

## WALKER AGGREGATES INC.

NIAGARA FALLS, ONTARIO

### UPPER'S QUARRY: ACOUSTIC ASSESSMENT REPORT

RWDI #1603157

October 28, 2021

#### SUBMITTED TO

**Kevin Kehl**  
Environmental Lead | Specialist  
kkeh1@walkerind.com

**Walker Aggregates Inc.**

P.O. Box 100  
Thorold, Ontario L2V 3Y8

T: 905.227.4142  
F: 905.227.1034

#### SUBMITTED BY

**Brad Bergeron, A.Sc.T., d.E.T.**  
Senior Project Manager | Principal  
Brad.Bergeron@rwdi.com | ext. 2428

**Slavi Grozev, P.Eng.**  
Senior Noise Engineer  
Slavi.Grozev@rwdi.com | ext. 2609

**Ray Li, M.Sc., P.Eng.**  
Noise & Vibration Engineer  
Ray.Li@rwdi.com | ext. 6283

**RWDI AIR Inc.**  
**Consulting Engineers & Scientists**

600 Southgate Drive  
Guelph, Ontario N1G 4P6

T: 519.823.1311  
F: 519.823.1316



# TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2</b>	<b>FACILITY DESCRIPTION.....</b>	<b>1</b>
2.1	Proposed Extraction Scenario .....	1
2.2	Modelled Phases.....	3
<b>3</b>	<b>NOISE SOURCE SUMMARY .....</b>	<b>3</b>
3.1	Continuous Sources.....	4
3.2	Impulsive Sources.....	5
3.3	Construction Sources.....	5
3.4	Identifiable Source Characteristics .....	5
<b>4</b>	<b>POINTS OF RECEPTION .....</b>	<b>5</b>
4.1	Surrounding Noise Sensitive Land Uses.....	6
4.2	Modelled Points of Reception .....	6
<b>5</b>	<b>ASSESSMENT CRITERIA.....</b>	<b>7</b>
5.1	Exclusion Limits for Continuous Sources .....	7
5.2	Exclusion Limits for Impulsive Sources.....	7
5.3	Construction Limits .....	8
<b>6</b>	<b>NOISE CONTROL RECOMMENDATIONS .....</b>	<b>9</b>
<b>7</b>	<b>IMPACT ASSSSESSMENT.....</b>	<b>10</b>
<b>8</b>	<b>ALTERNATE EXTRACTION SCENARIO.....</b>	<b>11</b>
<b>9</b>	<b>CONCLUSIONS.....</b>	<b>11</b>
<b>10</b>	<b>REFERENCES .....</b>	<b>12</b>



## LIST OF TABLES

- Table 1:** Noise Source Summary – Proposed Extraction Scenario  
**Table 2a:** Point of Reception Noise Impact (Sample Calculation for Proposed Phase 1A Sinking Cut)  
**Table 2b:** Point of Reception Noise Impact (Sample Calculation for Proposed Phase 4 Southeast)  
**Table 3a:** Acoustic Assessment Summary, Proposed Phase 1A Sinking Cut  
**Table 3b:** Acoustic Assessment Summary, Proposed Phase 1A South Sinking Cut  
**Table 3c:** Acoustic Assessment Summary, Proposed Phase 2A Sinking Cut  
**Table 3d:** Acoustic Assessment Summary, Proposed Phase 3A  
**Table 3e:** Acoustic Assessment Summary, Proposed Phase 3B Northeast  
**Table 3f:** Acoustic Assessment Summary, Proposed Phase 4 Southeast  
**Table 3g:** Acoustic Assessment Summary, Proposed Phase 5 East  
**Table 3h:** Acoustic Assessment Summary, Proposed Scenario Impulsive Source

## LIST OF FIGURES

- Figure 1:** Site Overview and Sensitive Receptor Locations – Proposed Extraction Scenario  
**Figure 2a:** Proposed Phase 1A Sinking Cut Operation Overview  
**Figure 2b:** Proposed Phase 1A South Sinking Cut Operation Overview  
**Figure 2c:** Proposed Phase 2A Sinking Cut Operation Overview  
**Figure 2d:** Proposed Phase 3A Operation Overview  
**Figure 2e:** Proposed Phase 3B Northeast Operation Overview  
**Figure 2f:** Proposed Phase 4 Southeast Operation Overview  
**Figure 2g:** Proposed Phase 5 East Operation Overview  
**Figure 2h:** Significant Source Locations (Detailed Example) – Proposed Phase 1A Sinking Cut  
**Figure 2i:** Significant Source Locations (Detailed Example) – Proposed Phase 4 Southeast  
**Figure 3a:** Sound Level Contours – Proposed Phase 1A Sinking Cut, Daytime  
**Figure 3b:** Sound Level Contours – Proposed Phase 1A Sinking Cut, Evening/Nighttime  
**Figure 3c:** Sound Level Contours – Proposed Phase 1A South Sinking Cut, Daytime  
**Figure 3d:** Sound Level Contours – Proposed Phase 1A South Sinking Cut, Evening/Nighttime  
**Figure 3e:** Sound Level Contours – Proposed Phase 2A Sinking Cut, Daytime  
**Figure 3f:** Sound Level Contours – Proposed Phase 2A Sinking Cut, Evening/Nighttime  
**Figure 3g:** Sound Level Contours – Proposed Phase 3A, Daytime  
**Figure 3h:** Sound Level Contours – Proposed Phase 3A, Evening/Nighttime  
**Figure 3i:** Sound Level Contours – Proposed Phase 3B Northeast, Daytime  
**Figure 3j:** Sound Level Contours – Proposed Phase 3B Northeast, Evening/Nighttime  
**Figure 3k:** Sound Level Contours – Proposed Phase 4 Southeast, Daytime  
**Figure 3l:** Sound Level Contours – Proposed Phase 4 Southeast, Evening/Nighttime  
**Figure 3m:** Sound Level Contours – Proposed Phase 5 East, Daytime  
**Figure 3n:** Sound Level Contours – Proposed Phase 5 East, Evening/Nighttime



## LIST OF APPENDICES

- Appendix A:** Zoning Information
- Appendix B:** Rolling Meadows Secondary Plan Aggregate Resource Protection Policies
- Appendix C:** Key Parameters Included in Cadna/A Noise Modelling  
Sample Cadna/A Modelling Output
- Appendix D:** Alternate Extraction Scenario
- Appendix E:** Curriculum Vitae



## REPORT SIGNATURES

A handwritten signature in black ink, appearing to be 'SG' with a flourish, positioned above a horizontal line.

Slavi Grozev, P.Eng.



# 1 INTRODUCTION

Walker Aggregates Inc. (WAI) has retained RWDI AIR Inc. (RWDI) to complete an Acoustic Assessment Report (AAR) for the Upper's Quarry (the Quarry) in Niagara Falls, Ontario.

This assessment is completed in respect of an application under the Aggregate Resources Act. Based on the Ministry of Natural Resources Policy #A.R. 2.01.09 (MNR, 2006), a detailed noise assessment is required since there are noise-sensitive lands within 150 m of the Quarry. The Aggregate Resources Act recommends referencing the Ontario Ministry of the Environment and Climate Change (MOECC) guidelines for stationary sources of sound. This AAR is completed using the applicable Ontario Ministry of the Environment, Conservation and Parks (MECP), previously known as the Ministry of the Environment and Climate Change (MOECC), guidance documents (MOECC, 2012 and 1995). Documents in this report still reference the MOECC.

Quarry operations will not include large sources of vibration. Therefore, an assessment of vibration impact is not required. Blasting is outside of the scope of this assessment and is addressed separately in the blast impact analysis by Explotech. The results of the acoustic assessment indicate that sound levels produced at the proposed quarry will comply with the applicable guidelines with the implementation of noise control recommendations summarized in **Section 6**.

## 2 FACILITY DESCRIPTION

The proposed Upper's Quarry is located on Part of Lots 119, 120, 136 and 137, and Part of the Road Allowance between Lots 120 and 136 (geographic township of Stamford) in the City of Niagara Falls, Regional Municipality of Niagara. Sensitive land uses adjacent to Upper's is shown on zoning maps in **Appendix A**.

### 2.1 Proposed Extraction Scenario

The layout of the site and phases for the Proposed Extraction Scenario can be found in **Figure 1**. Two municipal road allowances separate the proposed quarry site into three extraction areas:

- i. North Extraction Area: extraction area north of Upper's Lane;
- ii. Mid Extraction Area: extraction area south of Upper's Lane and north of the unopened road allowance between Township Lots 120 & 136 in the former Township of Stamford, now in the City of Niagara Falls ("unopened road allowance"); and
- iii. South Extraction Area: extraction area south of the unopened road allowance.

The proposed extraction scenario avoids extraction within the road allowances. Operations at the proposed quarry will consist of overburden stripping; berm construction; drilling, blasting, extraction, transportation, processing, washing, stockpiling, and shipping of aggregate; and rehabilitation. The annual production limit will be 1,800,000 tonnes of aggregate per year, however during several phases of operation, the maximum annual tonnage will be lower due to operational constraints.



Clearing of overburden and berm construction will take place prior to drilling and blasting in each phase. At the start of extraction operations, four sinking cuts will be required to allow extraction to begin. Two sinking cuts are required in Phase 1A (one in the Mid Extraction Area, one in the South Extraction Area), one sinking cut is required in 2A.

During the sinking cuts and early phases of operation, the primary crusher is integrated into a single processing plant located near the working face. In later phases, the primary crusher will split from the single integrated plant and start to follow the working face. The processing plant, which contains the secondary and tertiary crushers, will remain close to the quarry entrance. The processing plant will be located at varying elevations, beginning at the top of rock during the sinking cut portion of operations, and moving to the first bench and then the final quarry floor as space becomes available.

Shot rock will be loaded by front-end loaders into the primary crusher adjacent of the working face. Conveyors will then transport the products from the primary crusher to the processing plant, where it will be further processed, washed and stockpiled, prior to loading into highway shipping trucks by front-end loaders.

Phases 1A, 2A, and 3 will be extracted in two benches down to the Quarry floor, which is at elevations of 141 to 149 metres above sea level (masl). The quarry floor has a gradual downward slope from the northeast corner (149 masl) to the southwest corner (141 masl). The first bench is between 175 to 178 masl and the second bench is between 160 to 162 masl. Phases 1B and 2B will be extracted to an elevation of 155 masl. They will then be backfilled with clay material up to approximately 176 to 177 masl for the watercourse realignment.

In addition to aggregate extraction and processing, the site will also include an asphalt plant (AP), to be located in mid-extraction area Phase 1A, capable of producing 4,900 tonnes per day of hot-mix asphalt (HMA). Operations include the receipt and drying of washed aggregate, receipt and storage of asphalt cement, mixing and storage of HMA, and loading highway trucks for shipment to the job site. The asphalt plant will become operational once Phases 1A and 1B have been fully extracted. This will allow room for the asphalt plant to be put in place.

The hours of operation at the Quarry for the Proposed Extraction Scenario are:

- Drilling and extraction at the working face: Monday to Saturday 0700 – 1900h;
- Aggregate processing at the primary crusher: Monday to Saturday 0700 – 1900h;
- Conveyor to the mobile crusher plants: Monday to Saturday 0700 – 1900h;
- Aggregate processing at the processing plant: Monday to Saturday 0700 – 1900h;
- Aggregate shipping from processing plant stockpile: 24 hours per day, 7 days a week;
- Hauling aggregates from processing plant stockpiles to the asphalt plant: 24 hours per day, 7 days a week;
- Asphalt plant: 24 hours per day, 7 days a week;
- HMA shipping from asphalt plant: 24 hours per day, 7 days a week; and
- Asphalt cement (AC) and reclaimed asphalt pavement (RAP) receiving at the asphalt plant: 24 hours per day, 7 days a week.



## 2.2 Modelled Phases

The receptors surrounding the Quarry will experience the most impact from the Quarry during different phases. Therefore, the modelled scenarios are selected based on the worst-case extraction location for the different receptors.

The modelled phases for the Proposed Extraction Scenario are:

- **Phase 1A Sinking Cut** (P1A\_Sinkcut\*):
  - Sinking cut in Mid Extraction Area
- **Phase 1A South Sinking Cut** (P1AS\_Sinkcut\*):
  - Sinking cut in South Extraction Area
- **Phase 2A Sinking Cut** (P2A\_Sinkcut\*):
  - Sinking cut in North Extraction Area
- **Phase 3A** (P3A\*):
  - Extraction in northern portion of Phase 3A, with AP operational
- **Phase 3B Northeast** (P3B\_NE\*):
  - Extraction in the northeastern corner of North Extraction Area, with AP operational
- **Phase 4 Southeast** (P4\_SE\*):
  - Extraction in southeastern corner of Mid Extraction Area, with AP operational
- **Phase 5 East** (P5\_E\*):
  - Extraction in eastern corner of South Extraction Area, with AP operational

Sinking cut in Phase 3A was also assessed but was deemed to be less impactful than Phase 2A sinking cut. Phase 3B sinking cut is expected to have similar impacts. Therefore sinking cuts in Phases 3A/3B were not evaluated further. The operation overviews of the modelled scenarios are shown in **Figures 2a** through **2g**.

## 3 NOISE SOURCE SUMMARY

A summary of significant sound sources is provided in **Table 1**, including sound power levels, location, sound characteristics, operating duration, and vehicle route assumptions. Sound power levels for the proposed sources are based on historical measurement data on file at RWDI. The overview of the locations of the modelled sources are shown in **Figures 2a** through **2g**. Detailed examples of the significant source locations are shown in **Figures 2h** and **2i**.





## **3.1 Continuous Sources**

The continuous sources modelled are:

- Working Face (WF) and Primary Crusher (PC) sources (daytime only, 0700 to 1900h):
  - One (1) silenced drill working on the 1<sup>st</sup> bench;
  - One (1) loader working on the 2<sup>nd</sup> bench;
  - Dumping of rocks into primary crusher;
  - One (1) primary crusher; and
  - One (1) primary screen.
- Conveyor from Working Face Primary Crusher to Processing Plant (daytime only, 0700 to 1900h).
- Processing Plant (PP) sources:
  - Two (2) secondary crushers (daytime only, 0700 to 1900h);
  - Two (2) secondary & tertiary screens (daytime only, 0700 to 1900h);
  - Two (2) tertiary crushers (daytime only, 0700 to 1900h);
  - One (1) loader working at piles (24h/day); and
  - Two (2) idling shipping trucks (24h/day).
- Asphalt Plant (AP) sources (operating continuously, 24 hours per day):
  - Two (2) loaders working;
  - Two (2) idling trucks;
  - One (1) compressor vent;
  - One (1) dust collector blower motor;
  - One (1) dust collector blower stack;
  - One (1) elevator motor;
  - One (1) conveyor motor;
  - One (1) oven motor;
  - One (1) pug mill door (pressure relief noise through the door); and
  - One (1) pug mill motor.
- Internal Haul Truck Routes:
  - Haul roads between PP and AP for aggregates (24h/day).
- Shipping Truck Routes (24h/day):
  - Shipping of aggregate from PP stockpiles to offsite;
  - Shipping of HMA from AP to offsite; and
  - Receiving of AC and RAP at AP.

All continuous sources are assumed to be operating constantly in their respective operating periods. During the sinking cut, only one (1) secondary and one (1) tertiary crusher will be deployed. As the Quarry progresses to later phases, two (2) sets of secondary and tertiary crushers will be deployed at the processing plant. Asphalt plant noise sources were based on the existing asphalt plant at Walker Brothers Quarry and Asphalt Plant in Niagara Falls.



Shipping truck traffic modelled using moving point source calculation method. Shipping trucks on site are expected to travel at a mean speed of approximately 20 km/h. The number of vehicle trips per hour are calculated based on peak daily production rate and typical vehicle payload and are shown in **Table 1**.

## **3.2 Impulsive Sources**

The only impulsive source considered in this study is the impulses associated with the asphalt plant silos (ASPH\_imp\_silo), which could operate up to 24 hours a day. As per NPC-300, the sound limits are based on the number of impulses per hour. Nine (9) or more impulses are anticipated to occur at a worst-case hour during daytime, evening, and nighttime.

## **3.3 Construction Sources**

Temporary construction noise from the Quarry is anticipated for short periods throughout its lifespan. Activities considered to be construction noise include overburden removal and berm creation. Details on construction noise assessment are provided in **Section 5**.

## **3.4 Identifiable Source Characteristics**

Continuous sources that warrant adjustment due to tonal, cyclically varying, quasi-steady impulsive or beating sound characteristics receive additional consideration in accordance with MOECC NPC-104 guidelines (MOECC, 1978). These guidelines specify that a penalty is applicable for tonal, cyclically varying, or quasi-steady impulsive sound characteristics. No sources were identified to exhibit tonal, cyclically varying, quasi-steady impulsive or beating sound characteristics per NPC-103.

# **4 POINTS OF RECEPTION**

Sound levels from sources at the Quarry were determined at points of reception (PORs) located on noise sensitive land uses. Noise sensitive land uses are defined in the MOECC's environmental guideline, Publication NPC-300 (MOECC, 2013), as the property of a person that accommodates a dwelling, a noise sensitive commercial building or a noise sensitive institutional building. In some cases, a vacant lot may be considered noise sensitive provided it is zoned to allow a sensitive use.

A noise sensitive land use may have one or more POR. PORs for an acoustic assessment are those locations where sound from the facility is received and assessed against the applicable limits. Sound levels may be assessed at the façade of the building and/or outdoor areas, depending on the type of sensitive land use assessed. Outdoor PORs are only assessed for dwellings and are not assessed for commercial and institutional noise sensitive land uses.

## 4.1 Surrounding Noise Sensitive Land Uses

Representative receptors with noise-sensitive land uses were identified from zoning maps and aerial photography of the area surrounding the facility. Zoning information for the area surrounding the Quarry is provided in

**Appendix A.** These receptors are:

- **R1**, Residence at 10148 Beaverdams Rd;
- **R2**, Residence at 9722 Beaverdams Rd;
- **R3**, Residence at 9602 Beaverdams Rd;
- **R4**, Residence at 5584 Beechwood Rd;
- **R5**, Residence at 5769 Beechwood Rd; and
- **R6**, Residence at 9944 Lundy's Ln.

There is a neighboring church on the southwest corner of the intersection of Upper's Lane and Beechwood Rd, approximately 60 m from the Quarry boundary. WAI has a special agreement in place with the Church to avoid noise disturbance. Therefore, the Church was not assessed as a noise sensitive receptor.

There is a residential-zoned vacant lot for the Rolling Meadows development approximately 420 m west of the Quarry. The vacant lot was not considered as a receptor for this assessment since the land developer will be required to mitigating any noise within 500m of the bed rock resource area according to policy B.8.12.3. of the Rolling Meadows Secondary Plan. The policy is included in **Appendix B.**

## 4.2 Modelled Points of Reception

Two PORs were used to assess the sound level at residential receptors (**R1** through **R6**): the façade POR and the outdoor POR. The façade PORs are placed at the closest window facing the Quarry. For two-storey residences, the façade POR is modelled 4.5 m above ground. For one-storey residence, the POR is modelled 1.5 m above ground. All outdoor PORs are modelled at a height of 1.5 m.

The locations of the modelled PORs are shown in **Figure 1**. The location of the PORs are also shown on the zoning map **Figure A.1** in **Appendix A.**

## 5 ASSESSMENT CRITERIA

The assessment criteria for sound levels at the receptors is the higher of either the exclusion limit per NPC-300 or the minimum background sound level that occurs or is likely to occur. The exclusion limit is the highest sound level limit that may be used for a receptor when the background sound level is lower than the exclusion limit.

The sound from the facility was assessed during a given worst-case hour occurring in three time periods in NPC 300:

- **Daytime**, 0700 – 1900h;
- **Evening**, 1900 – 2300h; and
- **Nighttime**, 2300 – 0700h.

The outdoor location is only assessed during daytime and evening periods, and may have a different evening sound level limit than the corresponding façade depending on the Class. The type of acoustic environment, or "Class", defines the set of sound level limits based on the level of urbanization.

- **Class 1**, an acoustical environment which is typical of a major population centre that is dominated by sounds of human activity and traffic.
- **Class 2**, an acoustical environment which is dominated by sounds of human activity and traffic during the daytime (07:00 - 19:00) and defined by the environmental and infrequent human activity at night (19:00 - 07:00).
- **Class 3**, an acoustical environment defined by the environmental and infrequent human activity.

Different types of sources are also assessed separately. There are separate assessment criteria for continuous sources vs. impulsive sources.

### 5.1 Exclusion Limits for Continuous Sources

The exclusion limits are determined from the level of urbanization, or 'Class', at the noise-sensitive land use. The acoustic environment surround the Quarry is characterized primarily by CN rail to the south and road traffic surrounding the site. Noise sensitive land uses for the receptors are therefore in a Class 2 acoustical environment, which is typical of a suburban area that is dominated by sounds of human activity and road traffic. As such, the MOECC Publication NPC-300 Class 2 exclusion limits apply to PORs in this study. The exclusion limits for each POR are shown in **Tables 3a** through **3g**.

### 5.2 Exclusion Limits for Impulsive Sources

The effect of impulsive sources of sound is evaluated separately from that of continuous sources. The sound level limits for impulsive sources are determined by the number of impulses expected to occur during a worst-case hour.

Since there is only one impulsive source on site (ASPH\_imp\_silo), it is evaluated against the limit associated with the number of impulses per hour for this individual source. There is expected to be nine or more impulses per hour. Therefore, the strictest Class 2 impulsive limits apply. The worst-case impulsive sound level impacts and associated limits for each POR are summarized in **Tables 3h**.



## **5.3 Construction Limits**

Overburden-clearing and berm construction are considered short-term construction activities and are not examined explicitly in this assessment. Construction activities is generally temporary in nature and is not part of the day-to-day operation of the site. The sound level due to temporary construction events are not generally assessed at the surrounding receptors.

The following best practice recommendations have been provided in order to minimize the potential for construction noise impacts:

- Construction should be limited to the time periods allowed by the locally applicable bylaws. If construction activities are required outside of these hours, WAI must seek permits / exemptions directly from the municipalities in advance.
- Ensure that all internal combustion engines are fitted with appropriate muffler systems.
- WAI operating procedures should contain a provision that any initial noise complaint will trigger verification that the general noise control measures agreed to are in effect.
- In the event of verified noise complaints, all construction equipment should be verified to comply with MOECC NPC-115 guidelines, as outlined below.
- In the event of verified noise complaints, alternative noise control measured may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative and economic feasibility of the various alternatives.

All construction equipment must meet the sound emission standards defined in MOECC publication NPC-115 (MOECC, 1977). The applicable guidelines for sound emissions from construction equipment are:

- For equipment manufactured after January 1, 1981:
  - 83 dBA at 15 m for equipment under 75 kW; and
  - 85 dBA at 15 m for equipment 75 kW or larger.
- For equipment manufactured January 1, 1979 to December 31, 1980:
  - 85 dBA at 15 m for equipment under 75 kW; and
  - 88 dBA at 15 m for equipment 75 kW or larger.



## 6 NOISE CONTROL RECOMMENDATIONS

The following recommendations are provided in order to meet the applicable compliance criteria:

1. Minimum 3 m tall perimeter berms shall be constructed around the Quarry as shown in **Figure 1**. The perimeter berms shall be constructed as soon as possible during site preparation prior to extraction.
2. The primary crusher shall stay within 30 m of the working face to maximize shielding effect of the Quarry terrain.
3. Material extracted from the South Extraction Area shall be processed in the Mid Extraction Area.
4. While processing in Phase 4, the licensee shall maintain an 8 m tall barrier at a radius of 40 m to the southeast of the processing plant secondary crushers as shown in **Figures 2f** and **2g**. The barrier can be material stockpiles, noise walls, or a combination of both. The barrier shall extend long enough to shield R4 and R5 from the secondary crushers.

Although construction noise is not part of the assessment, RWDI recommends the following best practices to minimize potential for construction noise impacts and complaints:

5. All construction equipment shall meet the sound emission standards defined in MECP Publication NPC-115.
6. Construction will be limited to time periods allowed by the City's applicable by-laws. If construction activities are required outside of these hours, the licensee will seek permits / exemptions directly from the City in advance.
7. All internal combustion engines will be fitted with appropriate muffler systems.
8. The licensee's operating procedures will contain a provision that any initial complaint will trigger verification that the general noise control measures agreed to on this Plan are in effect.
9. In the presences of persistent noise complaints, all construction equipment will be verified to comply with MECP's NPC-115 guidelines.
10. In the presence of persistent noise complaints and subject to the results of a field investigation, alternative noise control measures may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives.

## 7 IMPACT ASSESSEMENT

The Quarry sound emissions were modelled based on the operating scenarios as described in **Section 2**. The sound levels at surrounding PORs are calculated by modelling the sound propagation from the significant sources at the Quarry. The modelled sound levels at the PORs were assessed against the applicable limits.

Modelling of sound level propagation to the PORs was completed using Cadna/A, a commercially available implementation of the ISO 9613 (ISO, 1994b and ISO, 1996) algorithms. Cadna/A is produced by Datakustik GmbH. The modelling took into account the following factors:

- Source sound power level;
- Distance attenuation;
- Source-receptor geometry including heights, elevations and topography;
- Barrier effects of terrains, berms, and surrounding buildings;
- Duration of events;
- Ground and air (atmospheric) attenuation; and
- Meteorological effects on sound propagation.

Sample calculations showing step-by-step calculation parameters is included in **Appendix C**. Key modelling parameters are also summarized in **Appendix C**.

Ground absorption surrounding the Quarry is modelled as 0.8, to account for the predominantly soft ground. Ground absorption within the Quarry boundary is modelled as 0.2 to account for the hard rock surfaces.

Existing terrain surrounding the quarry was extracted from the Southwestern Ontario Orthophotography Project (SWOOP) 2015 Digital Elevation Model (MNRF, 2015).

The individual contribution of each source at the modelled PORs are presented for Proposed Phase 1A Sinking Cut and Proposed Phase 4 Southeast in **Tables 2a** and **2b**, respectively, as representative sample results.

The predicted sound levels at PORs were assessed using applicable sound level limits, as shown in **Tables 3a** to **3g** for continuous sources, and **Table 3h** for impulsive source. The predicted sound levels at each POR complies with the applicable NPC-300 exclusion limits for all scenarios.

Predicted sound level contours (isopleths of equal sound level) for continuous sources were generated for the worst-case operating scenario for the modelled phases described in **Section 2**. The sound level contours are shown in **Figures 3a** through **3n**.



## 8 ALTERNATE EXTRACTION SCENARIO

In the event that Walker obtains permission from the City of Niagara Falls, extraction will include the two road allowances bisecting the proposed quarry site:

- i. Upper's Lane, between the North Extraction Area and the Mid Extraction Area; and
- ii. the unopened road allowance between Lots 120 and 136, between the Mid Extraction Area and the South Extraction Area.

The assessment results and recommendations for the alternate extraction scenario are included in **Appendix D**.

## 9 CONCLUSIONS

An assessment of the sound levels from the Upper's Quarry operation was completed by modelling the contribution of the significant sources at the representative receptors. The sound levels due the Quarry are predicted to comply with MOECC NPC-300 Class 2 exclusion limits at the representative receptors with the implementation of the mitigation measures described in **Section 6**.

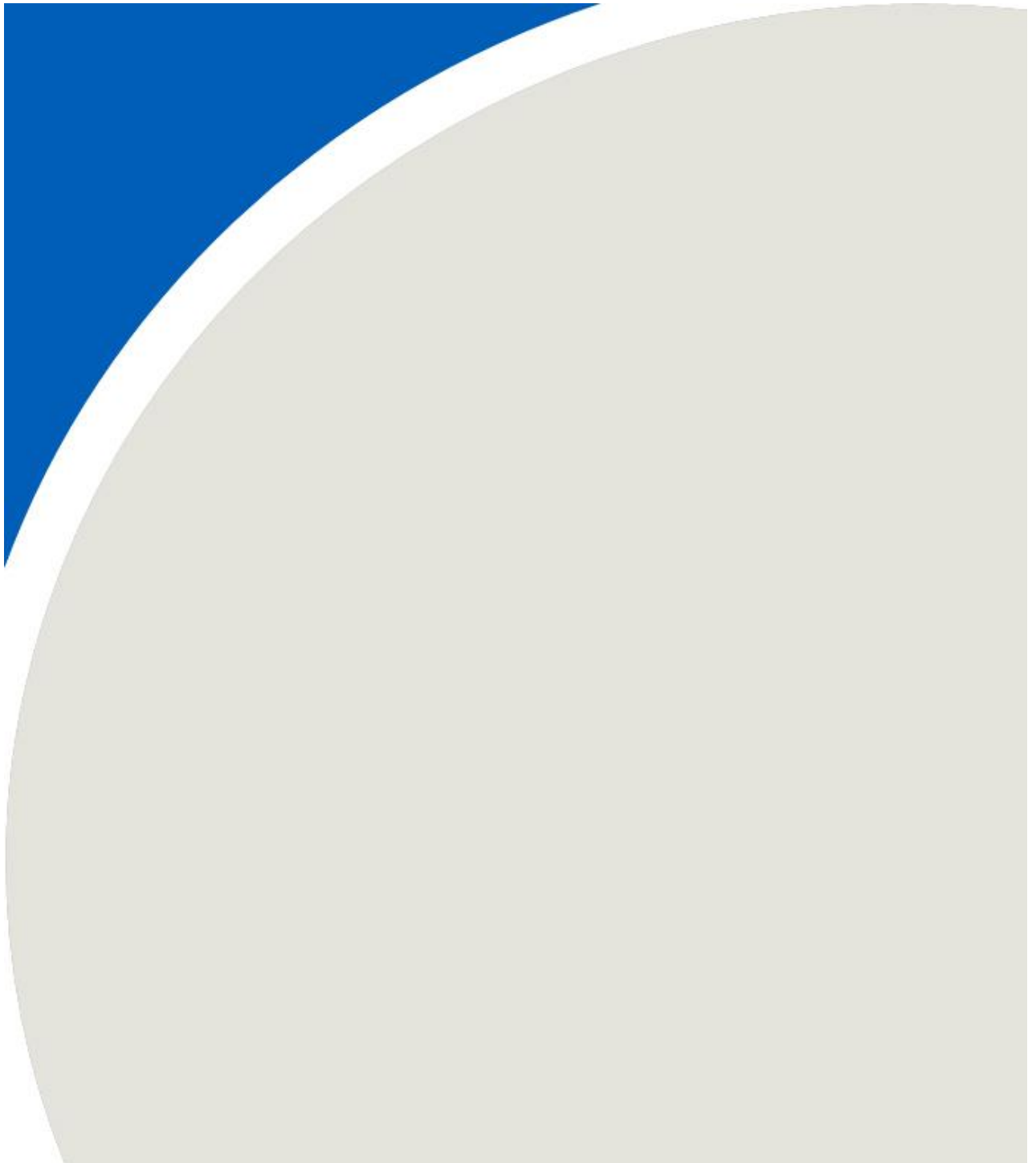




## 10 REFERENCES

1. Aggregate Resources Act (ARA), 1996, Ontario Regulation 244/97, Bill 52, Aggregate and Petroleum Resources Statute Law Amendment Act.
2. International Organization for Standardization (ISO), 1994, International Standard ISO 9613-1:1994, Acoustics – Attenuation of Sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere.
3. International Organization for Standardization (ISO), 1996, International Standard ISO 9613-2:1996, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.
4. Ministry of Natural Resources (MNR), 2006, Policy #A.R. 2.01.09, Licence Applications: Noise Assessment and Blast Design Report Standards.
5. Ontario Ministry of Natural Resources and Forestry (MNRF), 2015, Southwestern Ontario Orthophotography (SWOOP) 2015 Digital Elevation Model
6. Ontario Ministry of the Environment and Climate Change (MOECC), 1977, Publication NPC-115, Construction Equipment, published under the Model Municipal Noise Control Bylaw
7. Ontario Ministry of the Environment and Climate Change (MOECC), 1978, Model Municipal Noise Control Bylaw, which includes Publication NPC-103 – Procedures, and Publication NPC-104 – Sound Level Adjustments.
8. Ontario Ministry of the Environment and Climate Change (MOECC), 1995, Publication NPC-233, Information to be Submitted for Approval of Stationary Sources of Sound.
9. Ontario Ministry of the Environment and Climate Change (MOECC), 2012, Guide to Applying for an Environmental Compliance Approval.
10. Ontario Ministry of the Environment and Climate Change (MOECC), August 2013, Publication NPC-300, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning.
11. RWDI AIR Inc. (RWDI), 2020, Upper's Quarry: Air Quality Assessment

# TABLES



**Table 1: Noise Source Summary - Proposed Extraction Scenario**  
Upper's Quarry, 1603157

Notes to Table:
1. Wherever possible, the Source ID matches the identifiers used in the ESDM report.
2. Sound Power Level of Source, in dBA, not including sound characteristic adjustments per NPC-104.
3. Source Location: O = Outside of building, including the roof, I = Inside of building.
4. Sound Characteristic, per NPC-104: - S = Steady, - Q = Quasi-Steady Impulsive, - I = Impulsive, - B = Buzzer, - T = Tonal, - C = Cyclic
5. Noise control measures currently in place or specified in construction drawings: - S = Silencer/Muffler, - A = Acoustic lining, plenum, - B = Barrier/Berm, - L = Lagging, - E = Acoustic enclosure, - O = Other, - U = Uncontrolled
Where noise control measures are specified in construction drawings or were found on existing equipment, octave band sound power levels include the effects of the noise control measures. Noise control measures recommended in the mitigation section of this report are not included in this table.

**Table 1: Additional Data**  
Upper's Quarry, 1603157

6. Source type indicates Cadna/A modelling methodology. For Point, Line, and Area sources, PWLs represent the overall level for the entire source. Where source type is Mobile Equipment, the source is modelled as a moving point source, and PWL is calculated from a single-vehicle passby.
7. Sound Power Level Data Source: - Man = Manufacturer's Data, - Mea = Measured Directly, - Hist = Historical Data on File at RWDI, - EC = Engineering Calc based on specifications, - Same ### = same type as source no. ###
8. For loader dumping into primary crusher, it is assumed each dump takes approximately 10s

Table with 6 columns: Source ID [1], Source Description, Sound Power Level [2], Source Location [3], Sound Characteristics [4], Noise Control Measures [5].

Table with multiple columns: 1/1 Octave Band Sound Power Level Data (dB), Source Type [6], PWL Data Source [7], Height Above Roof (m), Local Roof Height Ab. Grade (m), Height Above Grade (m), Source Co-ordinates (X, Y, Z), Operating Time during Worst-case hour for Point Sources (Daytime, Evening, Nighttime).

Main data table with 23 columns. Includes headers for Source ID, Description, Sound Power Level, Location, Characteristics, Noise Control, and detailed noise level data across multiple octave bands (31.5-8000 dB) and operating conditions.





**Table 2a: Point of Reception Noise Impact (Sample Calculation for Proposed Phase 1A Sinking Cut)**

Uppers Quarry, 1603157

Notes to Table:	
-	"Table A2" in Appendix A of Basic CCoA Guide.
1.	"Continuous" noise sources includes operating time corrections and sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300.
2.	Wherever possible, the Source ID matches the identifiers used in the ESDM report.
3.	Sound Level units: - dBA = 1-hour energy equivalent sound level ( $L_{eq}(1-hr)$ ), in terms of A-Weighted decibels. - dBAI = Logarithmic mean impulsive noise level ( $L_{eqi}$ ), in terms of A-Weighted decibels incorporating an impulsive time weighting.
-	Noise and vibration receptors representative of worst-case potential impacts have been selected. For the purposes of noise and vibration impact assessment, the following land uses (existing or zoned for future use) have been considered: - permanent, seasonal, or rental residences - hospitals and clinics - hotels, motels and campgrounds - schools, universities, libraries and daycare centres - nursing / retirement homes - churches and places of worship

Point of Reception ID R1f	Point of Reception ID R1o	Point of Reception ID R2f	Point of Reception ID R2o	Point of Reception ID R3f	Point of Reception ID R3o	Point of Reception ID R4f	Point of Reception ID R4o	Point of Reception ID R5f	Point of Reception ID R5o	Point of Reception ID R6f	Point of Reception ID R6o
Point of Reception Description Facade of dwelling (10148 Beaverdams Rd)	Point of Reception Description Outdoor area of dwelling (10148 Beaverdams Rd)	Point of Reception Description Facade of dwelling (9722 Beaverdams Rd)	Point of Reception Description Outdoor area of dwelling (9722 Beaverdams Rd)	Point of Reception Description Facade of dwelling (9602 Beaverdams Rd)	Point of Reception Description Outdoor area of dwelling (9602 Beaverdams Rd)	Point of Reception Description Facade of dwelling (5584 Beechwood Rd)	Point of Reception Description Outdoor area of dwelling (5584 Beechwood Rd)	Point of Reception Description Facade of dwelling (5769 Beechwood Rd)	Point of Reception Description Outdoor area of dwelling (5769 Beechwood Rd)	Point of Reception Description Facade of dwelling (9944 Lundy's Ln)	Point of Reception Description Outdoor area of dwelling (9944 Lundy's Ln)
Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z	Point of Reception Coordinates X Y Z
648766 4773660 181.91	648766 4773629 179.5	649394 4773728 184.5	649391 4773698 178.69	649571 4773645 184.4	649553 4773620 179.77	649611 4772698 190.5	649594 4772727 186.76	649553 4772408 189.5	649552 4772429 185.95	649084 4771672 186.5	649070 4771693 182.43

Source ID [1]	Source Description	Point of Reception 1			Point of Reception 2			Point of Reception 3			Point of Reception 4			Point of Reception 5			Point of Reception 6			Point of Reception 7			Point of Reception 8			Point of Reception 9			Point of Reception 10			Point of Reception 11			Point of Reception 12		
		Distance (m)	Sound Level at PoR (dBA)	Units [2]	Distance (m)	Sound Level at PoR (dBA)	Units [2]	Distance (m)	Sound Level at PoR (dBA)	Units [2]	Distance (m)	Sound Level at PoR (dBA)	Units [2]	Distance (m)	Sound Level at PoR (dBA)	Units [2]	Distance (m)	Sound Level at PoR (dBA)	Units [2]	Distance (m)	Sound Level at PoR (dBA)	Units [2]	Distance (m)	Sound Level at PoR (dBA)	Units [2]	Distance (m)	Sound Level at PoR (dBA)	Units [2]	Distance (m)	Sound Level at PoR (dBA)	Units [2]	Distance (m)	Sound Level at PoR (dBA)	Units [2]			
P1A_Sinkcut_PC_CrusherDump	P1A_Sinkcut_PC loader dumping into crusher	817	37	dBA	786	37	dBA	1137	37	dBA	1112	32	dBA	1200	36	dBA	1170	31	dBA	949	39	dBA	929	34	dBA	984	39	dBA	956	34	dBA	1246	36	dBA	1221	31	dBA
P1A_Sinkcut_PC_Ldr	P1A_Sinkcut_PC Loader	815	29	dBA	785	29	dBA	1137	25	dBA	1112	24	dBA	1200	29	dBA	1170	24	dBA	951	31	dBA	930	26	dBA	985	31	dBA	957	26	dBA	1248	28	dBA	1223	23	dBA
P1A_Sinkcut_PC_PrimaryCrush	P1A_Sinkcut_PC Primary Crusher	818	43	dBA	788	42	dBA	1138	43	dBA	1113	38	dBA	1200	43	dBA	1170	37	dBA	948	46	dBA	927	40	dBA	982	45	dBA	954	40	dBA	1244	42	dBA	1219	37	dBA
P1A_Sinkcut_PC_PrimaryScreen	P1A_Sinkcut_PC Primary Screen	819	38	dBA	789	37	dBA	1138	39	dBA	1113	33	dBA	1200	38	dBA	1170	32	dBA	946	41	dBA	926	35	dBA	980	40	dBA	952	35	dBA	1242	38	dBA	1217	32	dBA
P1A_Sinkcut_PP_Ldr	P1A_Sinkcut_PP Loader	861	28	dBA	831	28	dBA	1102	30	dBA	1075	25	dBA	1143	29	dBA	1143	29	dBA	815	33	dBA	795	28	dBA	847	28	dBA	819	28	dBA	1162	24	dBA	1138	24	dBA
P1A_Sinkcut_PP_SecondaryCrush	P1A_Sinkcut_PP Secondary Crusher	867	43	dBA	837	38	dBA	1112	40	dBA	1086	34	dBA	1152	39	dBA	1124	34	dBA	825	43	dBA	805	38	dBA	853	38	dBA	825	38	dBA	1158	39	dBA	1134	34	dBA
P1A_Sinkcut_PP_SecondaryTertiaryScreen	P1A_Sinkcut_PP Secondary & Tertiary Screen	869	42	dBA	838	37	dBA	1113	39	dBA	1086	33	dBA	1155	38	dBA	1124	33	dBA	823	42	dBA	804	37	dBA	852	37	dBA	824	36	dBA	1157	38	dBA	1133	33	dBA
P1A_Sinkcut_PP_TertiaryCrush	P1A_Sinkcut_PP Tertiary Crusher	870	28	dBA	839	23	dBA	1113	25	dBA	1086	20	dBA	1155	25	dBA	1124	19	dBA	822	28	dBA	803	23	dBA	850	23	dBA	822	23	dBA	1155	24	dBA	1131	19	dBA
P1A_Sinkcut_PP_Trk1	P1A_Sinkcut_PP Idling Truck	850	25	dBA	820	20	dBA	1091	22	dBA	1064	17	dBA	1133	21	dBA	1102	16	dBA	814	25	dBA	794	20	dBA	850	25	dBA	822	20	dBA	1172	21	dBA	1148	16	dBA
P1A_Sinkcut_PP_Trk2	P1A_Sinkcut_PP Idling Truck	850	25	dBA	819	20	dBA	1089	22	dBA	1062	17	dBA	1131	21	dBA	1101	16	dBA	812	25	dBA	792	20	dBA	848	25	dBA	820	20	dBA	1172	16	dBA	1148	16	dBA
P1A_Sinkcut_WF_Drill	P1A_Sinkcut_WF Drill	801	33	dBA	771	32	dBA	1148	28	dBA	1124	28	dBA	1218	27	dBA	1188	27	dBA	995	35	dBA	973	30	dBA	1031	34	dBA	1003	29	dBA	1280	31	dBA	1256	26	dBA
P1A_Sinkcut_Conveyor	P1A_Sinkcut_Conveyor	varies	32	dBA	varies	28	dBA	varies	29	dBA	varies	24	dBA	varies	28	dBA	varies	23	dBA	varies	23	dBA	varies	26	dBA	varies	26	dBA	varies	26	dBA	varies	28	dBA	varies	23	dBA
P1A_Sinkcut_RD_SHP_Aggr_Fm	P1A_Sinkcut_Aggregate Shipping from PP_Empvy	varies	22	dBA	varies	18	dBA	varies	18	dBA	varies	13	dBA	varies	17	dBA	varies	12	dBA	varies	20	dBA	varies	15	dBA	varies	19	dBA	varies	16	dBA	varies	16	dBA	varies	13	dBA
P1A_Sinkcut_RD_SHP_Aggr_Fu	P1A_Sinkcut_Aggregate Shipping from PP_Full	varies	22	dBA	varies	18	dBA	varies	18	dBA	varies	13	dBA	varies	17	dBA	varies	12	dBA	varies	20	dBA	varies	15	dBA	varies	19	dBA	varies	16	dBA	varies	13	dBA			



**Table 3a: Acoustic Assessment Summary, Proposed Phase 1A Sinking Cut**

Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCoFA Guide.
- 1. "Continuous" noise sources includes sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300. Impulsive and emergency noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Continuous" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M/ D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	49	No	50	D	Yes	648766	4773660	4.5
		Evening	32	No	50		Yes			
		Nighttime	32	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	46	No	50	D	Yes	648766	4773629	1.5
		Evening	30	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	47	No	50	D	Yes	649394	4773728	4.5
		Evening	31	No	50		Yes			
		Nighttime	31	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	42	No	50	D	Yes	649391	4773698	1.5
		Evening	26	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	47	No	50	D	Yes	649571	4773645	4.5
		Evening	31	No	50		Yes			
		Nighttime	31	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	42	No	50	D	Yes	649553	4773620	1.5
		Evening	26	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	50	No	50	D	Yes	649611	4772698	4.5
		Evening	35	No	50		Yes			
		Nighttime	35	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	45	No	50	D	Yes	649594	4772727	1.5
		Evening	29	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	48	No	50	D	Yes	649553	4772408	4.5
		Evening	31	No	50		Yes			
		Nighttime	31	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	44	No	50	D	Yes	649532	4772429	1.5
		Evening	29	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	47	No	50	D	Yes	649084	4771672	4.5
		Evening	27	No	50		Yes			
		Nighttime	27	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	41	No	50	D	Yes	649070	4771693	1.5
		Evening	25	No	45		Yes			



**Table 3b: Acoustic Assessment Summary, Proposed Phase 1A South Sinking Cut**

Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCoFA Guide.
- 1. "Continuous" noise sources includes sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300. Impulsive and emergency noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Continuous" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M / D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	44	No	50	D	Yes	648766	4773660	4.5
		Evening	30	No	50		Yes			
		Nighttime	30	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	43	No	50	D	Yes	648766	4773629	1.5
		Evening	29	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	43	No	50	D	Yes	649394	4773728	4.5
		Evening	30	No	50		Yes			
		Nighttime	30	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	40	No	50	D	Yes	649391	4773698	1.5
		Evening	25	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	43	No	50	D	Yes	649571	4773645	4.5
		Evening	30	No	50		Yes			
		Nighttime	30	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	40	No	50	D	Yes	649553	4773620	1.5
		Evening	25	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	49	No	50	D	Yes	649611	4772698	4.5
		Evening	34	No	50		Yes			
		Nighttime	34	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	44	No	50	D	Yes	649594	4772727	1.5
		Evening	28	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	49	No	50	D	Yes	649553	4772408	4.5
		Evening	29	No	50		Yes			
		Nighttime	29	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	47	No	50	D	Yes	649532	4772429	1.5
		Evening	29	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	47	No	50	D	Yes	649084	4771672	4.5
		Evening	31	No	50		Yes			
		Nighttime	31	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	44	No	50	D	Yes	649070	4771693	1.5
		Evening	26	No	45		Yes			

**Table 3c: Acoustic Assessment Summary, Proposed Phase 2A Sinking Cut**

Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCoFA Guide.
- 1. "Continuous" noise sources includes sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300. Impulsive and emergency noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Continuous" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M/ D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	50	No	50	D	Yes	648766	4773660	4.5
		Evening	35	No	50		Yes			
		Nighttime	35	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	50	No	50	D	Yes	648766	4773629	1.5
		Evening	34	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	47	No	50	D	Yes	649394	4773728	4.5
		Evening	30	No	50		Yes			
		Nighttime	30	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	43	No	50	D	Yes	649391	4773698	1.5
		Evening	28	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	48	No	50	D	Yes	649571	4773645	4.5
		Evening	32	No	50		Yes			
		Nighttime	32	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	43	No	50	D	Yes	649553	4773620	1.5
		Evening	27	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	49	No	50	D	Yes	649611	4772698	4.5
		Evening	32	No	50		Yes			
		Nighttime	32	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	43	No	50	D	Yes	649594	4772727	1.5
		Evening	27	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	45	No	50	D	Yes	649553	4772408	4.5
		Evening	31	No	50		Yes			
		Nighttime	31	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	43	No	50	D	Yes	649532	4772429	1.5
		Evening	26	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	40	No	50	D	Yes	649084	4771672	4.5
		Evening	24	No	50		Yes			
		Nighttime	24	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	39	No	50	D	Yes	649070	4771693	1.5
		Evening	23	No	45		Yes			

**Table 3d: Acoustic Assessment Summary, Proposed Phase 3A**

Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCofA Guide.
- 1. "Continuous" noise sources includes sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300. Impulsive and emergency noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Continuous" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M/ D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	47	No	50	D	Yes	648766	4773660	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	47	No	50	D	Yes	648766	4773629	1.5
		Evening	36	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	43	No	50	D	Yes	649394	4773728	4.5
		Evening	36	No	50		Yes			
		Nighttime	36	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	42	No	50	D	Yes	649391	4773698	1.5
		Evening	33	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	45	No	50	D	Yes	649571	4773645	4.5
		Evening	35	No	50		Yes			
		Nighttime	35	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	44	No	50	D	Yes	649553	4773620	1.5
		Evening	31	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	47	No	50	D	Yes	649611	4772698	4.5
		Evening	35	No	50		Yes			
		Nighttime	35	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	43	No	50	D	Yes	649594	4772727	1.5
		Evening	33	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	44	No	50	D	Yes	649553	4772408	4.5
		Evening	35	No	50		Yes			
		Nighttime	35	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	42	No	50	D	Yes	649532	4772429	1.5
		Evening	34	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	40	No	50	D	Yes	649084	4771672	4.5
		Evening	34	No	50		Yes			
		Nighttime	34	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	38	No	50	D	Yes	649070	4771693	1.5
		Evening	33	No	45		Yes			

**Table 3e: Acoustic Assessment Summary, Proposed Phase 3B Northeast**

Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCofA Guide.
- 1. "Continuous" noise sources includes sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300. Impulsive and emergency noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Continuous" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M/ D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	46	No	50	D	Yes	648766	4773660	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	44	No	50	D	Yes	648766	4773629	1.5
		Evening	37	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	47	No	50	D	Yes	649394	4773728	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	45	No	50	D	Yes	649391	4773698	1.5
		Evening	35	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	48	No	50	D	Yes	649571	4773645	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	47	No	50	D	Yes	649553	4773620	1.5
		Evening	35	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	49	No	50	D	Yes	649611	4772698	4.5
		Evening	41	No	50		Yes			
		Nighttime	41	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	45	No	50	D	Yes	649594	4772727	1.5
		Evening	39	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	46	No	50	D	Yes	649553	4772408	4.5
		Evening	39	No	50		Yes			
		Nighttime	39	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	43	No	50	D	Yes	649532	4772429	1.5
		Evening	38	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	41	No	50	D	Yes	649084	4771672	4.5
		Evening	36	No	50		Yes			
		Nighttime	36	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	39	No	50	D	Yes	649070	4771693	1.5
		Evening	34	No	45		Yes			

**Table 3f: Acoustic Assessment Summary, Proposed Phase 4 Southeast**

Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCofA Guide.
- 1. "Continuous" noise sources includes sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300. Impulsive and emergency noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Continuous" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M/ D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	45	No	50	D	Yes	648766	4773660	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	43	No	50	D	Yes	648766	4773629	1.5
		Evening	36	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	46	No	50	D	Yes	649394	4773728	4.5
		Evening	37	No	50		Yes			
		Nighttime	37	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	39	No	50	D	Yes	649391	4773698	1.5
		Evening	33	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	46	No	50	D	Yes	649571	4773645	4.5
		Evening	37	No	50		Yes			
		Nighttime	37	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	40	No	50	D	Yes	649553	4773620	1.5
		Evening	33	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	49	No	50	D	Yes	649611	4772698	4.5
		Evening	41	No	50		Yes			
		Nighttime	41	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	48	No	50	D	Yes	649594	4772727	1.5
		Evening	40	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	46	No	50	D	Yes	649553	4772408	4.5
		Evening	40	No	50		Yes			
		Nighttime	40	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	44	No	50	D	Yes	649532	4772429	1.5
		Evening	39	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	40	No	50	D	Yes	649084	4771672	4.5
		Evening	36	No	50		Yes			
		Nighttime	36	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	39	No	50	D	Yes	649070	4771693	1.5
		Evening	34	No	45		Yes			

**Table 3g: Acoustic Assessment Summary, Proposed Phase 5 East**

Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCoFA Guide.
- 1. "Continuous" noise sources includes sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300. Impulsive and emergency noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Continuous" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M / D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	41	No	50	D	Yes	648766	4773660	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	40	No	50	D	Yes	648766	4773629	1.5
		Evening	36	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	42	No	50	D	Yes	649394	4773728	4.5
		Evening	37	No	50		Yes			
		Nighttime	37	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	36	No	50	D	Yes	649391	4773698	1.5
		Evening	33	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	43	No	50	D	Yes	649571	4773645	4.5
		Evening	37	No	50		Yes			
		Nighttime	37	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	36	No	50	D	Yes	649553	4773620	1.5
		Evening	33	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	47	No	50	D	Yes	649611	4772698	4.5
		Evening	41	No	50		Yes			
		Nighttime	41	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	45	No	50	D	Yes	649594	4772727	1.5
		Evening	40	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	43	No	50	D	Yes	649553	4772408	4.5
		Evening	40	No	50		Yes			
		Nighttime	40	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	42	No	50	D	Yes	649532	4772429	1.5
		Evening	39	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	40	No	50	D	Yes	649084	4771672	4.5
		Evening	36	No	50		Yes			
		Nighttime	36	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	38	No	50	D	Yes	649070	4771693	1.5
		Evening	34	No	45		Yes			

**Table 3h: Acoustic Assessment Summary, Proposed Scenario Impulsive Source**

Upper's Quarry, 1603157

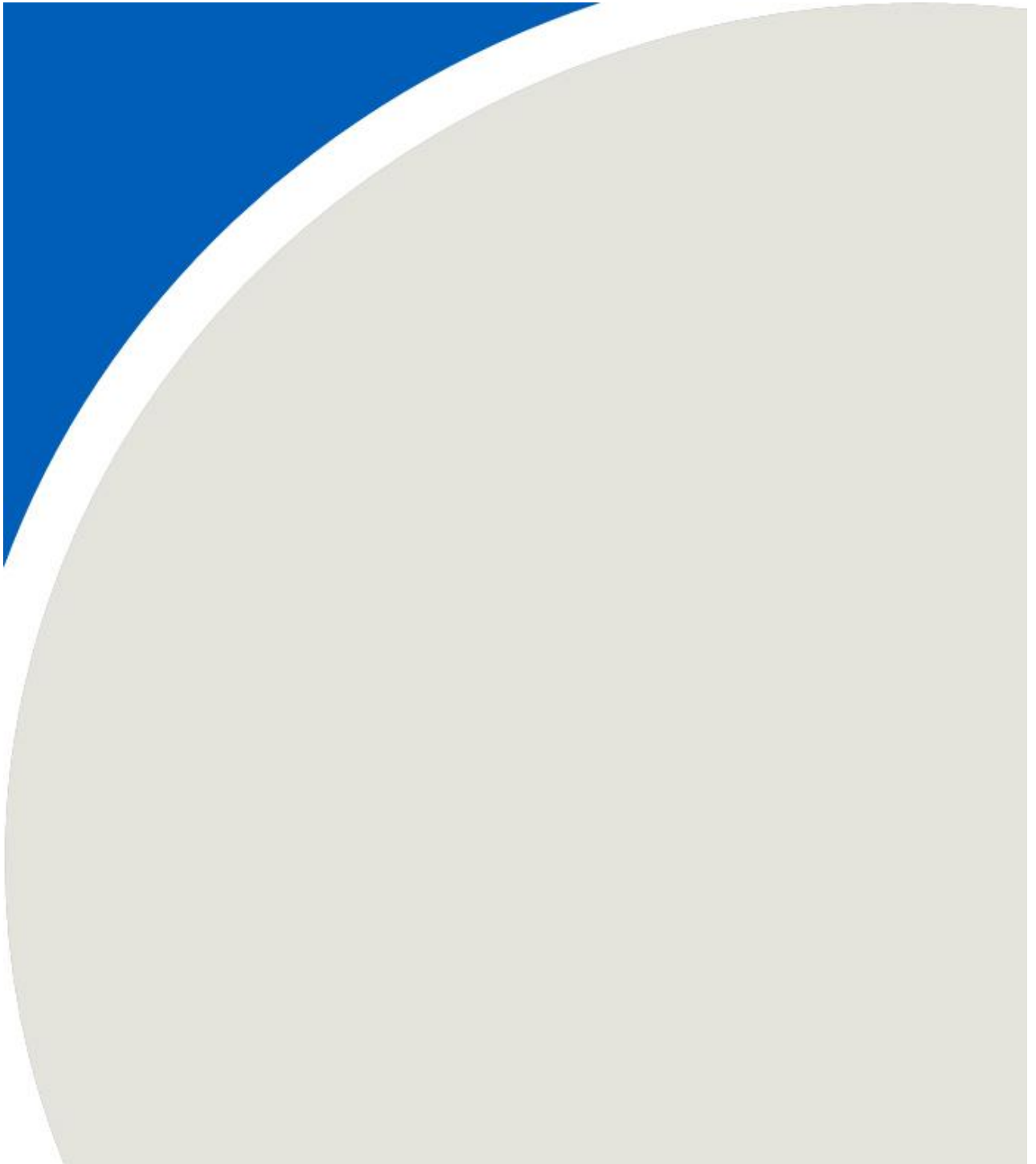
## Notes to Table:

- "Table A3" in Appendix A of Basic CCofA Guide.
- 1. Impulsive noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit, based on more than 9 impulses per hour in a Class 2 area.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

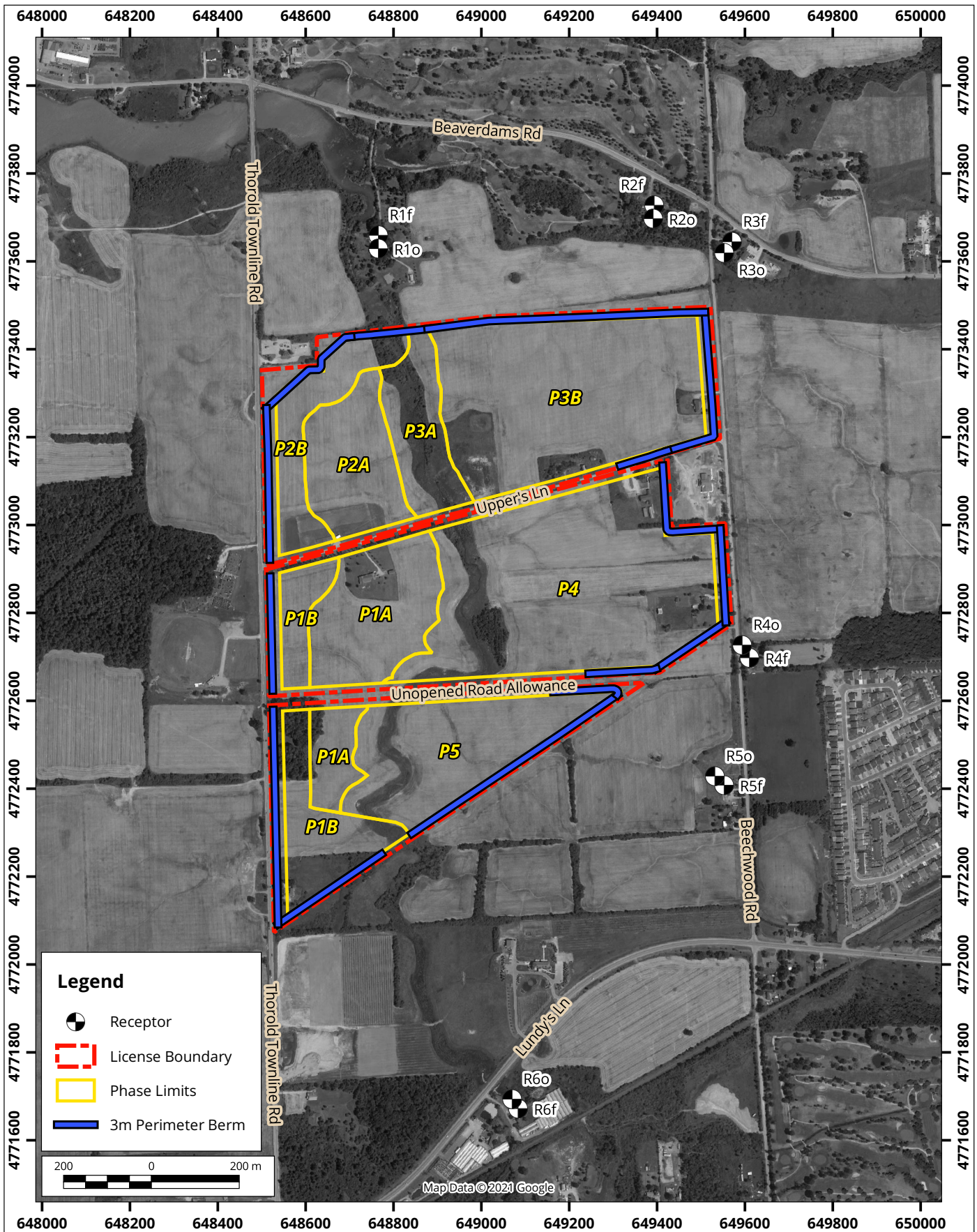
**Assessment of Impacts for "Impulsive" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M/ D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	39	No	50	D	Yes	648766	4773660	4.5
		Evening	39	No	50		Yes			
		Nighttime	39	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	38	No	50	D	Yes	648766	4773629	1.5
		Evening	38	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	38	No	50	D	Yes	649394	4773728	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	36	No	50	D	Yes	649391	4773698	1.5
		Evening	36	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	38	No	50	D	Yes	649571	4773645	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	36	No	50	D	Yes	649553	4773620	1.5
		Evening	36	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	42	No	50	D	Yes	649611	4772698	4.5
		Evening	42	No	50		Yes			
		Nighttime	42	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	43	No	50	D	Yes	649594	4772727	1.5
		Evening	43	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	41	No	50	D	Yes	649553	4772408	4.5
		Evening	41	No	50		Yes			
		Nighttime	41	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	41	No	50	D	Yes	649532	4772429	1.5
		Evening	41	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	35	No	50	D	Yes	649084	4771672	4.5
		Evening	35	No	50		Yes			
		Nighttime	35	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	35	No	50	D	Yes	649070	4771693	1.5
		Evening	35	No	45		Yes			

# FIGURES







## Site Overview and Sensitive Receptor Locations Proposed Extraction Scenario

True North



Drawn by: RNL | Figure: 1

Approx. Scale: 1:12000

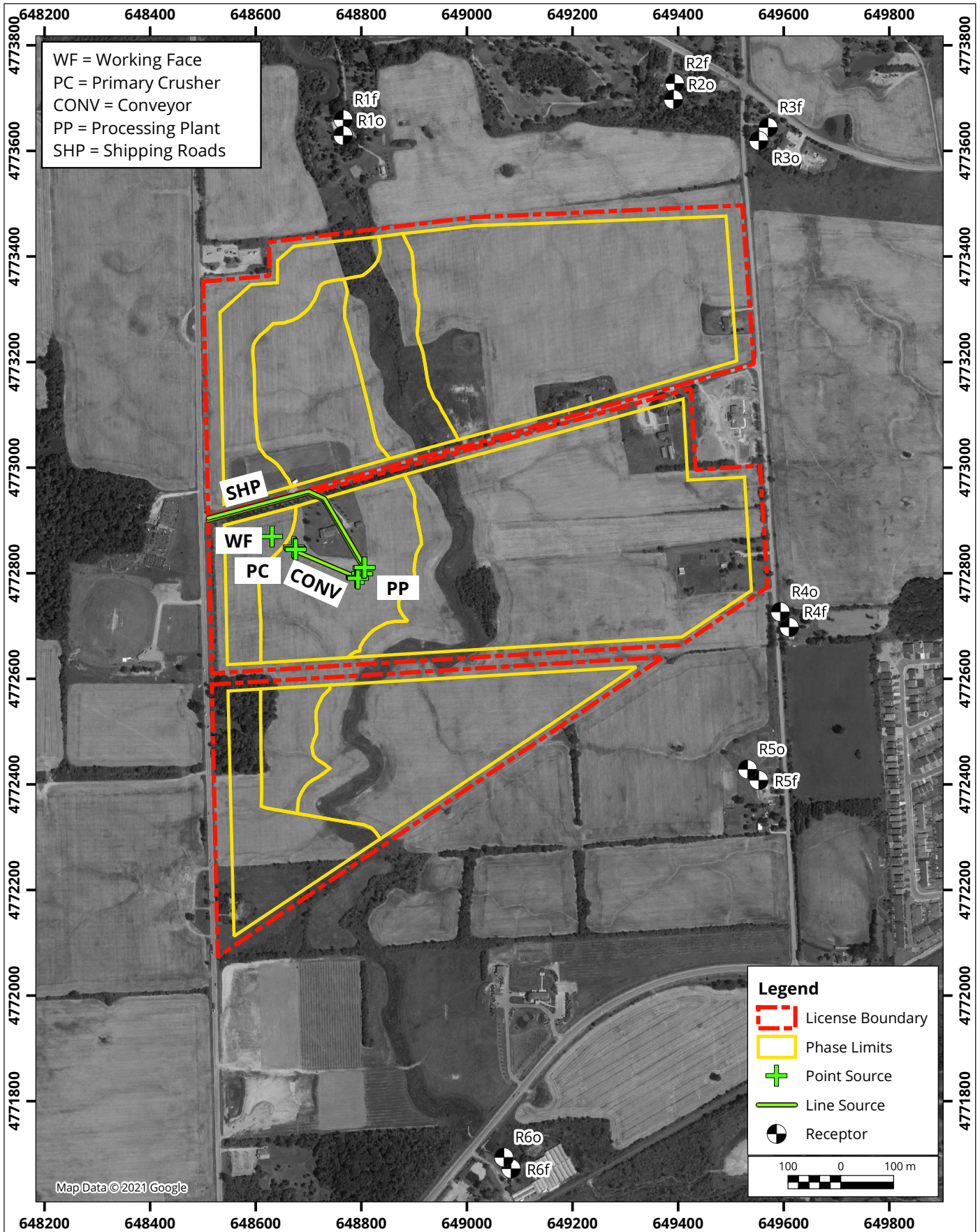
Date Revised: Sep 22, 2021



Map Projection: NAD 1983 UTM Zone 17N

Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157



## Proposed Phase 1A Sinking Cut Operation Overview

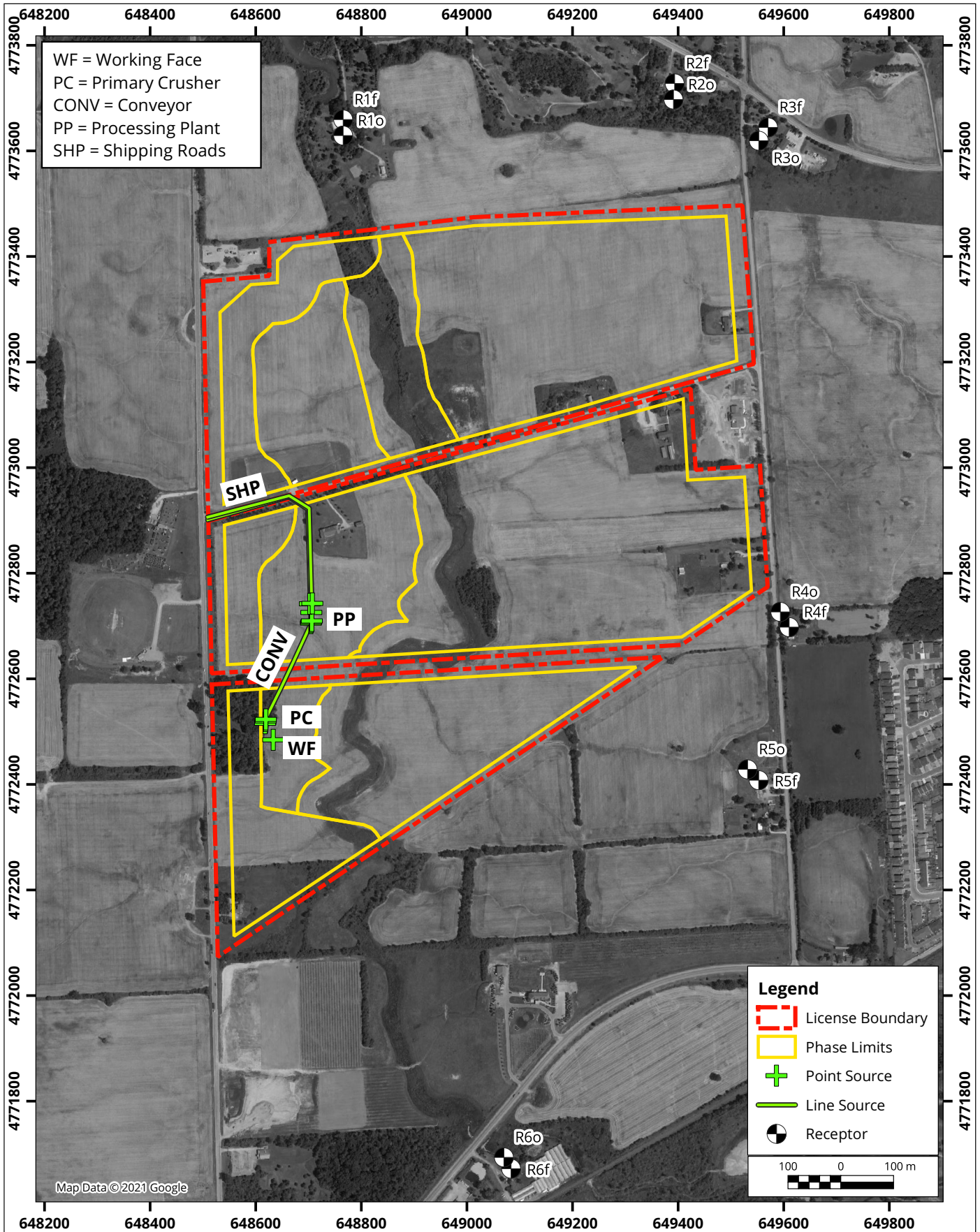
Map Projection: NAD 1983 UTM Zone 17N  
 Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: 2a
Approx. Scale: 1:10000	
Date Revised: Sep 22, 2021	





## Proposed Phase 1A South Sinking Cut Operation Overview

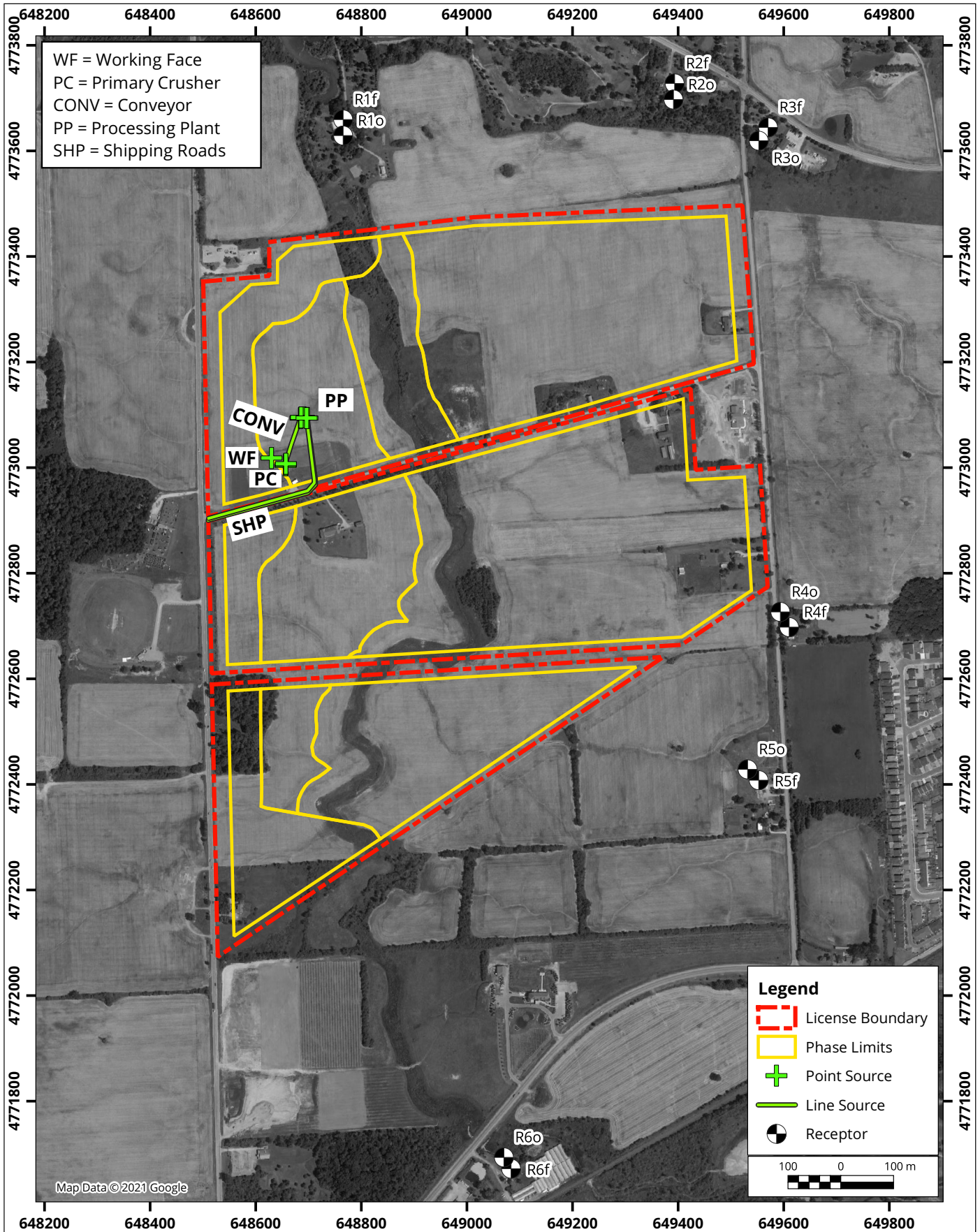
Map Projection: NAD 1983 UTM Zone 17N  
 Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: 2b
Approx. Scale: 1:10000	
Date Revised: Sep 22, 2021	





## Proposed Phase 2A Sinking Cut Operation Overview

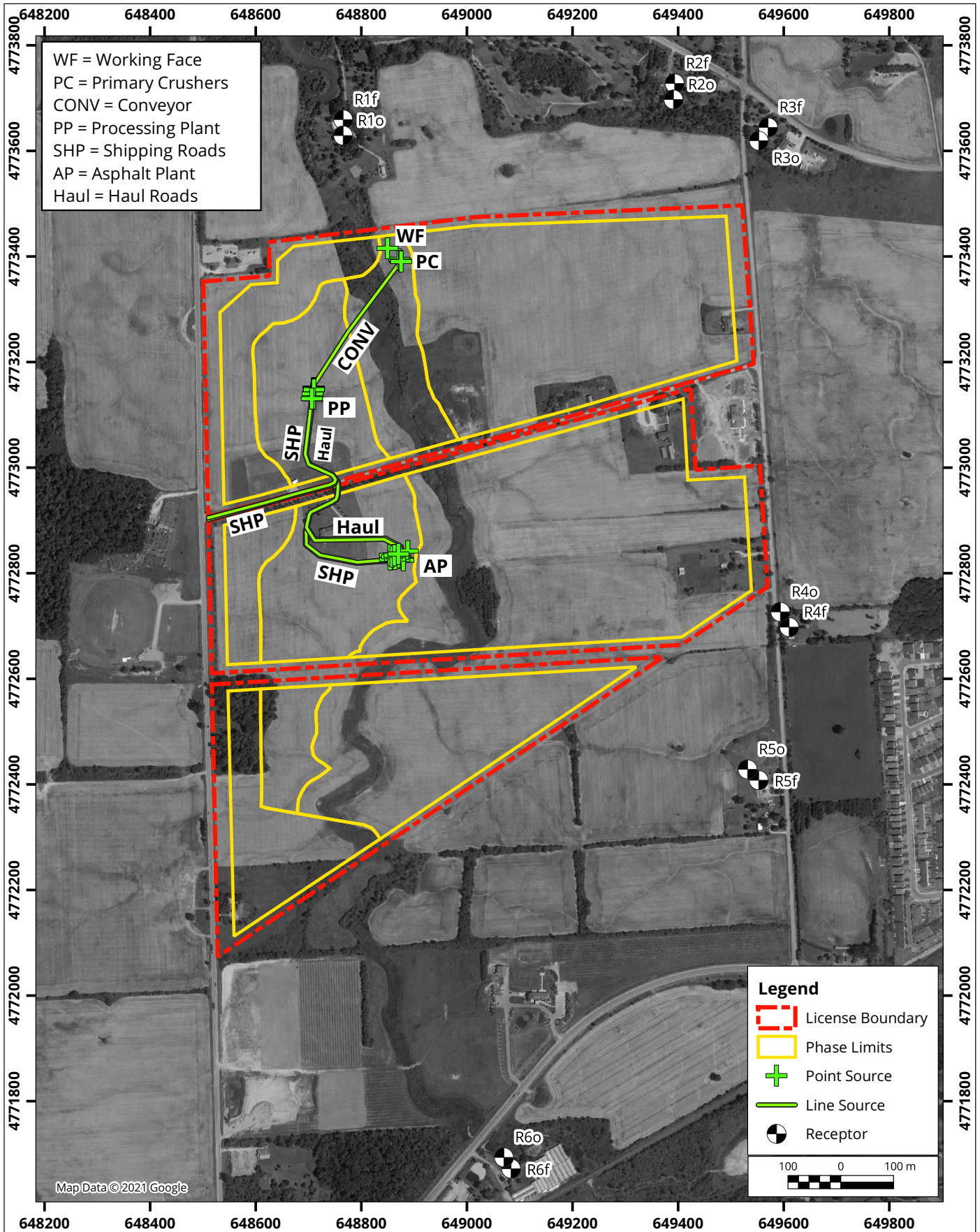
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: 2c
Approx. Scale: 1:10000	
Date Revised: Sep 22, 2021	





## Proposed Phase 3A Operation Overview

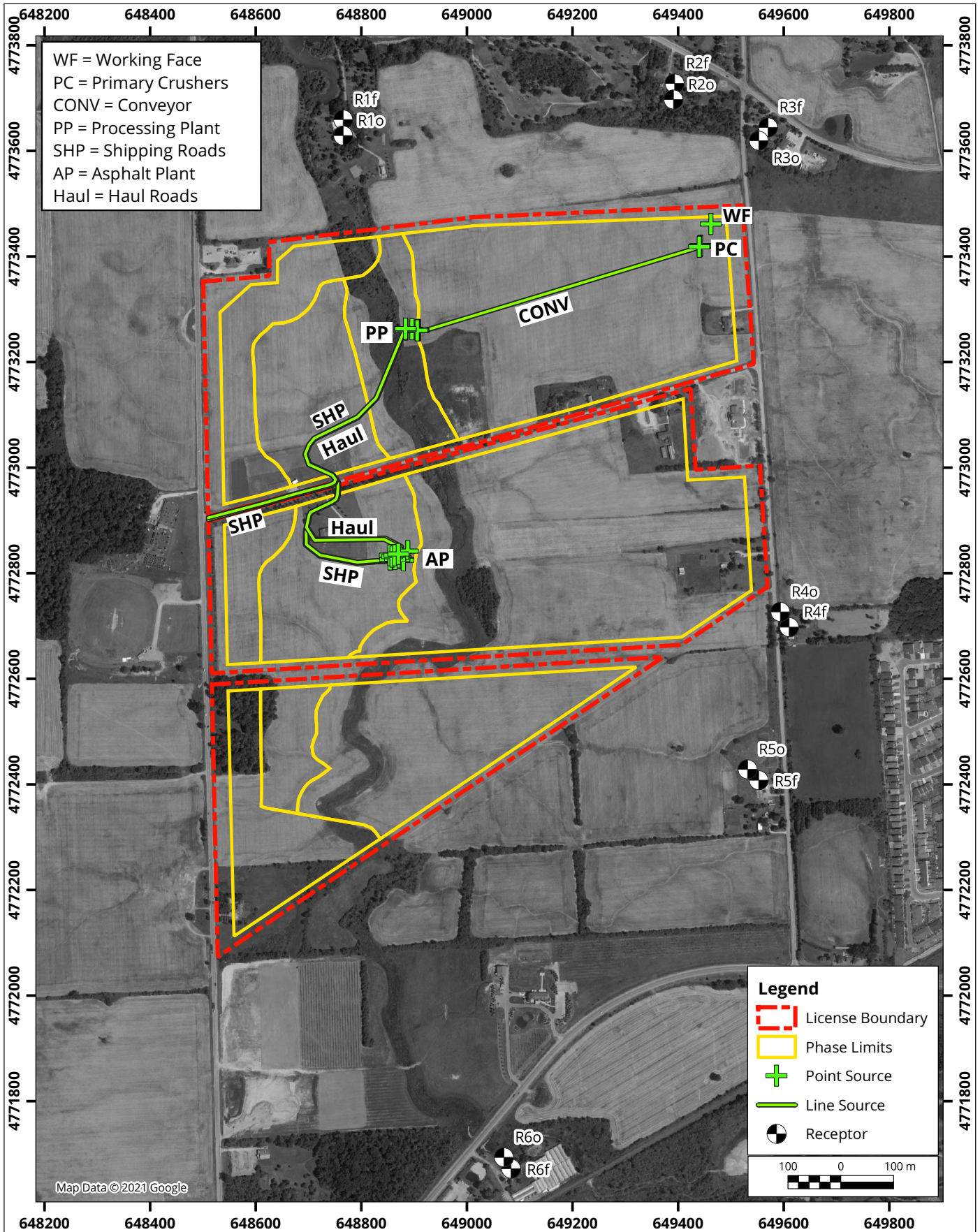
Map Projection: NAD 1983 UTM Zone 17N  
 Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: 2d
Approx. Scale: 1:10000	
Date Revised: Sep 22, 2021	





## Proposed Phase 3B Northeast Operation Overview

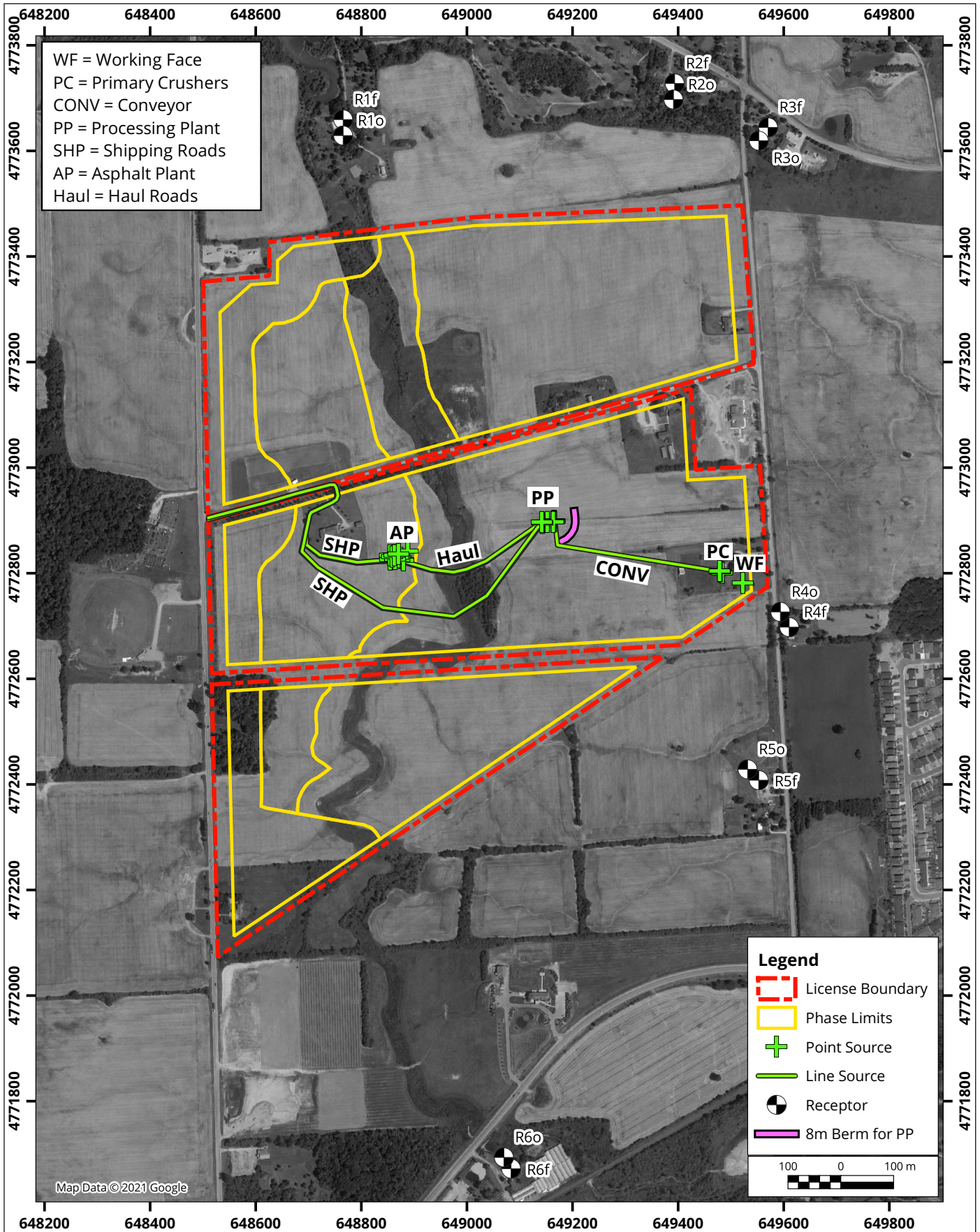
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: 2e
Approx. Scale: 1:10000	
Date Revised: Sep 22, 2021	





## Proposed Phase 4 Southeast Operation Overview

Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

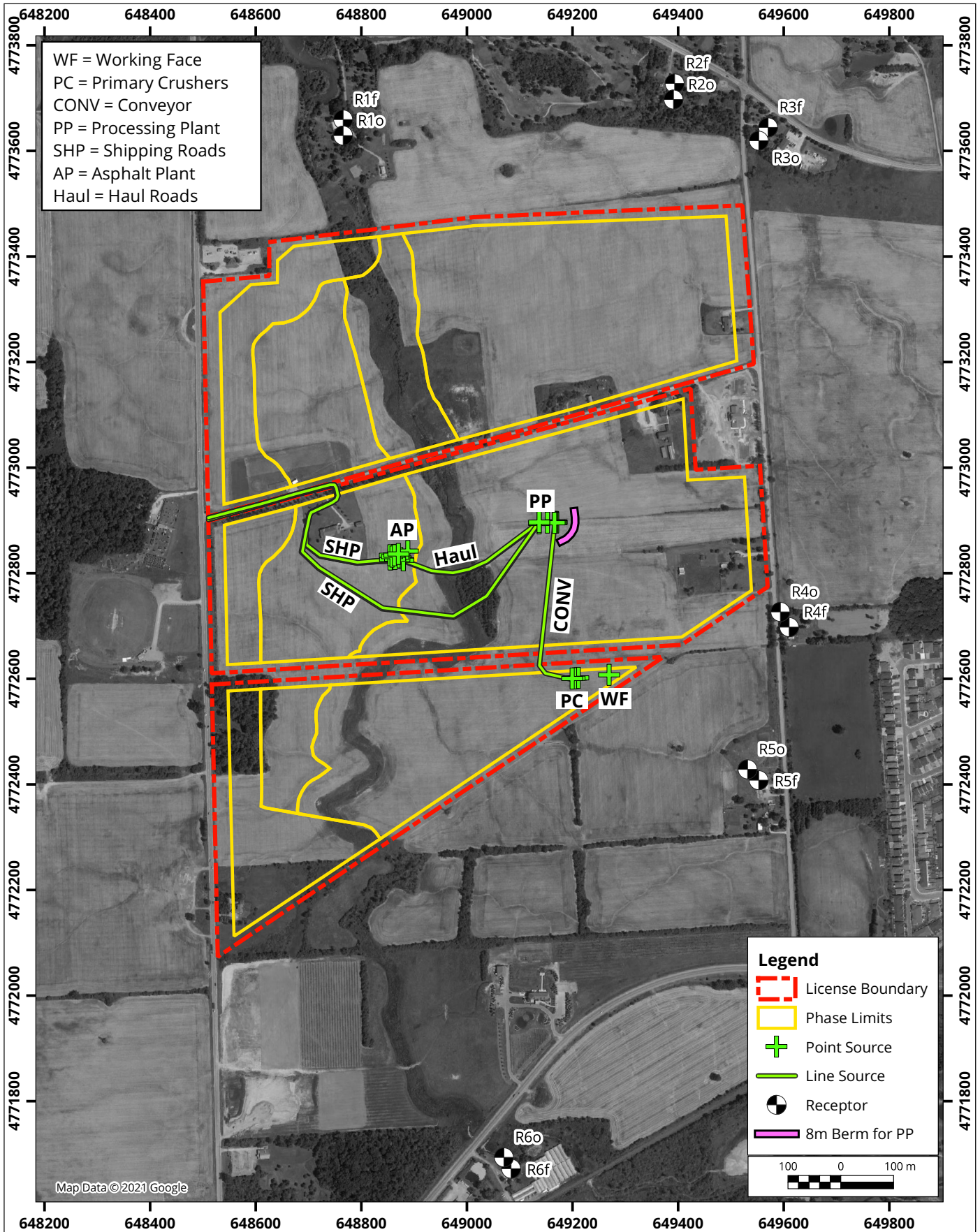
True North



Drawn by: RNL	Figure: 2f
Approx. Scale: 1:10000	
Date Revised: Sep 22, 2021	



Project #: 1603157



## Proposed Phase 5 East Operation Overview

Map Projection: NAD 1983 UTM Zone 17N  
 Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

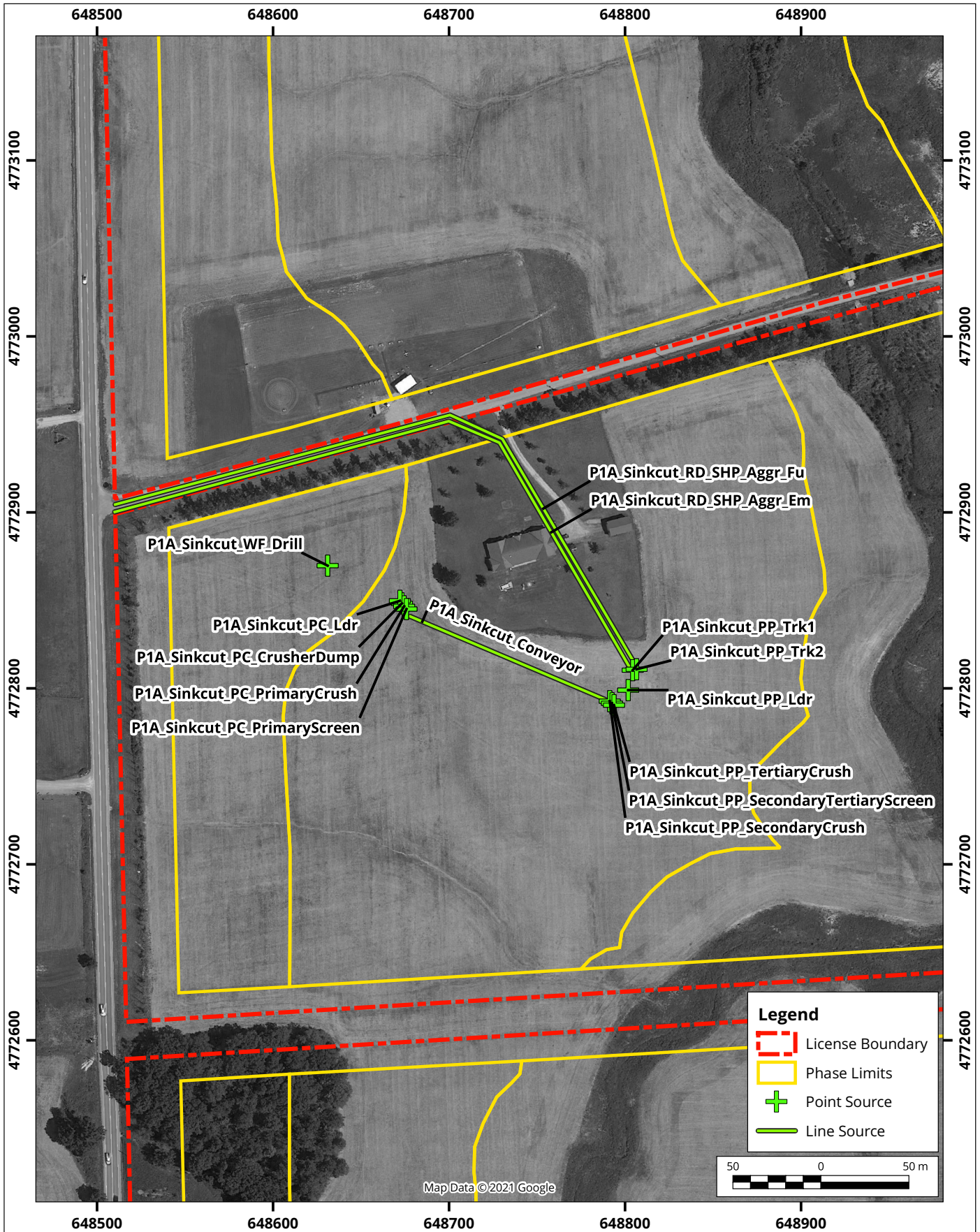


Project #: 1603157

Drawn by: RNL	Figure: 2g
Approx. Scale: 1:10000	
Date Revised: Sep 22, 2021	







## Significant Source Locations (Detailed Example) Proposed Phase 1A Sinking Cut

Map Projection: NAD 1983 UTM Zone 17N

Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

True North



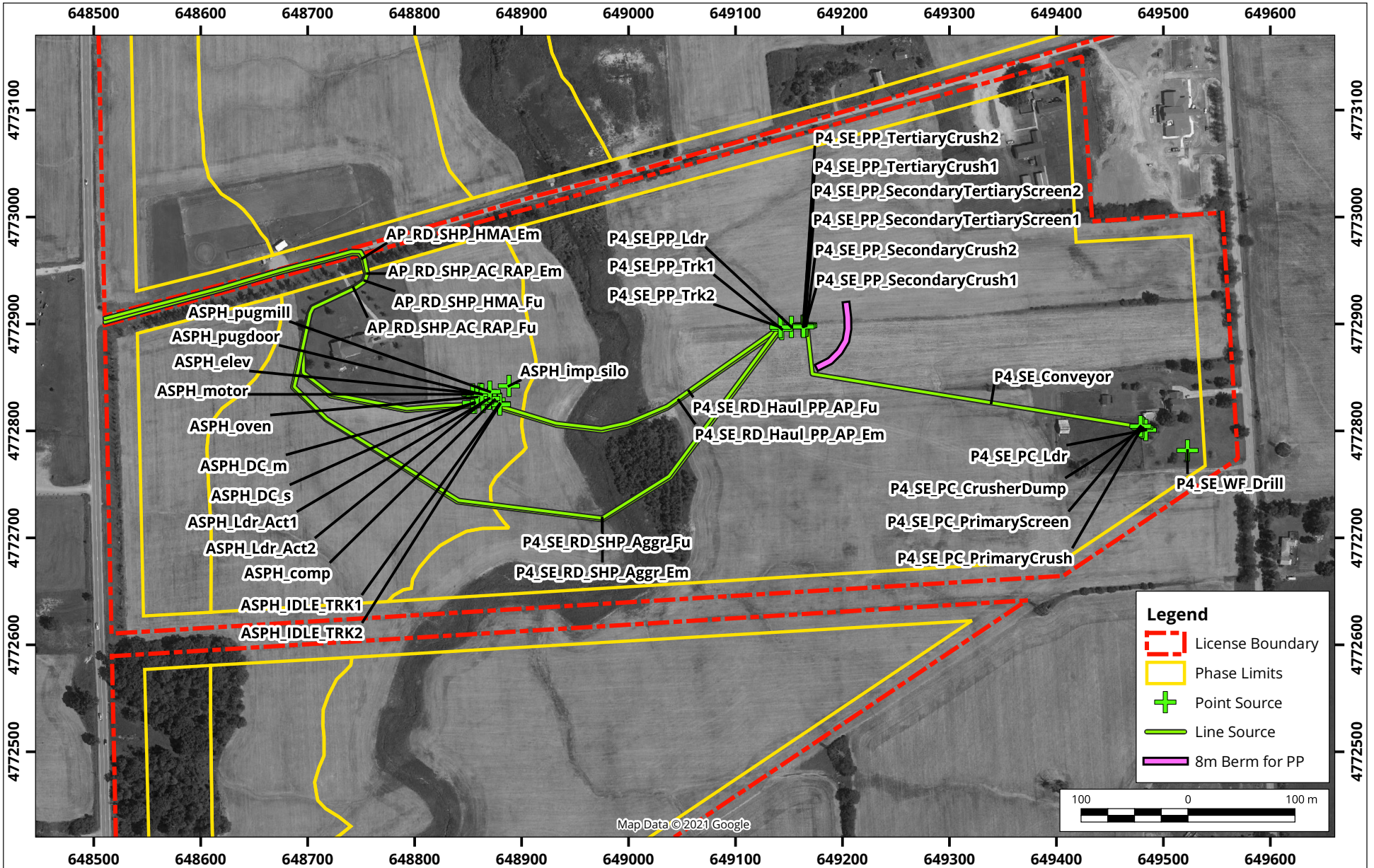
Drawn by: RNL | Figure: 2h

Approx. Scale: 1:3000

Date Revised: Sep 22, 2021

Project #: 1603157





## Significant Source Locations (Detailed Example) Proposed Phase 4 Southeast

Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

True North



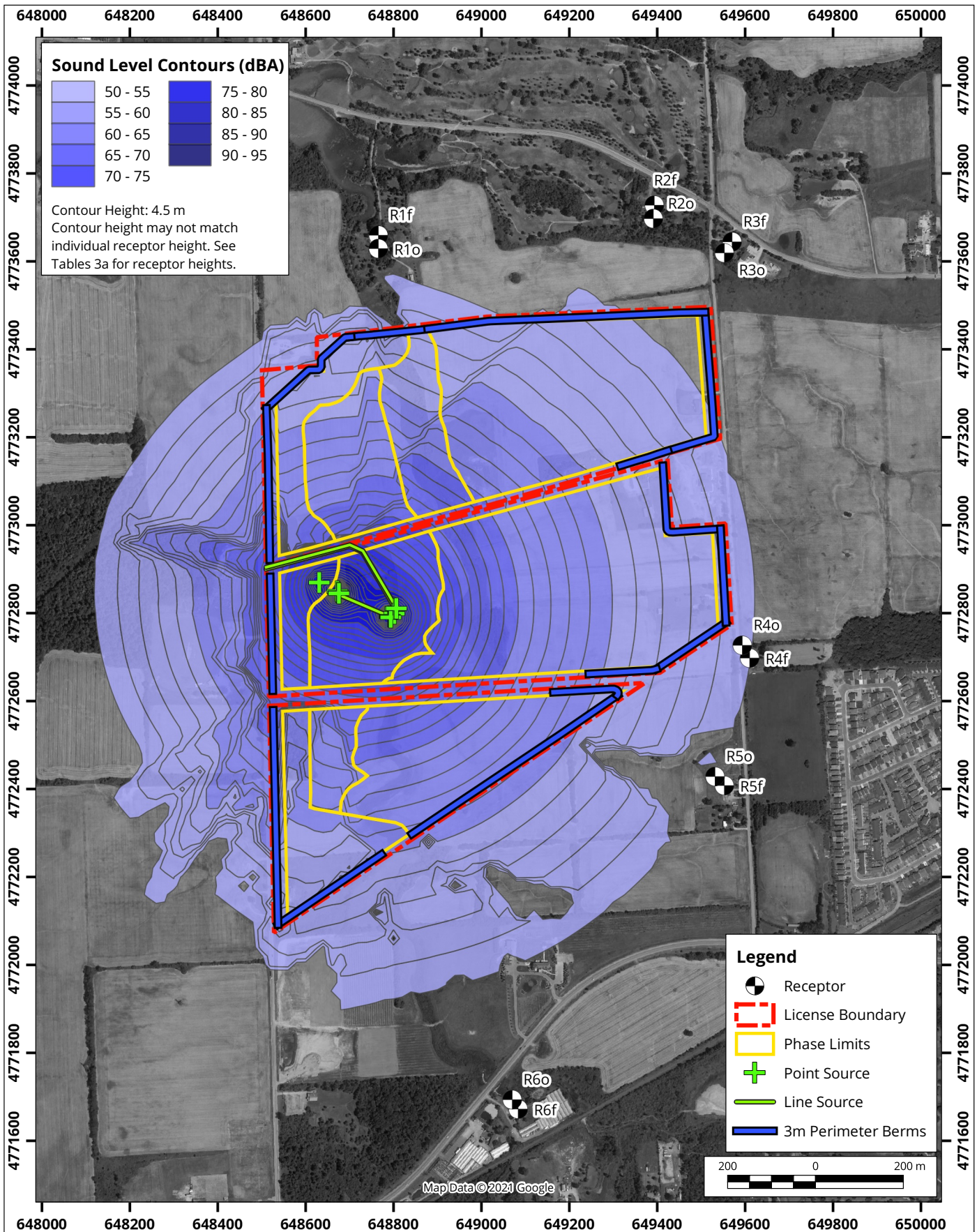
Drawn by: RNL | Figure: 2i

Approx. Scale: 1:5000

Date Revised: Sep 22, 2021

Project #: 1603157






# Sound Level Contours

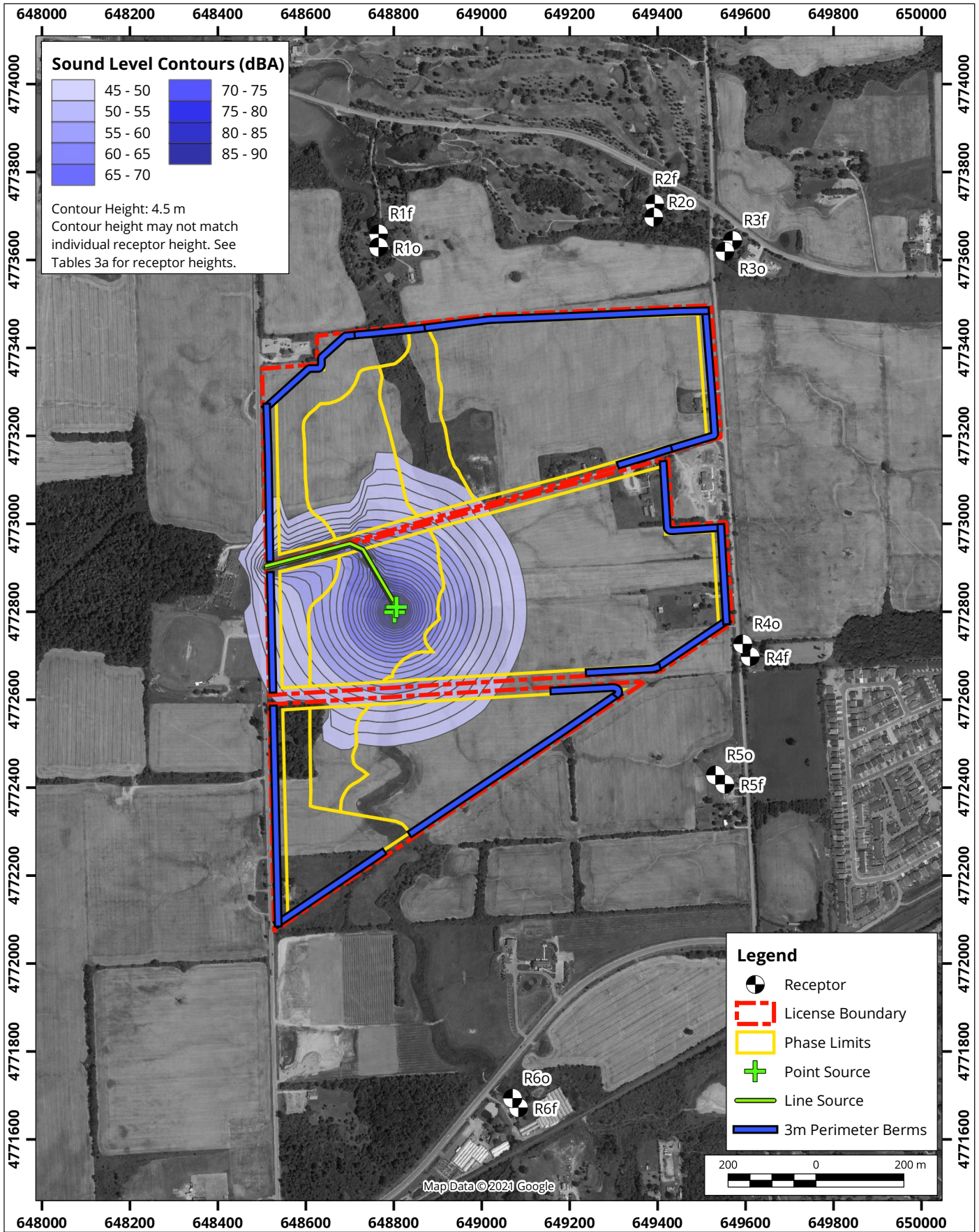
## Proposed Phase 1A Sinking Cut, Daytime

Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

True North  
  
 Project #: 1603157

Drawn by: RNL	Figure: 3a
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





# Sound Level Contours

## Proposed Phase 1A Sinking Cut, Evening/Nighttime

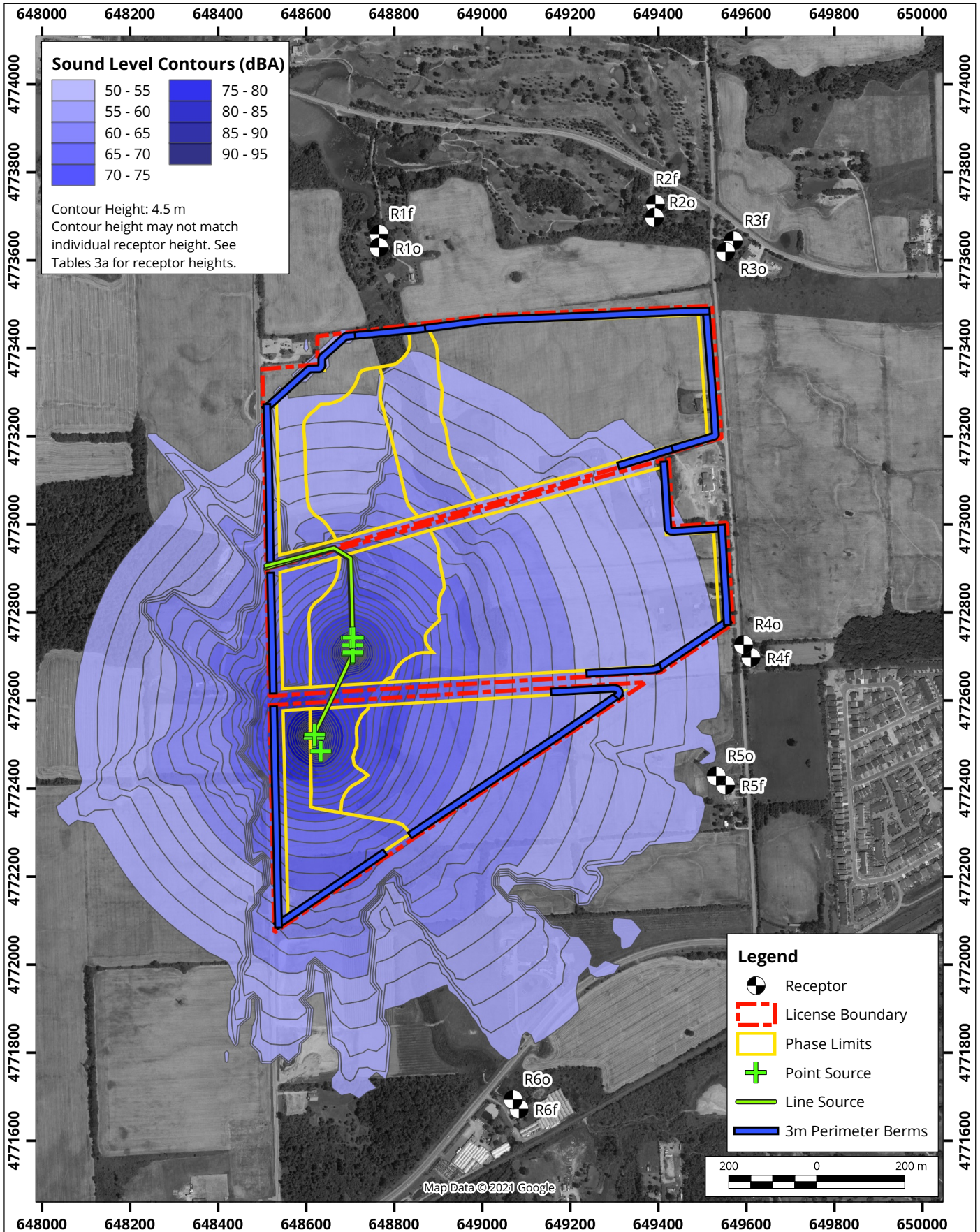


Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157

Drawn by: RNL	Figure: 3b
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	






# Sound Level Contours

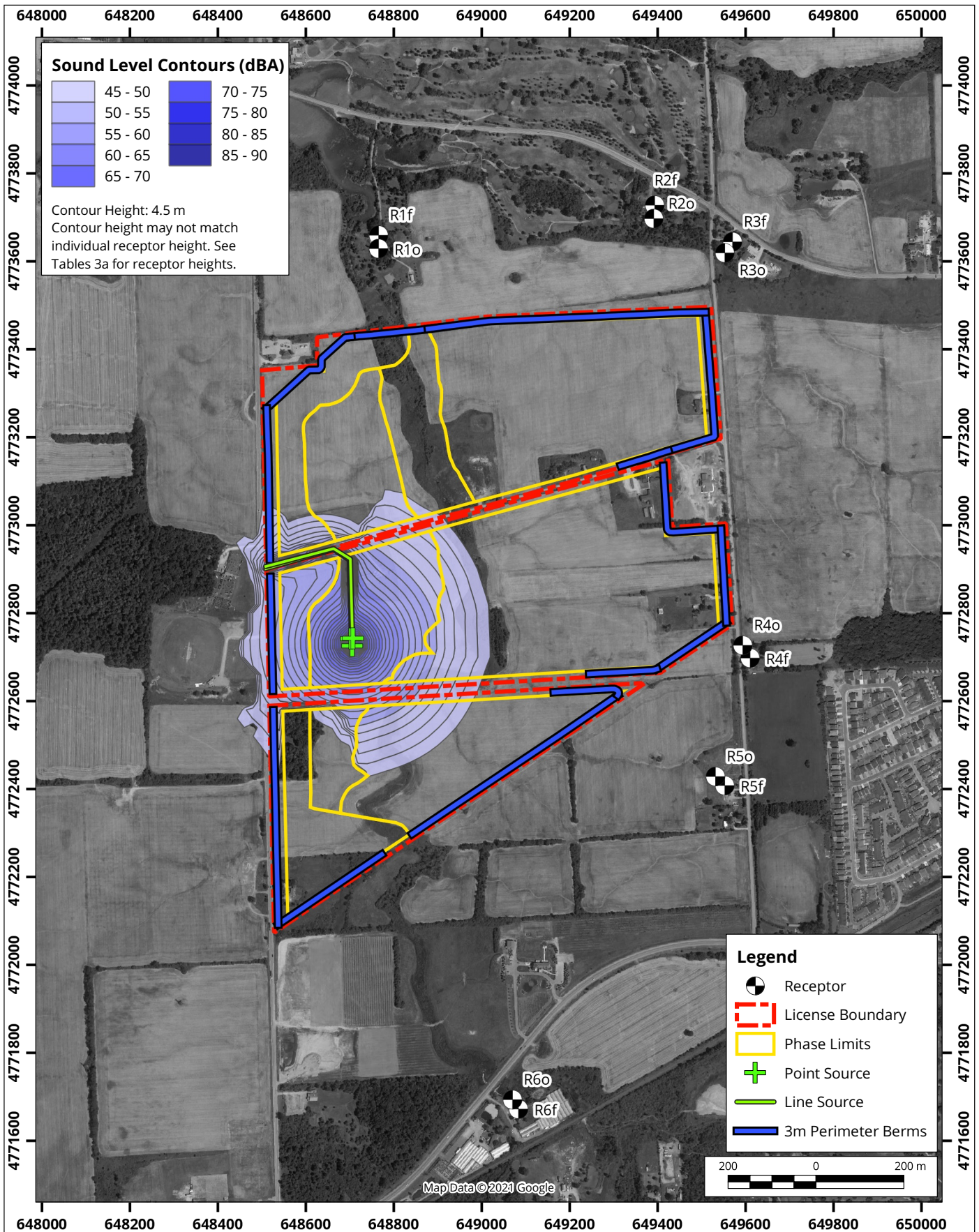
## Proposed Phase 1A South Sinking Cut, Daytime

Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

True North  
  
 Project #: 1603157

Drawn by: RNL	Figure: 3c
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





**Sound Level Contours**  
**Proposed Phase 1A South Sinking Cut, Evening/Nighttime**

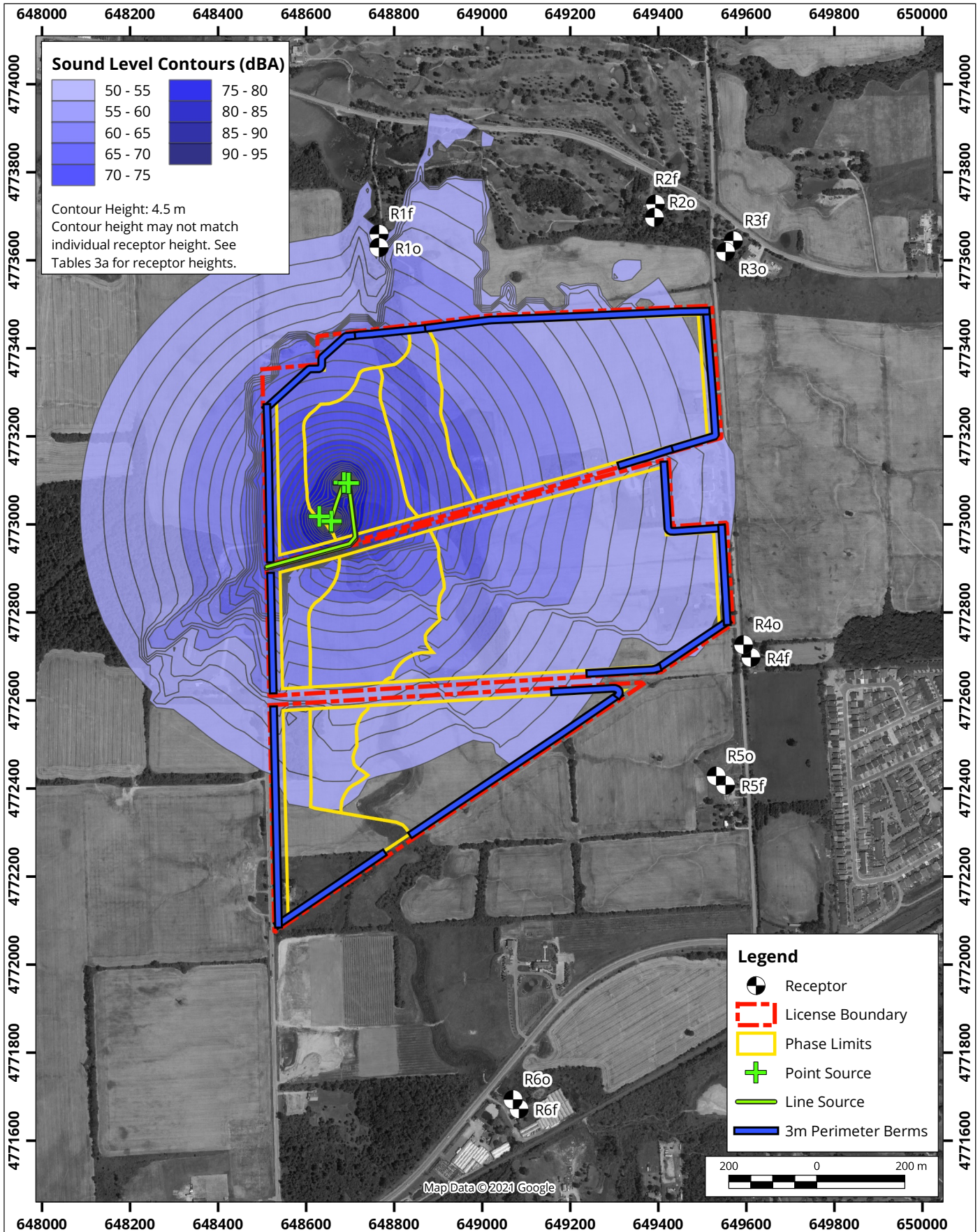


Drawn by: RNL	Figure: 3d
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	

Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157





# Sound Level Contours Proposed Phase 2A Sinking Cut, Daytime

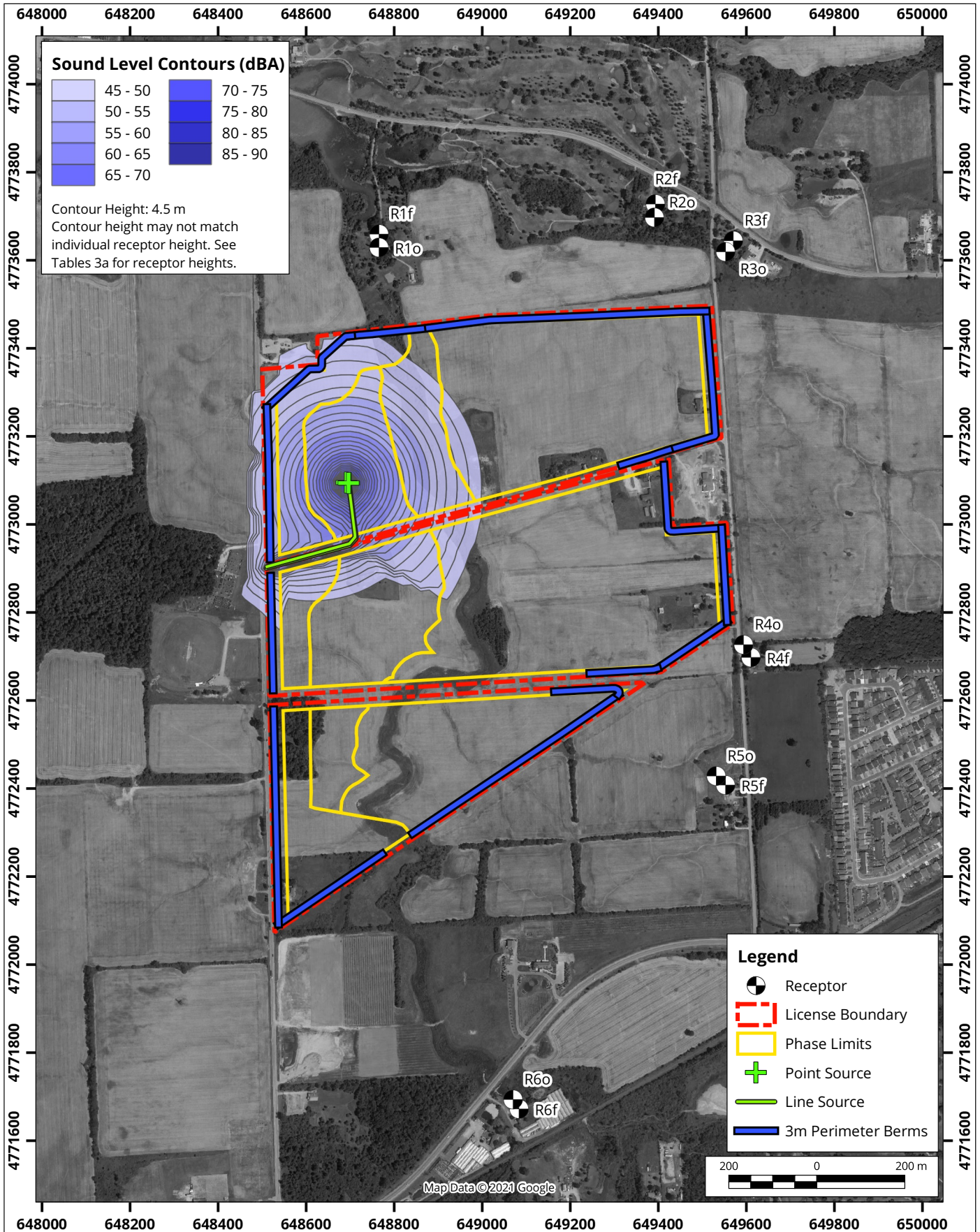
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: 3e
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





# Sound Level Contours

## Proposed Phase 2A Sinking Cut, Evening/Nighttime



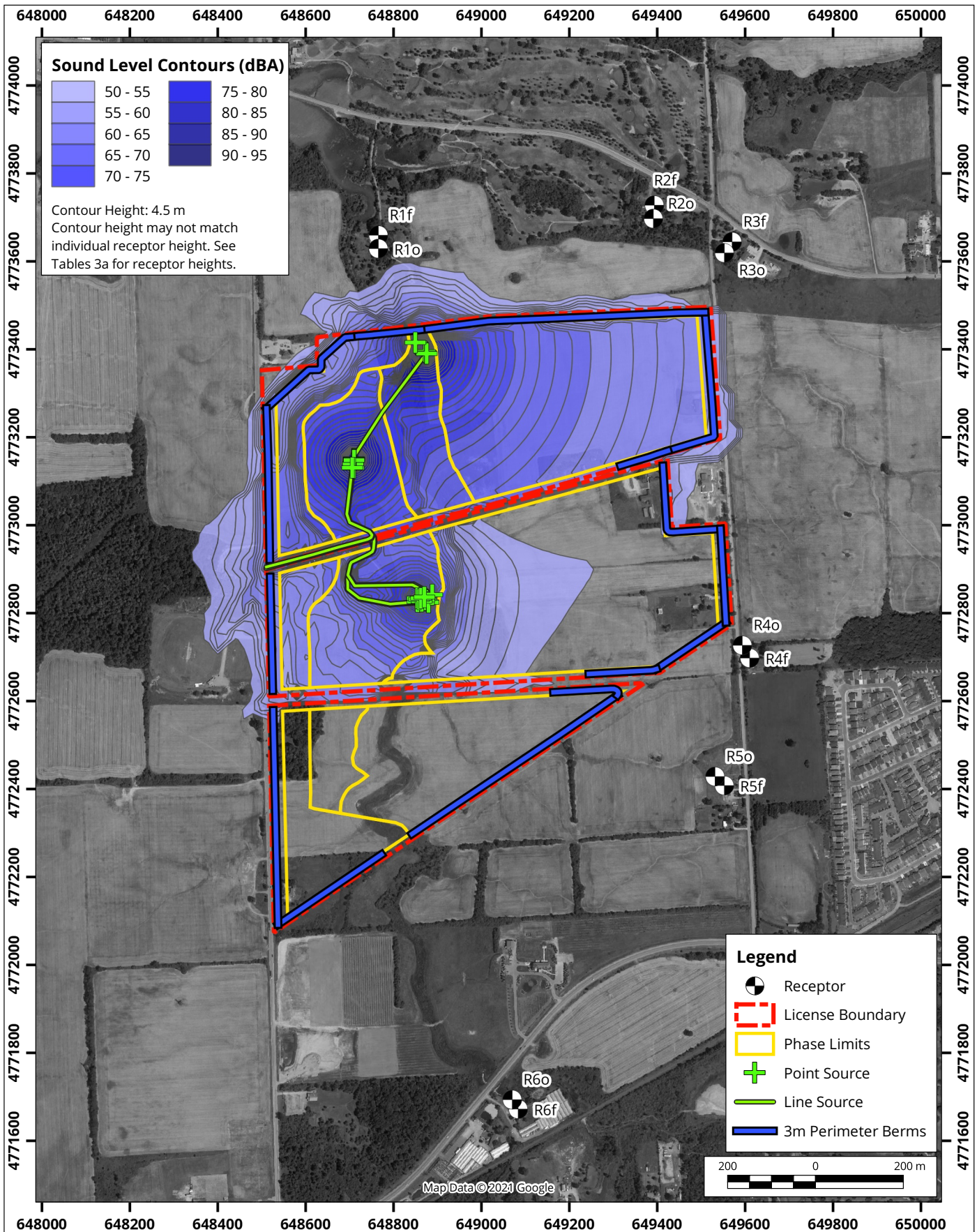
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157

Drawn by: RNL	Figure: 3f
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	








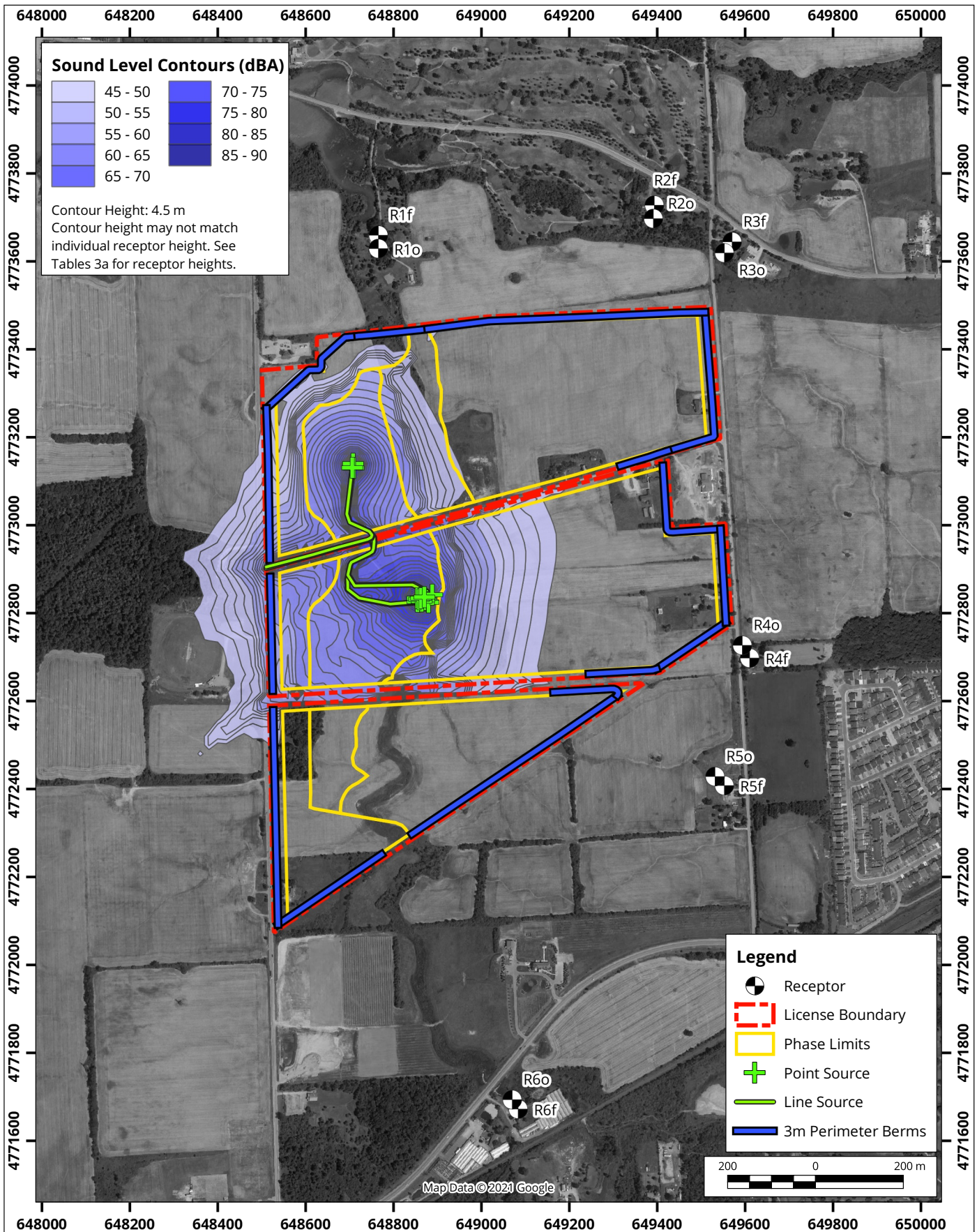
# Sound Level Contours Proposed Phase 3A, Daytime

Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

True North  
  
 Project #: 1603157

Drawn by: RNL	Figure: 3g
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





# Sound Level Contours Proposed Phase 3A, Evening/Nighttime

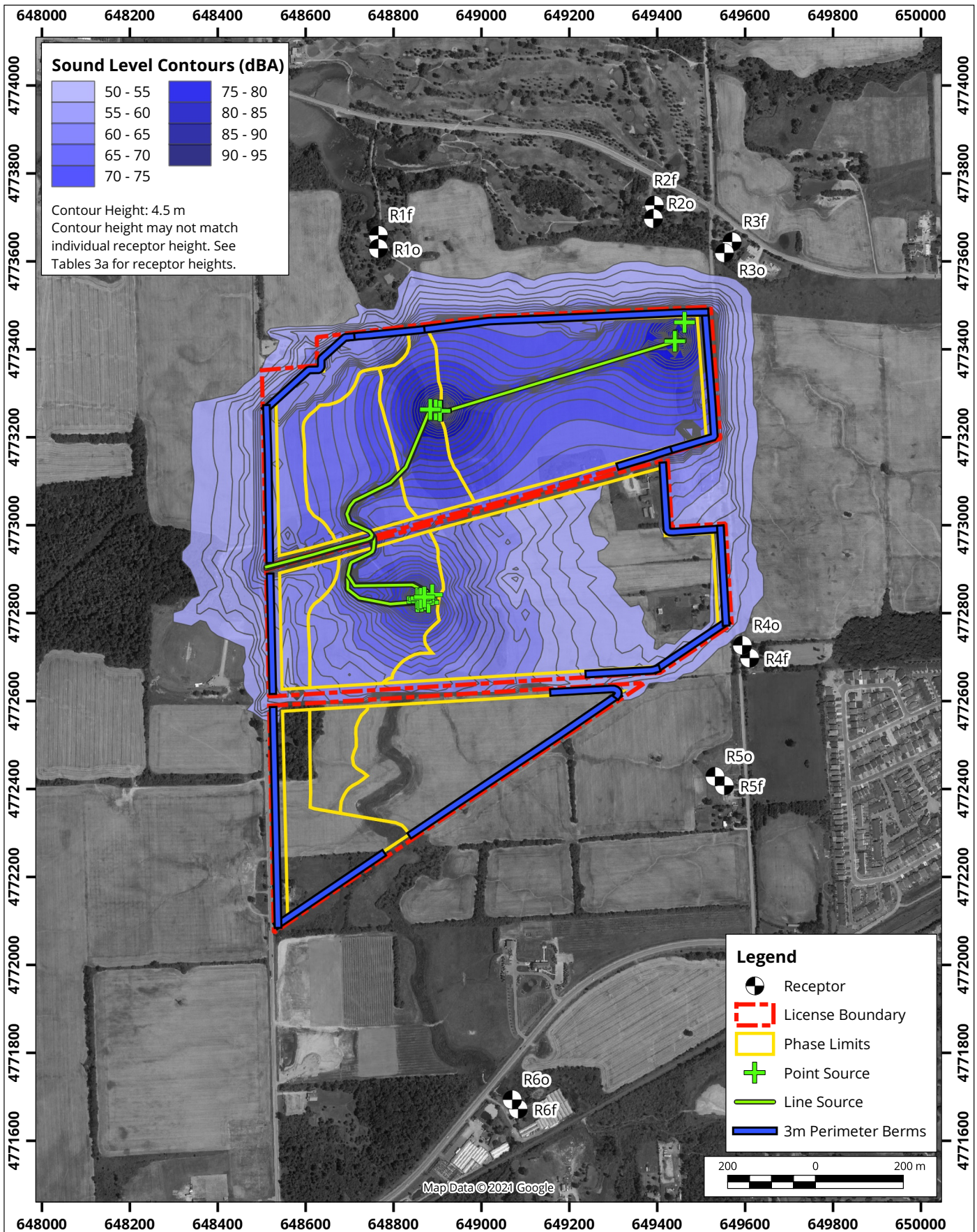
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: 3h
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





## Sound Level Contours Proposed Phase 3B Northeast, Daytime

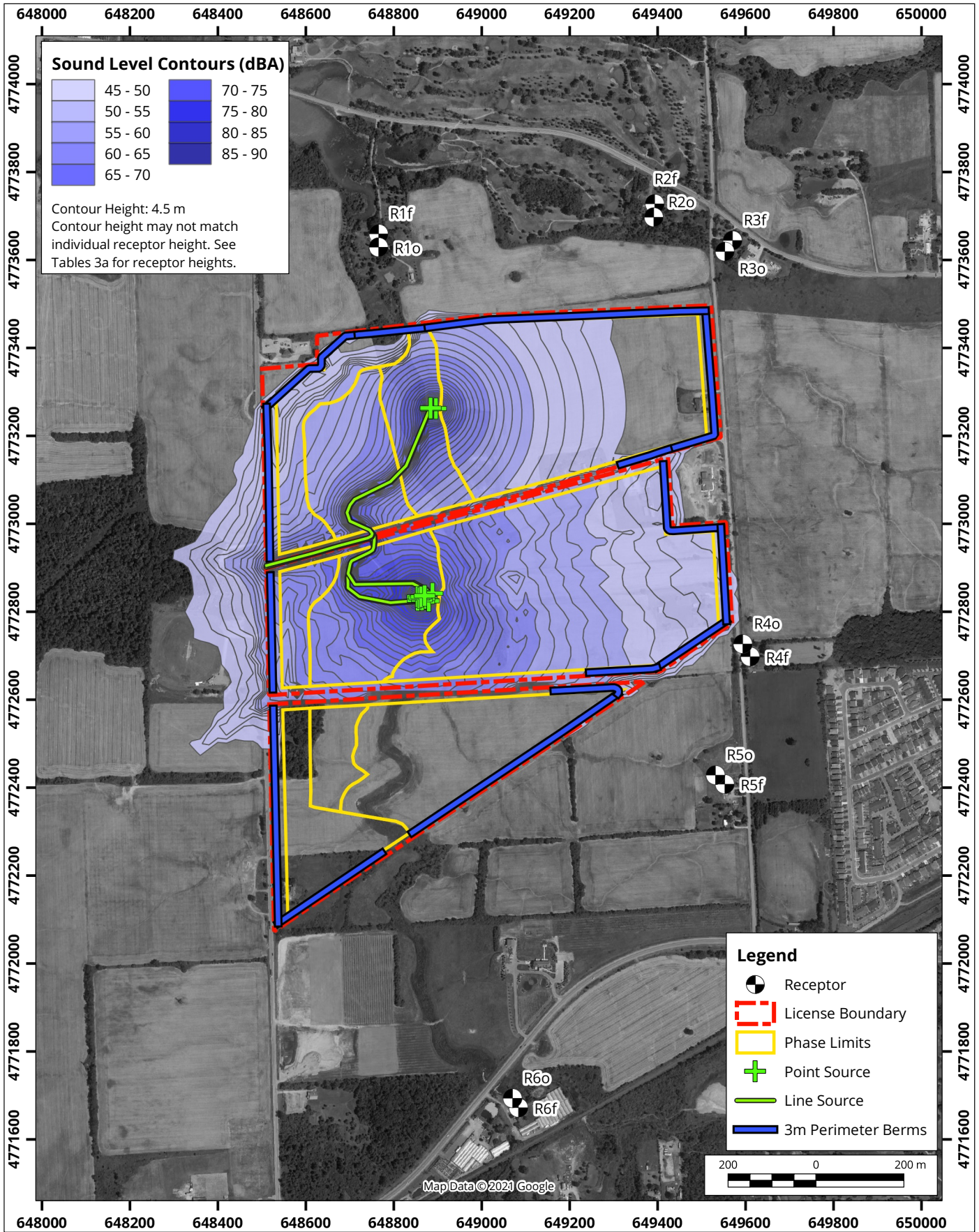
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: 3i
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





# Sound Level Contours

## Proposed Phase 3B Northeast, Evening/Nighttime

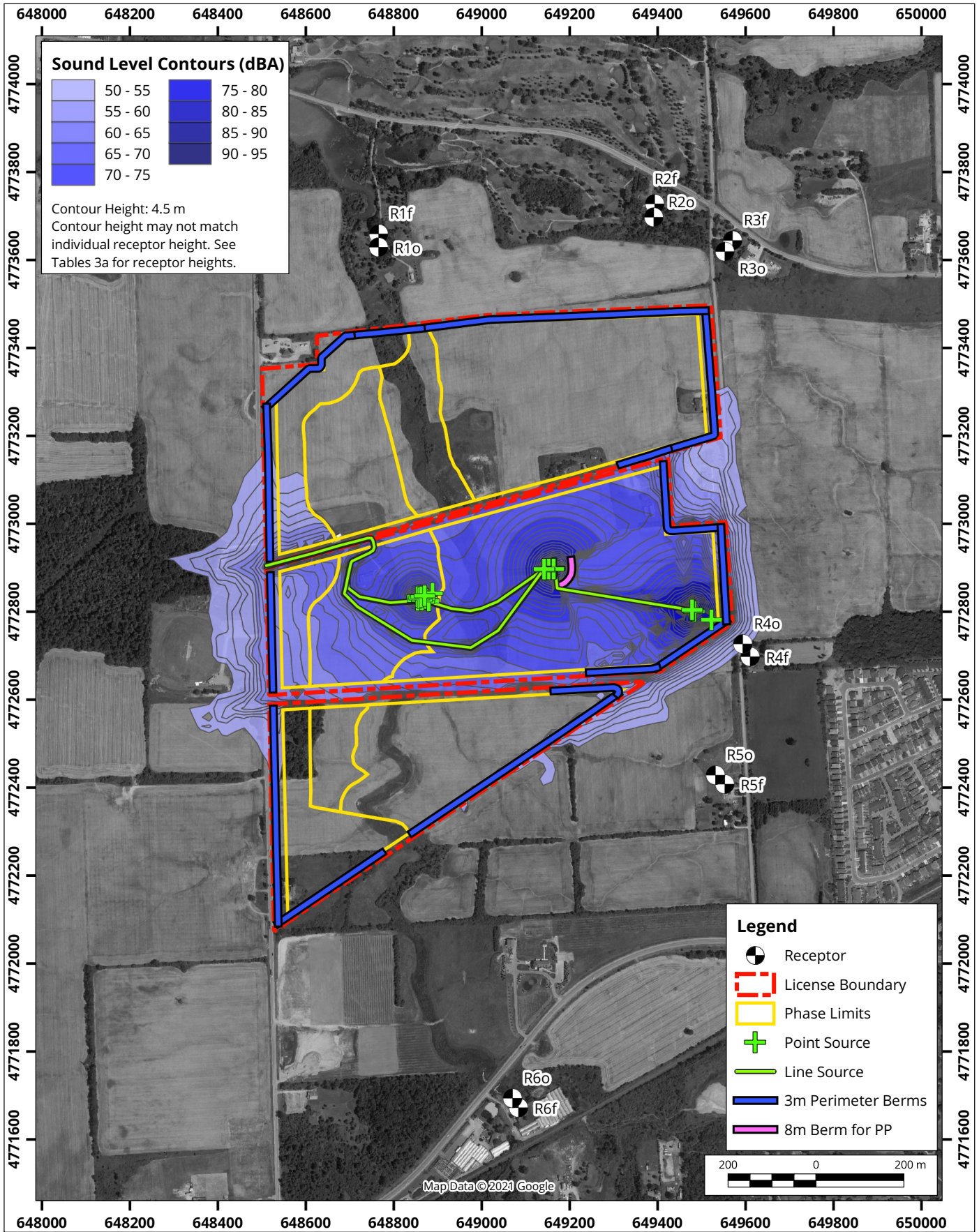


Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157

Drawn by: RNL	Figure: 3j
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





# Sound Level Contours Proposed Phase 4 Southeast, Daytime

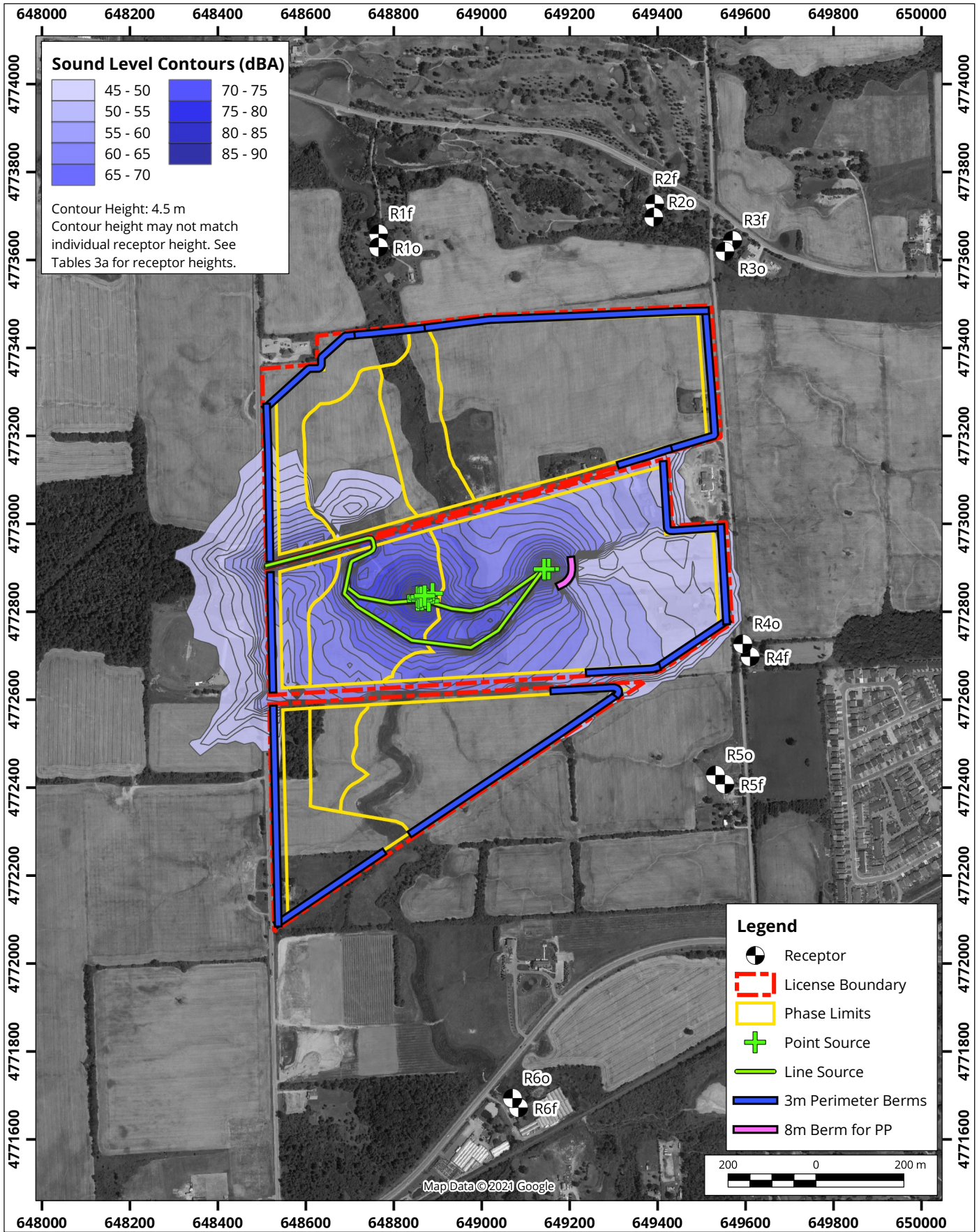
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: 3k
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





# Sound Level Contours Proposed Phase 4 Southeast, Evening/Nighttime

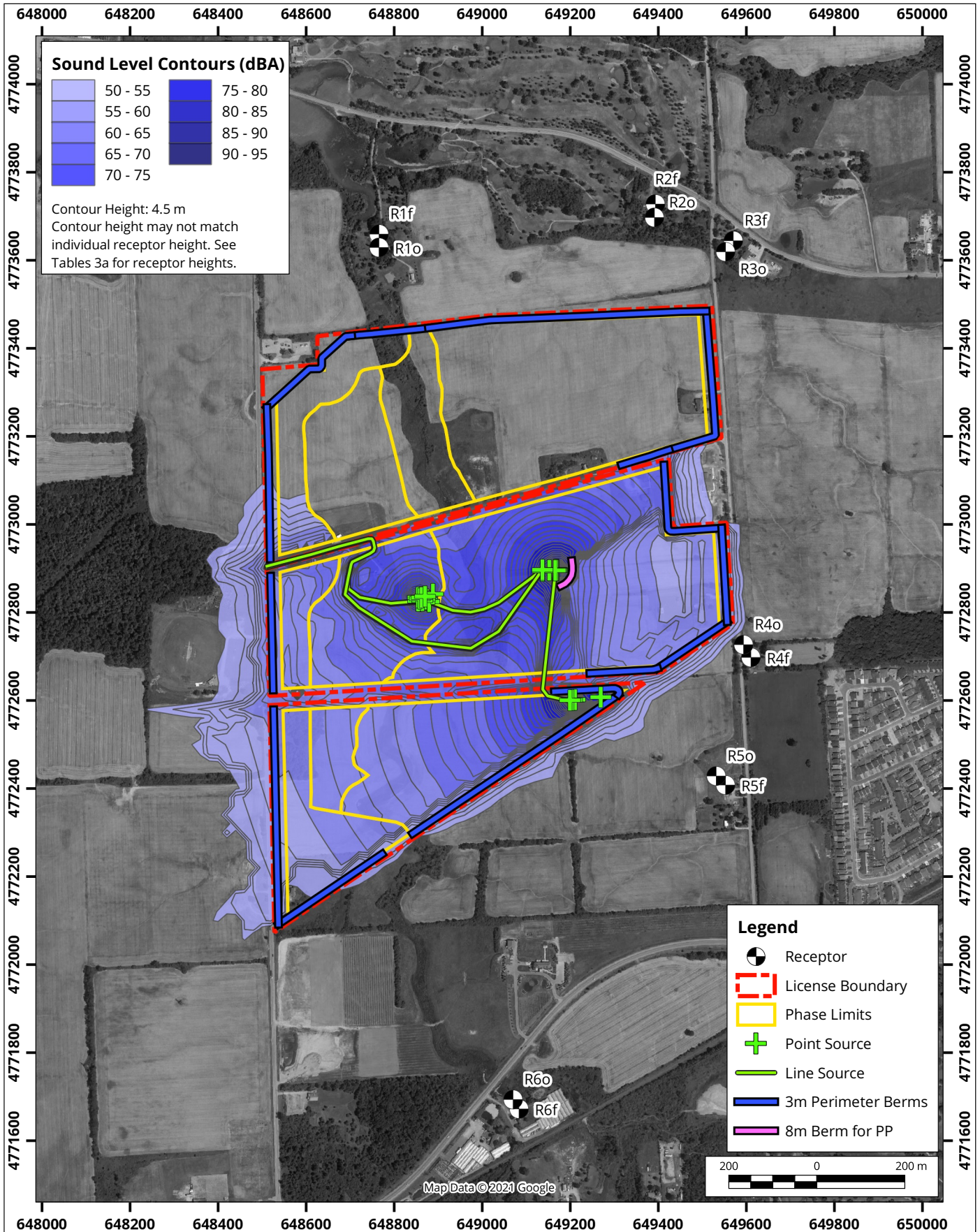


Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157

Drawn by: RNL	Figure: 3I
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





## Sound Level Contours Proposed Phase 5 East, Daytime

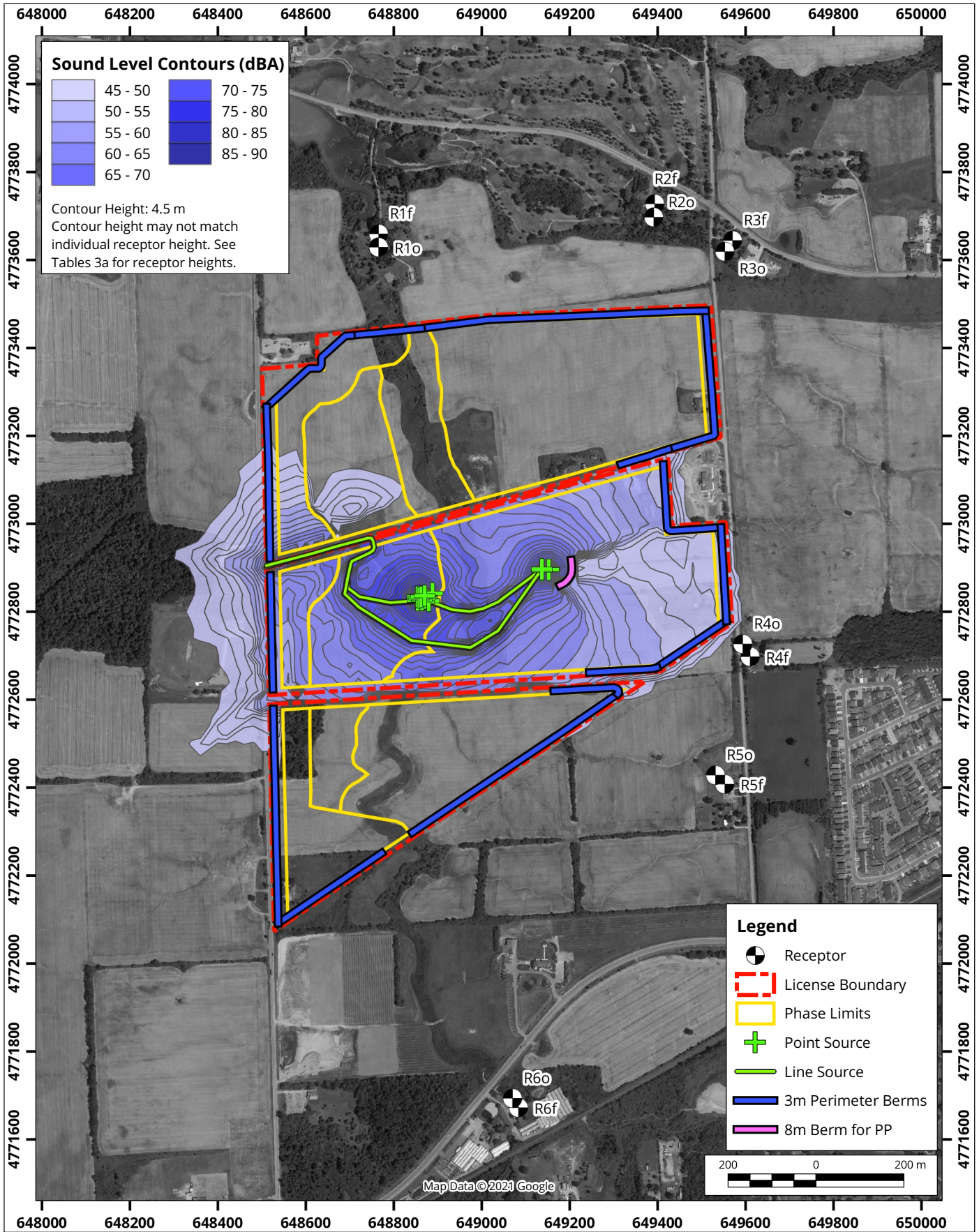
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: 3m
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	






# Sound Level Contours

## Proposed Phase 5 East, Evening/Nighttime

Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

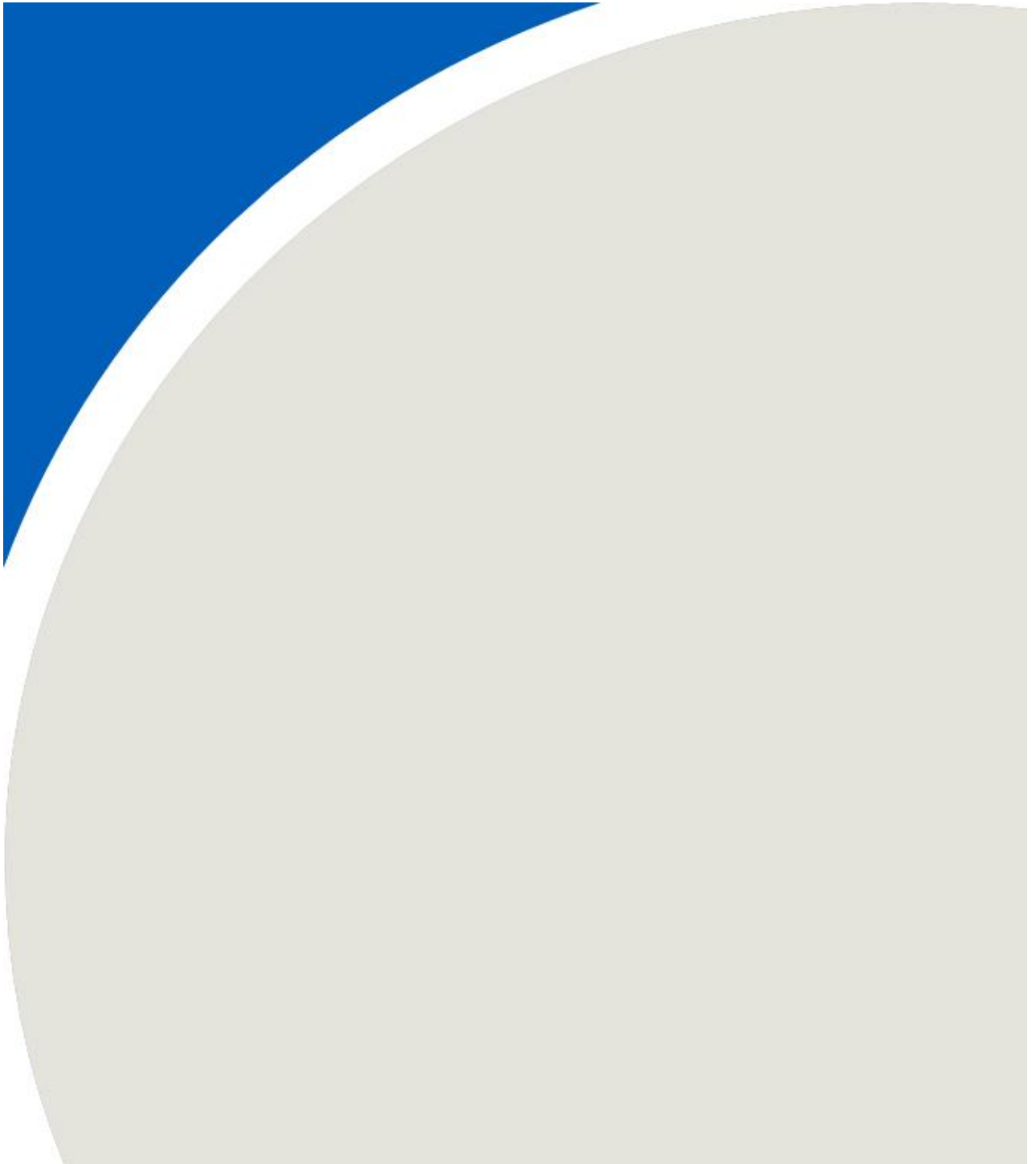
True North  
  
 Project #: 1603157

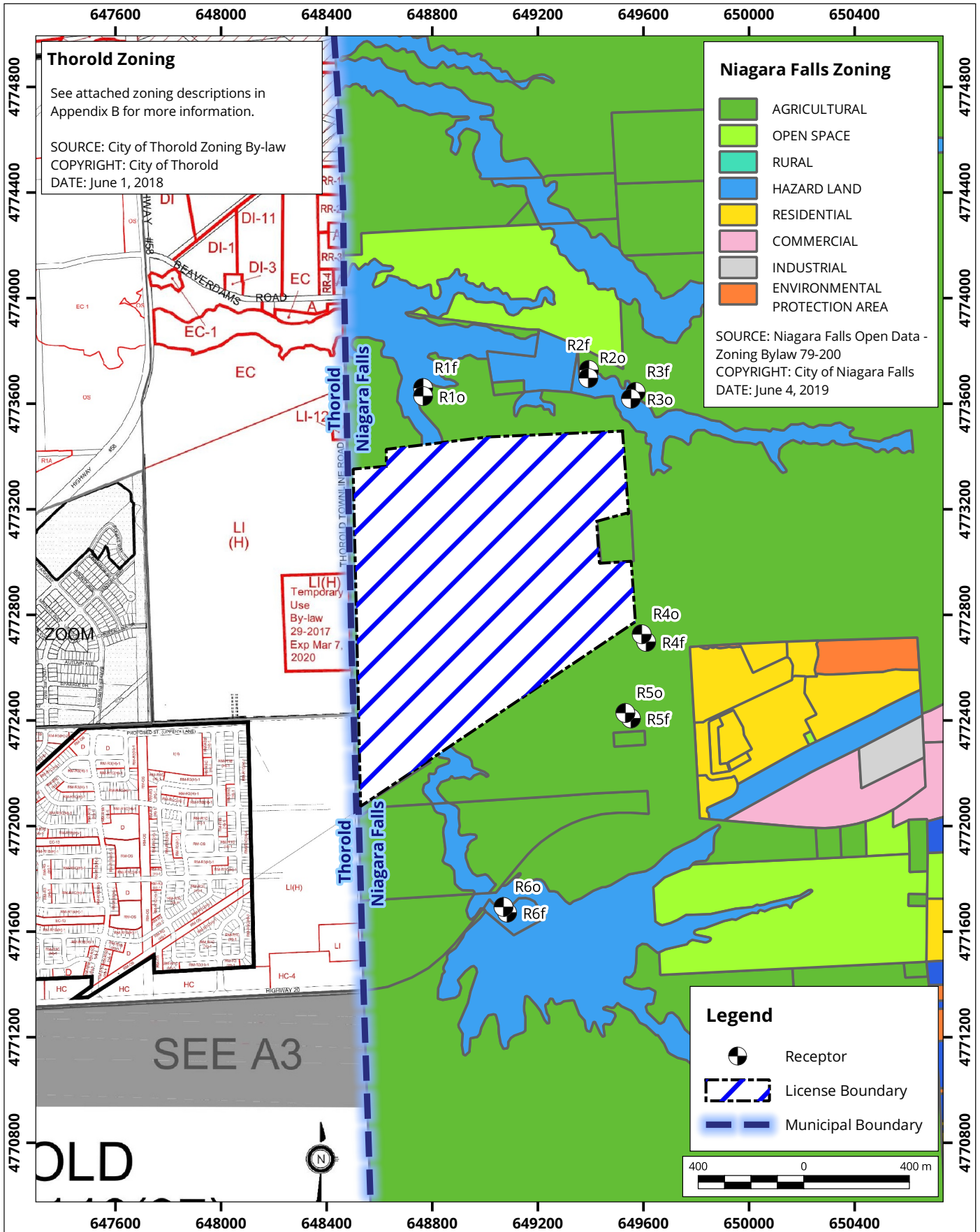
Drawn by: RNL	Figure: 3n
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





# APPENDIX A





**Thorold Zoning**  
 See attached zoning descriptions in Appendix B for more information.  
 SOURCE: City of Thorold Zoning By-law  
 COPYRIGHT: City of Thorold  
 DATE: June 1, 2018

**Niagara Falls Zoning**

- AGRICULTURAL
- OPEN SPACE
- RURAL
- HAZARD LAND
- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- ENVIRONMENTAL PROTECTION AREA

SOURCE: Niagara Falls Open Data - Zoning Bylaw 79-200  
 COPYRIGHT: City of Niagara Falls  
 DATE: June 4, 2019

**Legend**

- Receptor
- License Boundary
- Municipal Boundary

400 0 400 m

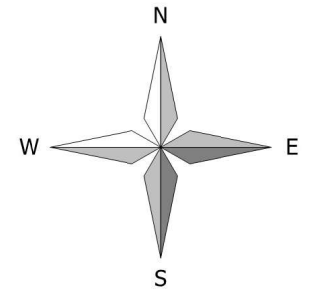
# ZONING BY-LAW 79-200



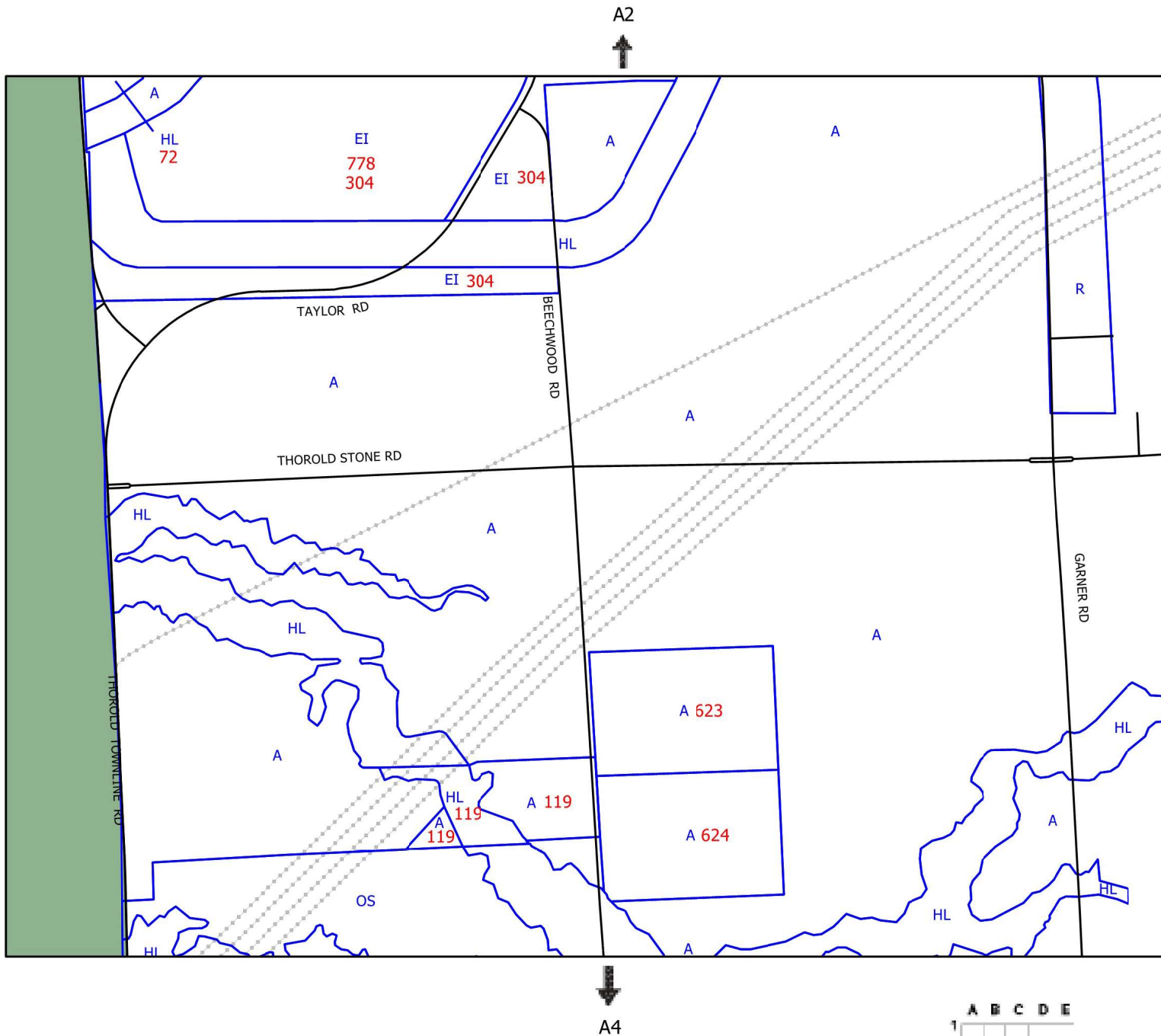
 ZONE LINES

EXCEPTIONS & SPECIAL PROVISION NO.  
SEE SECTION 19

- 81-181
- 85-77
- 92-289
- 03-116
- 07-91



CONSOLIDATION  
MAY 2018



CITY OF NIAGARA FALLS  
Planning & Development Department



Scale 1:13 000

	A	B	C	D	E
1					
2					
3					
4					
5					F
6					
7					
8					

# ZONING BY-LAW 79-200

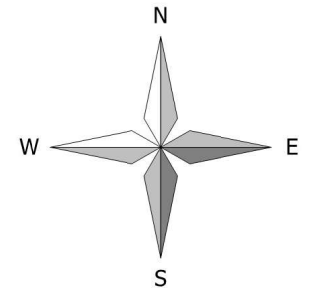


**—** ZONE LINES

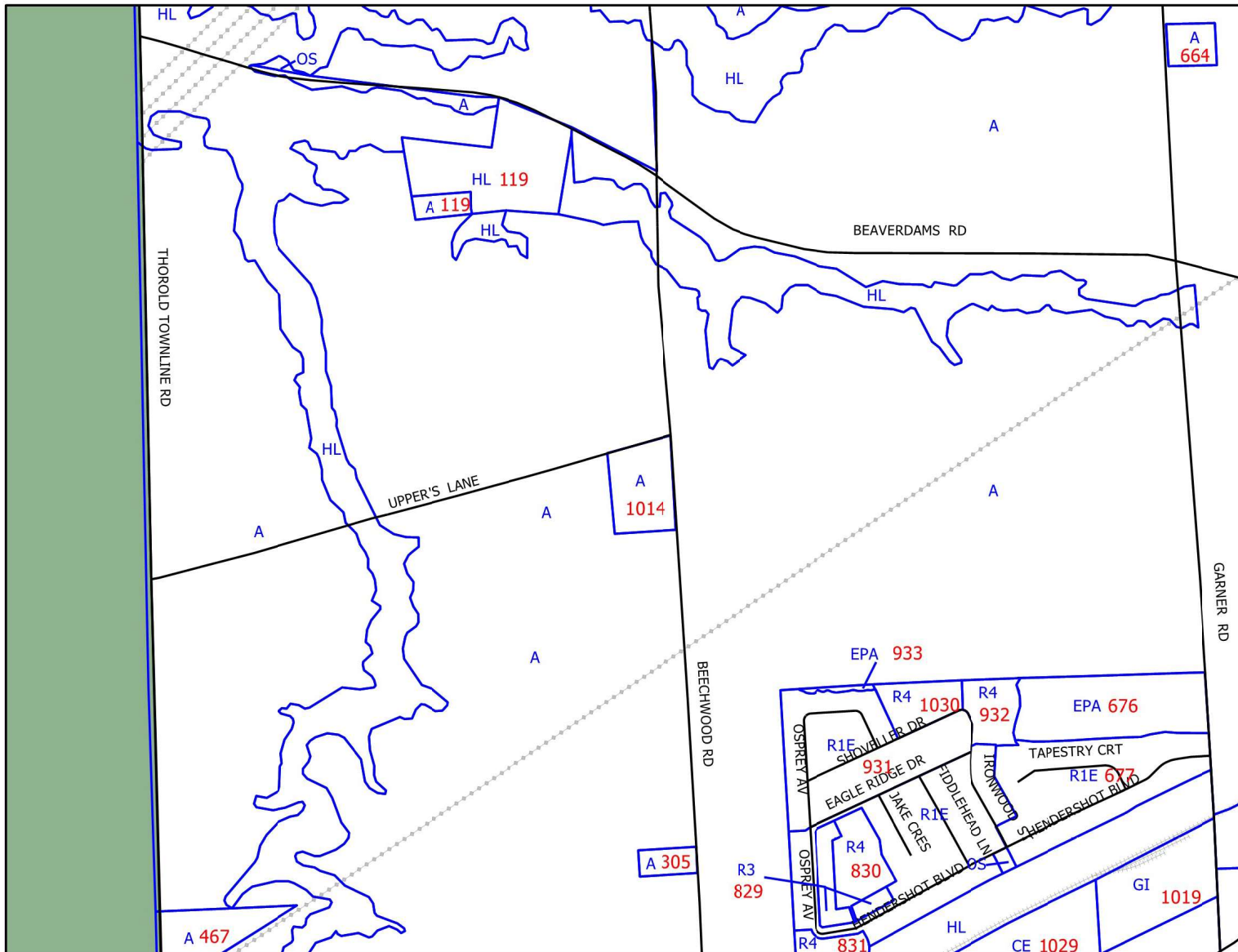
EXCEPTIONS & SPECIAL PROVISION NO.  
SEE SECTION 19

- 99-48 15-124
- 04-133 16-028
- 04-157 16-095
- 08-099 16-096
- 11-004

→ B4



CONSOLIDATION  
OCTOBER 2018

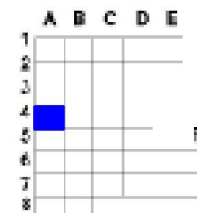


↓  
A5

CITY OF NIAGARA FALLS  
Planning & Development Department

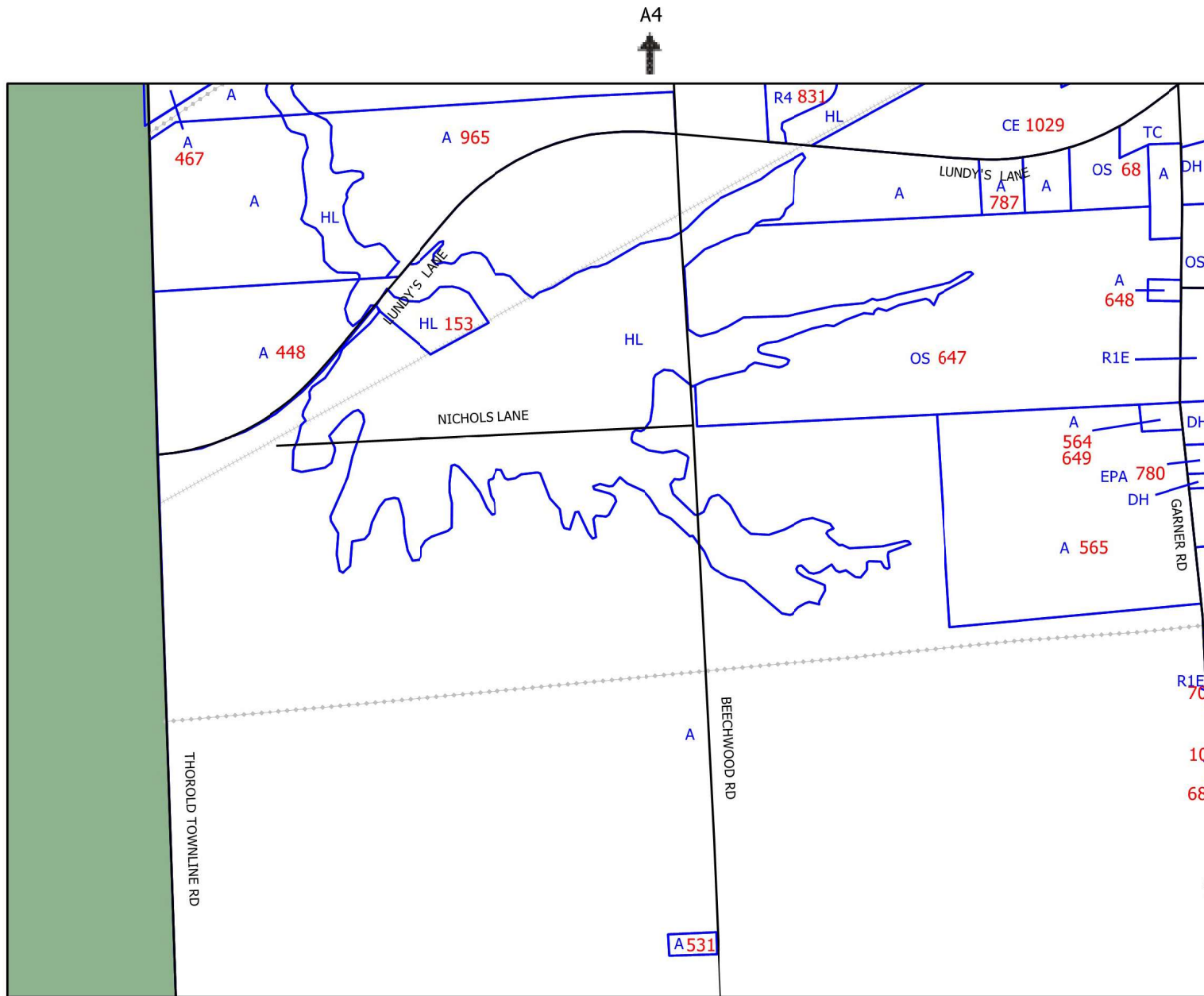


Scale 1:13 000



# SHEET A4

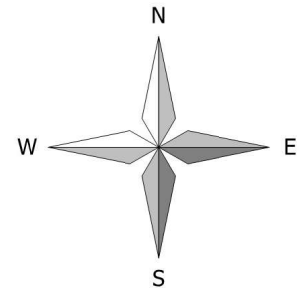
# ZONING BY-LAW 79-200



ZONE LINES

EXCEPTIONS & SPECIAL PROVISION NO.  
SEE SECTION 19

95-116	05-084	12-068
99-048	04-157	16-095
98-244	07-090	
04-046	07-130	
04-090	08-099	



CONSOLIDATION  
OCTOBER 2018

CITY OF NIAGARA FALLS  
Planning & Development Department



Scale 1:13 000



# SHEET A5

### SECTION 3 - ZONES

3.1 CLASSIFICATION OF ZONES: For the purpose of this By-law, the following defined areas of the City of Niagara Falls, namely:

- (a) all of the former Village of Chippawa, and
- (b) all of the remaining part of the City of Niagara Falls lying north of the middle of the main channel of the Welland River are hereby divided into the following zones, which are hereby established and the lands included in each zone are shown on the Zoning Maps appended hereto as Schedule "A".

<b>ZONES</b>	<b>SHORT TITLES</b>
Residential 1A Density Zone	<b>R1A</b>
Residential 1B Density Zone	<b>R1B</b>
Residential 1C Density Zone	<b>R1C</b>
Residential 1D Density Zone	<b>R1D</b>
Residential 1E Density Zone	<b>R1E</b>
Residential 1F Density Zone	<b>R1F</b>
Residential Mobile Home Park Zone	<b>RMP</b>
Residential and Two Zone	<b>R2</b>
Residential Mixed Zone	<b>R3</b>
Residential Low Density, Group Multiple Dwelling Zone	<b>R4</b>
Residential Apartment 5A Density Zone	<b>R5A</b>
Residential Apartment 5B Density Zone	<b>R5B</b>
Residential Apartment 5C Density Zone	<b>R5C</b>
Residential Apartment 5D Density Zone	<b>R5D</b>
Residential Apartment 5E Density Zone	<b>R5E</b>
Residential Apartment 5F Density Zone	<b>R5F</b>
Transition Residential Multiple Zone	<b>TRM</b>
Neighbourhood Commercial Zone	<b>NC</b>
General Commercial Zone	<b>GC</b>
Deferred Commercial Zone	<b>DC</b>
Planned Shopping Centre Commercial Zone	<b>SC</b>
Central Business Commercial Zone	<b>CB</b>
Tourist Commercial Zone	<b>TC</b>
Camping Establishment Zone	<b>CE</b>
Deferred Tourist Commercial Zone	<b>DTC</b>
Automobile Service Station and Gasoline Bar	<b>AS</b>

Institutional Zone	I
Prestige Industrial Zone	PI
Light Industrial Zone	LI
General Industrial Zone	GI
Heavy Industrial Zone	HI
Transportation - Distribution Industrial Zone	TDI
Extractive Industrial Zone	EI
Agricultural Zone	A
Rural Zone	R
Open Space Zone	OS
Development Holding Zone	DH
Hazard Land Zone	HL
Parking Zone	P
Parking Holding Zone	PH
Environmental Protection Area Zone	EPA







- 3.2 ZONING MAPS: The Zones aforesaid and the boundaries of such Zones are shown on one or more of the Zoning Maps appended thereto as Schedule "A", referred to in this By-law as 2004-14 "Zoning Maps", each of which Zoning Maps and the Key Map contained in the said Schedule 2012-60 "A" and the Setback Plans appended hereto as Schedules "B-1", "B-2", "B-3" and "B-4", Schedule "C" and Schedules "C-A" through to and including "C-F" and Schedules "C-H" through to and including "C-K", and Schedule "D" together with all titles, symbols, notations, references and information shown therein shall form a part of this by-law to the same extent as if fully described in the text of this By-law."
- 3.3 SHORT TITLES: The short titles of the Zones listed in Section 3.1 may be used to refer to **buildings** and **structures** and **uses** of **buildings**, **structures** and land permitted by this By-law in such Zones; and whenever in this By-law the word "Zone" is **used** preceded by any of the said short titles, such references shall mean any area of the City of Niagara Falls delineated and designated on the said Zoning Maps by such short title.
- 3.3.1 "RESIDENTIAL ZONE": The expression "residential zone", whenever **used** in this By-law, means an area of the City of Niagara Falls delineated on a Zoning Map and designated therein as R1A, R1B, R1C, R1D, R1E, R1F, RMP, R2, R3, R4, R5A, R5B, R5C, R5D, R5E, R5F or TRM.
- 3.3.2 "COMMERCIAL ZONE": The expression "commercial zone" whenever **used** in this By-law, means an area of the City of Niagara Falls delineated on a Zoning Map and designated therein as NC, GC, DC, SC, CB, TC, CE, DTC, AS, P or PH.

3.3.3 "INDUSTRIAL ZONE": The expression "industrial zone" whenever **used** in this By-law means an area of the City of Niagara Falls delineated on a Zoning Map and designated therein as PI, LI, GI, HI, TDI or EI.







3.4 ZONE BOUNDARIES: Where any uncertainty exists with respect to the boundary of any zone as shown on the Zoning Maps, the following rules shall apply:

- (a) a boundary indicated as following a highway, **street** or **lane** shall be the centre line of such highway, **street** or **lane**;
- (b) where a **street** or part of a **street** referred to in Section 4.27.1 of this By-law as a Type A, Type B, Type C, Type D, Type E or Transitional **street**.

(i) forms a boundary between zones, it is shown on the Zoning Maps by one or more of the respective symbols set forth in Column 2 of the following Table:

Column 1	Column 2
Type of Street	Symbol
Type A (Green)	
Type B (Salmon)	
Type C (Magenta)	
Type D (Cyan)	
Type E (Gold)	
Transitional (Red)	

(ii) does not form a boundary between zones, it is shown on the Zoning Maps by one or more of the respective symbols set forth in Column 2 of the following Table:

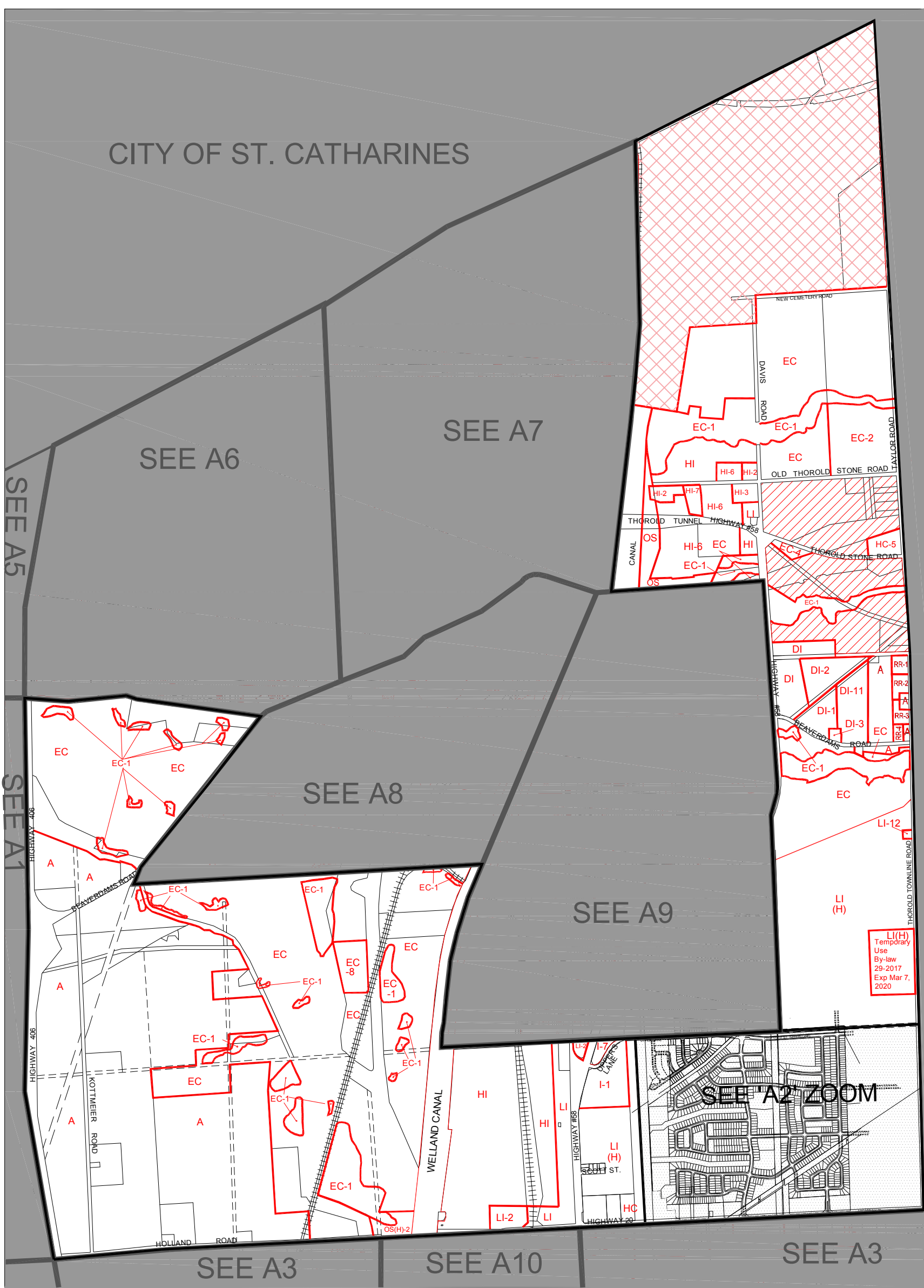
Column 1	Column 2
Type of Street	Symbol
Type A (Green)	
Type B (Salmon)	
Type C (Magenta)	
Type D (Cyan)	
Type E (Gold)	
Transitional (Red)	

(c) generally, boundaries between zones are indicated either by an unbroken heavy line or by one or more of the symbols set forth in subclause I of clause b of this section.



- (d) a boundary indicated as following a watercourse, creek, stream, power canal, or the right-of-way of a railway or of an electrical, gas or oil transmission line shall be the centre line of such watercourse, creek, stream, power canal or right-of-way;
- (e) a boundary indicated as approximately following **lot lines** shall follow such **lot lines**;
- (f) in every case, where
  - (i) any **street** or **lane** or portion thereof is altered, diverted or closed,
  - (ii) the right-of-way of a railway or of an electrical, gas or oil transmission line or portion of any such right-of-way is altered, diverted or ceases to be used for railway purposes or transmission line purposes,
  - (iii) a watercourse or portion thereof is altered or diverted, the land formerly included in such **street, lane**, railway right-of-way, transmission line right-of-way or watercourse, or portion thereof shall be included within the zone adjoining such land. Where such land formed a boundary between different zones, the new zone boundaries shall be the former centre line of such **street, lane**, railway right-of-way, transmission line right-of-way or watercourse;
- (g) where any zone boundary remains uncertain after the application of the rules set forth in clauses a to f inclusive, then the boundary shall be determined by scale from the Zoning Map or Maps.

# CITY OF ST. CATHARINES



## ZONE LEGEND (Rolling Meadows)

- rm-R1B - Residential First Density B Zone
- rm-R1C - Residential First Density C Zone
- rm-R2 - Residential Second Density Zone
- rm-R3 - Residential Third Density Zone
- rm-OS - Open Space Zone

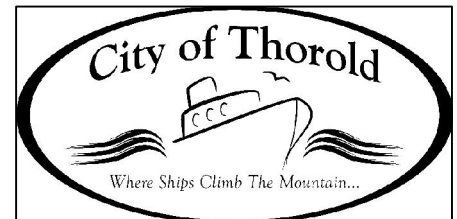
## ZONE LEGEND

- R1A - Residential First Density A Zone
- R1B - Residential First Density B Zone
- R1C - Residential First Density C Zone
- R1D - Residential First Density D Zone
- R2 - Residential Second Density Zone
- R2S - Residential Second Density Special Zone
- R3 - Residential Third Density Zone
- R4A - Residential Fourth Density A Zone
- R4B - Residential Fourth Density B Zone
- CC - Central Commercial Zone
- HCN - Highway Commercial Node Zone
- NC - Neighbourhood Commercial Zone
- SC - Shopping Centre Commercial Zone
- HC - Highway Commercial Zone
- RUC - Rural Commercial Zone

# CITY OF THOROLD Zoning By-law No. 2140(97) SCHEDULE 'A2'



- HCI - Highway Commercial/Industrial Zone
- PO - Prestige Office Zone
- PI - Prestige Industrial Zone
- LI - Light Industrial Zone
- HI - Heavy Industrial Zone
- DI - Dry Industrial Zone
- I - Institutional Zone
- OS - Open Space Zone
- EC - Environmental Conservation Zone
- D - Development Zone
- A - Agricultural Zone
- Lands to which Development Control of the Niagara Escarpment Commission applies
- Lands subject to By-laws 1448(90) and 1449(90)
- See Zoom Schedule



This is Schedule 'A2' to By-law No. 2140(97) passed this 2nd day of July, 1997.

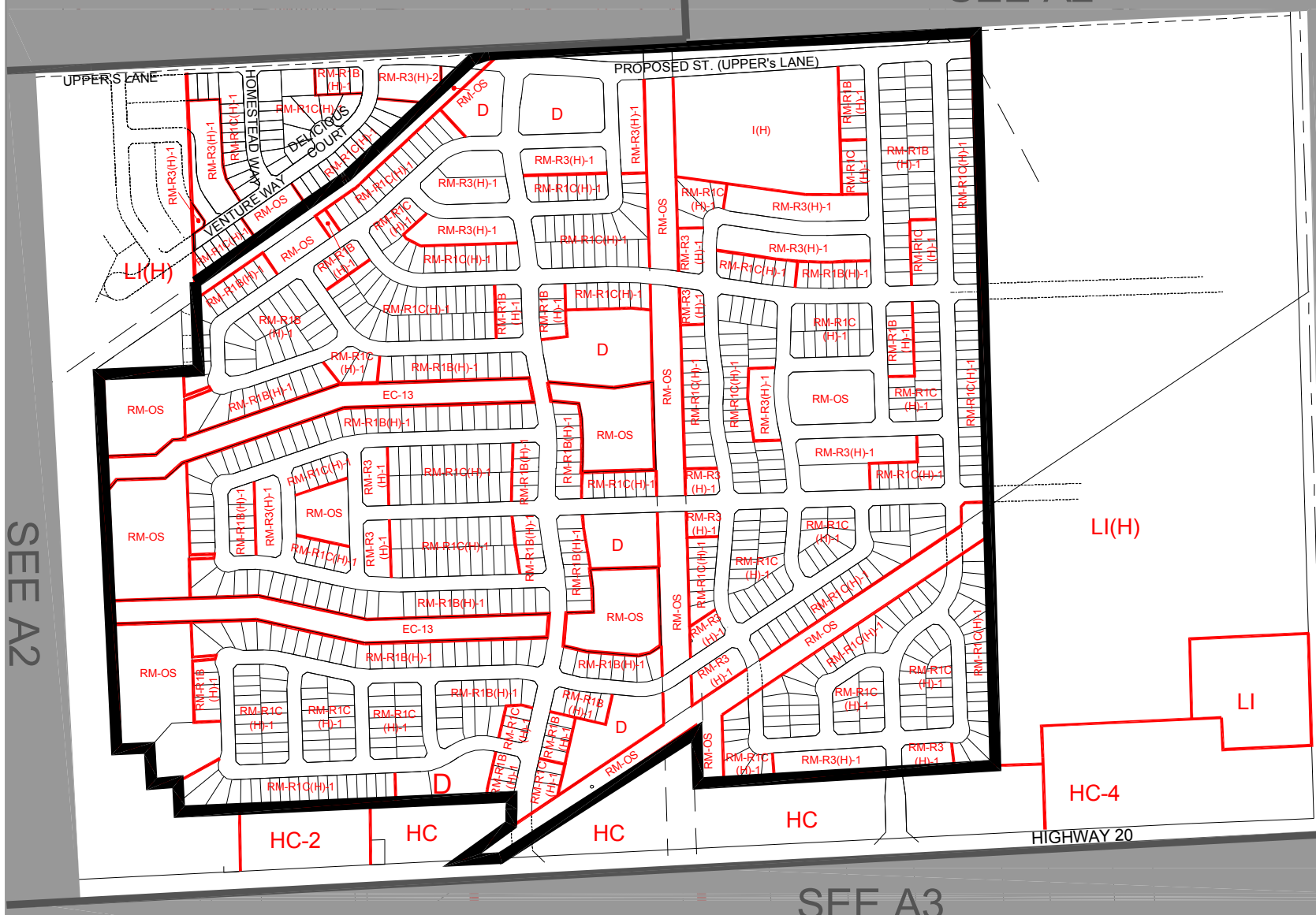
MAYOR

CLERK

OFFICE CONSOLIDATION JUNE 2018

SEE A9

SEE A2



SEE A2

SEE A3

**ZONE LEGEND (Rolling Meadows)**

- rm-R1B - Residential First Density B Zone
- rm-R1C - Residential First Density C Zone
- rm-R2 - Residential Second Density Zone
- rm-R3 - Residential Third Density Zone
- rm-OS - Open Space Zone

**ZONE LEGEND**

- R1A - Residential First Density A Zone
- R1B - Residential First Density B Zone
- R1C - Residential First Density C Zone
- R1D - Residential First Density D Zone
- R2 - Residential Second Density Zone
- R2S - Residential Second Density Special Zone
- R3 - Residential Third Density Zone
- R4A - Residential Fourth Density A Zone
- R4B - Residential Fourth Density B Zone
- CC - Central Commercial Zone
- HCN - Highway Commercial Node Zone
- NC - Neighbourhood Commercial Zone
- SC - Shopping Centre Commercial Zone
- HC - Highway Commercial Zone
- RUC - Rural Commercial Zone

# CITY OF THOROLD

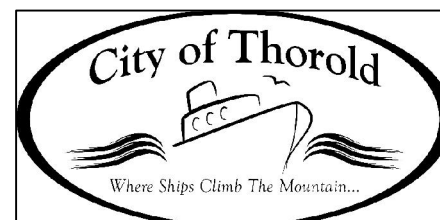
## Zoning By-law No. 2140(97)

### 'A2' ZOOM



- HCI - Highway Commercial/Industrial Zone
- PO - Prestige Office Zone
- PI - Prestige Industrial Zone
- LI - Light Industrial Zone
- HI - Heavy Industrial Zone
- DI - Dry Industrial Zone
- I - Institutional Zone
- OS - Open Space Zone
- EC - Environmental Conservation Zone
- D - Development Zone
- A - Agricultural Zone

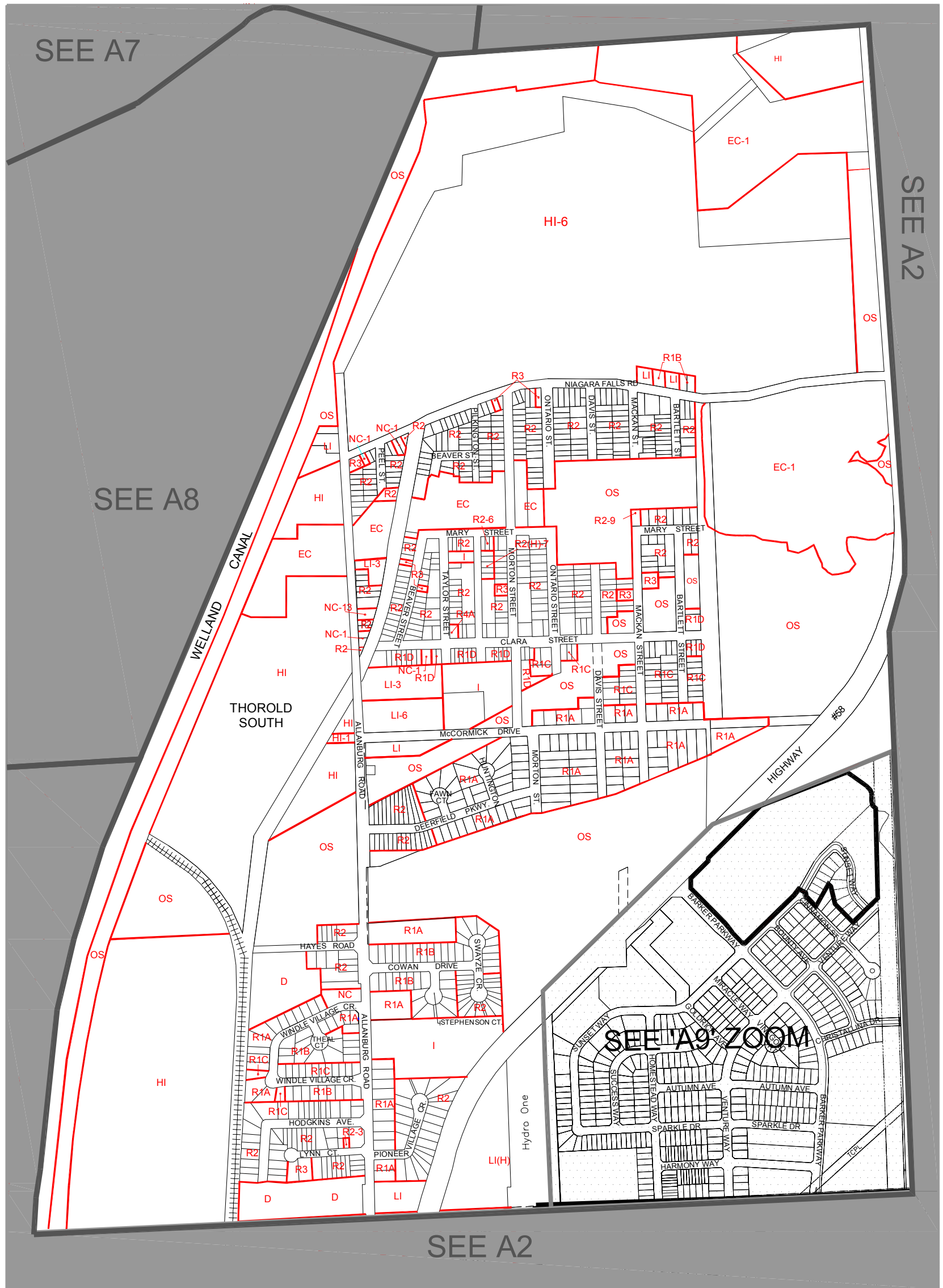
- Lands Subject to Final Approval



This is Schedule 'A2' to By-law No. 2140(97) passed this 2nd day of July, 1997.

MAYOR

CLERK



## CITY OF THOROLD Zoning By-law No. 2140(97) SCHEDULE 'A9'



### ZONE LEGEND

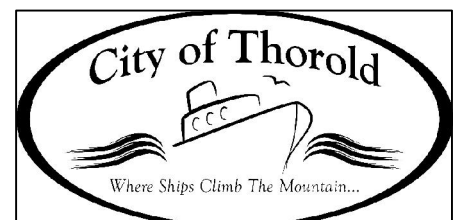
- R1A - Residential First Density A Zone
- R1B - Residential First Density B Zone
- R1C - Residential First Density C Zone
- R1D - Residential First Density D Zone
- R2 - Residential Second Density Zone
- R2S - Residential Second Density Special Zone
- R3 - Residential Third Density Zone
- R4A - Residential Fourth Density A Zone
- R4B - Residential Fourth Density B Zone
- CC - Central Commercial Zone
- HCN - Highway Commercial Node Zone
- NC - Neighbourhood Commercial Zone
- SC - Shopping Centre Commercial Zone
- HC - Highway Commercial Zone
- RUC - Rural Commercial Zone
- HCI - Highway Commercial/Industrial Zone
- PO - Prestige Office Zone
- PI - Prestige Industrial Zone
- LI - Light Industrial Zone
- HI - Heavy Industrial Zone
- DI - Dry Industrial Zone

- I - Institutional Zone
- OS - Open Space Zone
- EC - Environmental Conservation Zone
- D - Development Zone
- A - Agricultural Zone

### ZONE LEGEND (Rolling Meadows)

- rm-R1B - Residential First Density B Zone
- rm-R1C - Residential First Density C Zone
- rm-R2 - Residential Second Density Zone
- rm-R3 - Residential Third Density Zone
- rm-OS - Open Space Zone

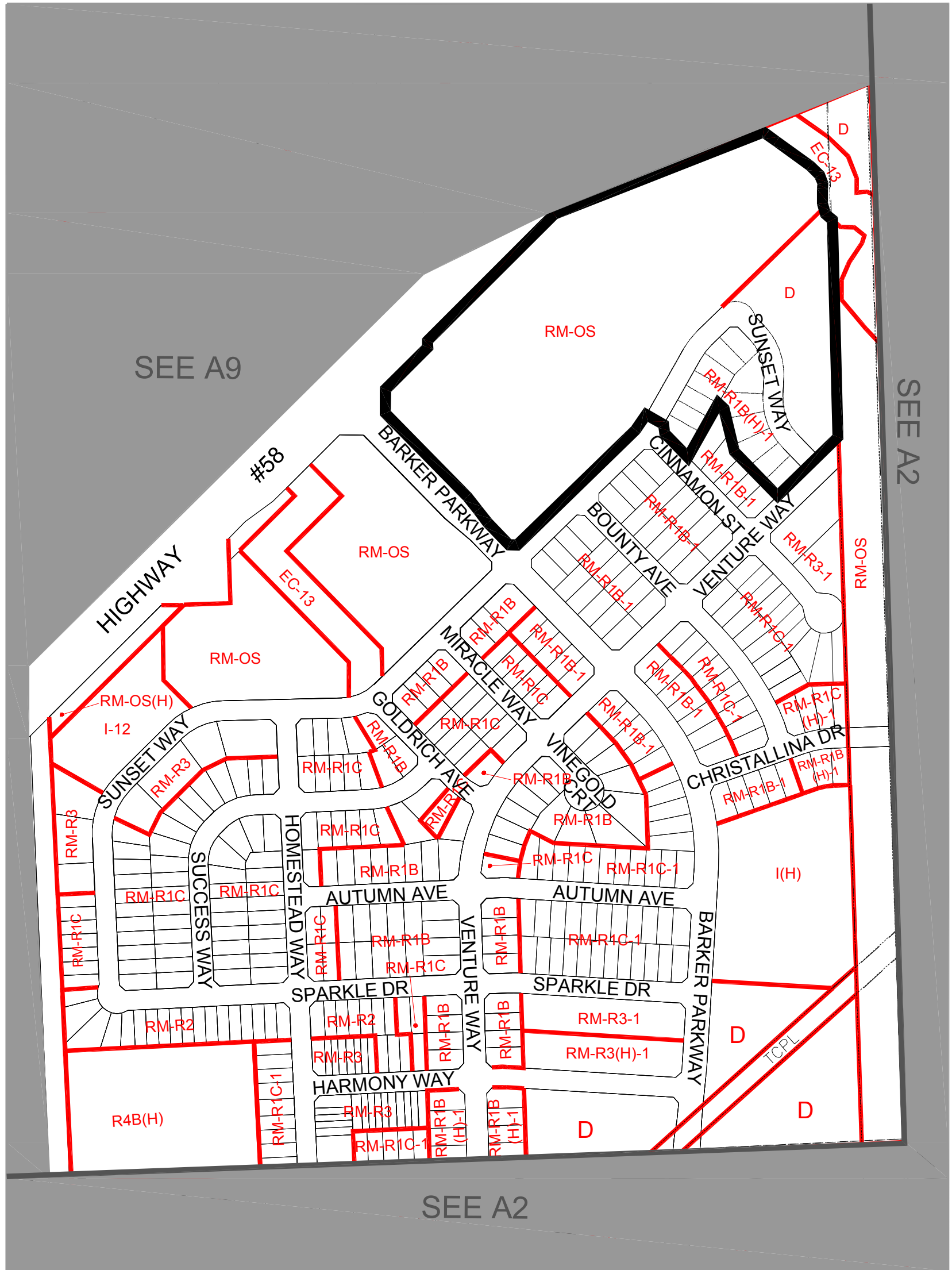
- Lands subject to final approval
- See Zoom Schedule



This is Schedule 'A9' to By-law No. 2140(97) passed this 2nd day of July, 1997.


MAYOR

CLERK



**ZONE LEGEND (Rolling Meadows)**

- rm-R1B - Residential First Density B Zone
- rm-R1C - Residential First Density C Zone
- rm-R2 - Residential Second Density Zone
- rm-R3 - Residential Third Density Zone
- rm-OS - Open Space Zone

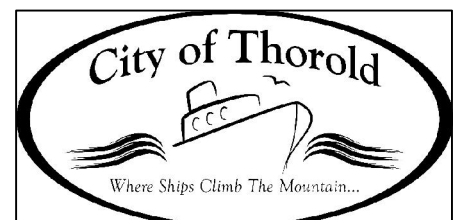
 Lands Subject to Final Approval

**ZONE LEGEND**

- R1A - Residential First Density A Zone
- R1B - Residential First Density B Zone
- R1C - Residential First Density C Zone
- R1D - Residential First Density D Zone
- R2 - Residential Second Density Zone
- R2S - Residential Second Density Special Zone
- R3 - Residential Third Density Zone
- R4A - Residential Fourth Density A Zone
- R4B - Residential Fourth Density B Zone
- CC - Central Commercial Zone
- HCN - Highway Commercial Node Zone
- NC - Neighbourhood Commercial Zone
- SC - Shopping Centre Commercial Zone
- HC - Highway Commercial Zone
- RUC - Rural Commercial Zone

- HCI - Highway Commercial/Industrial Zone
- PO - Prestige Office Zone
- PI - Prestige Industrial Zone
- LI - Light Industrial Zone
- HI - Heavy Industrial Zone
- DI - Dry Industrial Zone
- I - Institutional Zone
- OS - Open Space Zone
- EC - Environmental Conservation Zone
- D - Development Zone
- A - Agricultural Zone

**CITY OF THOROLD**  
**Zoning By-law No. 2140(97)**  
**'A9' ZOOM**



This is Schedule 'A9' to By-law No. 2140(97) passed this 2nd day of July, 1997.

MAYOR

CLERK

OFFICE CONSOLIDATION JUNE 2018

**SECTION 5: ZONES**5.1 Establishment of Zones

5.1.1 For purposes of this By-law, the following zones are established:

<u>ZONE CLASS</u>	<u>ZONE SYMBOL</u>	<u>SECTION</u>
RESIDENTIAL ZONES		
Residential First Density A Zone	R1A	7
Residential First Density B Zone	R1B	8
Residential First Density C Zone	R1C	9
Residential First Density D Zone	R1D	10
Residential Second Density Zone	R2	11
Residential Second Density Special Zone	R2S	12
Residential Third Density Zone	R3	13
Residential Fourth Density A Zone	R4A	14
Residential Fourth Density B Zone	R4B	15
Office Residential OR Zone	OR	16
COMMERCIAL ZONES		
Central Commercial Zone	CC	17
Neighbourhood Commercial Zone	NC	18
Commercial	C	18A
Shopping Centre Commercial Zone	SC	19
Highway Commercial Zone	HC	20
Highway Commercial/Industrial Zone	HCI	21
Highway Commercial Node Zone	HCN	22
INDUSTRIAL ZONES		
Prestige Office Zone	PO	23
Prestige Industrial Zone	PI	24
Light Industrial Zone	LI	25
Heavy Industrial Zone	HI	26
Dry Industrial Zone	DI	27
INSTITUTIONAL ZONE		
Institutional Zone	I	28
OPEN SPACE ZONE		
Open Space Zone	OS	29
Environmental Conservation Zone	EC	30

	<u>ZONE SYMBOL</u>	<u>SECTION</u>
<b>DEVELOPMENT ZONE</b>		
Development Zone	D	31
Residential Development	RD	31A
Residential Development Deferred	RDD	31B
Rural Residential	RR	31C
<b>AGRICULTURAL ZONE</b>		
Agricultural Zone	A	32
Rural Commercial Zone	RUC	33
<b>WEST NEIGHBOURHOOD ZONES</b>		
West Neighbourhood Residential First Density B Zone	wn-R1B	34
West Neighbourhood Residential First Density D Zone	wn-R1D	35
West Neighbourhood Residential First Density E Zone	wn-R1E	36
West Neighbourhood Residential First Density F Zone	wn-R1F	37
West Neighbourhood Residential Second Density Zone	wn-R2	38
West Neighbourhood Residential Third Density B Zone	wn-R3	39
West Neighbourhood Open Space Zone	wn-OS	40
West Neighbourhood Open Space/ Institutional Zone	wn-OS/I	41
West Neighbourhood Open Space/ Woodlot Zone	wn-OSW	42
West Neighbourhood Neighbourhood Commercial Zone	wn-NC	43
<b>ROLLING MEADOWS ZONES</b>		
Rolling Meadows Open Space	RM-OS	44
Rolling Meadows Residential First Density B Zone	RM-R1B	45
Rolling Meadows Residential First Density C Zone	RM-R1C	46
Rolling Meadows Residential Second Density	RM-R2	47
Rolling Meadows Residential Third Density	RM-R3	48

5.1.2 A zone class may be identified solely by its zone symbol and may be referred to as a zone e.g. R1A Zone means Residential First Density R1A Zone Class and may be referred to as a Residential First Density R1A Zone. On a Zone Map, the zone symbol R1A has the same meaning.

5.1.3 Whenever lands on any Zoning Schedule have the zone symbol followed directly by a dash (-) and a number, e.g. A-1, such lands shall be considered to have a "Special Provision" number

and to have reference to a Zone subsection. The said lands shall be subject to the provisions of the relevant zone category and all other provisions contained herein, and shall in addition, be subject to any special provisions provided for within the relevant special provision subsection of the relevant zone.

5.1.4 Holding zones are hereby established by the use of the symbol (H) as a suffix to the zone symbols in Sections 5.1.1 and 5.1.3. Lands subject to the symbol (H) shall not be used, nor any building or structure used, altered or erected until the (H) is removed by amendment, pursuant to the provisions of the Planning Act, provided the following occurs:

- (a) adequate servicing including sanitary sewers, storm sewers, stormwater management facilities and waterlines can be provided to the lands to the satisfaction of Regional Niagara and the City of Thorold, and/or
- (b) approvals have been obtained from the Regional Public Health Department, and
- (c) the provisions of Section 7.15.1 of the Official Plan are satisfied.

This provision shall not prevent continuation of uses existing at the time of establishment of the (H) symbol on said lands.

## 5.2 Zone Maps - Schedule A

### 5.2.1 Maps Identified

The Zone Maps comprising Schedule A to this By-law shall form part of this By-law, and consist of the following:

- (1) Key Map - Schedule A
- (2) Area Maps - Schedules A1 to A12

### 5.2.2 Zones Indicated on Maps

The boundaries and zone symbols of the lands included in each zone class established by this By-law are shown on the Area Maps forming Schedule A1 to A12 of this By-law.

## 5.3 Determination of Zone Boundaries

The boundaries of any zone shown on a Zone Map shall be determined in accordance with the following rules:

5.3.1 Zone boundaries are indicated by heavy black lines.

### 5.3.2 Centre lines

Where a zone boundary is indicated as following approximately the centre line of a street or lane and/or its production, such centre line and/or its production shall be deemed to be the boundary.



**5.3.3 Railways**

Where a zone boundary is indicated as following the centre line or outer limit of a railway right-of-way or an electrical, gas or oil transmission line, the centre line or outer limit of such right-of-way, as the case may be, shall be deemed to be the boundary.

**5.3.4 Watercourses**

Where a zone boundary is indicated as following the centre line or edge of a body of water, such centre line or edge, as the case may be, shall be deemed to be the boundary.

**5.3.5 Welland Ship Canal**

Where a zone boundary is indicated as following a side of the Welland Ship Canal, the boundary shall be deemed to coincide with the lot line, on that side of the Welland Ship Canal, of lands owned by or under the jurisdiction of the St. Lawrence Seaway Authority.

**5.3.6 Identified Lot Lines**

Where a zone boundary is indicated as following an identified lot line and/or its production shown on a registered plan or former Township lot line, such lot line and/or its production shall be deemed to be the boundary. A street line and/or its production shall be deemed to be an identified lot line.

**5.3.7 Top of Bank**

Where a zone boundary is indicated as following the top of bank, such top of bank as the case may be, shall be deemed to be the boundary and in the event of change to the top of bank, the boundary shall be construed as moving with the actual top of bank.

**5.3.8 City Limits**

Where a zone boundary is indicated as following the limits of the City, such City limits, as the case may be, shall be deemed to be the boundary.

**5.3.9 Street Closure**

In the event a dedicated street, road allowance or lane shown on any Schedule forming part of this By-law is closed, the property formerly in such street, road allowance, or lane shall be included with the zone of the joining property on either side of such closed street, road allowance or lane.

If a closed street, road allowance or lane is the boundary between two or more different zones, the new zone boundaries shall be the former centreline of the closed street, road allowance or lane as such are adjacent to such zones.

**5.3.10 Zone Measurement**

Where the zone boundary is not a street, road allowance or lane, nor a lot line and a specific measurement indicating the position of the said boundary is not shown on the Zoning Schedules or indicated in the text of this By-law, the position thereof shall be determined by scaling from the Zoning Schedules.

### 5.3.11 Zoning Maps

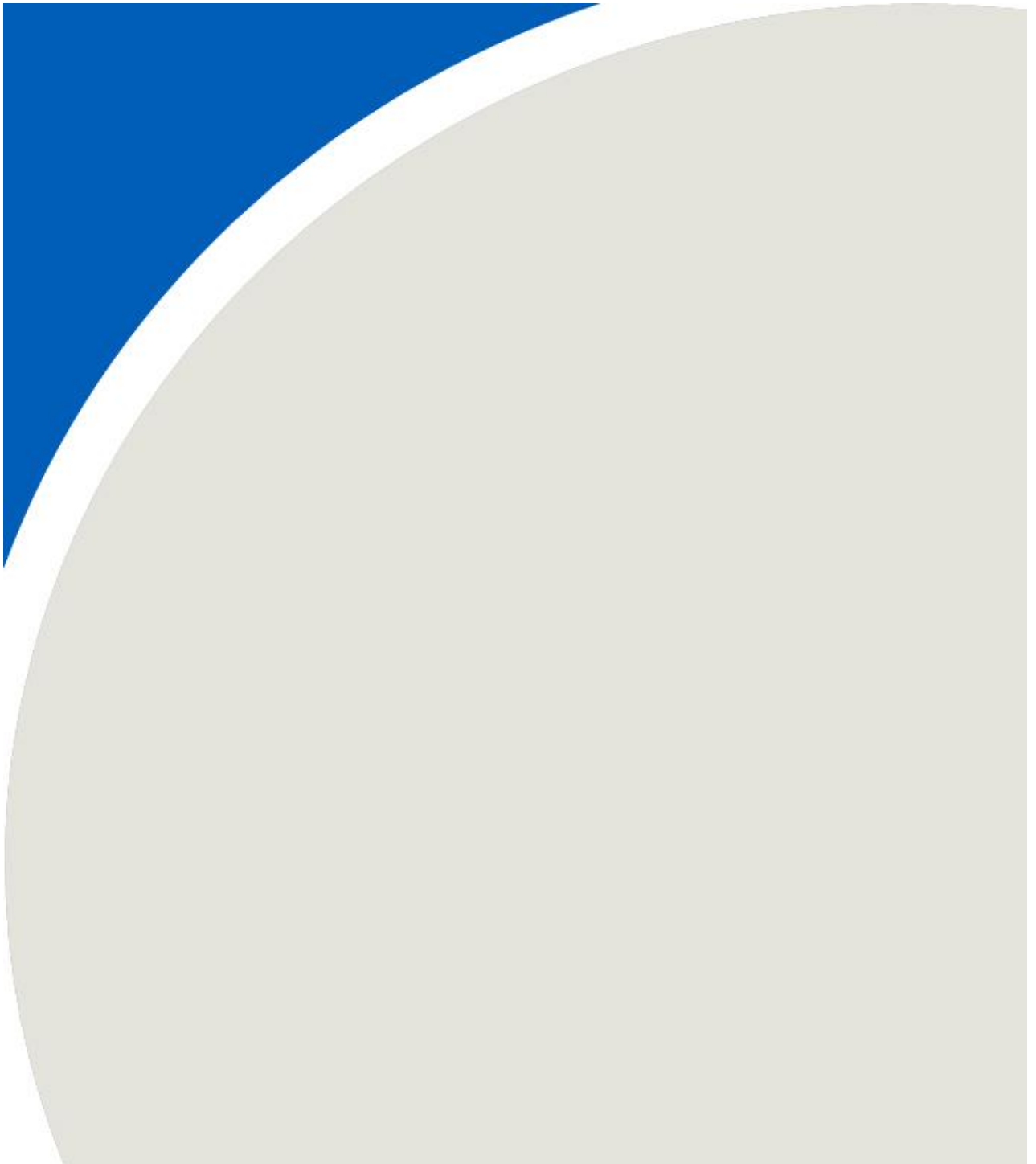
The extent and boundaries of all zones are shown on the following Schedules which form part of this By-law and are attached hereto:

Schedule A	- Key Map (Zone Schedules)
Schedule A1	- Decew (Northwest Rural)
Schedule A2	- Lake Gibson/Blackhorse/The Neighbourhoods of Rolling Meadows (Northeast Rural)
Schedule A3	- Thorold South East (Southeast Rural)
Schedule A4	- Turners Corners (Southwest Rural)
Schedule A5	- Brock Neighbourhood (Lake Gibson Brock)
Schedule A6	- Confederation Heights
Schedule A7	- Thorold Centre (Old Town)
Schedule A7-1	- Permissible Bed & Breakfast Locations
Schedule A8	- Beaverdams
Schedule A9	- Thorold South/The Neighbourhoods of Rolling Meadows
Schedule A10	- Allanburg
Schedule A11	- Allanport Road
Schedule A12	- Port Robinson

### 5.4 Deemed Amendments to the Zone Maps

5.4.1 The Zone Maps, Schedule A and any other schedule affected, shall be deemed to be amended from time to time as necessary to reflect changes, correction, alterations and additions to lot lines, lot numbers, road patterns, railway lines, hydro, gas and other utility lines, watercourses, subdivisions, municipal boundaries, status and jurisdiction, and all similar or other features, except zoning changes.

## APPENDIX B



**B1.8.12 Land Use Compatibility**

It is a requirement of this Plan that appropriate measures be undertaken to attenuate the effects of noise, visual intrusion or other undesirable impacts of residential development adjacent to Highways 58 and 20, Thorold Townline Road and other environmentally incompatible land uses.

**B1.8.12.1 Residential Development Adjacent to Provincial Highways and Regional Arterial Roads**

Where residential development is proposed to be located adjacent to Highway 58 and 20 three alternative design considerations can be utilized to achieve environmental compatibility:

- a) Acoustical barriers such as berms or walls; or
- b) Minimum building setbacks of 65 metres from Highway 20 and 85 metres from Highway 58; or
- c) Single loaded window streets with the dwelling units facing the highway.

For residential development within 250 metres of Highway 58 and 20 and 100 metres of Thorold Townline Road the developer shall be required to prepare a detailed noise study. A noise feasibility study is required within 50 metres of a provincial highway in accordance with Provincial Guideline NPC-300. The noise study shall include recommendations regarding noise attenuation measures which are required in order to satisfy Provincial sound level objectives. Noise attenuation measures may include but shall not be limited to the following:

- a) Sound proofing measures and construction techniques;
- b) Warning clauses; and,
- c) Equipping the dwelling units with air conditioning or special ventilation.

**B1.8.12.2 Residential Development Adjacent to Stationary Noise Sources and Industrial Facilities**

Located within the Blackhorse Community are a number of existing uses which are stationary noise sources and may therefore impact sensitive receptors. A noise study is required for residential uses and noise sensitive land uses, such as a daycare facility, institutional use, or hotel/motel, if these uses are to be located within:

- a) 300 metres of the commercial vehicle refuelling station; or,
- b) 70 metres of the natural gas metering facility.

The noise study shall include recommendations regarding noise attenuation measures which are required in order to satisfy Provincial sound level objectives.

When residential development is proposed adjacent to the natural gas metering facility a 20 metre separation distance is required measured from lot line to line.

- a) The utilization of window streets abutting the industrial area and the dwelling units having flanking yards;
- b) Sound proofing and construction techniques;
- c) Acoustical barriers such as berms or walls; and
- d) A forced air ventilation system with central air conditioning or some other form of mechanical ventilation.

#### **B1.8.12.3 Aggregate Resource Protection Policies**

The Ministry of Natural Resources and Forestry has identified lands east of Thorold Townline Road, north of the Hydro One corridor, as a potential bedrock resource area. Development applications within 500 metres of this potential bedrock resource area shall be reviewed having regard to this identified resource area and the need to demonstrate that future aggregate extraction will not be precluded or hindered and to achieve land use compatibility. Mitigation measures which shall be determined through appropriate studies prepared by the developer may be necessary and include but shall not be limited to the following:

- a) Building orientation;
- b) The utilization of window streets and dwelling units having flanking yards;
- c) Sound proofing and construction techniques;
- d) Increasing building setbacks or possibly the need for additional spatial separation; and
- e) Landscape treatments.

In order to determine the necessary mitigation, the developer when proceeding before a quarry application shall be required to prepare the following studies assuming that a proposed quarry will be located on the east side of Thorold Townline Road:

- a) Operational noise;
- b) Blasting;
- c) Traffic; and,
- d) Any other technical report considered appropriate by Council.

The 500 metre study area is identified on Schedule A-3.

It shall also be recognized that Thorold Townline Road is a Regional arterial road and is the likely aggregate haul route required to serve any future aggregate extraction

operation to the east. Accordingly, all studies required by any policy of this Plan shall recognize that Thorold Townline Road is a future aggregate haul route. The haul route shall be restricted from the future extraction operation entrance southerly to Highway 20, a major arterial.

Once the proponent has prepared the appropriate studies and the necessary mitigation is incorporated into the proposed development, if necessary, the utilization of such mitigation measures does not relieve the new mineral aggregate operation from providing appropriate setbacks and mitigation measures in order to achieve land use compatibility.

**B1.8.12.4 Residential Development Adjacent to Thorold Townline Road**

When residential development is proposed to be located adjacent to the Townline Road and the easterly located agricultural lands in the City of Niagara Falls consideration shall be given to utilizing design elements of dwelling orientation, window streets, increased building setbacks, and landscape treatments to achieve land use compatibility.

**B1.8.13 Servicing and Transportation**

**B1.8.13.1 General**

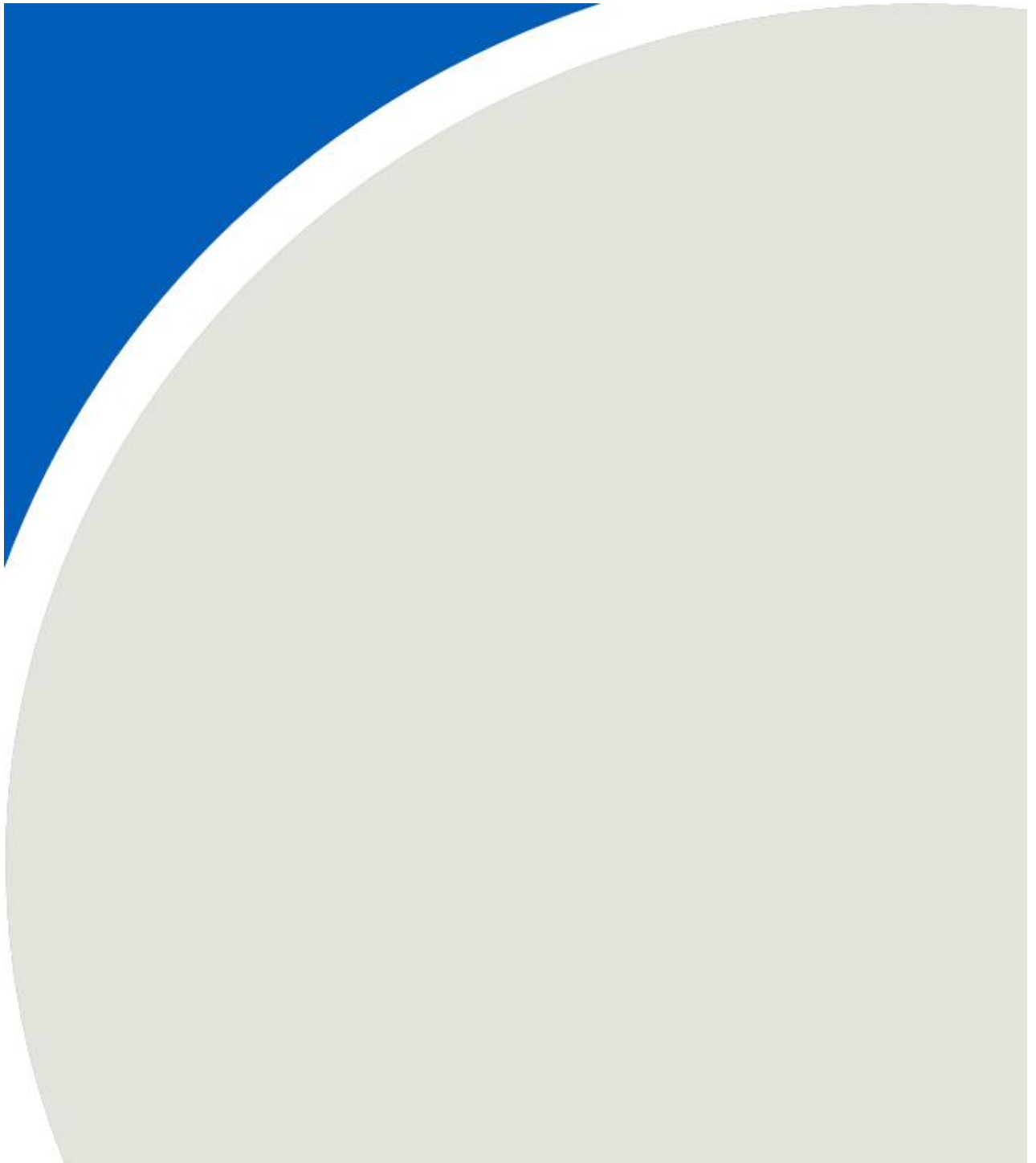
- a) All development within the Neighbourhoods of Rolling Meadows shall be developed with full municipal services in accordance with Municipal Policy.
- b) Extension of municipal services into the Neighbourhoods of Rolling will be required to service development.
- c) Easements to accommodate municipal services shall be granted as a condition of development approval.
- d) Easements to accommodate utilities shall be granted as a condition of development approval.
- e) The provision of a water distribution system, wastewater collection system, stormwater management facilities, road network, and other municipal services will be achieved with minimum costs to the City.
- f) In order to achieve the proper co-ordination of services and consistence in development standards, the orderly development of land by way of plan of subdivision and site plan will be required throughout the neighbourhood. Consents to sever land to create development blocks will only be permitted when it is determined to the satisfaction of the City that the severance of land will not prejudice or jeopardize the subsequent development of the balance of the lands.

**B1.8.13.2 Infrastructure Improvements**

In order to accommodate development within the Neighbourhoods of Rolling Meadows, it will be necessary to address off-site upgrading or expansion of infrastructure such as:

- a) The extension of the Allanburg Road trunk sanitary sewer easterly to the

# APPENDIX C



**Table C.1: Key Parameters Included in the Cadna/A Noise Modelling**

Upper's Quarry, 1603157

<b>Parameter</b>	<b>Value</b>	<b>Rationale</b>
Ground Absorption, within extraction limit	0.2	Accounts for hard ground (exposed rock surfaces) within extraction limit
Ground Absorption, outside of extraction limit	0.8	Accounts for mostly soft ground outside of quarry extraction limit
Temperature	10 °C	Ontario standard conditions
Relative Humidity	70%	Ontario standard conditions
Max. Order of Reflection	1	1st order reflection considered
Absorption Coefficient Alpha	0.37	Cadna/A default value for structured facade



### Cadna/A ISO-9613 Calculation Protocol - Definitions

Parameter	Unit	Definition
<b>Nr</b>		Ray Number
<b>X</b>	<b>(m)</b>	X-axis Cartesian Coordinate
<b>Y</b>	<b>(m)</b>	Y-axis Cartesian Coordinate
<b>Z</b>	<b>(m)</b>	Z-axis Cartesian Coordinate
<b>Refl.</b>	<b>order</b>	Order of Reflection
<b>DEN</b>	<b>D/E/N</b>	Time of Day (Day, Evening, or Night)
<b>Freq.</b>	<b>(Hz)</b>	1/1 Octave Band Dominant Frequency or Frequency Type ("A" for A-weighted)
<b>Lw</b>	<b>(dBA)</b>	Overall Sound Power Level
<b>l/a</b>	<b>dB</b>	Line/Area Source Correction
<b>Optime</b>	<b>dB</b>	Operating Time Correction
<b>K0</b>	<b>(dB)</b>	D_omega in ISO 9613-2 (correction for radiation into solid angles less than 4 Pi)
<b>Di</b>	<b>(dB)</b>	Directivity Index
<b>Adiv</b>	<b>(dB)</b>	Attenuation Due to Divergence
<b>Aatm</b>	<b>(dB)</b>	Atmospheric Attenuation
<b>Agr</b>	<b>(dB)</b>	Ground Attenuation
<b>Afol</b>	<b>(dB)</b>	Attenuation Due to Foliage
<b>Ahous</b>	<b>(dB)</b>	Attenuation from Houses
<b>Abar</b>	<b>(dB)</b>	Barrier Attenuation
<b>Cmet</b>	<b>(dB)</b>	Meteorological Correction
<b>RL</b>	<b>(dB)</b>	Reflection Loss
<b>Lr</b>	<b>(dBA)</b>	Resulting Noise Impact at Receptor - Leq (1-Hr)





Sample CadnaA Output - Uppers Quarry - Proposed Phase P4 Southeast

Receiver  
 Name: Facade of dwelling (5584 Beechwood Rd)  
 ID: R4f  
 X: 649610.64 m  
 Y: 4772697.98 m  
 Z: 190.50 m

Point Source, ISO 9613, Name: "Asphalt Plant - Dust Collector Blower (stack)", ID: "ASPH\_DC\_s"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1547	648854.54	4772826.22	166.05	0	D	A	109.5	0.0	0.0	0.0	0.0	68.7	1.8	-1.3	0.0	0.0	4.6	0.0	0.0	35.7

Point Source, ISO 9613, Name: "P4\_SE, PC Primary Crusher", ID: "P4\_SE\_PC\_PrimaryCrush"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1549	649480.08	4772803.25	164.50	0	D	A	117.6	0.0	0.0	0.0	0.0	55.6	0.9	-0.8	0.0	0.0	21.2	0.0	0.0	40.7

Point Source, ISO 9613, Name: "P4\_SE, PP Loader", ID: "P4\_SE\_PP\_Ldr"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1551	649152.30	4772897.23	148.50	0	D	A	105.6	0.0	0.0	0.0	0.0	65.0	4.0	-2.6	0.0	0.0	10.3	0.0	0.0	28.9

Point Source, ISO 9613, Name: "P4\_SE, PC loader dumping into crusher", ID: "P4\_SE\_PC\_CrusherDump"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1554	649481.42	4772802.28	164.50	0	D	A	123.0	0.0	-7.8	0.0	0.0	55.5	1.1	-1.0	0.0	0.0	22.6	0.0	0.0	37.0

Point Source, ISO 9613, Name: "Asphalt Plant - Pug Mill door (pressure relief noise)", ID: "ASPH\_pugdoor"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1557	648862.85	4772834.18	150.00	0	D	A	107.0	0.0	0.0	0.0	0.0	68.6	2.7	-2.6	0.0	0.0	23.8	0.0	0.0	14.5
1559	648862.85	4772834.18	150.00	1	D	A	107.0	0.0	0.0	0.0	0.0	68.8	2.7	-2.7	0.0	0.0	4.7	0.0	19.8	-86.4
1562	648862.85	4772834.18	150.00	1	D	A	107.0	0.0	0.0	0.0	0.0	68.8	2.7	-2.7	0.0	0.0	4.7	0.0	15.3	18.0

Point Source, ISO 9613, Name: "Asphalt Plant - Conveyor motor, gravel hitting metal plate", ID: "ASPH\_motor"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1564	648854.17	4772834.20	150.00	0	D	A	107.0	0.0	0.0	0.0	0.0	68.7	4.6	-3.0	0.0	0.0	5.9	0.0	0.0	30.8
1567	648854.17	4772834.20	150.00	1	D	A	107.0	0.0	0.0	0.0	0.0	68.8	4.6	-3.0	0.0	0.0	4.8	0.0	20.0	-88.2

Point Source, ISO 9613, Name: "P4\_SE, PC Primary Screen", ID: "P4\_SE\_PC\_PrimaryScreen"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1569	649478.69	4772804.35	164.50	0	D	A	113.8	0.0	0.0	0.0	0.0	55.7	1.5	-1.1	0.0	0.0	21.7	0.0	0.0	35.9

Point Source, ISO 9613, Name: "Asphalt Plant - Pug Mill Motor", ID: "ASPH\_pugmill"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1571	648870.31	4772836.62	151.00	0	D	A	104.8	0.0	0.0	0.0	0.0	68.6	7.2	-2.4	0.0	0.0	6.5	0.0	0.0	25.1
1574	648870.31	4772836.62	151.00	1	D	A	104.8	0.0	0.0	0.0	0.0	68.9	7.3	-2.4	0.0	0.0	20.6	0.0	14.2	-103.7
1577	648870.31	4772836.62	151.00	1	D	A	104.8	0.0	0.0	0.0	0.0	68.6	7.2	-2.4	0.0	0.0	4.7	0.0	3.4	23.2

Point Source, ISO 9613, Name: "Asphalt Plant - Dust Collector Blower (motor)", ID: "ASPH\_DC\_m"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1579	648856.17	4772826.28	148.00	0	D	A	104.8	0.0	0.0	0.0	0.0	68.7	2.9	-2.7	0.0	0.0	4.8	0.0	0.0	31.2
1582	648856.17	4772826.28	148.00	1	D	A	104.8	0.0	0.0	0.0	0.0	68.7	2.9	-2.7	0.0	0.0	4.8	0.0	8.3	22.9

Point Source, ISO 9613, Name: "P4\_SE, WF Drill", ID: "P4\_SE\_WF\_Drill"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1584	649522.65	4772781.71	180.50	0	D	A	110.0	0.0	0.0	0.0	0.0	52.7	1.6	-0.7	0.0	0.0	16.4	0.0	0.0	40.0

Sample CadnaA Output - Uppers Quarry - Proposed Phase P4 Southeast

Point Source, ISO 9613, Name: "Asphalt Plant - Oven Motor", ID: "ASPH_oven"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1587	648858.27	4772831.59	151.80	0	D	A	102.4	0.0	0.0	0.0	0.0	68.7	3.4	-2.6	0.0	0.0	4.7	0.0	0.0	28.3
1590	648858.27	4772831.59	151.80	1	D	A	102.4	0.0	0.0	0.0	0.0	68.8	3.4	-2.6	0.0	0.0	4.7	0.0	46.3	-18.1

Point Source, ISO 9613, Name: "Asphalt Plant - Loader Activity", ID: "ASPH_Ldr_Act1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1597	648869.76	4772830.27	148.50	0	D	A	101.7	0.0	0.0	0.0	0.0	68.5	3.8	-2.7	0.0	0.0	12.1	0.0	0.0	20.1
1600	648869.76	4772830.27	148.50	1	D	A	101.7	0.0	0.0	0.0	0.0	68.9	3.8	-2.7	0.0	0.0	4.7	0.0	20.1	-93.1

Point Source, ISO 9613, Name: "Asphalt Plant - Loader Activity", ID: "ASPH_Ldr_Act2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1603	648864.03	4772827.02	148.50	0	D	A	101.7	0.0	0.0	0.0	0.0	68.6	3.8	-2.7	0.0	0.0	4.7	0.0	0.0	27.3
1607	648864.03	4772827.02	148.50	1	D	A	101.7	0.0	0.0	0.0	0.0	68.8	3.8	-2.7	0.0	0.0	4.7	0.0	44.6	-17.6

Point Source, ISO 9613, Name: "Asphalt Plant - Elevator Motor", ID: "ASPH_elev"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1609	648861.24	4772834.76	165.00	0	D	A	99.8	0.0	0.0	0.0	0.0	68.6	3.1	-1.5	0.0	0.0	4.8	0.0	0.0	24.9
1612	648861.24	4772834.76	165.00	1	D	A	99.8	0.0	0.0	0.0	0.0	68.8	3.1	-1.6	0.0	0.0	4.8	0.0	28.5	-103.8

Point Source, ISO 9613, Name: "P4_SE, PP Idling Truck", ID: "P4_SE_PP_Trk1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1615	649143.29	4772895.19	149.00	0	D	A	96.3	0.0	0.0	0.0	0.0	65.1	2.6	-2.7	0.0	0.0	5.2	0.0	0.0	26.1

Point Source, ISO 9613, Name: "P4_SE, PP Idling Truck", ID: "P4_SE_PP_Trk2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1617	649141.96	4772897.03	149.00	0	D	A	96.3	0.0	0.0	0.0	0.0	65.2	2.6	-2.7	0.0	0.0	5.2	0.0	0.0	26.0

Point Source, ISO 9613, Name: "Asphalt Plant - Compressor Vent", ID: "ASPH_comp"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1620	648874.75	4772829.07	146.60	0	D	A	96.0	0.0	0.0	3.0	0.0	68.5	2.9	-1.5	0.0	0.0	21.0	0.0	0.0	8.2
1623	648874.75	4772829.07	146.60	1	D	A	96.0	0.0	0.0	3.0	0.0	68.9	3.0	-1.5	0.0	0.0	4.7	0.0	22.2	-98.3

Line Source, ISO 9613, Name: "P4_SE, Conveyor", ID: "P4_SE_Conveyor"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1627	649434.42	4772810.92	149.50	0	D	A	82.7	18.8	0.0	0.0	0.0	57.6	1.2	-1.4	0.0	0.0	23.8	0.0	0.0	20.4
1629	649359.39	4772823.01	149.50	0	D	A	82.7	18.8	0.0	0.0	0.0	60.1	1.5	-1.8	0.0	0.0	14.9	0.0	0.0	26.9
1631	649246.84	4772841.14	149.50	0	D	A	82.7	21.8	0.0	0.0	0.0	62.9	2.0	-2.3	0.0	0.0	8.5	0.0	0.0	33.5
1804	649473.37	4772804.82	157.25	0	D	A	82.7	12.0	0.0	0.0	0.0	56.0	1.0	-1.1	0.0	0.0	24.8	0.0	0.0	14.1
1973	649171.27	4772858.25	149.50	0	D	A	82.7	10.0	0.0	0.0	0.0	64.4	2.3	-2.6	0.0	0.0	5.8	0.0	0.0	22.8
1983	649168.92	4772879.80	149.50	0	D	A	82.7	15.2	0.0	0.0	0.0	64.6	2.3	-2.6	0.0	0.0	13.6	0.0	0.0	20.0
2190	649475.97	4772804.73	165.00	0	D	A	82.7	3.7	0.0	0.0	0.0	55.8	1.0	-1.1	0.0	0.0	22.3	0.0	0.0	8.4

Line Source, ISO 9613, Name: "P4 SE, Aggregate Haul road b/w PP and AP, Full", ID: "P4_SE_RD_Haul_PP_AP_Fu"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1633	649130.91	4772889.48	149.50	0	DEN	A	73.4	14.1	0.0	0.0	0.0	65.3	2.5	-2.6	0.0	0.0	5.1	0.0	0.0	17.2
1635	649078.32	4772852.64	149.50	0	DEN	A	73.4	20.1	0.0	0.0	0.0	65.9	2.6	-2.6	0.0	0.0	4.9	0.0	0.0	22.7
1706	649017.68	4772815.35	149.50	0	DEN	A	73.4	16.0	0.0	0.0	0.0	66.6	2.8	-2.7	0.0	0.0	4.8	0.0	0.0	17.8
1709	648907.21	4772814.73	149.50	0	DEN	A	73.4	17.2	0.0	0.0	0.0	68.1	3.2	-2.8	0.0	0.0	4.8	0.0	0.0	17.3
1710	648907.21	4772814.73	149.50	1	DEN	A	73.4	17.2	0.0	0.0	0.0	68.6	3.4	-2.8	0.0	0.0	4.8	0.0	16.5	0.2
1712	648907.21	4772814.73	149.50	1	DEN	A	73.4	17.2	0.0	0.0	0.0	68.7	3.4	-2.8	0.0	0.0	4.8	0.0	51.8	-35.2
1714	648907.21	4772814.73	149.50	1	DEN	A	73.4	17.2	0.0	0.0	0.0	68.7	3.4	-2.8	0.0	0.0	4.8	0.0	17.2	-0.6
1716	648907.21	4772814.73	149.50	1	DEN	A	73.4	17.2	0.0	0.0	0.0	68.7	3.4	-2.8	0.0	0.0	4.8	0.0	51.3	-34.7
1718	648953.45	4772804.66	149.50	0	DEN	A	73.4	16.3	0.0	0.0	0.0	67.5	3.1	-2.7	0.0	0.0	4.8	0.0	0.0	17.1
1720	648953.45	4772804.66	149.50	1	DEN	A	73.4	16.3	0.0	0.0	0.0	69.2	3.5	-2.9	0.0	0.0	4.8	0.0	29.7	-114.6
1722	648953.45	4772804.66	149.50	1	DEN	A	73.4	16.3	0.0	0.0	0.0	69.1	3.5	-2.9	0.0	0.0	4.8	0.0	29.2	-114.1
1724	648986.92	4772804.88	149.50	0	DEN	A	73.4	14.0	0.0	0.0	0.0	67.0	2.9	-2.7	0.0	0.0	4.8	0.0	0.0	15.3
1726	648986.92	4772804.88	149.50	1	DEN	A	73.4	14.0	0.0	0.0	0.0	69.5	3.6	-2.9	0.0	0.0	4.8	0.0	34.3	-121.9

Sample CadnaA Output - Uppers Quarry - Proposed Phase P4 Southeast

Line Source, ISO 9613, Name: "P4 SE, Aggregate Haul road b/w PP and AP, Full", ID: "P4_SE_RD_Haul_PP_AP_Fu"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1728	648986.92	4772804.88	149.50	1	DEN	A	73.4	14.0	0.0	0.0	0.0	69.5	3.6	-2.9	0.0	0.0	4.8	0.0	33.9	-121.5

Line Source, ISO 9613, Name: "P4_SE, Aggregate Shipping from PP, Empty", ID: "P4_SE_RD_SHP_Aggr_Em"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1639	649139.11	4772890.32	149.50	0	DEN	A	71.7	10.6	0.0	0.0	0.0	65.2	2.8	-2.4	0.0	0.0	5.1	0.0	0.0	11.8
1641	649132.97	4772882.08	149.50	0	DEN	A	71.7	9.6	0.0	0.0	0.0	65.2	2.8	-2.4	0.0	0.0	5.1	0.0	0.0	10.7
1644	649084.75	4772817.35	149.50	0	DEN	A	71.7	21.8	0.0	0.0	0.0	65.7	2.9	-2.4	0.0	0.0	5.0	0.0	0.0	22.5
1680	648907.83	4772725.25	149.50	0	DEN	A	71.7	21.4	0.0	0.0	0.0	68.0	3.4	-2.5	0.0	0.0	4.7	0.0	0.0	19.5
1695	648778.40	4772772.26	149.50	0	DEN	A	71.7	21.6	0.0	0.0	0.0	69.4	3.8	-2.6	0.0	0.0	4.7	0.0	0.0	18.0
1698	649007.42	4772736.56	149.50	0	DEN	A	71.7	18.7	0.0	0.0	0.0	66.6	3.1	-2.4	0.0	0.0	4.8	0.0	0.0	18.3
1731	648707.63	4772956.98	187.19	0	DEN	A	71.7	18.5	0.0	0.0	0.0	70.5	4.1	-2.8	0.0	0.0	0.0	0.0	0.0	18.4
1733	648687.35	4772847.10	149.50	0	DEN	A	71.7	11.1	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	6.3
1735	648688.95	4772854.30	149.50	0	DEN	A	71.7	2.5	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	6.7	0.0	0.0	-4.2
1737	648689.43	4772856.50	149.50	0	DEN	A	71.7	4.3	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-0.5
1739	648689.85	4772858.41	149.50	0	DEN	A	71.7	0.7	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.1
1741	648690.19	4772859.94	149.50	0	DEN	A	71.7	2.9	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-1.9
1743	648690.76	4772862.48	149.50	0	DEN	A	71.7	5.1	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	0.3
1745	648691.22	4772864.59	149.50	0	DEN	A	71.7	0.3	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.5
1747	648691.79	4772867.15	149.50	0	DEN	A	71.7	6.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	1.4
1750	648692.47	4772870.25	149.50	0	DEN	A	71.7	3.4	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-1.4
1752	648693.11	4772873.10	149.50	0	DEN	A	71.7	5.7	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	0.9
1755	648693.92	4772876.77	149.50	0	DEN	A	71.7	5.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.8	0.0	0.0	-0.1
1757	648694.77	4772880.62	149.50	0	DEN	A	71.7	6.1	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.9	0.0	0.0	0.2
1758	648698.25	4772896.37	149.50	0	DEN	A	71.7	14.5	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	9.7
1763	648582.94	4772921.88	187.43	0	DEN	A	71.7	18.6	0.0	0.0	0.0	71.4	4.4	-2.8	0.0	0.0	0.0	0.0	0.0	17.2
1765	648547.42	4772912.09	187.50	0	DEN	A	71.7	1.5	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-0.2
1788	648645.64	4772939.76	187.31	0	DEN	A	71.7	17.6	0.0	0.0	0.0	71.0	4.3	-2.8	0.0	0.0	0.0	0.0	0.0	16.9
1791	648724.20	4772925.31	149.50	0	DEN	A	71.7	16.5	0.0	0.0	0.0	70.2	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	11.9
1794	648701.36	4772825.84	149.50	0	DEN	A	71.7	16.3	0.0	0.0	0.0	70.3	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	11.7
1863	648542.69	4772910.77	187.55	0	DEN	A	71.7	9.2	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	7.5
1865	648533.50	4772908.20	187.66	0	DEN	A	71.7	10.3	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	8.5
1867	648523.62	4772905.45	187.78	0	DEN	A	71.7	9.9	0.0	0.0	0.0	71.9	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	8.0
1868	648516.07	4772903.34	187.87	0	DEN	A	71.7	7.7	0.0	0.0	0.0	71.9	4.6	-2.6	0.0	0.0	0.0	0.0	0.0	5.5
1870	648511.97	4772902.19	187.92	0	DEN	A	71.7	4.3	0.0	0.0	0.0	72.0	4.6	-2.6	0.0	0.0	0.0	0.0	0.0	2.1
2023	648751.95	4772957.71	178.53	0	DEN	A	71.7	11.1	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	11.5
2032	648754.42	4772947.09	155.33	0	DEN	A	71.7	10.7	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	6.4
2109	648748.21	4772937.54	149.50	0	DEN	A	71.7	9.8	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	5.5
2186	648744.94	4772965.81	187.11	0	DEN	A	71.7	8.0	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	8.4
2210	648702.72	4772912.91	149.50	0	DEN	A	71.7	8.0	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	3.2
2213	648749.67	4772963.29	187.12	0	DEN	A	71.7	7.6	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	7.9
2216	648753.11	4772942.75	149.50	0	DEN	A	71.7	7.4	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	3.2
2219	648753.12	4772952.63	166.83	0	DEN	A	71.7	7.5	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	7.9
2325	648752.69	4772954.51	171.01	0	DEN	A	71.7	5.7	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	6.1
2343	648753.47	4772951.19	162.57	0	DEN	A	71.7	5.4	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	1.1
2357	648754.15	4772948.34	159.80	0	DEN	A	71.7	5.2	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	0.9
2391	648753.76	4772949.94	159.69	0	DEN	A	71.7	4.6	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	0.3
2403	648751.31	4772960.40	185.82	0	DEN	A	71.7	4.5	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	4.9
2442	648754.26	4772946.06	149.50	0	DEN	A	71.7	1.6	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	-2.7

Point Source, ISO 9613, Name: "P4_SE, PC Loader", ID: "P4_SE_PC_Ldr"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1647	649483.67	4772800.84	164.00	0	D	A	105.6	0.0	0.0	0.0	0.0	55.4	2.2	-1.1	0.0	0.0	22.0	0.0	0.0	27.1

Line Source, ISO 9613, Name: "P4_SE, Aggregate Shipping from PP, Full", ID: "P4_SE_RD_SHP_Aggr_Fu"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1650	649083.00	4772818.36	149.50	0	DEN	A	71.7	21.8	0.0	0.0	0.0	65.7	2.9	-2.4	0.0	0.0	4.9	0.0	0.0	22.4
1652	649129.95	4772881.43	149.50	0	DEN	A	71.7	7.4	0.0	0.0	0.0	65.3	2.8	-2.4	0.0	0.0	5.0	0.0	0.0	8.5
1653	649136.50	4772890.23	149.50	0	DEN	A	71.7	12.1	0.0	0.0	0.0	65.2	2.8	-2.4	0.0	0.0	5.1	0.0	0.0	13.3
1682	648908.30	4772726.74	149.50	0	DEN	A	71.7	21.3	0.0	0.0	0.0	68.0	3.4	-2.5	0.0	0.0	4.7	0.0	0.0	19.5
1690	648779.52	4772773.20	149.50	0	DEN	A	71.7	21.6	0.0	0.0	0.0	69.4	3.8	-2.6	0.0	0.0	4.7	0.0	0.0	18.0

Sample CadnaA Output - Uppers Quarry - Proposed Phase P4 Southeast

Line Source, ISO 9613, Name: "P4_SE, Aggregate Shipping from PP, Full", ID: "P4_SE_RD_SHP_Aggr_Fu"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1703	649006.55	4772737.99	149.50	0	DEN	A	71.7	18.7	0.0	0.0	0.0	66.7	3.1	-2.4	0.0	0.0	4.8	0.0	0.0	18.2
1776	648581.82	4772923.96	187.43	0	DEN	A	71.7	18.6	0.0	0.0	0.0	71.5	4.4	-2.8	0.0	0.0	0.0	0.0	0.0	17.3
1786	648645.08	4772941.51	187.31	0	DEN	A	71.7	17.7	0.0	0.0	0.0	71.0	4.3	-2.8	0.0	0.0	0.0	0.0	0.0	17.0
1790	648725.03	4772924.59	149.50	0	DEN	A	71.7	16.5	0.0	0.0	0.0	70.2	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	11.9
1796	648702.68	4772826.35	149.50	0	DEN	A	71.7	16.3	0.0	0.0	0.0	70.3	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	11.7
1799	648753.85	4772957.12	176.06	0	DEN	A	71.7	13.8	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	14.2
1802	648755.28	4772949.98	157.24	0	DEN	A	71.7	12.2	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	8.0
1830	648699.37	4772896.12	149.50	0	DEN	A	71.7	14.5	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	9.7
1833	648696.01	4772880.51	149.50	0	DEN	A	71.7	5.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	6.0	0.0	0.0	-0.2
1835	648695.18	4772876.66	149.50	0	DEN	A	71.7	6.1	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.9	0.0	0.0	0.2
1837	648694.57	4772873.82	149.50	0	DEN	A	71.7	2.4	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-2.4
1861	648727.75	4772964.09	187.15	0	DEN	A	71.7	14.4	0.0	0.0	0.0	70.3	4.1	-2.7	0.0	0.0	0.0	0.0	0.0	14.5
1888	648703.57	4772957.74	187.20	0	DEN	A	71.7	13.5	0.0	0.0	0.0	70.5	4.1	-2.8	0.0	0.0	0.0	0.0	0.0	13.4
1892	648520.98	4772907.90	187.83	0	DEN	A	71.7	1.2	0.0	0.0	0.0	71.9	4.6	-2.8	0.0	0.0	0.0	0.0	0.0	-0.8
1893	648526.62	4772909.39	187.76	0	DEN	A	71.7	10.1	0.0	0.0	0.0	71.9	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	8.3
1896	648536.87	4772912.10	187.63	0	DEN	A	71.7	10.4	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	8.6
1898	648544.39	4772914.08	187.53	0	DEN	A	71.7	6.7	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	5.0
1902	648682.94	4772952.40	187.24	0	DEN	A	71.7	13.1	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	12.7
1932	648691.53	4772858.14	149.50	0	DEN	A	71.7	0.9	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-3.9
1935	648691.07	4772856.22	149.50	0	DEN	A	71.7	4.3	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-0.4
1940	648690.55	4772854.03	149.50	0	DEN	A	71.7	2.5	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	6.8	0.0	0.0	-4.3
1943	648688.94	4772847.25	149.50	0	DEN	A	71.7	10.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	6.1
2006	648694.20	4772872.02	149.50	0	DEN	A	71.7	2.9	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-1.9
2008	648693.82	4772869.99	149.50	0	DEN	A	71.7	3.4	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-1.4
2011	648693.23	4772866.93	149.50	0	DEN	A	71.7	6.1	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	1.3
2014	648692.74	4772864.36	149.50	0	DEN	A	71.7	0.7	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.1
2017	648692.34	4772862.28	149.50	0	DEN	A	71.7	4.9	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	0.1
2019	648691.86	4772859.75	149.50	0	DEN	A	71.7	3.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-1.6
2095	648749.24	4772936.89	149.50	0	DEN	A	71.7	10.0	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	5.7
2120	648745.26	4772967.67	187.11	0	DEN	A	71.7	9.2	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	9.5
2131	648754.61	4772943.40	149.50	0	DEN	A	71.7	8.9	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	4.6
2142	648751.23	4772964.48	187.11	0	DEN	A	71.7	8.6	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	9.0
2162	648511.34	4772905.30	187.89	0	DEN	A	71.7	0.5	0.0	0.0	0.0	72.0	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	-1.7
2163	648516.12	4772906.59	187.86	0	DEN	A	71.7	9.4	0.0	0.0	0.0	71.9	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	7.4
2225	648703.63	4772912.51	149.50	0	DEN	A	71.7	7.7	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	3.0

Point Source, ISO 9613, Name: "P4_SE, PP Secondary Crusher", ID: "P4_SE_PP_SecondaryCrush2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1654	649166.16	4772898.39	149.00	0	D	A	114.6	0.0	0.0	0.0	0.0	64.8	2.8	-2.6	0.0	0.0	11.8	0.0	0.0	37.9

Point Source, ISO 9613, Name: "P4_SE, PP Secondary Crusher", ID: "P4_SE_PP_SecondaryCrush1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1655	649165.78	4772899.34	149.00	0	D	A	114.6	0.0	0.0	0.0	0.0	64.8	2.8	-2.6	0.0	0.0	11.6	0.0	0.0	38.0

Point Source, ISO 9613, Name: "Asphalt Plant - Idling Truck", ID: "ASPH_IDLE_TRK2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1657	648879.73	4772824.63	149.50	0	D	A	96.3	0.0	0.0	0.0	0.0	68.4	3.5	-2.9	0.0	0.0	4.8	0.0	0.0	22.5
1660	648879.73	4772824.63	149.50	1	D	A	96.3	0.0	0.0	0.0	0.0	68.5	3.6	-2.9	0.0	0.0	14.7	0.0	59.5	-47.0
1662	648879.73	4772824.63	149.50	1	D	A	96.3	0.0	0.0	0.0	0.0	69.0	3.7	-3.0	0.0	0.0	4.8	0.0	32.2	-110.5

Point Source, ISO 9613, Name: "Asphalt Plant - Idling Truck", ID: "ASPH_IDLE_TRK1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1666	648879.52	4772825.56	149.50	0	D	A	96.3	0.0	0.0	0.0	0.0	68.4	3.5	-2.9	0.0	0.0	4.8	0.0	0.0	22.5
1670	648879.52	4772825.56	149.50	1	D	A	96.3	0.0	0.0	0.0	0.0	68.5	3.6	-2.9	0.0	0.0	15.3	0.0	59.6	-47.8
1672	648879.52	4772825.56	149.50	1	D	A	96.3	0.0	0.0	0.0	0.0	69.0	3.7	-3.0	0.0	0.0	4.8	0.0	32.2	-110.4

Sample CadnaA Output - Uppers Quarry - Proposed Phase P4 Southeast

Point Source, ISO 9613, Name: "P4_SE, PP Secondary & Tertiary Screen", ID: "P4_SE_PP_SecondaryTertiaryScreen2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1674	649164.92	4772897.98	149.00	0	D	A	113.8	0.0	0.0	0.0	0.0	64.8	3.0	-2.6	0.0	0.0	11.0	0.0	0.0	37.5

Point Source, ISO 9613, Name: "P4_SE, PP Secondary & Tertiary Screen", ID: "P4_SE_PP_SecondaryTertiaryScreen1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1677	649164.51	4772898.84	149.00	0	D	A	113.8	0.0	0.0	0.0	0.0	64.8	3.0	-2.6	0.0	0.0	10.9	0.0	0.0	37.6

Line Source, ISO 9613, Name: "P4 SE, Aggregate Haul road b/w PP and AP, Empty", ID: "P4_SE_RD_Haul_PP_AP_Em"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1686	649132.52	4772888.09	149.50	0	DEN	A	69.7	13.8	0.0	0.0	0.0	65.3	2.4	-2.5	0.0	0.0	5.1	0.0	0.0	13.3
1688	649079.54	4772851.39	149.50	0	DEN	A	69.7	20.2	0.0	0.0	0.0	65.9	2.5	-2.6	0.0	0.0	4.9	0.0	0.0	19.2
1762	649018.07	4772813.70	149.50	0	DEN	A	69.7	16.0	0.0	0.0	0.0	66.6	2.7	-2.6	0.0	0.0	4.8	0.0	0.0	14.2
1767	648907.31	4772812.89	149.50	0	DEN	A	69.7	17.3	0.0	0.0	0.0	68.1	3.0	-2.7	0.0	0.0	4.8	0.0	0.0	13.8
1769	648907.31	4772812.89	149.50	1	DEN	A	69.7	17.3	0.0	0.0	0.0	68.6	3.2	-2.8	0.0	0.0	4.8	0.0	18.0	-4.9
1770	648907.31	4772812.89	149.50	1	DEN	A	69.7	17.3	0.0	0.0	0.0	68.7	3.2	-2.8	0.0	0.0	4.8	0.0	54.4	-41.3
1772	648907.31	4772812.89	149.50	1	DEN	A	69.7	17.3	0.0	0.0	0.0	68.7	3.2	-2.8	0.0	0.0	4.8	0.0	18.7	-5.6
1774	648907.31	4772812.89	149.50	1	DEN	A	69.7	17.3	0.0	0.0	0.0	68.7	3.2	-2.8	0.0	0.0	4.8	0.0	53.9	-40.8
1779	648954.09	4772802.59	149.50	0	DEN	A	69.7	16.3	0.0	0.0	0.0	67.5	2.9	-2.7	0.0	0.0	4.8	0.0	0.0	13.5
1781	648954.09	4772802.59	149.50	1	DEN	A	69.7	16.3	0.0	0.0	0.0	69.2	3.4	-2.8	0.0	0.0	4.8	0.0	31.8	-120.3
1783	648954.09	4772802.59	149.50	1	DEN	A	69.7	16.3	0.0	0.0	0.0	69.2	3.3	-2.8	0.0	0.0	4.8	0.0	31.3	-119.8
1843	648987.53	4772802.96	149.50	0	DEN	A	69.7	14.0	0.0	0.0	0.0	67.0	2.8	-2.6	0.0	0.0	4.8	0.0	0.0	11.7
1845	648987.53	4772802.96	149.50	1	DEN	A	69.7	14.0	0.0	0.0	0.0	69.5	3.4	-2.8	0.0	0.0	4.8	0.0	36.3	-127.5
1847	648987.53	4772802.96	149.50	1	DEN	A	69.7	14.0	0.0	0.0	0.0	69.5	3.4	-2.8	0.0	0.0	4.8	0.0	35.9	-127.1

Line Source, ISO 9613, Name: "AP, AC and RAP shipped from Offsite, Empty", ID: "AP_RD_SHP_AC_RAP_Em"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1805	648854.10	4772824.67	149.50	0	DEN	A	68.7	17.0	0.0	0.0	0.0	68.7	3.6	-2.6	0.0	0.0	4.7	0.0	0.0	11.3
1807	648854.10	4772824.67	149.50	1	DEN	A	68.7	17.0	0.0	0.0	0.0	68.7	3.6	-2.6	0.0	0.0	4.7	0.0	19.9	-8.6
1852	648748.87	4772829.28	149.50	0	DEN	A	68.7	17.4	0.0	0.0	0.0	69.8	3.9	-2.7	0.0	0.0	4.7	0.0	0.0	10.3
1857	648582.08	4772924.01	187.43	0	DEN	A	68.7	18.4	0.0	0.0	0.0	71.4	4.4	-2.8	0.0	0.0	0.0	0.0	0.0	14.1
1874	648716.72	4772961.26	187.17	0	DEN	A	68.7	17.0	0.0	0.0	0.0	70.4	4.1	-2.8	0.0	0.0	0.0	0.0	0.0	14.0
1886	648724.77	4772924.42	149.50	0	DEN	A	68.7	16.4	0.0	0.0	0.0	70.2	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	8.9
1890	648639.14	4772939.74	187.32	0	DEN	A	68.7	16.9	0.0	0.0	0.0	71.0	4.3	-2.8	0.0	0.0	0.0	0.0	0.0	13.1
1956	648697.76	4772852.98	149.50	0	DEN	A	68.7	6.6	0.0	0.0	0.0	70.3	4.1	-2.7	0.0	0.0	7.2	0.0	0.0	-3.6
1958	648710.76	4772843.05	149.50	0	DEN	A	68.7	14.5	0.0	0.0	0.0	70.2	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	7.0
1967	648816.82	4772822.79	149.50	0	DEN	A	68.7	13.9	0.0	0.0	0.0	69.1	3.7	-2.7	0.0	0.0	4.7	0.0	0.0	7.7
1985	648699.40	4772895.90	149.50	0	DEN	A	68.7	14.4	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	6.7
1987	648696.05	4772880.50	149.50	0	DEN	A	68.7	5.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	6.0	0.0	0.0	-3.2
1989	648695.53	4772878.14	149.50	0	DEN	A	68.7	0.1	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.9	0.0	0.0	-8.8
2035	648754.54	4772953.97	168.09	0	DEN	A	68.7	8.2	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	5.7
2037	648755.32	4772950.00	157.25	0	DEN	A	68.7	12.2	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	4.9
2097	648784.26	4772822.42	149.50	0	DEN	A	68.7	12.4	0.0	0.0	0.0	69.5	3.8	-2.7	0.0	0.0	4.7	0.0	0.0	5.8
2112	648753.70	4772958.16	178.99	0	DEN	A	68.7	12.3	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	9.7
2148	648798.64	4772821.27	149.50	0	DEN	A	68.7	10.7	0.0	0.0	0.0	69.3	3.8	-2.7	0.0	0.0	4.7	0.0	0.0	4.3
2167	648695.49	4772876.08	149.50	0	DEN	A	68.7	5.0	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.9	0.0	0.0	-4.0
2169	648695.63	4772872.62	149.50	0	DEN	A	68.7	5.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-2.0
2172	648695.75	4772869.63	149.50	0	DEN	A	68.7	3.5	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.3
2174	648695.88	4772866.44	149.50	0	DEN	A	68.7	6.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-1.6
2177	648695.98	4772864.08	149.50	0	DEN	A	68.7	-2.5	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-10.2
2200	648526.89	4772909.46	187.86	0	DEN	A	68.7	9.9	0.0	0.0	0.0	71.9	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	5.0
2203	648535.60	4772911.74	187.89	0	DEN	A	68.7	9.1	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	4.3
2231	648749.03	4772936.75	149.50	0	DEN	A	68.7	10.3	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	3.0
2261	648667.84	4772948.21	187.27	0	DEN	A	68.7	10.5	0.0	0.0	0.0	70.8	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	7.0
2274	648695.99	4772861.94	149.50	0	DEN	A	68.7	5.7	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-2.0
2277	648695.98	4772859.00	149.50	0	DEN	A	68.7	3.3	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.4
2280	648695.97	4772857.34	149.50	0	DEN	A	68.7	0.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-7.0
2282	648695.97	4772855.55	149.50	0	DEN	A	68.7	3.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-3.9
2287	648745.25	4772967.66	187.11	0	DEN	A	68.7	9.3	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	6.6
2305	648754.63	4772943.48	149.50	0	DEN	A	68.7	8.9	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	1.7
2308	648511.35	4772905.30	187.89	0	DEN	A	68.7	0.5	0.0	0.0	0.0	72.0	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	-4.6
2310	648516.74	4772906.76	187.87	0	DEN	A	68.7	10.0	0.0	0.0	0.0	71.9	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	5.0



Sample CadnaA Output - Uppers Quarry - Proposed Phase P4 Southeast

Line Source, ISO 9613, Name: "AP, AC and RAP shipped from Offsite, Empty", ID: "AP_RD_SHP_AC_RAP_Em"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
2312	648521.86	4772908.15	187.85	0	DEN	A	68.7	-2.4	0.0	0.0	0.0	71.9	4.6	-2.8	0.0	0.0	0.0	0.0	0.0	-7.3
2331	648751.28	4772964.42	186.95	0	DEN	A	68.7	8.7	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	6.0
2345	648688.63	4772953.85	187.23	0	DEN	A	68.7	8.9	0.0	0.0	0.0	70.6	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	5.7
2395	648703.62	4772912.28	149.50	0	DEN	A	68.7	7.9	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	0.2
2417	648675.54	4772950.43	187.25	0	DEN	A	68.7	6.8	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	3.4
2426	648679.94	4772951.59	187.24	0	DEN	A	68.7	6.3	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	2.9
2445	648683.41	4772952.51	187.24	0	DEN	A	68.7	4.7	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	1.3
2447	648546.64	4772914.67	187.56	0	DEN	A	68.7	5.5	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	0.8
2450	648543.26	4772913.80	187.73	0	DEN	A	68.7	5.4	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	0.7
2470	648540.12	4772912.94	187.89	0	DEN	A	68.7	0.6	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-4.2
2489	648541.33	4772913.29	187.85	0	DEN	A	68.7	-2.9	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-7.7
2493	648540.88	4772913.15	187.87	0	DEN	A	68.7	-3.6	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-8.4

Line Source, ISO 9613, Name: "AP, HMA product shipping, Full", ID: "AP_RD_SHP_HMA_Fu"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1811	648854.16	4772824.66	149.50	0	DEN	A	68.7	17.0	0.0	0.0	0.0	68.7	3.6	-2.6	0.0	0.0	4.7	0.0	0.0	11.3
1813	648854.16	4772824.66	149.50	1	DEN	A	68.7	17.0	0.0	0.0	0.0	68.7	3.6	-2.6	0.0	0.0	4.7	0.0	19.7	-8.4
1849	648748.85	4772829.22	149.50	0	DEN	A	68.7	17.4	0.0	0.0	0.0	69.8	3.9	-2.7	0.0	0.0	4.7	0.0	0.0	10.3
1859	648582.97	4772924.27	187.43	0	DEN	A	68.7	18.4	0.0	0.0	0.0	71.4	4.4	-2.8	0.0	0.0	0.0	0.0	0.0	14.1
1881	648725.03	4772924.56	149.50	0	DEN	A	68.7	16.5	0.0	0.0	0.0	70.2	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	8.9
1891	648639.68	4772939.97	187.32	0	DEN	A	68.7	16.8	0.0	0.0	0.0	71.0	4.3	-2.8	0.0	0.0	0.0	0.0	0.0	13.0
1904	648723.53	4772963.03	187.16	0	DEN	A	68.7	15.6	0.0	0.0	0.0	70.3	4.1	-2.8	0.0	0.0	0.0	0.0	0.0	12.7
1948	648697.82	4772853.01	149.50	0	DEN	A	68.7	6.7	0.0	0.0	0.0	70.3	4.1	-2.7	0.0	0.0	7.2	0.0	0.0	-3.5
1951	648710.78	4772843.00	149.50	0	DEN	A	68.7	14.5	0.0	0.0	0.0	70.2	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	7.0
1962	648816.88	4772822.78	149.50	0	DEN	A	68.7	13.9	0.0	0.0	0.0	69.1	3.7	-2.7	0.0	0.0	4.7	0.0	0.0	7.7
2026	648754.48	4772954.33	168.51	0	DEN	A	68.7	8.8	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	6.2
2029	648755.32	4772950.08	157.24	0	DEN	A	68.7	12.2	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	4.9
2091	648699.84	4772898.02	149.50	0	DEN	A	68.7	13.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	6.0
2100	648784.26	4772822.41	149.50	0	DEN	A	68.7	12.4	0.0	0.0	0.0	69.5	3.8	-2.7	0.0	0.0	4.7	0.0	0.0	5.8
2124	648697.27	4772956.05	187.21	0	DEN	A	68.7	12.6	0.0	0.0	0.0	70.5	4.1	-2.8	0.0	0.0	0.0	0.0	0.0	9.4
2127	648753.63	4772958.48	179.54	0	DEN	A	68.7	12.1	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	9.5
2145	648798.63	4772821.27	149.50	0	DEN	A	68.7	10.7	0.0	0.0	0.0	69.3	3.8	-2.7	0.0	0.0	4.7	0.0	0.0	4.3
2232	648511.15	4772905.35	187.90	0	DEN	A	68.7	0.3	0.0	0.0	0.0	72.0	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	-4.8
2237	648516.59	4772906.79	187.89	0	DEN	A	68.7	10.1	0.0	0.0	0.0	71.9	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	5.0
2239	648523.89	4772908.71	187.88	0	DEN	A	68.7	6.9	0.0	0.0	0.0	71.9	4.6	-2.8	0.0	0.0	0.0	0.0	0.0	2.0
2242	648695.69	4772872.15	149.50	0	DEN	A	68.7	4.5	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-3.2
2244	648695.78	4772869.63	149.50	0	DEN	A	68.7	3.4	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.3
2246	648695.88	4772866.44	149.50	0	DEN	A	68.7	6.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-1.6
2249	648695.97	4772863.86	149.50	0	DEN	A	68.7	0.1	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-7.7
2251	648696.01	4772862.88	149.50	0	DEN	A	68.7	-0.3	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-8.1
2253	648749.20	4772936.85	149.50	0	DEN	A	68.7	10.1	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	2.8
2266	648528.91	4772910.03	187.88	0	DEN	A	68.7	7.4	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	2.5
2267	648535.71	4772911.80	187.90	0	DEN	A	68.7	9.3	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	4.5
2270	648667.98	4772948.31	187.27	0	DEN	A	68.7	10.4	0.0	0.0	0.0	70.8	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	6.9
2290	648745.26	4772967.67	187.11	0	DEN	A	68.7	9.3	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	6.6
2294	648696.86	4772884.38	149.50	0	DEN	A	68.7	6.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-1.6
2297	648696.03	4772880.50	149.50	0	DEN	A	68.7	5.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	6.0	0.0	0.0	-3.2
2300	648695.52	4772878.16	149.50	0	DEN	A	68.7	-0.0	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.9	0.0	0.0	-8.9
2302	648754.63	4772943.46	149.50	0	DEN	A	68.7	8.9	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	1.7
2315	648696.01	4772861.24	149.50	0	DEN	A	68.7	3.7	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.0
2318	648696.00	4772859.00	149.50	0	DEN	A	68.7	3.3	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.4
2321	648695.99	4772857.34	149.50	0	DEN	A	68.7	0.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-7.0
2323	648695.98	4772855.59	149.50	0	DEN	A	68.7	3.6	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.1
2335	648751.26	4772964.46	187.07	0	DEN	A	68.7	8.6	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	6.0
2387	648685.27	4772952.93	187.23	0	DEN	A	68.7	8.3	0.0	0.0	0.0	70.6	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	5.0
2400	648703.70	4772912.42	149.50	0	DEN	A	68.7	7.9	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	0.1
2409	648545.86	4772914.49	187.64	0	DEN	A	68.7	8.6	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	3.9
2414	648675.67	4772950.45	187.25	0	DEN	A	68.7	7.1	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	3.7
2420	648695.50	4772876.09	149.50	0	DEN	A	68.7	5.0	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.9	0.0	0.0	-3.9
2423	648695.62	4772874.04	149.50	0	DEN	A	68.7	-0.3	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-8.0
2434	648680.08	4772951.59	187.24	0	DEN	A	68.7	6.0	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	2.6
2459	648541.57	4772913.36	187.83	0	DEN	A	68.7	0.1	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-4.6

Line Source, ISO 9613, Name: "AP, HMA product shipping, Full", ID: "AP_RD_SHP_HMA_Fu"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
2462	648542.23	4772913.53	187.80	0	DEN	A	68.7	-4.8	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-9.6
2468	648540.46	4772913.06	187.88	0	DEN	A	68.7	1.0	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-3.8

Line Source, ISO 9613, Name: "AP, AC and RAP shipped from Offsite, Full", ID: "AP_RD_SHP_AC_RAP_Fu"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
1817	648855.31	4772823.42	149.50	0	DEN	A	68.7	16.8	0.0	0.0	0.0	68.7	3.6	-2.6	0.0	0.0	4.7	0.0	0.0	11.1
1820	648855.31	4772823.42	149.50	1	DEN	A	68.7	16.8	0.0	0.0	0.0	68.7	3.6	-2.6	0.0	0.0	4.7	0.0	20.8	-9.7
1854	648547.38	4772912.13	187.50	0	DEN	A	68.7	1.1	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-3.6
1855	648582.70	4772921.85	187.43	0	DEN	A	68.7	18.6	0.0	0.0	0.0	71.4	4.4	-2.8	0.0	0.0	0.0	0.0	0.0	14.2
1872	648645.49	4772939.72	187.31	0	DEN	A	68.7	17.7	0.0	0.0	0.0	71.0	4.3	-2.8	0.0	0.0	0.0	0.0	0.0	13.9
1884	648724.08	4772925.26	149.50	0	DEN	A	68.7	16.5	0.0	0.0	0.0	70.2	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	8.9
1906	648761.28	4772825.07	149.50	0	DEN	A	68.7	14.9	0.0	0.0	0.0	69.7	3.9	-2.7	0.0	0.0	4.7	0.0	0.0	8.0
1914	648695.81	4772853.02	149.50	0	DEN	A	68.7	5.0	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	7.1	0.0	0.0	-5.1
1916	648709.29	4772842.40	149.50	0	DEN	A	68.7	14.9	0.0	0.0	0.0	70.2	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	7.4
1924	648818.15	4772821.17	149.50	0	DEN	A	68.7	14.2	0.0	0.0	0.0	69.1	3.7	-2.7	0.0	0.0	4.7	0.0	0.0	8.0
1929	648724.87	4772961.47	187.15	0	DEN	A	68.7	15.4	0.0	0.0	0.0	70.3	4.1	-2.7	0.0	0.0	0.0	0.0	0.0	12.5
1992	648698.23	4772896.28	149.50	0	DEN	A	68.7	14.5	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	6.7
1993	648694.84	4772880.81	149.50	0	DEN	A	68.7	5.6	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.9	0.0	0.0	-3.3
2020	648733.88	4772830.35	149.50	0	DEN	A	68.7	14.0	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	6.8
2065	648694.46	4772876.87	149.50	0	DEN	A	68.7	6.3	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.9	0.0	0.0	-2.6
2067	648694.48	4772872.84	149.50	0	DEN	A	68.7	5.7	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-2.0
2069	648694.49	4772869.87	149.50	0	DEN	A	68.7	3.4	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.3
2070	648694.50	4772866.70	149.50	0	DEN	A	68.7	6.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-1.6
2073	648694.51	4772864.12	149.50	0	DEN	A	68.7	0.1	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-7.7
2076	648694.52	4772861.97	149.50	0	DEN	A	68.7	5.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-2.6
2079	648694.53	4772859.26	149.50	0	DEN	A	68.7	3.3	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.4
2081	648694.54	4772857.59	149.50	0	DEN	A	68.7	0.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-7.0
2084	648694.54	4772855.62	149.50	0	DEN	A	68.7	4.4	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-3.4
2088	648694.55	4772854.13	149.50	0	DEN	A	68.7	-6.0	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	7.0	0.0	0.0	-16.0
2106	648784.43	4772820.67	149.50	0	DEN	A	68.7	12.2	0.0	0.0	0.0	69.4	3.8	-2.7	0.0	0.0	4.7	0.0	0.0	5.6
2118	648699.22	4772954.75	187.20	0	DEN	A	68.7	12.6	0.0	0.0	0.0	70.5	4.1	-2.8	0.0	0.0	0.0	0.0	0.0	9.4
2134	648798.77	4772819.63	149.50	0	DEN	A	68.7	11.0	0.0	0.0	0.0	69.3	3.8	-2.7	0.0	0.0	4.7	0.0	0.0	4.6
2157	648753.09	4772952.75	168.18	0	DEN	A	68.7	8.8	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	6.2
2160	648753.88	4772949.36	162.69	0	DEN	A	68.7	7.4	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	0.1
2179	648524.67	4772905.74	187.85	0	DEN	A	68.7	8.8	0.0	0.0	0.0	71.9	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	3.9
2181	648533.20	4772908.10	187.89	0	DEN	A	68.7	10.0	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	5.2
2183	648538.71	4772909.63	187.91	0	DEN	A	68.7	1.5	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-3.3
2222	648754.34	4772947.36	154.95	0	DEN	A	68.7	10.4	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	3.1
2227	648752.15	4772956.76	176.35	0	DEN	A	68.7	10.3	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	7.8
2256	648748.13	4772937.49	149.50	0	DEN	A	68.7	9.9	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	2.6
2337	648686.51	4772951.37	187.23	0	DEN	A	68.7	9.1	0.0	0.0	0.0	70.6	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	5.8
2341	648753.34	4772943.47	149.50	0	DEN	A	68.7	8.5	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	1.2
2348	648512.04	4772902.19	187.92	0	DEN	A	68.7	4.2	0.0	0.0	0.0	72.0	4.6	-2.6	0.0	0.0	0.0	0.0	0.0	-1.1
2351	648516.09	4772903.34	187.88	0	DEN	A	68.7	7.6	0.0	0.0	0.0	71.9	4.6	-2.6	0.0	0.0	0.0	0.0	0.0	2.5
2353	648519.94	4772904.42	187.85	0	DEN	A	68.7	3.4	0.0	0.0	0.0	71.9	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	-1.7
2372	648744.93	4772965.78	187.11	0	DEN	A	68.7	8.1	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	5.4
2378	648751.44	4772959.80	184.18	0	DEN	A	68.7	7.8	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	5.2
2384	648702.66	4772912.83	149.50	0	DEN	A	68.7	8.1	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	0.3
2397	648749.69	4772963.23	187.06	0	DEN	A	68.7	7.6	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	5.0
2412	648676.12	4772948.70	187.25	0	DEN	A	68.7	7.2	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	3.8
2429	648680.63	4772949.82	187.24	0	DEN	A	68.7	6.1	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	2.7
2452	648545.12	4772911.47	187.61	0	DEN	A	68.7	5.3	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	0.6
2471	648540.35	4772910.13	187.90	0	DEN	A	68.7	-1.1	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-5.9
2478	648541.87	4772910.57	187.82	0	DEN	A	68.7	-1.7	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-6.4
2484	648543.19	4772910.92	187.73	0	DEN	A	68.7	-2.0	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-6.7
2486	648539.68	4772909.92	187.91	0	DEN	A	68.7	-2.0	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-6.8
2491	648542.42	4772910.73	187.78	0	DEN	A	68.7	-3.4	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-8.1
2494	648540.93	4772910.29	187.88	0	DEN	A	68.7	-3.6	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-8.4
2496	648541.34	4772910.41	187.85	0	DEN	A	68.7	-3.7	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-8.4
2498	648542.76	4772910.82	187.76	0	DEN	A	68.7	-5.9	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-10.7

Sample CadnaA Output - Uppers Quarry - Proposed Phase P4 Southeast

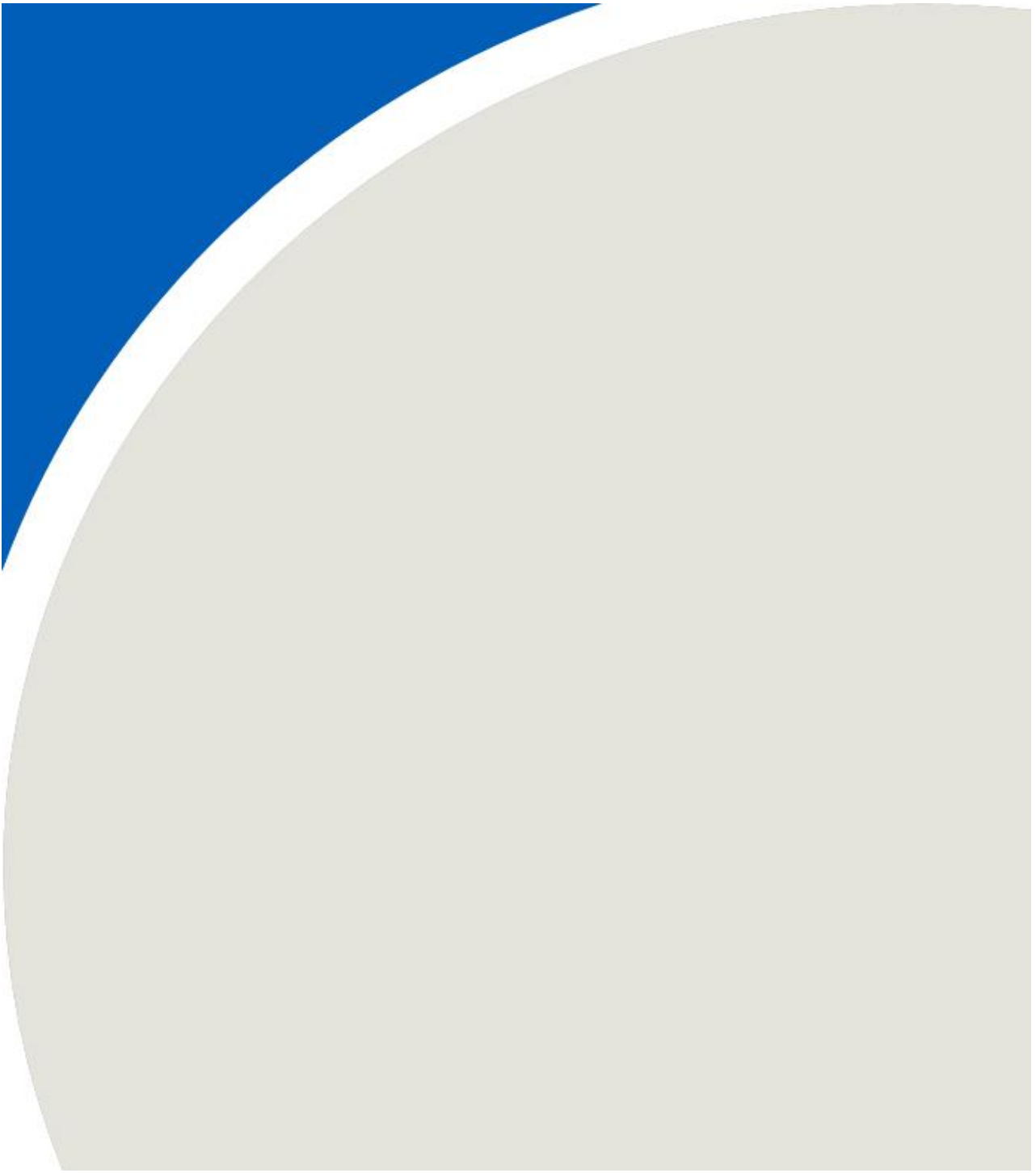
Line Source, ISO 9613, Name: "AP, HMA product shipping, Empty", ID: "AP_RD_SHP_HMA_Em"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1824	648855.34	4772823.41	149.50	0	DEN	A	68.7	16.8	0.0	0.0	0.0	68.7	3.6	-2.6	0.0	0.0	4.7	0.0	0.0	11.1
1826	648855.34	4772823.41	149.50	1	DEN	A	68.7	16.8	0.0	0.0	0.0	68.7	3.6	-2.6	0.0	0.0	4.7	0.0	20.8	-9.7
1839	648547.50	4772912.12	187.50	0	DEN	A	68.7	0.8	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-3.9
1840	648589.87	4772923.90	187.42	0	DEN	A	68.7	19.4	0.0	0.0	0.0	71.4	4.4	-2.8	0.0	0.0	0.0	0.0	0.0	15.1
1876	648718.93	4772959.74	187.17	0	DEN	A	68.7	16.7	0.0	0.0	0.0	70.4	4.1	-2.8	0.0	0.0	0.0	0.0	0.0	13.8
1879	648724.21	4772925.31	149.50	0	DEN	A	68.7	16.5	0.0	0.0	0.0	70.2	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	8.9
1900	648738.26	4772829.50	149.50	0	DEN	A	68.7	15.3	0.0	0.0	0.0	69.9	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	8.1
1909	648695.80	4772853.04	149.50	0	DEN	A	68.7	5.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	7.1	0.0	0.0	-4.9
1911	648709.32	4772842.40	149.50	0	DEN	A	68.7	14.9	0.0	0.0	0.0	70.2	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	7.4
1920	648818.18	4772821.15	149.50	0	DEN	A	68.7	14.2	0.0	0.0	0.0	69.1	3.7	-2.7	0.0	0.0	4.7	0.0	0.0	8.1
1996	648647.85	4772940.38	187.31	0	DEN	A	68.7	15.3	0.0	0.0	0.0	70.9	4.3	-2.8	0.0	0.0	0.0	0.0	0.0	11.6
2025	648765.65	4772824.22	149.50	0	DEN	A	68.7	13.4	0.0	0.0	0.0	69.6	3.9	-2.7	0.0	0.0	4.7	0.0	0.0	6.5
2040	648694.50	4772876.91	149.50	0	DEN	A	68.7	6.4	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.9	0.0	0.0	-2.5
2041	648694.50	4772872.84	149.50	0	DEN	A	68.7	5.7	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-2.0
2043	648694.50	4772869.87	149.50	0	DEN	A	68.7	3.4	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.3
2045	648694.50	4772866.70	149.50	0	DEN	A	68.7	6.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-1.6
2047	648694.50	4772864.12	149.50	0	DEN	A	68.7	0.1	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-7.7
2050	648694.50	4772861.98	149.50	0	DEN	A	68.7	5.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-2.6
2053	648694.51	4772859.26	149.50	0	DEN	A	68.7	3.3	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-4.4
2056	648694.51	4772857.60	149.50	0	DEN	A	68.7	0.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-7.0
2057	648694.51	4772855.63	149.50	0	DEN	A	68.7	4.4	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	-3.4
2062	648694.51	4772854.16	149.50	0	DEN	A	68.7	-6.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	7.0	0.0	0.0	-16.8
2102	648784.46	4772820.67	149.50	0	DEN	A	68.7	12.2	0.0	0.0	0.0	69.4	3.8	-2.7	0.0	0.0	4.7	0.0	0.0	5.6
2115	648699.26	4772900.94	149.50	0	DEN	A	68.7	12.6	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	4.8
2123	648751.95	4772957.69	178.99	0	DEN	A	68.7	12.2	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	9.6
2138	648798.80	4772819.62	149.50	0	DEN	A	68.7	11.0	0.0	0.0	0.0	69.3	3.8	-2.7	0.0	0.0	4.7	0.0	0.0	4.5
2150	648524.34	4772905.67	187.85	0	DEN	A	68.7	9.2	0.0	0.0	0.0	71.9	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	4.2
2153	648533.15	4772908.11	187.89	0	DEN	A	68.7	10.0	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	5.2
2155	648538.89	4772909.71	187.91	0	DEN	A	68.7	2.8	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-2.0
2194	648696.29	4772887.30	149.50	0	DEN	A	68.7	9.8	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	2.1
2197	648694.88	4772880.85	149.50	0	DEN	A	68.7	5.5	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	5.9	0.0	0.0	-3.4
2206	648754.46	4772947.08	155.39	0	DEN	A	68.7	10.7	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	3.5
2259	648748.22	4772937.51	149.50	0	DEN	A	68.7	9.8	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	2.5
2285	648668.80	4772946.67	187.26	0	DEN	A	68.7	10.0	0.0	0.0	0.0	70.8	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	6.5
2328	648692.16	4772952.73	187.22	0	DEN	A	68.7	9.2	0.0	0.0	0.0	70.6	4.1	-2.8	0.0	0.0	0.0	0.0	0.0	5.9
2333	648753.60	4772950.64	161.75	0	DEN	A	68.7	8.6	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	1.3
2355	648752.97	4772953.37	168.21	0	DEN	A	68.7	8.4	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	5.8
2360	648753.26	4772943.23	149.50	0	DEN	A	68.7	8.2	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	0.9
2363	648511.95	4772902.22	187.92	0	DEN	A	68.7	4.1	0.0	0.0	0.0	72.0	4.6	-2.6	0.0	0.0	0.0	0.0	0.0	-1.1
2365	648516.01	4772903.35	187.88	0	DEN	A	68.7	7.7	0.0	0.0	0.0	71.9	4.6	-2.6	0.0	0.0	0.0	0.0	0.0	2.5
2368	648519.59	4772904.35	187.84	0	DEN	A	68.7	2.0	0.0	0.0	0.0	71.9	4.6	-2.7	0.0	0.0	0.0	0.0	0.0	-3.1
2371	648744.87	4772965.78	187.11	0	DEN	A	68.7	8.1	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	5.4
2375	648702.67	4772912.81	149.50	0	DEN	A	68.7	8.2	0.0	0.0	0.0	70.4	4.1	-2.7	0.0	0.0	4.7	0.0	0.0	0.4
2381	648749.68	4772963.17	186.87	0	DEN	A	68.7	7.7	0.0	0.0	0.0	70.1	4.0	-2.7	0.0	0.0	0.0	0.0	0.0	5.1
2406	648685.26	4772951.12	187.23	0	DEN	A	68.7	7.7	0.0	0.0	0.0	70.6	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	4.4
2432	648754.16	4772948.31	159.86	0	DEN	A	68.7	5.4	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	-1.9
2436	648680.53	4772949.89	187.24	0	DEN	A	68.7	5.9	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	2.5
2439	648675.46	4772948.58	187.25	0	DEN	A	68.7	5.9	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	2.5
2455	648545.41	4772911.54	187.59	0	DEN	A	68.7	5.0	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	0.3
2457	648678.00	4772949.23	187.25	0	DEN	A	68.7	1.2	0.0	0.0	0.0	70.7	4.2	-2.8	0.0	0.0	0.0	0.0	0.0	-2.2
2465	648543.27	4772910.96	187.73	0	DEN	A	68.7	1.1	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-3.6
2474	648754.44	4772946.55	149.50	0	DEN	A	68.7	-2.9	0.0	0.0	0.0	70.0	4.0	-2.7	0.0	0.0	4.7	0.0	0.0	-10.1
2476	648542.28	4772910.69	187.79	0	DEN	A	68.7	-1.2	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-5.9
2480	648540.13	4772910.06	187.91	0	DEN	A	68.7	-1.8	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-6.5
2482	648541.60	4772910.48	187.84	0	DEN	A	68.7	-1.8	0.0	0.0	0.0	71.7	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-6.6
2488	648540.71	4772910.22	187.89	0	DEN	A	68.7	-2.6	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-7.3
2499	648541.06	4772910.32	187.87	0	DEN	A	68.7	-7.6	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-12.3
2501	648541.22	4772910.37	187.86	0	DEN	A	68.7	-8.4	0.0	0.0	0.0	71.8	4.5	-2.8	0.0	0.0	0.0	0.0	0.0	-13.2

Point Source, ISO 9613, Name: "P4_SE, PP Tertiary Crusher", ID: "P4_SE_PP_TertiaryCrush2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1999	649163.60	4772897.34	149.00	0	D	A	99.2	0.0	0.0	0.0	0.0	64.8	2.3	-2.4	0.0	0.0	10.3	0.0	0.0	24.2

Sample CadnaA Output - Uppers Quarry - Proposed Phase P4 Southeast

Point Source, ISO 9613, Name: "P4_SE, PP Tertiary Crusher", ID: "P4_SE_PP_TertiaryCrush1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2002	649163.10	4772898.30	149.00	0	D	A	99.2	0.0	0.0	0.0	0.0	64.8	2.3	-2.4	0.0	0.0	10.2	0.0	0.0	24.2

# APPENDIX D



**Table D.1: Noise Source Summary - Alternate Extraction Scenario**  
Upper's Quarry, 1603157

Notes to Table:

- Wherever possible, the Source ID matches the identifiers used in the ESDM report.
- Sound Power Level of Source, in dBA, not including sound characteristic adjustments per NPC-104.
- Source Location: O = Outside of building, including the roof, I = Inside of building.
- Sound Characteristic, per NPC-104:  
 - S = Steady  
 - Q = Quasi-Steady Impulsive  
 - I = Impulsive  
 - B = Buzzing  
 - T = Tonal  
 - C = Cyclic
- Noise control measures currently in place or specified in construction drawings:  
 - S = Silencer/Muffler  
 - A = Acoustic lining, plenum  
 - B = Barrier/Berm  
 - L = Lagging  
 - E = Acoustic enclosure  
 - O = Other  
 - U = Uncontrolled

Where noise control measures are specified in construction drawings or were found on existing equipment, octave band sound power levels include the effects of the noise control measures. Noise control measures recommended in the mitigation section of this report are not included in this table.

**Table 1: Additional Data**  
Upper's Quarry, 1603157

- Source type indicates Cadna/A modelling methodology. For Point, Line, and Area sources, PWLs represent the overall level for the entire source. Where source type is Mobile Equipment, the source is modelled as a moving point source, and PWL is calculated from a single-vehicle passby.
- Sound Power Level Data Source:  
 - Man = Manufacturer's Data  
 - Mea = Measured Directly  
 - Hist = Historical Data on File at RWDI  
 - EC = Engineering Calc based on specifications  
 - Same ### = same type as source no. ###
- For loader dumping into primary crusher, it is assumed each dump takes approximately 10s

Source ID <sup>[1]</sup>	Source Description	Sound Power Level <sup>[2]</sup>	Source Location <sup>[3]</sup>	Sound Characteristics <sup>[4]</sup>	Noise Control Measures <sup>[5]</sup>
		(dBA)	(I or O)	(S,Q,I,B,T,C)	(S,A,B,L,E,O,U)

1/1 Octave Band Sound Power Level Data if available (dB)									Source Type <sup>[6]</sup>	PWL Data Source <sup>[7]</sup>	Height Above Roof	Local Roof Height Ab. Grade	Height Above Grade	Source Co-ordinates for point sources (m)			Operating Time during Worst-case hour for Point Sources, <sup>[8]</sup> OR Vehicle Passby per Hour & Speed for Line Sources		
31.5	63	125	250	500	1000	2000	4000	8000			(m)	(m)	(m)	X	Y	Z	Daytime	Evening	Nighttime

Point Sources																						
Source ID	Description	31.5	63	125	250	500	1000	2000	4000	8000	Type	PWL Source	Height Above Roof (m)	Local Roof Height Ab. Grade (m)	Height Above Grade (m)	X	Y	Z	Daytime	Evening	Nighttime	
AP1B_N_PC_CrusherDump	Alternate P1B North, PC loader dumping into crusher	123			O	S					U											
AP1B_N_PC_Ldr	Alternate P1B North, PC loader	106			O	S					U											
AP1B_N_PC_PrimaryCrush	Alternate P1B North, PC Primary Crusher	118			O	S					U											
AP1B_N_PC_PrimaryScreen	Alternate P1B North, PC Primary Screen	114			O	S					U											
AP1B_N_PP_Ldr	Alternate P1B North, PP loader	106			O	S					U											
AP1B_N_PP_SecondaryCrush1	Alternate P1B North, PP Secondary Crusher	115			O	S					U											
AP1B_N_PP_SecondaryCrush2	Alternate P1B North, PP Secondary Crusher	115			O	S					U											
AP1B_N_PP_SecondaryTertiaryScreen1	Alternate P1B North, PP Secondary & Tertiary Screen	114			O	S					U											
AP1B_N_PP_SecondaryTertiaryScreen2	Alternate P1B North, PP Secondary & Tertiary Screen	114			O	S					U											
AP1B_N_PP_TertiaryCrush1	Alternate P1B North, PP Tertiary Crusher	99			O	S					U											
AP1B_N_PP_TertiaryCrush2	Alternate P1B North, PP Tertiary Crusher	99			O	S					U											
AP1B_N_PP_Trk1	Alternate P1B North, PP Idling Truck	96			O	S					U											
AP1B_N_PP_Trk2	Alternate P1B North, PP Idling Truck	96			O	S					U											
AP1B_N_WF_Drill	Alternate P1B North, WF Drill	110			O	S					U											
AP2_NE_PC_CrusherDump	Alternate P2 NE, PC loader dumping into crusher	123			O	S					U											
AP2_NE_PC_Ldr	Alternate P2 NE, PC loader	106			O	S					U											
AP2_NE_PC_PrimaryCrush	Alternate P2 NE, PC Primary Crusher	118			O	S					U											
AP2_NE_PC_PrimaryScreen	Alternate P2 NE, PC Primary Screen	114			O	S					U											
AP2_NE_PP_Ldr	Alternate P2 NE, PP loader	106			O	S					U											
AP2_NE_PP_SecondaryCrush1	Alternate P2 NE, PP Secondary Crusher	115			O	S					U											
AP2_NE_PP_SecondaryCrush2	Alternate P2 NE, PP Secondary Crusher	115			O	S					U											
AP2_NE_PP_SecondaryTertiaryScreen1	Alternate P2 NE, PP Secondary & Tertiary Screen	114			O	S					U											
AP2_NE_PP_SecondaryTertiaryScreen2	Alternate P2 NE, PP Secondary & Tertiary Screen	114			O	S					U											
AP2_NE_PP_TertiaryCrush1	Alternate P2 NE, PP Tertiary Crusher	99			O	S					U											
AP2_NE_PP_TertiaryCrush2	Alternate P2 NE, PP Tertiary Crusher	99			O	S					U											
AP2_NE_PP_Trk1	Alternate P2 NE, PP Idling Truck	96			O	S					U											
AP2_NE_PP_Trk2	Alternate P2 NE, PP Idling Truck	96			O	S					U											
AP2_NE_WF_Drill	Alternate P2 NE, WF Drill	110			O	S					U											
AP3_SE_PC_CrusherDump	Alternate P3 SE, PC loader dumping into crusher	123			O	S					U											
AP3_SE_PC_Ldr	Alternate P3 SE, PC Loader	106			O	S					U											
AP3_SE_PC_PrimaryCrush	Alternate P3 SE, PC Primary Crusher	118			O	S					U											
AP3_SE_PC_PrimaryScreen	Alternate P3 SE, PC Primary Screen	114			O	S					U											

**Table D.1: Noise Source Summary - Alternate Extraction Scenario**  
Upper's Quarry, 1603157

Notes to Table:

- Wherever possible, the Source ID matches the identifiers used in the ESDM report.
- Sound Power Level of Source, in dBA, not including sound characteristic adjustments per NPC-104.
- Source Location: O = Outside of building, including the roof, I = Inside of building.
- Sound Characteristic, per NPC-104:  
 - S = Steady  
 - Q = Quasi-Steady Impulsive  
 - I = Impulsive  
 - B = Buzzing  
 - T = Tonal  
 - C = Cyclic
- Noise control measures currently in place or specified in construction drawings:  
 - S = Silencer/Muffler  
 - A = Acoustic lining, plenum  
 - B = Barrier/Berm  
 - L = Lagging  
 - E = Acoustic enclosure  
 - O = Other  
 - U = Uncontrolled

Where noise control measures are specified in construction drawings or were found on existing equipment, octave band sound power levels include the effects of the noise control measures. Noise control measures recommended in the mitigation section of this report are not included in this table.

**Table 1: Additional Data**  
Upper's Quarry, 1603157

- Source type indicates Cadna/A modelling methodology. For Point, Line, and Area sources, PWLs represent the overall level for the entire source. Where source type is Mobile Equipment, the source is modelled as a moving point source, and PWL is calculated from a single-vehicle passby.
- Sound Power Level Data Source:  
 - Man = Manufacturer's Data  
 - Mea = Measured Directly  
 - Hist = Historical Data on File at RWDI  
 - EC = Engineering Calc based on specifications  
 - Same ### = same type as source no. ###
- For loader dumping into primary crusher, it is assumed each dump takes approximately 10s

Source ID <sup>[1]</sup>	Source Description	Sound Power Level <sup>[2]</sup>	Source Location <sup>[3]</sup>	Sound Characteristics <sup>[4]</sup>	Noise Control Measures <sup>[5]</sup>
		(dBA)	(I or O)	(S,Q,I,B,T,C)	(S,A,B,L,E,O,U)
AP3_SE_PP_Ldr	Alternate P3 SE, PP Loader	106	O	S	U
AP3_SE_PP_SecondaryCrush1	Alternate P3 SE, PP Secondary Crusher	115	O	S	U
AP3_SE_PP_SecondaryCrush2	Alternate P3 SE, PP Secondary Crusher	115	O	S	U
AP3_SE_PP_SecondaryTertiaryScreen1	Alternate P3 SE, PP Secondary & Tertiary Screen	114	O	S	U
AP3_SE_PP_SecondaryTertiaryScreen2	Alternate P3 SE, PP Secondary & Tertiary Screen	114	O	S	U
AP3_SE_PP_TertiaryCrush1	Alternate P3 SE, PP Tertiary Crusher	99	O	S	U
AP3_SE_PP_TertiaryCrush2	Alternate P3 SE, PP Tertiary Crusher	99	O	S	U
AP3_SE_PP_Trk1	Alternate P3 SE, PP Idling Truck	96	O	S	U
AP3_SE_PP_Trk2	Alternate P3 SE, PP Idling Truck	96	O	S	U
AP3_SE_WF_Drill	Alternate P3 SE, WF Drill	110	O	S	U
ASPH_comp	Asphalt Plant - Compressor Vent	96	O	S	U
ASPH_DC_m	Asphalt Plant - Dust Collector Blower (motor)	105	O	S	U
ASPH_DC_s	Asphalt Plant - Dust Collector Blower (stack)	110	O	S	U
ASPH_elev	Asphalt Plant - Elevator Motor	100	O	S	U
ASPH_IDLE_TRK1	Asphalt Plant - Idling Truck	96	O	S	U
ASPH_IDLE_TRK2	Asphalt Plant - Idling Truck	96	O	S	U
ASPH_imp_silo	Asphalt Plant - Silo - Impulsive	127	O	I	U
ASPH_Ldr_Act1	Asphalt Plant - Loader Activity	102	O	S	U
ASPH_Ldr_Act2	Asphalt Plant - Loader Activity	102	O	S	U
ASPH_motor	Asphalt Plant - Conveyor motor, gravel hitting metal plate	107	O	S	U
ASPH_oven	Asphalt Plant - Oven Motor	102	O	S	U
ASPH_pugdoor	Asphalt Plant - Pug Mill door (pressure relief noise)	107	O	S	U
ASPH_pugmill	Asphalt Plant - Pug Mill Motor	105	O	S	U

1/1 Octave Band Sound Power Level Data if available (dB)										Source Type <sup>[6]</sup>	PWL Data Source <sup>[7]</sup>	Height Above Roof (m)	Local Roof Height Ab. Grade (m)	Height Above Grade (m)	Source Co-ordinates for point sources (m)			Operating Time during Worst-case hour for Point Sources, <sup>[8]</sup> OR Vehicle Passby per Hour & Speed for Line Sources		
31.5	63	125	250	500	1000	2000	4000	8000	X						Y	Z	Daytime	Evening	Nighttime	
102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	649152	4772897	147.5	60 min	60 min	60 min	
102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	649166	4772899	148.0	60 min	-	-	
102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	649166	4772898	148.0	60 min	-	-	
111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	649165	4772899	148.0	60 min	-	-	
111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	649165	4772898	148.0	60 min	-	-	
103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	649163	4772897	148.0	60 min	-	-	
101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	649143	4772895	148.0	60 min	60 min	60 min	
101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	649142	4772897	148.0	60 min	60 min	60 min	
96.8	101.2	99.3	96.9	102.5	104.3	104.4	102.0	99.5	Point	Hist	-	-	2.5	649512	4772788	180.5	60 min	-	-	
91.4	88.5	99.4	96.2	93.0	90.2	87.4	84.9	81.3	Point	Hist	-	-	0.6	648875	4772829	143.6	60 min	60 min	60 min	
110.8	113.6	105.4	104.1	102.2	99.8	94.9	93.4	91.5	Point	Hist	-	-	2.0	648856	4772826	145.0	60 min	60 min	60 min	
125.3	126.2	117.0	110.0	105.8	103.5	98.5	93.6	86.1	Point	Hist	0.1	20.0	20.1	648855	4772826	163.1	60 min	60 min	60 min	
95.7	97.7	95.1	95.2	97.8	95.5	91.5	87.3	77.2	Point	Hist	-	-	19.0	648861	4772835	162.0	60 min	60 min	60 min	
101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.5	648880	4772826	146.5	60 min	60 min	60 min	
101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.5	648880	4772825	146.5	60 min	60 min	60 min	
122.0	127.9	114.5	107.6	106.6	108.5	117.9	122.3	123.2	Point	Hist	1.0	21.0	22.0	648888	4772842	165.0	60 min	60 min	60 min	
103.6	109.2	104.1	99.2	97.3	95.8	94.2	93.1	88.0	Point	Hist	-	-	2.5	648870	4772830	145.5	60 min	60 min	60 min	
103.6	109.2	104.1	99.2	97.3	95.8	94.2	93.1	88.0	Point	Hist	-	-	2.5	648864	4772827	145.5	60 min	60 min	60 min	
100.5	102.5	94.2	95.5	98.9	103.0	102.0	95.1	91.4	Point	Hist	-	-	4.0	648854	4772834	147.0	60 min	60 min	60 min	
111.4	110.7	104.0	100.1	98.3	97.8	93.9	91.9	89.9	Point	Hist	-	-	5.8	648858	4772832	148.8	60 min	60 min	60 min	
114.6	112.8	109.9	106.3	105.2	101.2	96.8	94.9	93.4	Point	Hist	-	-	4.0	648863	4772834	147.0	60 min	60 min	60 min	
0.0	105.0	104.6	100.8	94.8	94.7	96.6	99.5	99.3	Point	Hist	-	-	5.0	648870	4772837	148.0	60 min	60 min	60 min	

Source ID	Source Description	Sound Power Level (dBA)	Source Location (I or O)	Sound Characteristics (S,Q,I,B,T,C)	Noise Control Measures (S,A,B,L,E,O,U)
AP1B_N_Conveyor	Alternate P1B North, Conveyor	83	O	S	U
AP1B_N_RD_Haul_PP_AP_Em	Alternate P1B North, Aggregate Haul road b/w PP and AP, Empty	108	O	S	U
AP1B_N_RD_Haul_PP_AP_Fu	Alternate P1B North, Aggregate Haul road b/w PP and AP, Full	112	O	S	U
AP1B_N_RD_SHP_Aggr_Em	Alternate P1B North, Aggregate Shipping from PP, Empty	104	O	S	U
AP1B_N_RD_SHP_Aggr_Fu	Alternate P1B North, Aggregate Shipping from PP, Full	104	O	S	U
AP2_NE_Conveyor	Alternate P2 NE, Conveyor	83	O	S	U
AP2_NE_RD_Haul_PP_AP_Em	Alternate P2 NE, Aggregate Haul road b/w PP and AP, Empty	108	O	S	U
AP2_NE_RD_Haul_PP_AP_Fu	Alternate P2 NE, Aggregate Haul road b/w PP and AP, Full	112	O	S	U
AP2_NE_RD_SHP_Aggr_Em	Alternate P2 NE, Aggregate Shipping from PP, Empty	104	O	S	U
AP2_NE_RD_SHP_Aggr_Fu	Alternate P2 NE, Aggregate Shipping from PP, Full	104	O	S	U
AP3_SE_Conveyor	Alternate P3 SE, Conveyor	83	O	S	U
AP3_SE_RD_Haul_PP_AP_Em	Alternate P3 SE, Aggregate Haul road b/w PP and AP, Empty	108	O	S	U
AP3_SE_RD_Haul_PP_AP_Fu	Alternate P3 SE, Aggregate Haul road b/w PP and AP, Full	112	O	S	U
AP3_SE_RD_SHP_Aggr_Em	Alternate P3 SE, Aggregate Shipping from PP, Empty	104	O	S	U
AP3_SE_RD_SHP_Aggr_Fu	Alternate P3 SE, Aggregate Shipping from PP, Full	104	O	S	U
AP_RD_SHP_AC_RAP_Em	AP, AC and RAP shipped from Offsite, Empty	104	O	S	U
AP_RD_SHP_AC_RAP_Fu	AP, AC and RAP shipped from Offsite, Full	104	O	S	U
AP_RD_SHP_HMA_Em	AP, HMA product shipping, Empty	104	O	S	U
AP_RD_SHP_HMA_Fu	AP, HMA product shipping, Full	104	O	S	U

Line Sources										Source Type	PWL Data Source	Height Above Roof (m)	Local Roof Height Ab. Grade (m)	Height Above Grade (m)	Source Co-ordinates for point sources (m)			Operating Time during Worst-case hour for Point Sources, <sup>[8]</sup> OR Vehicle Passby per Hour & Speed for Line Sources		
74.5	75.5	79.0	77.3	78.8	79.2	75.6	69.1	58.5	X						Y	Z	Daytime	Evening	Nighttime	
74.5	75.5	79.0	77.3	78.8	79.2	75.6	69.1	58.5	Line	Hist	-	-	3.5	-	-	-	60 min	-	-	
110.2	113.9	109.7	105.1	104.6	102.7	101.6	92.5	89.4	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph	
108.8	108.3	109.9	109.0	106.2	108.2	104.3	98.4	94.8	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph	
107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph	
107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph	
74.5	75.5	79.0	77.3	78.8	79.2	75.6	69.1	58.5	Line	Hist	-	-	3.5	-	-	-	60 min	-	-	
110.2	113.9	109.7	105.1	104.6	102.7	101.6	92.5	89.4	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph	
108.8	108.3	109.9	109.0	106.2	108.2	104.3	98.4	94.8	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph	
107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph	
107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph	
107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	6/hr, 20kph	6/hr, 20kph	6/hr, 20kph	
107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	6/hr, 20kph	6/hr, 20kph	6/hr, 20kph	
107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	6/hr, 20kph	6/hr, 20kph	6/hr, 20kph	
107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	6/hr, 20kph	6/hr, 20kph	6/hr, 20kph	

**Table D.2a: Acoustic Assessment Summary, Alternate Phase 1B North**

Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCofA Guide.
- 1. "Continuous" noise sources includes sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300. Impulsive and emergency noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Continuous" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M/ D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	47	No	50	D	Yes	648766	4773660	4.5
		Evening	39	No	50		Yes			
		Nighttime	39	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	46	No	50	D	Yes	648766	4773629	1.5
		Evening	37	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	40	No	50	D	Yes	649394	4773728	4.5
		Evening	33	No	50		Yes			
		Nighttime	33	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	38	No	50	D	Yes	649391	4773698	1.5
		Evening	28	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	37	No	50	D	Yes	649571	4773645	4.5
		Evening	32	No	50		Yes			
		Nighttime	32	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	35	No	50	D	Yes	649553	4773620	1.5
		Evening	27	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	37	No	50	D	Yes	649611	4772698	4.5
		Evening	33	No	50		Yes			
		Nighttime	33	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	30	No	50	D	Yes	649594	4772727	1.5
		Evening	27	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	38	No	50	D	Yes	649553	4772408	4.5
		Evening	30	No	50		Yes			
		Nighttime	30	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	32	No	50	D	Yes	649532	4772429	1.5
		Evening	29	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	38	No	50	D	Yes	649084	4771672	4.5
		Evening	30	No	50		Yes			
		Nighttime	30	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	37	No	50	D	Yes	649070	4771693	1.5
		Evening	30	No	45		Yes			



**Table D.2b: Acoustic Assessment Summary, Alternate Phase 2 Northeast**

Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCofA Guide.
- 1. "Continuous" noise sources includes sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300. Impulsive and emergency noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Continuous" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M/ D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	46	No	50	D	Yes	648766	4773660	4.5
		Evening	41	No	50		Yes			
		Nighttime	41	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	45	No	50	D	Yes	648766	4773629	1.5
		Evening	40	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	47	No	50	D	Yes	649394	4773728	4.5
		Evening	35	No	50		Yes			
		Nighttime	35	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	45	No	50	D	Yes	649391	4773698	1.5
		Evening	34	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	48	No	50	D	Yes	649571	4773645	4.5
		Evening	36	No	50		Yes			
		Nighttime	36	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	48	No	50	D	Yes	649553	4773620	1.5
		Evening	33	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	48	No	50	D	Yes	649611	4772698	4.5
		Evening	36	No	50		Yes			
		Nighttime	36	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	44	No	50	D	Yes	649594	4772727	1.5
		Evening	30	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	45	No	50	D	Yes	649553	4772408	4.5
		Evening	32	No	50		Yes			
		Nighttime	32	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	43	No	50	D	Yes	649532	4772429	1.5
		Evening	31	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	40	No	50	D	Yes	649084	4771672	4.5
		Evening	31	No	50		Yes			
		Nighttime	31	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	39	No	50	D	Yes	649070	4771693	1.5
		Evening	31	No	45		Yes			

**Table D.2c: Acoustic Assessment Summary, Alternate Phase 3 Southeast**

Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCoFA Guide.
- 1. "Continuous" noise sources includes sum of steady, quasi-steady impulsive, tonal, cyclical and buzzing noise sources, with appropriate penalties applied, in accordance with documents NPC-104 and NPC-300. Impulsive and emergency noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Continuous" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M/ D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	48	No	50	D	Yes	648766	4773660	4.5
		Evening	41	No	50		Yes			
		Nighttime	41	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	47	No	50	D	Yes	648766	4773629	1.5
		Evening	40	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	47	No	50	D	Yes	649394	4773728	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	45	No	50	D	Yes	649391	4773698	1.5
		Evening	37	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	47	No	50	D	Yes	649571	4773645	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	46	No	50	D	Yes	649553	4773620	1.5
		Evening	37	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	49	No	50	D	Yes	649611	4772698	4.5
		Evening	41	No	50		Yes			
		Nighttime	41	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	48	No	50	D	Yes	649594	4772727	1.5
		Evening	40	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	43	No	50	D	Yes	649553	4772408	4.5
		Evening	40	No	50		Yes			
		Nighttime	40	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	42	No	50	D	Yes	649532	4772429	1.5
		Evening	39	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	42	No	50	D	Yes	649084	4771672	4.5
		Evening	37	No	50		Yes			
		Nighttime	37	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	41	No	50	D	Yes	649070	4771693	1.5
		Evening	36	No	45		Yes			

**Table D.2d: Acoustic Assessment Summary, Alternate Scenario Impulsive Source**

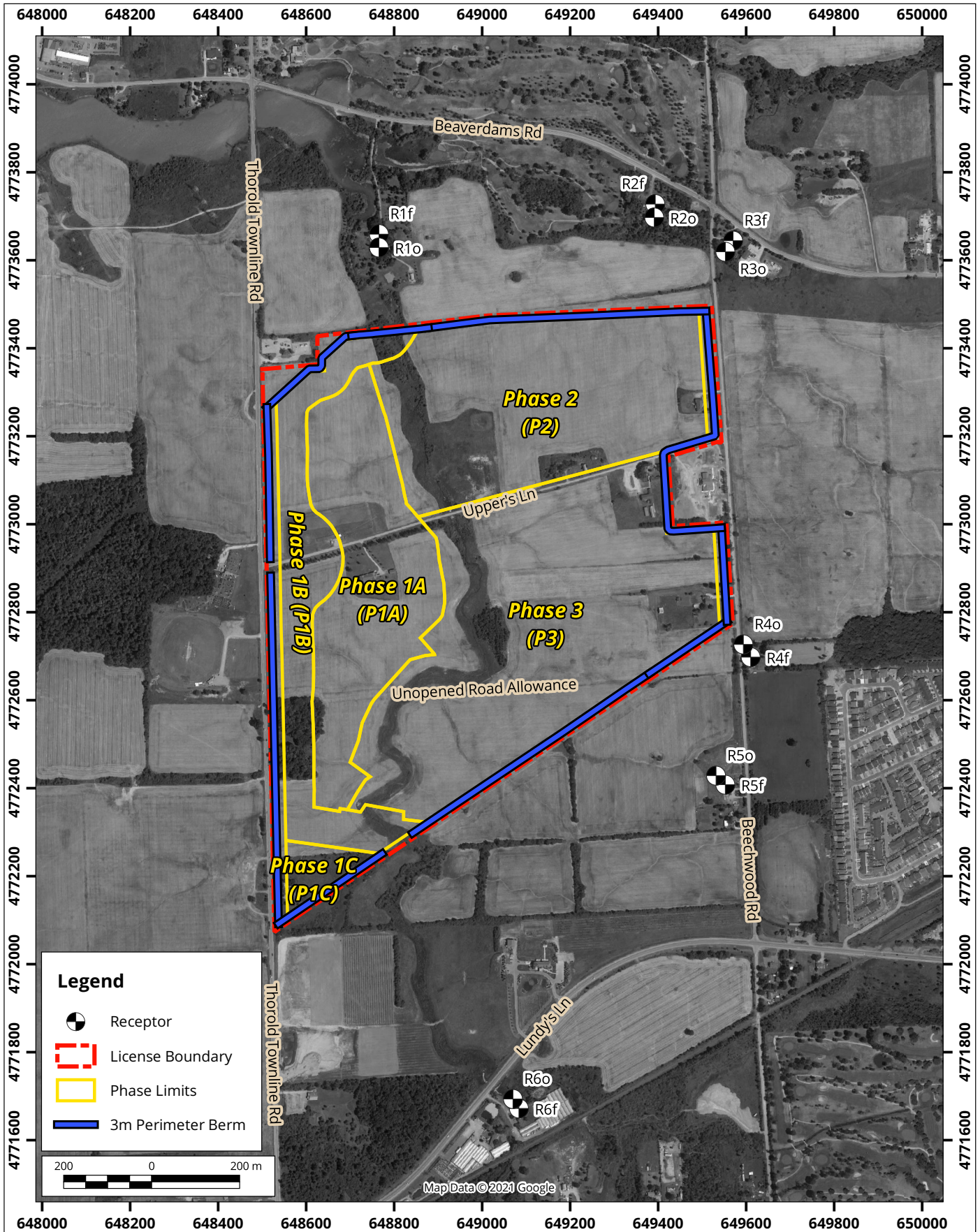
Upper's Quarry, 1603157

## Notes to Table:

- "Table A3" in Appendix A of Basic CCoFA Guide.
- 1. Impulsive noise sources are assessed separately from continuous noise sources.
- 2. Daytime occurs from 0700-1900h. Evening occurs from 1900h-2300h. Nighttime occurs from 2300-0700h.
- 3. Worst-case cumulative sound level from all applicable sources operating.
- 4. Has an acoustic audit (as defined in Publication NPC-233) been conducted with source in place and operating?
- 5. Applicable worst-case NPC-300 sound level limit, based on more than 9 impulses per hour in a Class 2 area.
- 6. Performance limit (aka guideline limit) based on following:
  - C = Calculated based on road traffic volumes in compliance with NPC-206 requirements.
  - M = Measured based on monitoring for a minimum 48 hour period, in accordance with NPC-233 requirements.
  - D = Default guideline minima per NPC-300.

**Assessment of Impacts for "Impulsive" Noise Sources <sup>[1]</sup>**

Point of Reception ID	Point of Reception Description	Time Period <sup>[2]</sup>	Total Sound Level at PoR <sup>[3]</sup> (dBA)	Verified by Acoustic Audit <sup>[4]</sup> (Yes/No)	Performance Limit <sup>[5]</sup> (dBA)	Performance Limit Source <sup>[6]</sup> (C / M/ D)	Compliance with Performance Limit (Yes/No)	UTM Coordinate (Zone 17N)		Height Relative to Local Grade (m)
								X (m)	Y (m)	
R1f	Facade of dwelling (10148 Beaverdams Rd)	Daytime	41	No	50	D	Yes	648766	4773660	4.5
		Evening	41	No	50		Yes			
		Nighttime	41	No	45		Yes			
R1o	Outdoor area of dwelling (10148 Beaverdams Rd)	Daytime	41	No	50	D	Yes	648766	4773629	1.5
		Evening	41	No	45		Yes			
R2f	Facade of dwelling (9722 Beaverdams Rd)	Daytime	38	No	50	D	Yes	649394	4773728	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R2o	Outdoor area of dwelling (9722 Beaverdams Rd)	Daytime	38	No	50	D	Yes	649391	4773698	1.5
		Evening	38	No	45		Yes			
R3f	Facade of dwelling (9602 Beaverdams Rd)	Daytime	38	No	50	D	Yes	649571	4773645	4.5
		Evening	38	No	50		Yes			
		Nighttime	38	No	45		Yes			
R3o	Outdoor area of dwelling (9602 Beaverdams Rd)	Daytime	38	No	50	D	Yes	649553	4773620	1.5
		Evening	38	No	45		Yes			
R4f	Facade of dwelling (5584 Beechwood Rd)	Daytime	42	No	50	D	Yes	649611	4772698	4.5
		Evening	42	No	50		Yes			
		Nighttime	42	No	45		Yes			
R4o	Outdoor area of dwelling (5584 Beechwood Rd)	Daytime	43	No	50	D	Yes	649594	4772727	1.5
		Evening	43	No	45		Yes			
R5f	Facade of dwelling (5769 Beechwood Rd)	Daytime	41	No	50	D	Yes	649553	4772408	4.5
		Evening	41	No	50		Yes			
		Nighttime	41	No	45		Yes			
R5o	Outdoor area of dwelling (5769 Beechwood Rd)	Daytime	42	No	50	D	Yes	649532	4772429	1.5
		Evening	42	No	45		Yes			
R6f	Facade of dwelling (9944 Lundy's Ln)	Daytime	35	No	50	D	Yes	649084	4771672	4.5
		Evening	35	No	50		Yes			
		Nighttime	35	No	45		Yes			
R6o	Outdoor area of dwelling (9944 Lundy's Ln)	Daytime	36	No	50	D	Yes	649070	4771693	1.5
		Evening	36	No	45		Yes			



## Site Overview and Sensitive Receptor Locations Alternate Extraction Scenario

True North



Drawn by: RNL | Figure: D.1

Approx. Scale: 1:12000

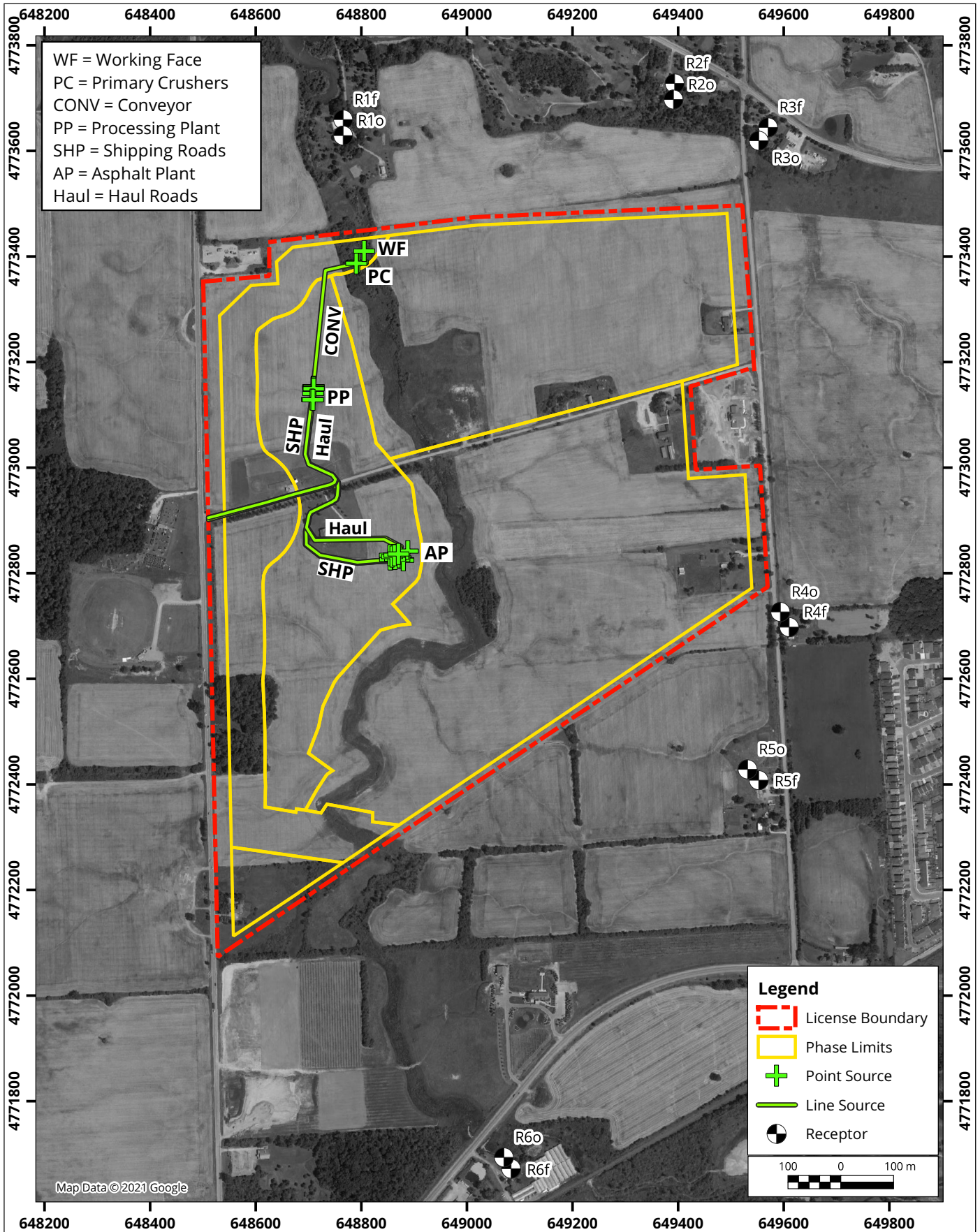
Date Revised: Sep 22, 2021



Map Projection: NAD 1983 UTM Zone 17N

Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157



## Alternate Phase 1B North Operation Overview

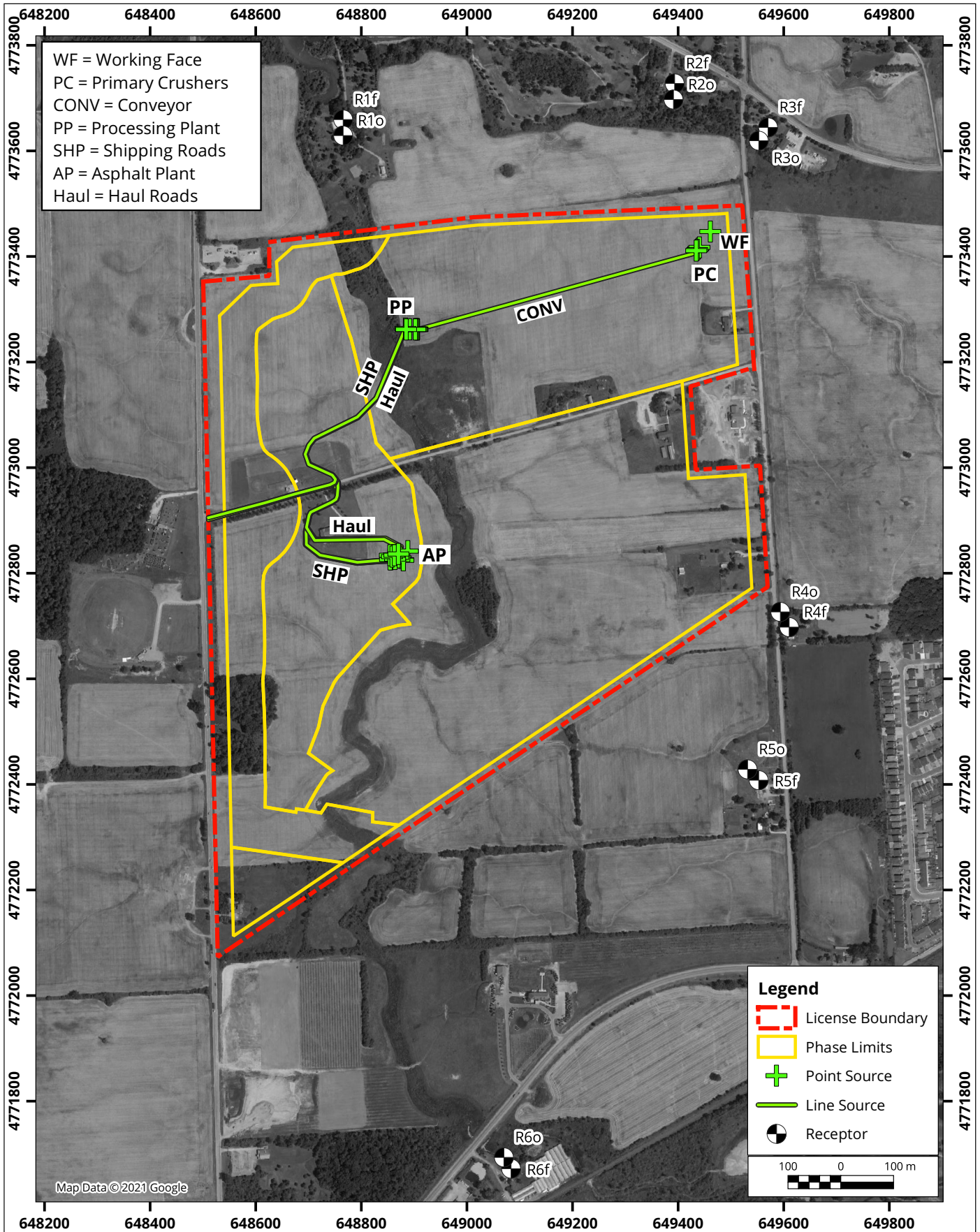
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: D.2a
Approx. Scale: 1:10000	
Date Revised: Sep 22, 2021	





## Alternate Phase 2 Northeast Operation Overview

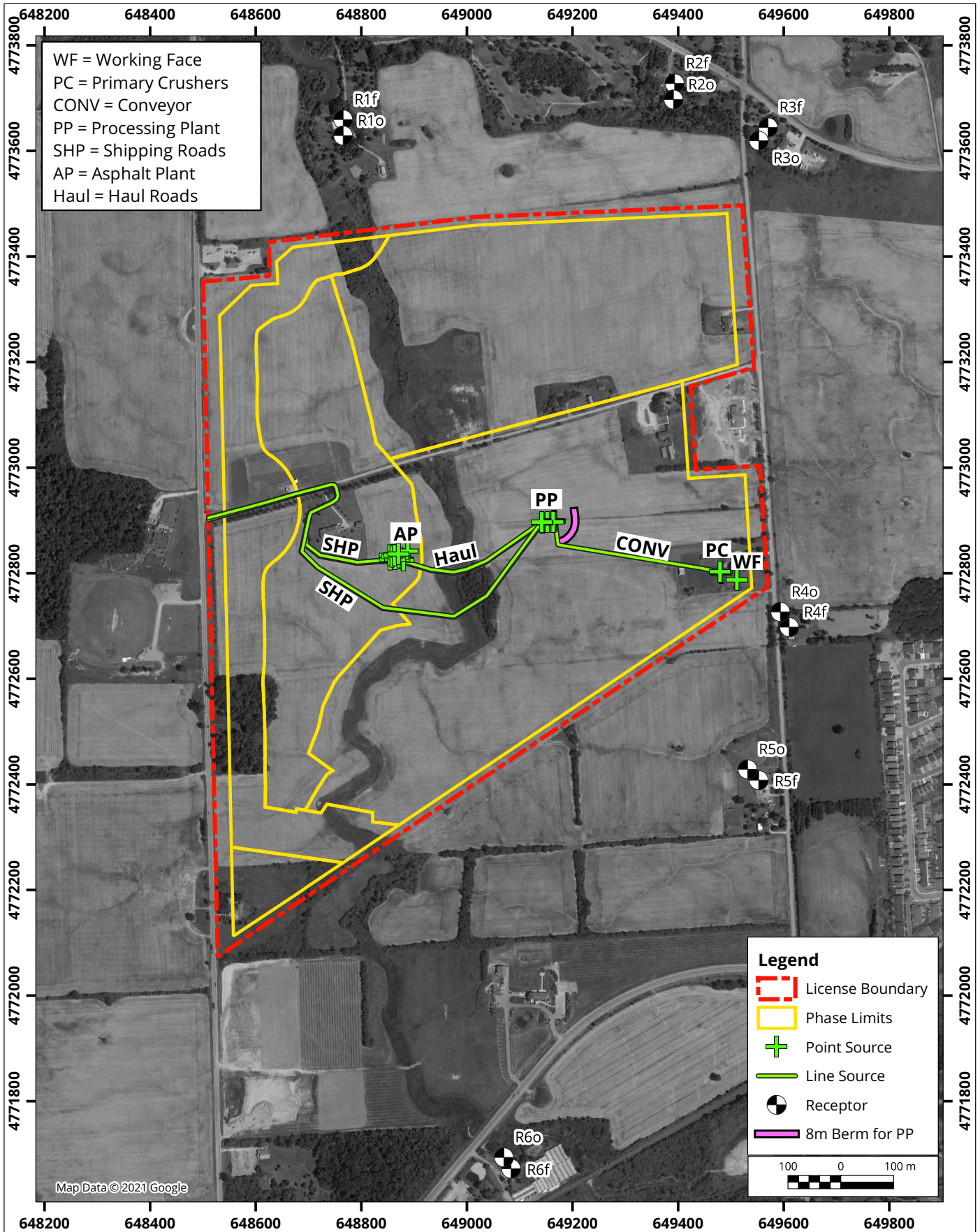
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: D.2b
Approx. Scale: 1:10000	
Date Revised: Sep 22, 2021	





WF = Working Face  
 PC = Primary Crushers  
 CONV = Conveyor  
 PP = Processing Plant  
 SHP = Shipping Roads  
 AP = Asphalt Plant  
 Haul = Haul Roads

**Legend**

- License Boundary
- Phase Limits
- + Point Source
- Line Source
- Receptor
- 8m Berm for PP

100 0 100 m

## Alternate Phase 3 Southeast Operation Overview

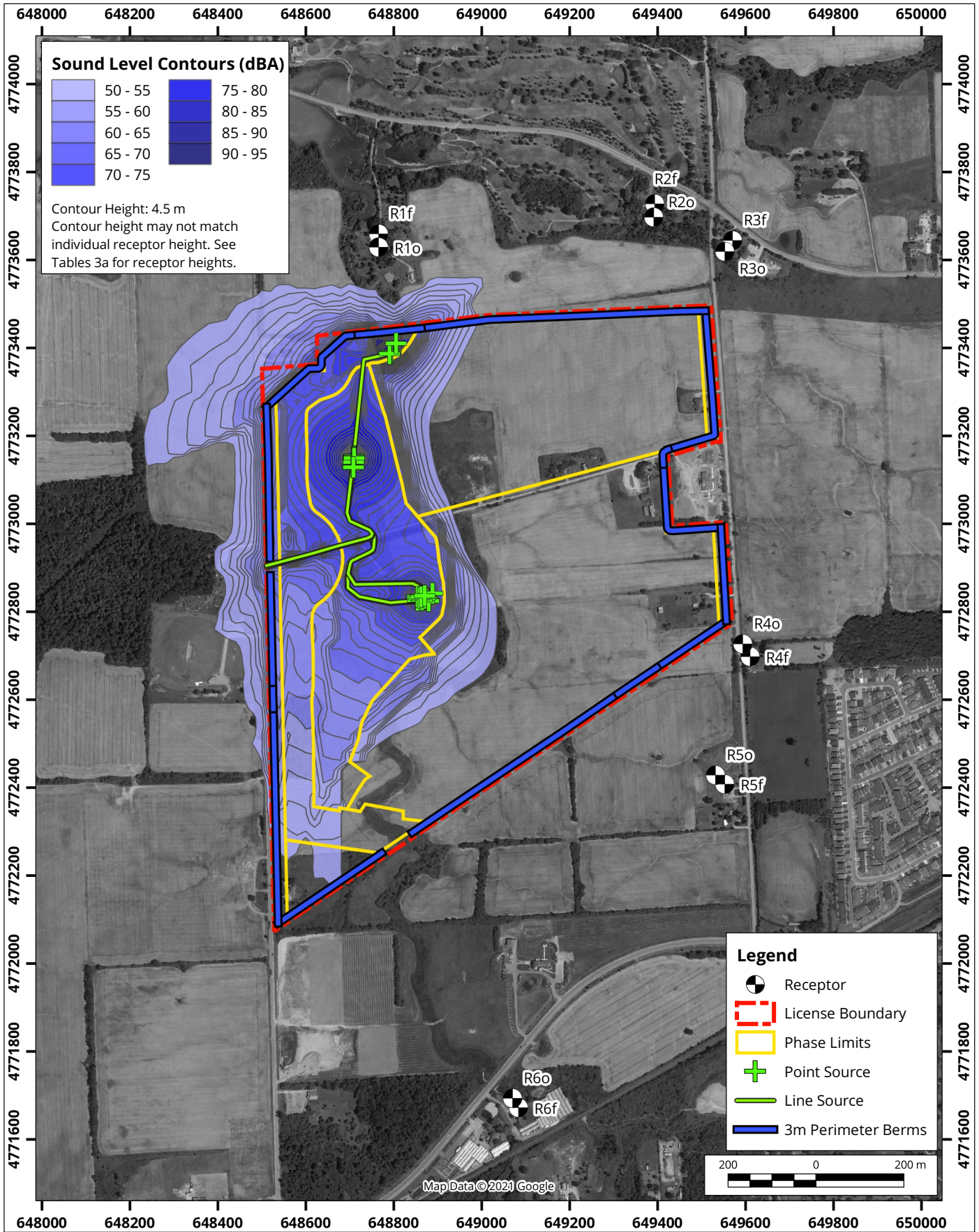
Map Projection: NAD 1983 UTM Zone 17N  
 Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: D.2c
Approx. Scale: 1:10000	
Date Revised: Sep 22, 2021	





## Sound Level Contours Alternate Phase 1B North, Daytime

Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

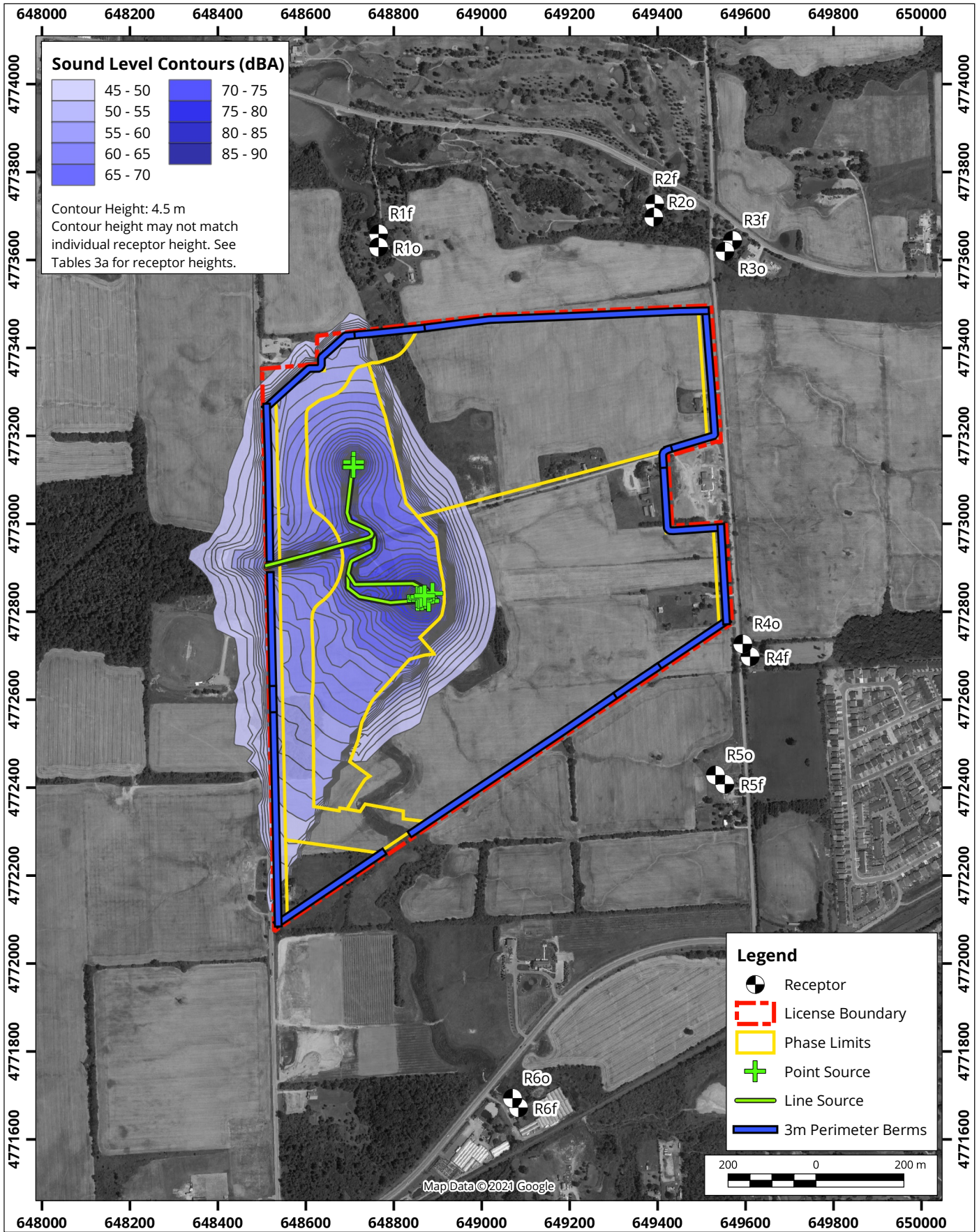


Project #: 1603157

Drawn by: RNL	Figure: D.3a
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	








# Sound Level Contours

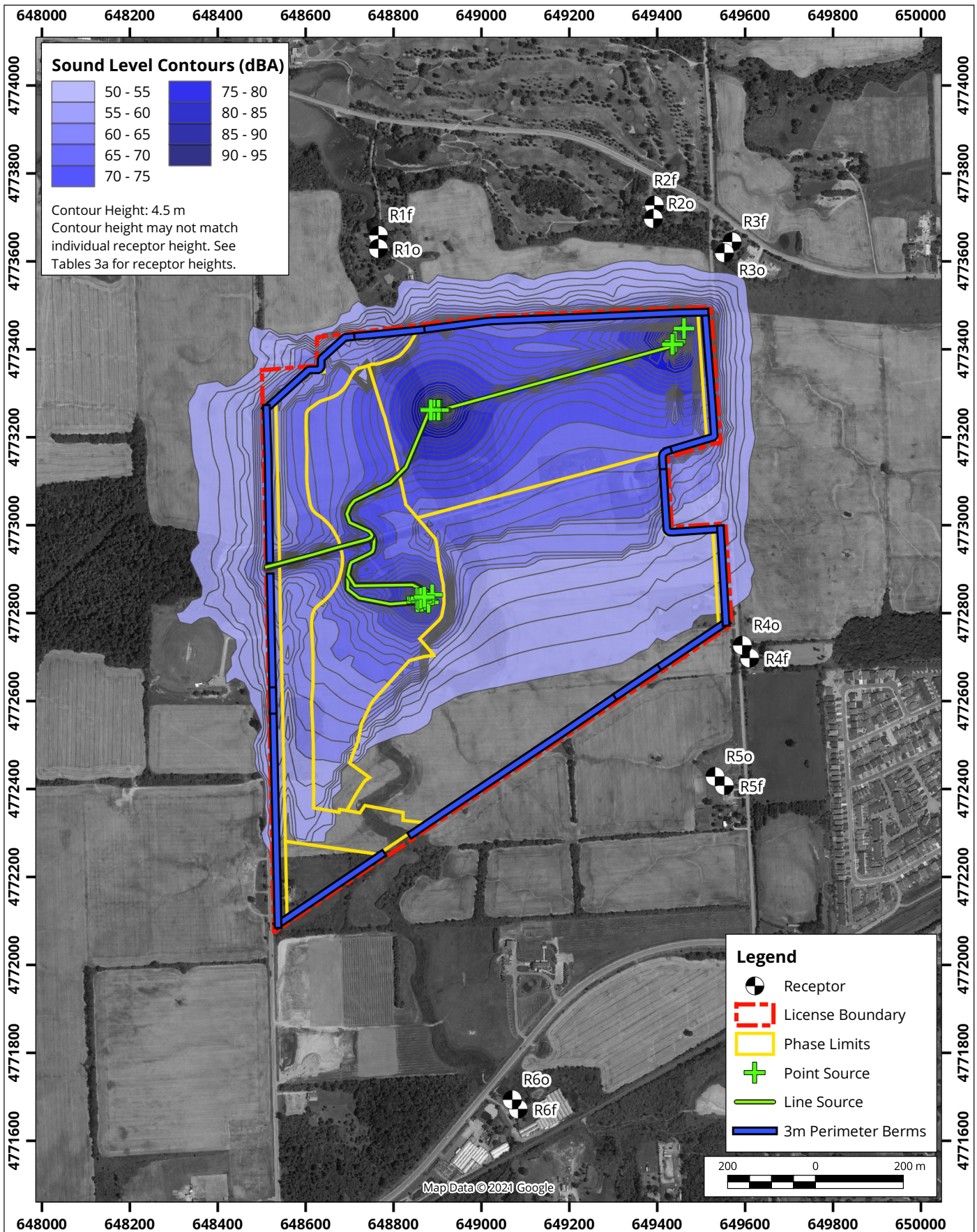
## Alternate Phase 1B North, Evening/Nighttime

Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

True North  
  
 Project #: 1603157

Drawn by: RNL	Figure: D.3b
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





## Sound Level Contours Alternate Phase 2 Northeast, Daytime

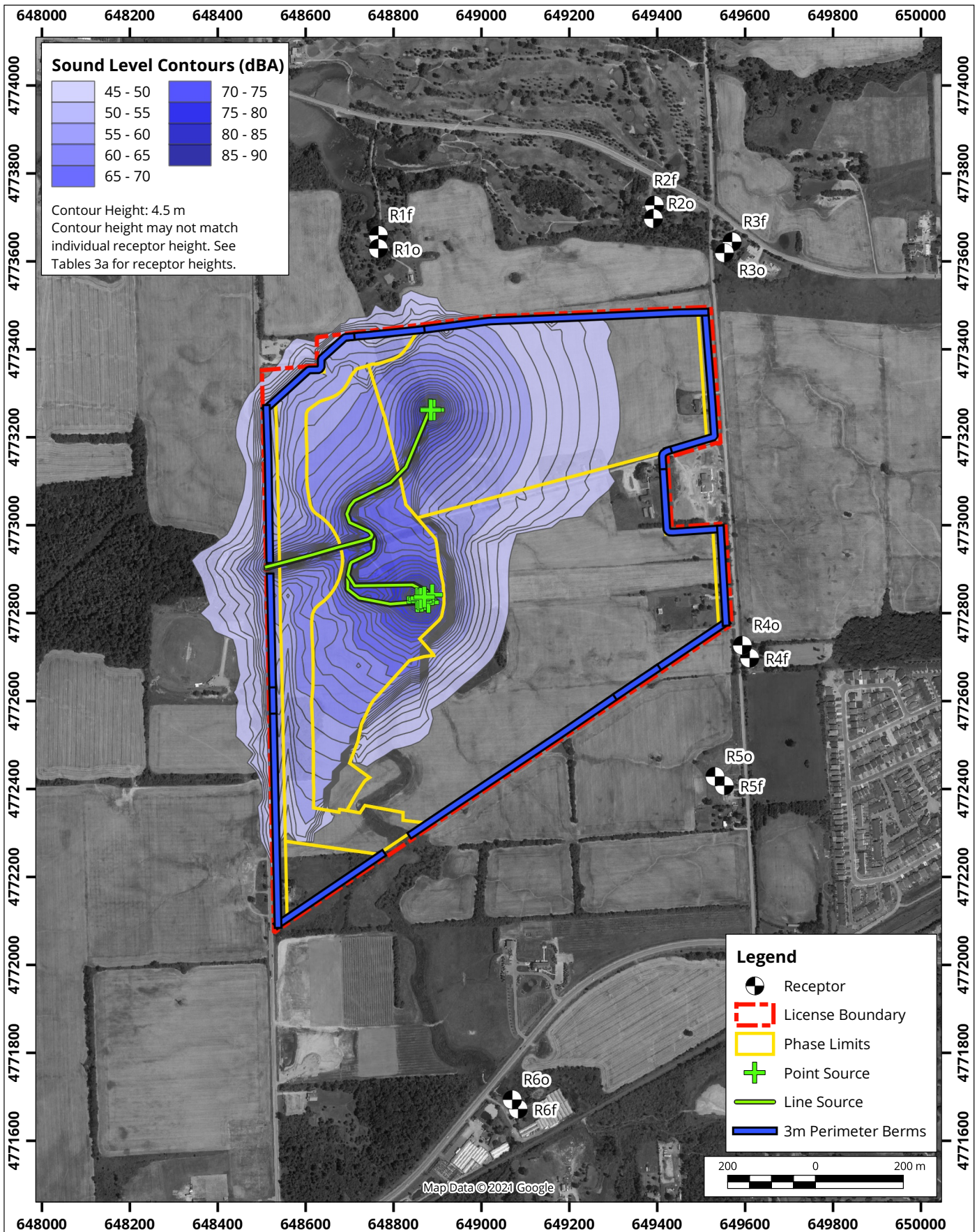
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: D.3c
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





# Sound Level Contours

## Alternate Phase 2 Northeast, Evening/Nighttime

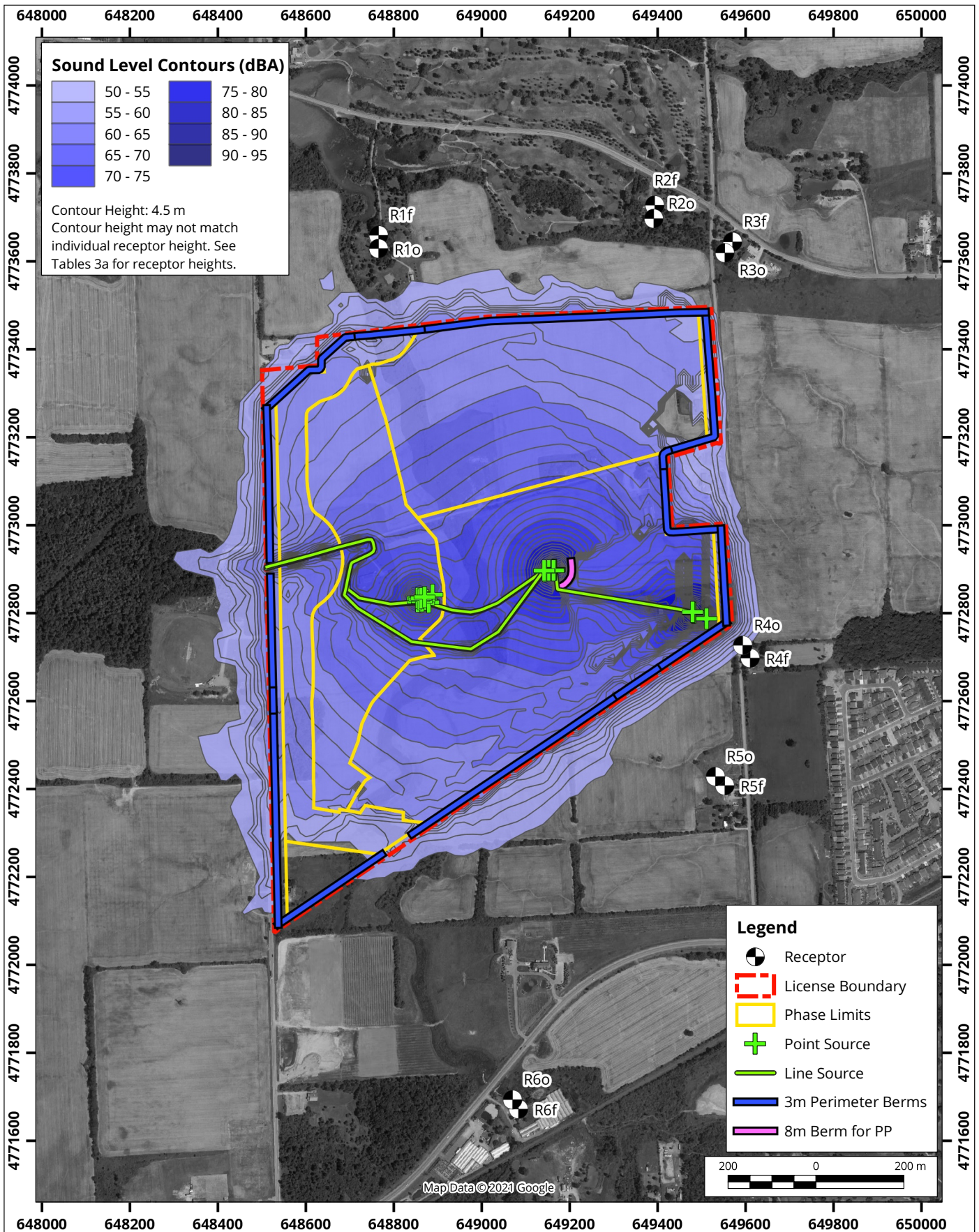


Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157

Drawn by: RNL	Figure: D.3d
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





## Sound Level Contours Alternate Phase 3 Southeast, Daytime

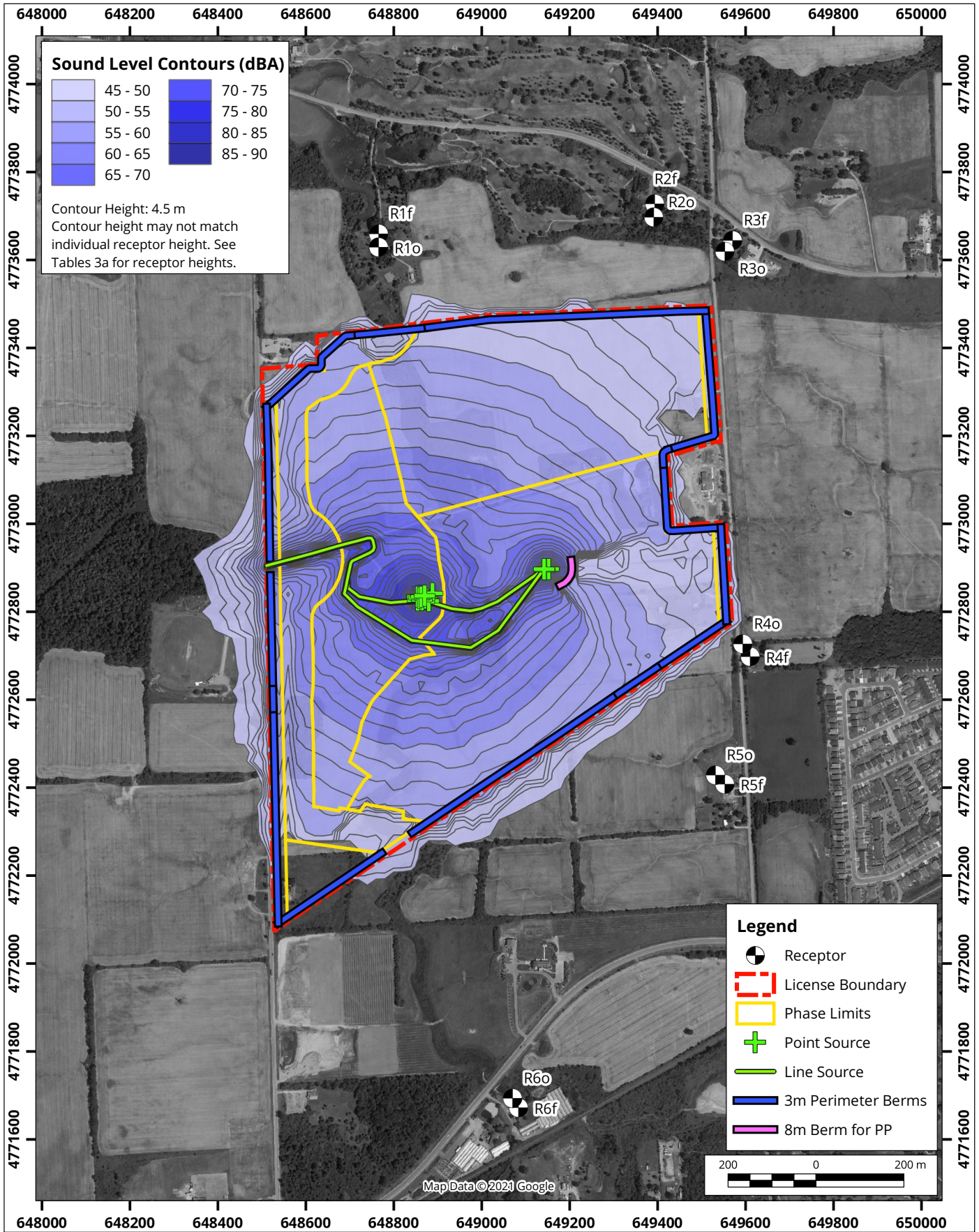
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario



Project #: 1603157

Drawn by: RNL	Figure: D.3e
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	





# Sound Level Contours

## Alternate Phase 3 Southeast, Evening/Nighttime



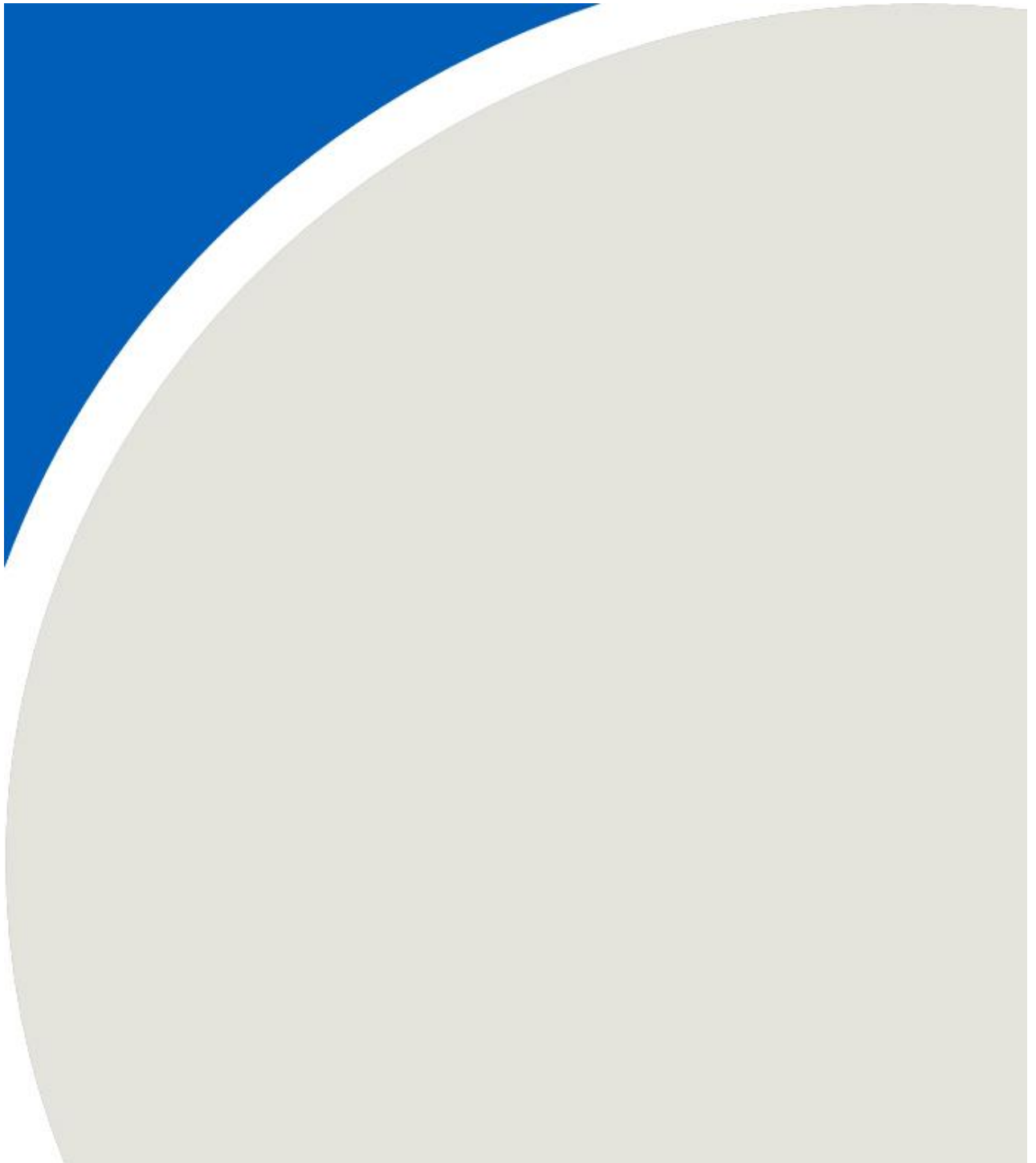
Map Projection: NAD 1983 UTM Zone 17N  
Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157

Drawn by: RNL	Figure: D.3f
Approx. Scale: 1:12000	
Date Revised: Sep 22, 2021	



# APPENDIX E





# SLAVI GROZEV, P.ENG., B.A.SC. SENIOR ENGINEER

T: 647-475-1048 X 2609 | Slavi.Grozev@rwdi.com

Slavi is an acoustics specialist who supports our clients with a range of noise-related processes, including permitting, compliance, modeling and complaint investigation. His project experience spans a range of industries, including manufacturing, utilities and distribution, food and beverage, quarries and pits, wastewater treatment, waste disposal and land development. Our clients benefit in particular from the depth of Slavi's experience with transportation-related noise. In a previous role with the Ontario Ministry of Transportation, he carried out noise impact assessments of highway and transit corridors and interchange reconfigurations, and also supported roadway noise abatement strategies and transportation policy development. Slavi is RAQS-certified and is experienced in a variety of road traffic models including TNM 2.5.

## Employment History

- 2019-Present  
**Senior Engineer,**  
**RWDI**
- 2017-2019  
**Senior Environmental Engineer (Acoustics),**  
**Arcadis Canada Inc.**
- 2015-2017  
**Senior Policy Analyst,**  
**Acoustics, Air Quality and Climate Change,**  
**Ontario Ministry of Transportation**
- 2010-2015  
**Project**  
**Manager/Engineer, Air and Noise Quality Group,**  
**GHD Limited**

## Education

**Bachelor of Science (Chemical Engineering) (Hons.), University of Waterloo, Waterloo, ON, 2010**

## Affiliations

- Member, Professional Engineers of Ontario, 2015 – Present**
- Member, Air & Waste Management Association, 2018 - Present**

## Technical Expertise

- Compliance and permitting
- Environmental Noise
- Government Reporting
- Industrial Noise
- Noise Impact Assessments
- Noise Modeling
- Transportation Noise

## Project Experience

- Lafarge Woodstock Quarry, Woodstock, ON
- McCreedy Mine, Sudbury, ON
- IKO Crusher Plant, Ingersoll, ON
- Tri City Spencer Pit, Guelph, ON
- Tri City Kitchener Pit, Kitchener, ON
- KPM Reid Pit, Brantford, ON





# RAY LI, M.SC., P.ENG. NOISE AND VIBRATION ENGINEER

T: 403-232-6771 X 6283 | [Ray.Li@rwdi.com](mailto:Ray.Li@rwdi.com)

Ray joined RWDI in 2018 and has become an integral part of the noise, acoustics, and vibration team. He has conducted noise and vibration studies in multiple jurisdictions across Canada and for a wide range of clients. His expertise is with energy production, industrial facilities, and mining operations.

Ray is also well versed in construction vibration and has helped clients manage construction vibration levels in dense urban areas.

## Project Experience

### Energy & Power

- Prairie Lights Power Plant – AB
- Hidden Lake Compressor Station – AB
- Buffalo Creek Compressor Station – AB
- Hidden Lake Compressor Station – AB
- Kaybob Gas Plant – AB
- ALC Scotford Generator Addition – AB
- Fox Creek Wells – AB
- Enbridge Valve Stations Blowdown – BC
- Claresholm Solar Farm – AB
- Greengate Solar Farm – AB

### Ontario Regulatory Applications

- ECA/EASR noise assessment for industrial facilities
- Land use planning for developments

### Construction Vibration

- Calgary Cancer Centre – Calgary, AB
- Trans Mountain Pipeline – Edmonton, AB

### Mining and Quarry

- Upper's Quarry – Niagara Falls, ON
- Melbourne Road Quarry – Thunder Bay, ON
- North Coal – Sparwood, BC
- Portable Crusher Plants – ON

## Employment History

2018-Present  
**Noise and Vibration Engineer,  
RWDI**

2016-2018  
**Research Assistant,  
University of Alberta**

2015  
**Engineer-in-Training,  
TransCanada Pipelines**

2013-2014  
**Engineering Intern,  
TransCanada Pipelines**

## Education

**Master of Science  
(Materials Engineering),  
University of Alberta, Canada**

**Bachelor of Science  
(Mech. Engineering),  
University of Calgary, Canada**

## Affiliation

**Association of Professional Engineers and  
Geoscientists of Alberta (APEGA)**

