine compliance with respect to bylaw, Provincial or State requirements.
  - Long-term noise monitoring to determine background environmental noise levels.
  - Post-construction noise surveys to audit wind turbine operations and noise compliance.
- Industrial Facilities. Acoustic Assessments, Audits and Noise Abatement Action Plans are prepared in support of Applications for Certificates of Approval (Air & Noise) and EA/EIS approval for significant existing or proposed industrial facilities to demonstrate compliance with the applicable noise limits. Sample projects include:
  - Foundry - Gerdeau-Ameristeel, Whitby, Ontario.
  - Renewable Energy – Liberty Energy Biomass Power Plant, Hamilton, Ontario .

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- Mining & Exploration - Touquoy Gold Project, Moose River Gold Mines, Halifax, Nova Scotia.
  - Landfill - Region of Waterloo Landfill Flare Facility, Waterloo, Ontario.
  - Waste Treatment - St. Mary's Waste Water Treatment Plant, St. Mary's, Ontario.
  - Quarry / Pit Extraction - Holcim Quarry, Milton, Ontario.
  - Concrete Products - Hanson Pressure Pipe Inc., Stouffville and Uxbrige, Ontario.
  - Automotive - Cooper Standard Automotive, Glencoe, Ontario.
  - Manufacturing - Praxair Oxygen Manufacturing/Air Separation Plant Expansion, Sault Ste. Marie, Ontario.
  - Fleet Operations & Mobile Heavy Equipment - TTC Mount Dennis Bus Garage, Toronto, Ontario.
  - Land Development - Zoning Applications or Draft Plan of Subdivision Approval. Noise impact studies are completed to support zoning applications and proposed draft plans of subdivision for land development sites. This work involves the evaluation of potential noise impacts from stationary sources such as existing industry and/or commercial development and mobile sources such as road and/or rail traffic corridors on proposed sensitive residential or institutional developments that require Regional or City government planning approval for draft subdivision development plans or zoning applications. Noise is directly measured and/or modelled using industry standard acoustic modelling software to predict off-site impacts for comparison to the LU-131 (Ontario, Canada) or HUD (US) requirements. Noise abatement measures are engineered and specified to meet the applicable limits defined for the outdoor living and amenity areas and/or sensitive indoor living or sleeping areas such as bedrooms and may include barrier walls and/or earthen berms, special building components and acoustic wall construction materials, building setbacks/land use buffers, noise warning clauses and provisions/requirements for forced air/air-conditioning. Sample projects include:
    - Claiborne Homes Proposed Subdivision Development, Jefferson Parish, Louisiana, US.
    - 6 Building Residential Development Site Approval - 745 University Avenue East, Waterloo, Ontario.
    - 38 unit Condominium Development Site Approval - 19-25 Concession Street, Cambridge, Ontario.
    - Car Wash Development Site Approval - Goderich Street, Port Elgin, Ontario.
    - Proposed City of Toronto Homeless Shelter Approval - Peter Street, Toronto, Ontario.
    - Draft Plan of Subdivision Approval - 56 Pioneer Tower Road, Kitchener, Ontario.
    - Waterloo Research and Development Park Tekpark Centre Site Zoning Application, Waterloo, Ontario.
    - Draft Plan of Subdivision Approval - Ottawa Street, Kitchener, Ontario.
    - Draft Plan of Subdivision Approval - 125 Golf Road, Brantford, Ontario.

## **PUBLICATIONS AND PRESENTATIONS**

- Wiens, T., "Managing Industrial Noise Sources" Presentation provided to the Air & Waste Management Association Conference, *Environmental Nuisances: Noise, Light, Odour and Fugitive Dust*, Vancouver, British Columbia, May 2007.
- Session Chair at the Air & Waste Management Association Conference, *Environmental Nuisances: Noise, Light, Odour and Fugitive Dust*, Vancouver, British Columbia, May 2007.

- Wiens, T., "3M Noise Compliance Seminar" Training for 3M executives and facility managers, May 2007.
- Wiens, T., "Noise Case Studies & Solutions: Managing Industrial Noise Sources" Presentation provided to the Air & Waste Management Association Conference, *Environmental Nuisances: Noise, Light, Odour and Fugitive Dust*, Toronto, Ontario, February 2008.
- Wiens, T., "I Hear That:: an informal introduction to noise work" Presentation and training seminar for CRA's Air & Noise Group, February 2008.
- Wiens, T., "An Introduction to Acoustic Modelling" Training for Cooper Standard Automotive Management, April 2008 - Ongoing.
- Wiens, T., "Noise Modelling Versus Reality Under Worst-case Meteorological Conditions", *Canadian Acoustics – The Canadian Acoustical Association (CAA)*, Volume 38, No. 3 (2010).
- "Noise Modelling Versus Reality" Presentation at the annual Canadian Acoustical Association 2010 Conference in Victoria, British Columbia - October 2010.
- "Solutions to Environmental Noise Problems" Presentation at Kinetics Noise Control 2011 Corporate Sales Incentive Meeting in Cancun, Mexico, November 2011.
- "Noise Control Case Studies" Presentation at the Air & Waste Management Association, Ontario Section, Noise Conference, May 2012.
- Wiens, T., "Quantifying the Ambient Environment: siting within the urban din", INTER-NOISE 2012, 41<sup>st</sup> International Congress and Exposition on Noise Control Engineering, New York City, USA, August 2012.
- "Quantifying the Ambient Environment: siting within the urban din", Presentation at INTER-NOISE 2012, New York City, USA, August 2012.

## EDUCATION

B.A.Sc. Chemical Engineering, University of Waterloo, 2010

## **Other Training**

Hoover & Keith Inc. – Noise Control for Buildings, Manufacturing Plants, Equipment and Products, 2011  
Ontario Regulation 419/05 – Assessing Compliance with Air Standards

## EMPLOYMENT HISTORY

2010-Present Conestoga-Rovers & Associates, Waterloo, ON  
2008-09 Ontario Ministry of the Environment (MOE), Toronto, ON  
2008 Toyota Motor Manufacturing Canada (Toyota), Cambridge, ON  
2005-07 Agriculture and Agri-Food Canada (AAFC), Harrow, ON

## PROFESSIONAL REGISTRATIONS/AFFILIATIONS

Engineering Intern: Ontario

## PROFILE OF PROFESSIONAL ACTIVITIES

### **Air Compliance and Assessment**

- Preparation of air emissions inventories, assessments and permitting for a variety of industrial clients including Ontario Ministry of the Environment (MOE) Emissions Summary and Dispersion Modelling (ESDM) Reports, and Environmental Compliance Approvals (ECA) (Air & Noise).
- Experience with stationary air emission and dispersion modelling programs including Ontario Regulation 346, AERMOD, SCREEN3, and USEPA Compilation of Air Pollutant Emission Factors AP-42.
- Knowledge and experience with several environmental legislation in Ontario and Canada, including Environmental Compliance Approval Air [ECA (Air)], Ontario Local Air Pollution, Greenhouse Gas Emissions Reporting and Toxics Reduction Act regulations as well as federal regulations under the Canadian Environmental Protection Act (1999).
- Conducted plant inspections to identify emission sources and ventilation testing to quantify air flow and emissions rates for use in emission inventories.
- Annual Canadian National Pollutant Release Inventory and Regulation 127 Assessment and internet based reporting for a variety of industrial clients.
- Preparation of Operations and Maintenance Manuals as part of ECA conditions.
- Analysis and speciation of Ontario's Industrial Sub-sector VOC emissions for future regulatory work through Certificates of Approval and National Pollutant Release Inventory Reports. Implementation of Maximum Incremental Reactivity (MIR) values and calculations of MIR values for compound products.



- Analyzed, compiled, and prepared a Carbon Dioxide Capture and Storage report based on published IPCC work in support of MOE initiatives.
- Data compilation and calculation in support of benchmarking emissions of Primary Iron and Steel Mills for the MOE.
- Performed calculation of Upper Risk Thresholds for Hazardous Air Pollutants and conducted detailed comparisons to identify Facilities with potentials to exceed the Thresholds.

#### **Greenhouse Gas Emission Inventories**

- Verified multiple Greenhouse Gas (GHG) Inventories for a variety of industrial clients, including linear facilities, under Ontario Regulation 452/09.
- Developed Toyota's internal Greenhouse Gas (GHG) calculation tool including reporting methodology and documentation based on the work of the World Resources Institute and the World Business Council for Sustainable Development.
- Prepared the baseline GHG emissions report for the Toyota Cambridge Facility for the 2007 fiscal year.
- Assisted in the implementation of the GHG calculation tool and reporting methodology for a second Toyota plant in Ontario.

#### **Noise Assessment**

- Field measurements using Type 1 precision Sound Level Meters to conduct short and long term noise measurements and monitoring programs.
- Ambient background sound level evaluations and negotiation of site-specific sound level limits.
- Acoustic Assessments and Acoustic Audits to meet Ontario noise publications policies and standards.
- Design of Noise Abatement Plans for a variety of clients including the specification of noise controls such as silencers, enclosures, barrier walls, equipment replacement and administrative/operator controls.
- Experience using Computer Aided Noise Abatement (Cadna A) noise modeling software to determine off-site environmental noise impacts.
- Noise assessment of mobile road and rail traffic corridors using MOE Stamson software programs including Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) and Sound from Trains Environmental Analysis Method (STEAM).
- Land Use Compatibility Assessments for proposed residential development based on Municipal and MOE Guidelines.

#### **Field Activities**

- Conducted Noise and Odour field work activities (in accordance to best practices and published MOE procedures and guidance).
- Performed oversight activities in support of a large remediation project for a Specialty Chemical Manufacturer in Ontario. Took quantitative measurements of affected areas to verify predictions of an air dispersion model.
- Conducted soil depth sampling for moisture and nitrite/nitrate measurements.
- Performed soil respiration (emissions) monitoring, focus on CO<sub>2</sub> and NO<sub>2</sub>.

- Deployment and calibration of UV-DOAS and OP-FTIR optical remote sensing equipment for fugitive emissions monitoring.

## **PUBLICATIONS AND PRESENTATIONS**

### **Published Refereed Papers**

- Wiens, T., Grozev S., Zehr Z., Reusing G., "Quantifying the Ambient Environment: siting within the urban din", INTER-NOISE 2012, 41st International Congress and Exposition on Noise Control Engineering, New York City, USA, August 2012.