

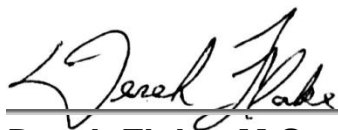
NOISE IMPACT STUDY – Project: 18327.00

Brantford Pit Extension
Brant County, ON

Prepared for:

Lafarge Canada
6509 Airport Road
Mississauga, Ontario
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Prepared by:



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June 25, 2020



Revision History

Version	Description	Author	Reviewed	Date
--	Initial Report	RSM	DF	June 25, 2020

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1 Introduction

Lafarge Canada is applying for a Category 1 Class “A” licence (pit below water) under the Aggregate Resources Act and a County of Brant Zoning By-law Amendment and Official Plan Amendment under the Planning Act to permit an extension of the existing Brantford Pit.

The area proposed to be licensed under the Aggregate Resources Act is approximately 20 hectares and is located on the south side of Colborne Street West, 7 km west of Brantford in the County of Brant. The municipal address is 1044 Colborne Street West.

Aercoustics Engineering Limited (Aercoustics) has been retained to prepare a Noise Impact Study. The purpose of this study is to provide noise control recommendations in order that the operation within the proposed licensed area will satisfy the Ontario Ministry of the Environment, Conservation, and Parks (MECP) noise guidelines.

Sound level limits for the aggregate pit noise on the residential receptors were first established. These were based on the noise guidelines of the MECP. Next, the noise predictions of the aggregate pit operations were performed at these residential receptors. Where the predicted levels were found to exceed the MECP sound level limits, noise control measures were recommended to satisfy these limits.

Refer to Appendix A for a comprehensive list of the proposed noise controls.

Figure 1 provides a key plan showing the location of the proposed aggregate pit extension. A site plan is provided in Figure 2, illustrating the proposed aggregate pit extension area and the locations of nearby local residences (receptors).

2 Site Description

Figure 1 provides a key plan showing the location of the existing Brantford Pit (Licence No. 5515), its proposed extension, and the surrounding area. The site is located east of the intersection between Colborne Street West and Rest Acres Road in the County of Brant. The site is in a rural area where agriculture and aggregate extraction are the dominant land uses, with some nearby residential and commercial uses. The proposed extension is also in close proximity to the Brantford Municipal Airport, located approximately 700 m northeast. Noise from the airport, however, is not considered part of the ambient background as per the MECP noise guidelines.

A site visit was conducted on September 14, 2018. The lands in the area of the site are of essentially flat or gently rolling terrain. The existing single-family residential dwellings in the vicinity of the proposed pit are identified as Receptors R01 to R16. Receptor locations R01 to R16 are shown in Figure 2.

The proposed pit extension addressed by this noise impact study consists of operations within the lands outlined in purple in Figure 2. These operations include excavation, processing (crushing and screening) and aggregate haulage and shipping. The annual tonnage proposed to be removed from the proposed Brantford Pit Extension is 1,000,000 tonnes.

3 Noise Criteria

3.1 Acoustical Classification

The appropriate noise criteria for the receptors in the vicinity of the proposed Brantford Pit Extension were based on the MECP Noise Pollution Control publication NPC-300 “Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning” (MECP, August 2013).

Points of reception R01 to R16 have an acoustical environment consistent with the Class 2 (Urban) designation as defined by the MECP Publication NPC-300. In a Class 2 area, the background sound levels during the daytime (07:00 to 19:00) are defined by man-made noise sources, and in the evening and nighttime periods natural sounds are typically dominant. In this case, the man-made noise sources include road traffic in the area from Colborne Street and Rest Acres Road. Receptors R01 and R02 are located further from the nearby highways but are still expected to experience steady distant road traffic and are close to a truck repair shop as well as the existing Brantford Pit, both existing man-made noise sources.

Receptor VL17 is an assumed two-storey dwelling located on a small isolated vacant agricultural lot within the property on which R01 is located. There is an easement for access over the larger property located just north of the dwelling at Receptor R01, so the lot is not considered inaccessible. Any future dwelling located on this lot would be considered Class 2.

3.2 MECP Sound Level Limits

The applicable limits for noise from a stationary source at a noise sensitive point of reception (receptor) in a Class 2 (Urban) area are outlined in Table 1.

Table 1 : Sound Level Limits for Stationary Sources – Hourly L_{EQ} (dBA)

Time of Day	Class 2 Area (Urban)
Daytime (07:00 to 19:00)	50*
Evening and Nighttime (19:00 to 07:00)	45*

*or background sound level if higher

The noise from a stationary source should not exceed the higher of either the lowest measured background sound level or the exclusion limits presented in Table 1 in any hour. At some points of reception in the vicinity of the proposed pit extension, the lowest background sound level from traffic noise is expected to be higher than the exclusion limits

listed above. For conservatism and simplicity, the minimum exclusion limits were used for all receptors.

3.3 Vacant Lots

The MECP’s noise guidelines document NPC-300 requires consideration for potential receptors on noise sensitive zoned lots. These are defined as lots that have been zoned to permit a noise sensitive use and that are either vacant or have an existing land use that is not a noise sensitive land use.

The subject site is primarily surrounded by Suburban Residential zoned lands, Employment zoned lands, and Agricultural zoned lands.

One vacant noise sensitive zoned lot, identified as VL17, was identified immediately east of the existing pit, just north of the dwelling at Receptor R01. No additional vacant lots which permit dwellings were identified which would introduce new predictable worst-case locations.

4 Aggregate Pit Operation

The site plans outline the phases of extraction and the sequence and direction of operations in each phase. In general terms, the types of work consist of site preparation and rehabilitation, extraction and processing, and shipment off-site.

4.1 Hours of Operation

The proposed hours of operation for the proposed pit extension are summarized below in Table 2. Maintenance operations are limited to small vehicles and are considered acoustically insignificant. From time to time, to meet the requirements of the Ministry of Transportation (MTO) and public tender contracts, it may be required to ship material outside of the regular hours of operation.

Table 2 : Operating Hours for the proposed Brantford Pit Extension

Time of Day	Day of Week	Operations
06:00 to 07:00	Monday to Saturday	Shipping and Loading Operations Only
07:00 to 19:00	Monday to Saturday	Full Operation – Extraction, Processing, Loading & Shipping

4.2 Site Preparation and Rehabilitation

Site preparation includes the removal of topsoil and overburden to facilitate the construction of perimeter berms and visual screens as specified on the site plan. This work will be done primarily with bulldozers, scrapers, trucks, loaders and excavators. Rehabilitation phases will involve similar equipment in establishing the final grading for the site. Rehabilitation of the site will be progressive and is planned to consist of a lake with shallow littoral areas and naturalized side-slopes.

The site preparation and rehabilitation work described above is not part of the daily operation of the pit and is of short duration. These construction activities are not considered in the noise control analysis. The equipment used for these activities must satisfy the noise emission requirements of the MECP document NPC-115 “Construction Equipment”. By defining a maximum permissible noise emission for construction equipment rather than directly limiting the noise impact at a sensitive point of reception, the MECP is recognizing that construction is a temporary and largely unavoidable source of noise.

4.3 Extraction, Processing & Transport

The proposed extraction of the Brantford Pit Extension will include extraction above and below the water table. Both extraction and rehabilitation will be phased moving in a northerly direction with up to two (2) Extraction Loaders feeding a portable processing plant. A single Quiet Extraction Loader and Dragline or Excavator are permitted during below water extraction. Extraction down to below the water table is planned to be completed in each phase, also in a northerly direction, prior to continuing to the next phase. Two Shipment Loaders are assumed to operate near the processing plant at 50% duty cycle. Off-Road Trucks are permitted to operate as needed. Refer to Appendix A for a detailed list of all required noise controls.

4.4 Equipment

The extraction, processing and shipment equipment operating in the proposed pit is limited to:

- One (1) Processing Plant
- One (1) Dragline or Excavator
- Two (2) Extraction Loaders
- Two (2) Shipment Loaders
- Conveyors
- 20 Off-Road Truck trips/hr (40 passes/hr)
- 20 Highway truck trips/hr (40 passes/hr) – assumed worst case 1 hr volume

If desired, a regular Extraction Loader (maximum 74 dBA) may be replaced with two Quiet Extraction Loaders (maximum 70 dBA) wherever a regular Extraction Loader is permitted.

Furthermore, the single Processing Plant may consist of multiple pieces of equipment for purposes such as crushing, screening and washing. Since the noise predictions considered a single worst-case location for all the plant equipment, the distribution of the plant equipment is permitted at various locations. However, the combined sum sound power from all equipment locations must be equal to or lower than the permitted sound

power for the Processing Plant, and any local noise controls specific to the Processing Plant shall apply at each location.

5 Noise Predictions & Controls

5.1 Noise Prediction Methodology

The aggregate pit operations described in the previous section were modelled. Noise predictions were conducted based on the predictable worst-case noise impact for each of the aggregate pit operation areas at each of the receptors. This represents a design case where the pit is running at full capacity with all the equipment operating simultaneously and at locations where noise impact is highest for each receptor. The majority of the time, work would be occurring in other areas of the site, resulting in lower associated noise impacts.

The noise prediction model was generated using Datakustik's Noise Prediction Software, CadnaA. This model is based on established noise prediction methods outlined in the ISO 9613-2 standard entitled "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method and calculation".

Noise levels were predicted using existing topography under conditions of downwind propagation, generally with hard ground modelled in the pit area and soft ground conditions near the points of reception. The current topography of the adjacent existing pit property was considered; if there are any changes to this such as removal of existing berms, the noise controls may need to be revised. Appendix B contains sample stationary source calculations.

The noise impact of the operation was predicted. Where the MECF sound level limits were calculated to be exceeded, noise control measures were modelled and the noise impact recalculated. This process was repeated until the sound level limits were satisfied.

5.2 Aggregate Pit Noise Sources

The reference sound levels used for the aggregate pit equipment are outlined in Table 3. These were based on measured equipment from the existing Brantford Pit and from the Aercoustics database.

Table 3: Reference Sound Pressure Levels of Aggregate Pit Equipment

Equipment	Reference Sound Pressure Level at 30 m (dBA)
Processing Plant	84
Extraction Loader	74
Quiet Extraction Loader	70
Dragline or Excavator	74
Shipment Loader	67 ¹
Conveyors	44 ²
Off-Road Truck – 30km/hr	75
Highway Truck – 25 km/hr	65

1-The shipment loaders were assumed to operate at a 50 % duty cycle.

2-Reference sound level for conveyors is reported in dBA per metre at a distance of 30 m.

5.3 Recommended Noise Controls

The recommended noise controls presented in this section have been determined through noise impact predictions to be effective in controlling the noise generated by the aggregate pit activity, satisfying the MECP sound level limits. It should be noted that there may be other effective noise controls that could replace or revise some of the recommended controls of this report. Prior to implementing any changes to the noise controls, appropriate studies should be undertaken to demonstrate that the MECP sound level limits will be satisfied.

No additional noise controls would be required to address the potential dwelling at Receptor VL17.

An acoustic barrier is required to be solid, with no gaps or openings, and shall satisfy a minimum area density of 20 kg/m². It could take the form of a pit face, stockpile, acoustic fence, ISO containers, a combination of these, or any other construction satisfying the requirements of an acoustic barrier.

Refer to Figures 3 to 8 for an illustration of the proposed Brantford Pit Extension timing and implementation of noise controls at each of Phases 1 to 3. Noise controls include local plant acoustic barriers, perimeter berms, equipment limitations and extraction direction. The location of the processing plant in the figures is conceptual; the plant may be located anywhere in Phase 1 and Phase 2 during operations. It is expected that dry ground will be reserved for the processing plant during below-water extraction.

Refer to Appendix A for a comprehensive summary of the recommended noise controls for the proposed Brantford Pit Extension.

5.4 Predicted Sound Levels with Noise Controls Implemented

The predicted worst-case noise levels produced by operations within the proposed Brantford Pit Extension are summarized in Table 4.

Table 4 : Brantford Pit Extension Worst Case Predicted Sound Levels and Criteria – Hourly L_{EQ} (dBA)

Point of Reception	Extraction, Processing & Shipping (07:00 to 19:00)		Shipping and Loading Operations (06:00 to 07:00)	
	Daytime Sound Level Limit	Predicted Maximum Sound Level	Nighttime Sound Level Limit	Predicted Maximum Sound Level
R01	50	50	45	45
R02	50	47	45	39
R03	50	47	45	40
R04	50	47	45	42
R05	50	47	45	42
R06	50	48	45	41
R07	50	48	45	39
R08	50	50	45	42
R09	50	49	45	38
R10	50	50	45	37
R11	50	48	45	33
R12	50	48	45	33
R13	50	49	45	34
R14	50	48	45	33
R15	50	47	45	32
R16	50	45	45	30
VL17	50	50	45	45

With the above noise predictions, the worst case has been assessed for all planned operations within the proposed Brantford Pit Extension.

With the incorporation of the recommended noise controls, the predicted noise impact will satisfy the MECP sound level limits.

5.5 Cumulative Noise Impact

The predictable worst case of operation of the pit was designed to satisfy the MECP sound level limits. This represents an operating condition when the equipment in the pit is positioned such that the noise impact at a given residential receptor is highest. This generally occurs when the pit's extraction operation is at a location in the pit that is closest to the receptor. This condition will only occur for a small part of the pit's life. For the other times of the pit's life, the predicted noise level will be lower.

Given the timing of operations and setback distance of the existing Brantford Pit (Licence No. 5515) and other commercial operations, it is unlikely that their respective operation cycle will occur where noise impact is highest at the same receptor at the same time.

In the unlikely event that this overlap occurs between two sites, a combined noise level of 3 dB above the sound level limits is possible. In environmental noise, a change in sound level of 3 dB is perceived as minor. It is a change in sound level that most people would just barely notice. This analysis assumes that the neighbouring pit is designed with the same MECP noise limits.

6 Truck Traffic Noise on Haul Route

The noise impact of truck traffic on public roadways is not addressed by the MECP in their noise guidelines. However, the MECP requires consideration of noise impact in choosing the off-property haul route.

The aggregate from the proposed Brantford Pit Extension will be shipped to market through the existing Brantford Pit via the existing entrance & exit onto Colborne Street West and will utilize existing aggregate haul routes.

Since the pit extension truck traffic will use the same haul routes, no significant change in truck trips is expected to be generated compared to the operation of the existing Brantford Pit.

With this, the proposed haul route is not expected to cause an objectionable increase in road traffic noise and is considered the preferred haul route in the context of noise impact.

7 Conclusions

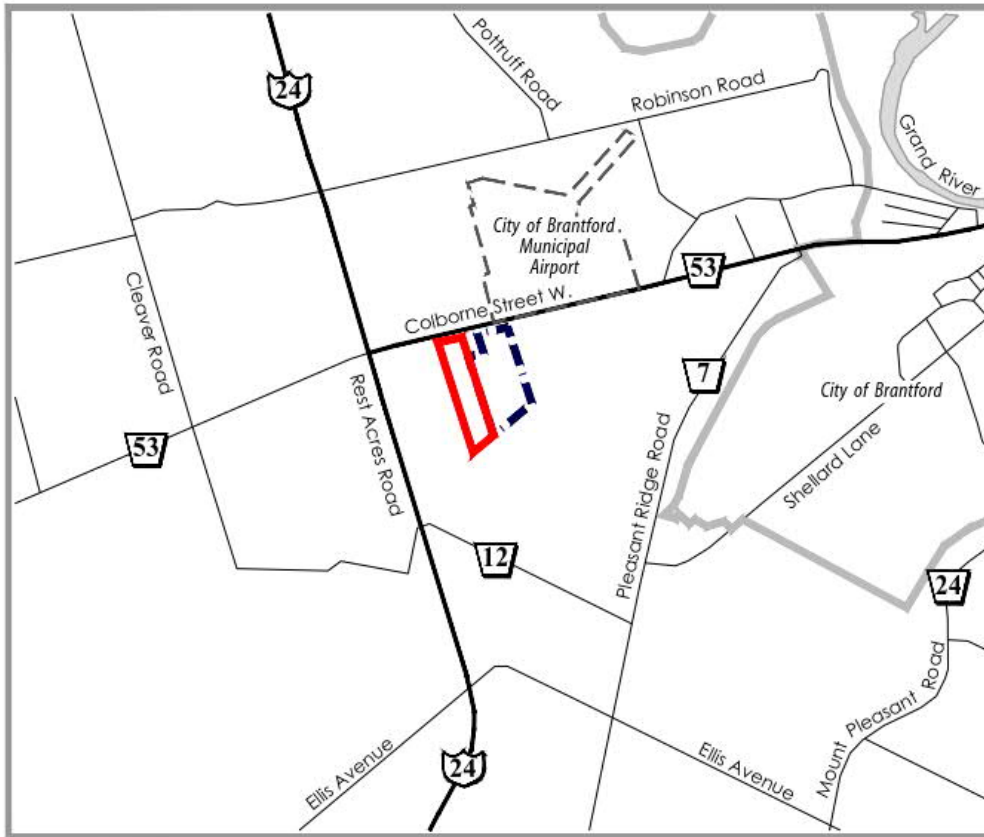
Aercoustics has conducted a noise impact study for the proposed Brantford Pit Extension. The purpose of this study is to provide noise control recommendations in order that the operation within the proposed licensed area will satisfy the Ontario Ministry of the Environment, Conservation, and Parks (MECP) noise guidelines. Figure 2 provides a key plan outlining the aggregate pit area and the locations of local residences (receptors).

To this end, sound level limits, based on the MECP noise guidelines, were developed. Calculations were then carried out to determine the worst-case noise for each of the aggregate pit operation areas at each of the receptors. Where noise was predicted to exceed the MECP sound level limits, noise control recommendations and required equivalent source reference sound levels were provided.

Refer to Appendix C for a summary of the qualifications of the authors.

With the implementation of the recommended noise controls, the proposed Brantford Pit Extension operations are predicted to satisfy the MECP noise guidelines.

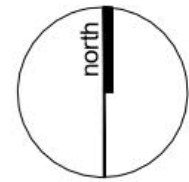
Key Plan



Subject Lands



Additional Lands Owned by Applicant



SCALE



Scale: N.T.S.
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 Eng: DF
 Date: 2019.04.26

Project Name:
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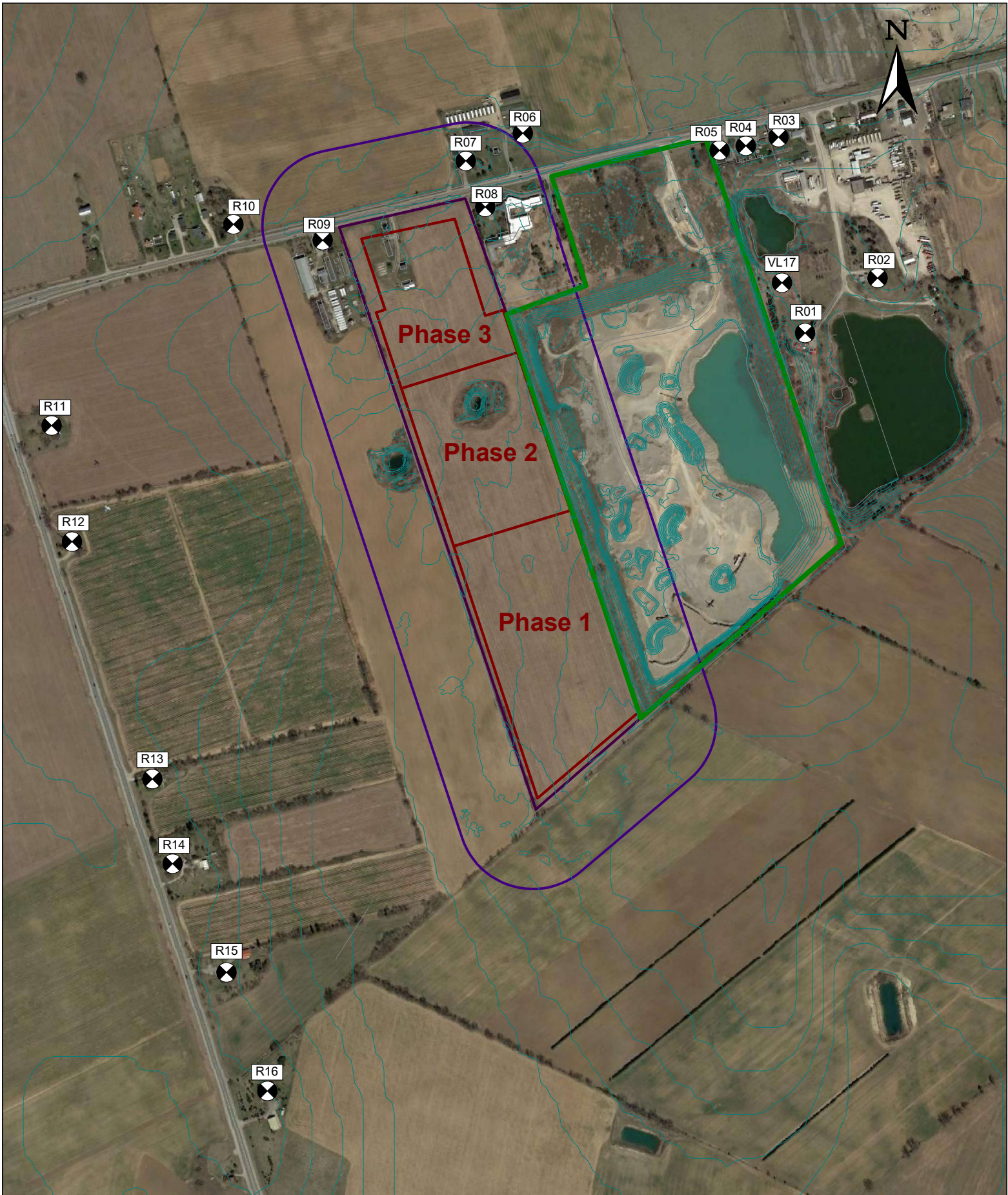
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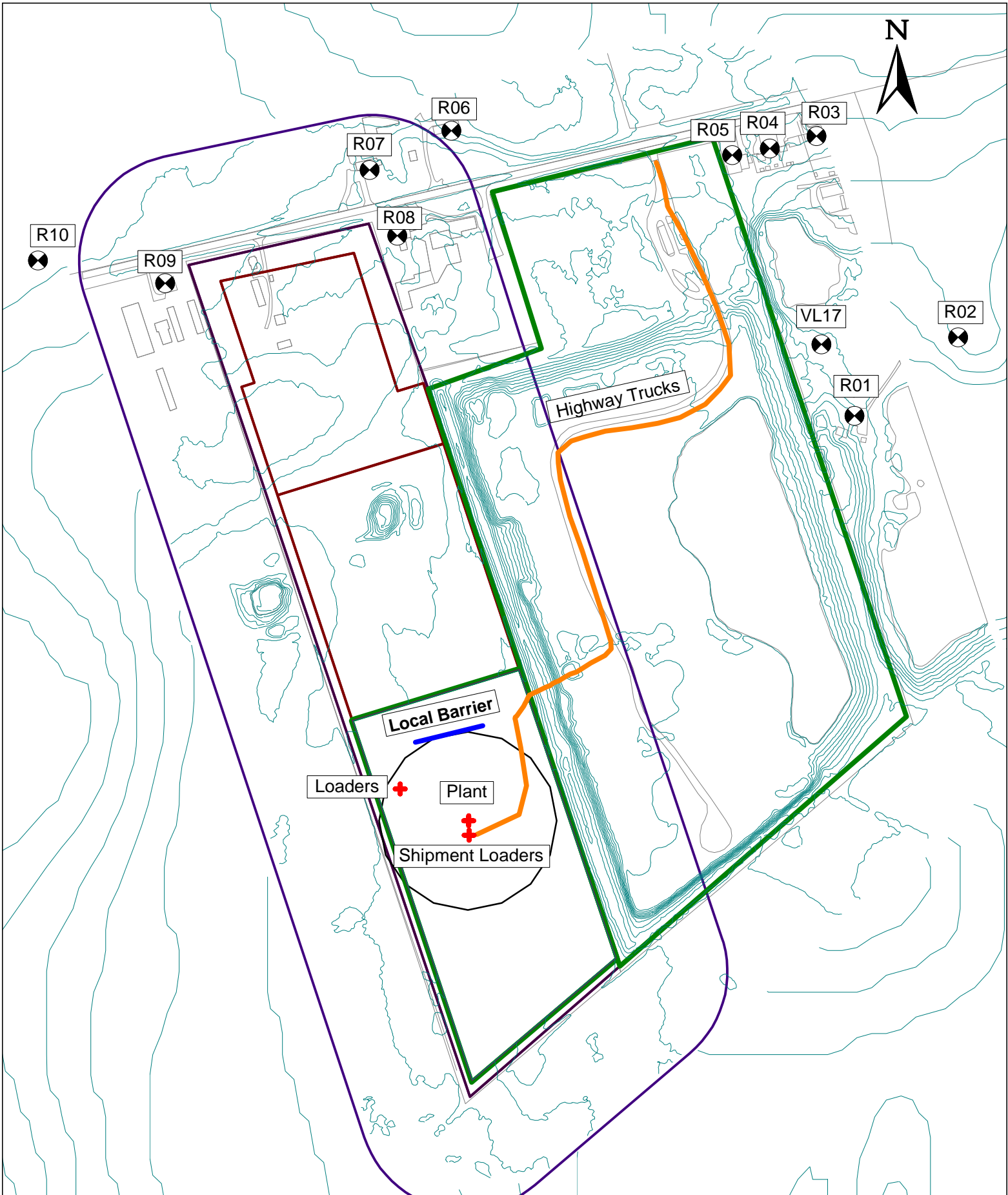
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 Key Plan Showing Site Location


The scope of the work outlined in this document is limited to the acoustic, noise and/or vibration control aspects of the design. Contractor to verify all dimensions

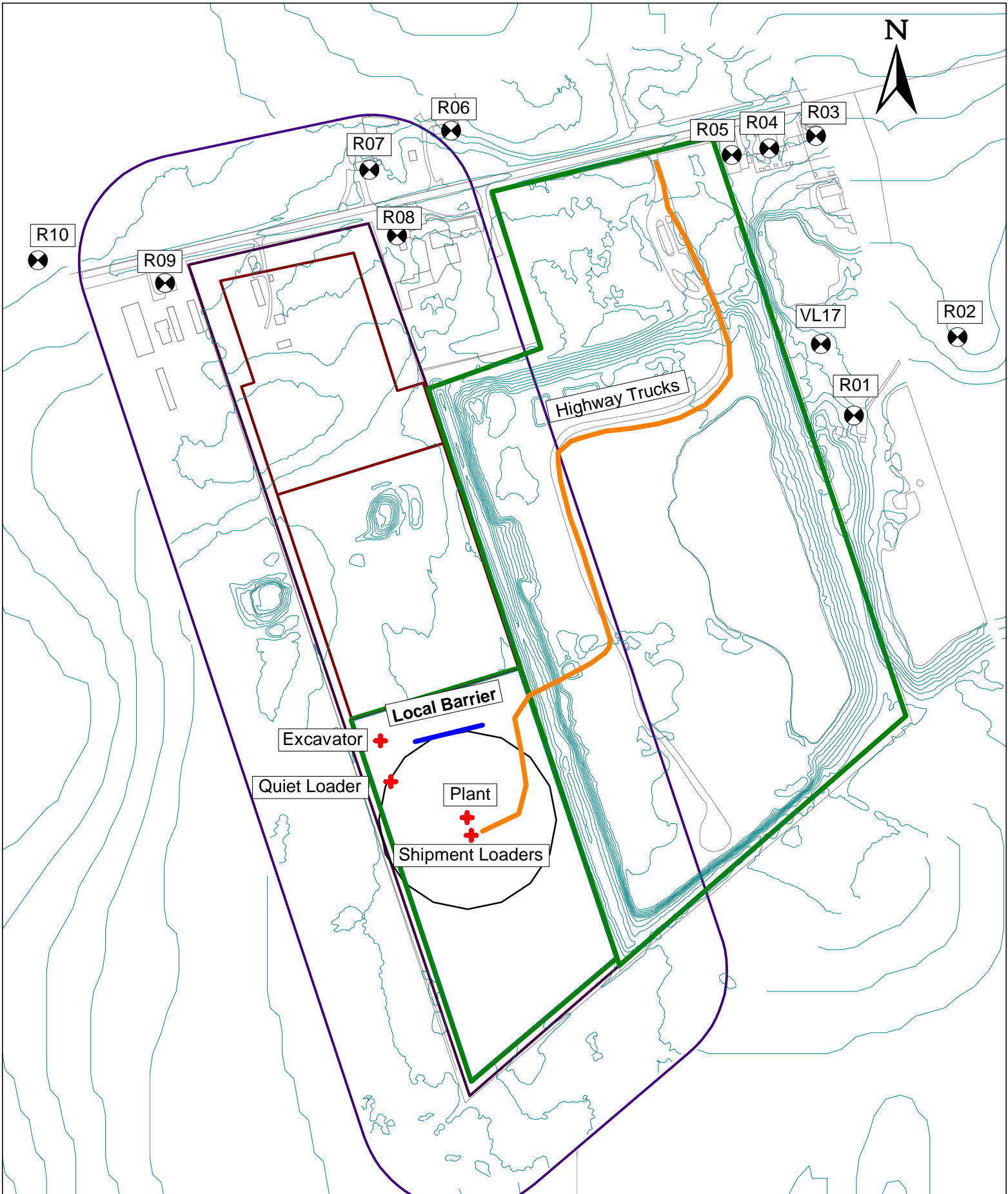
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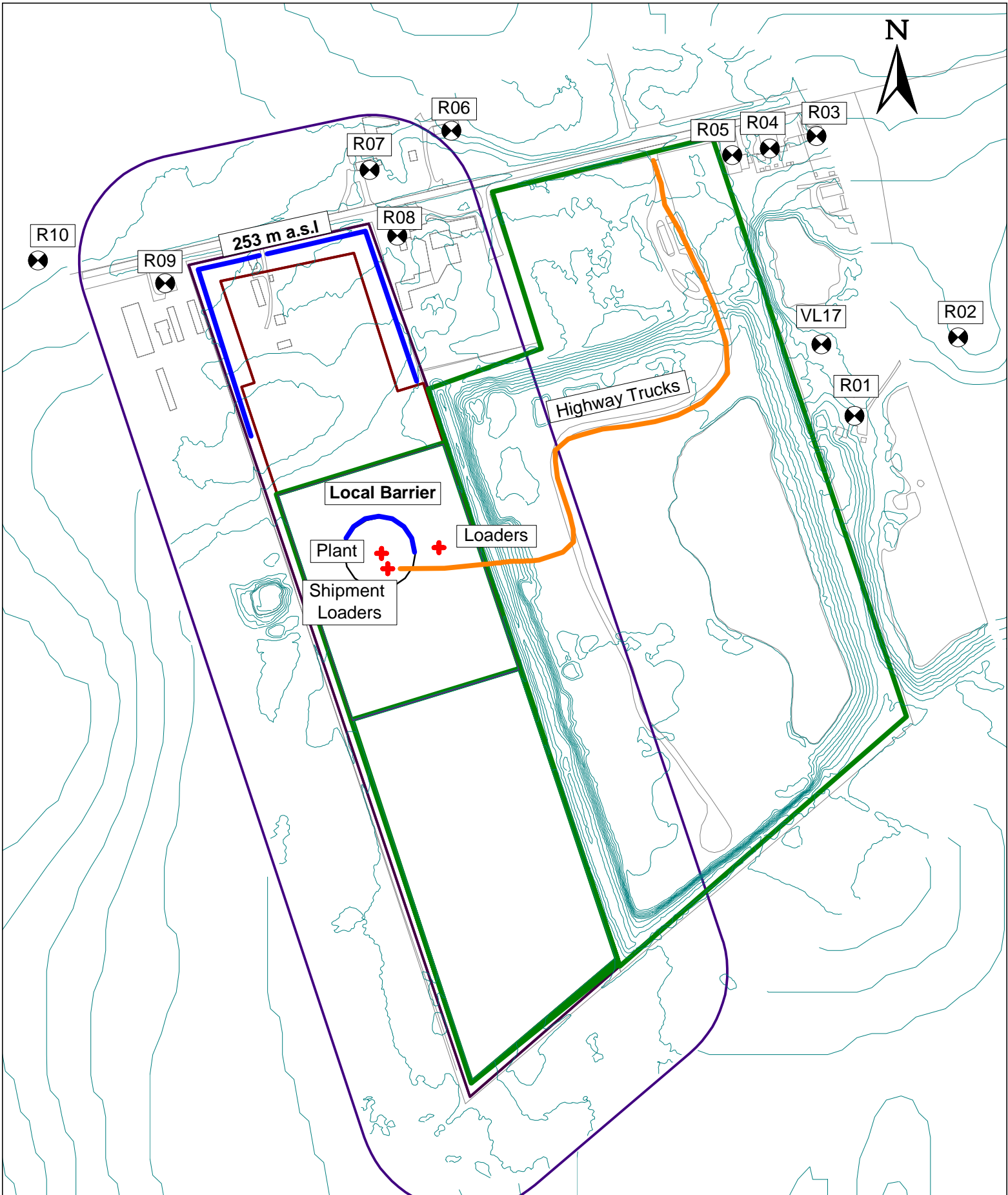
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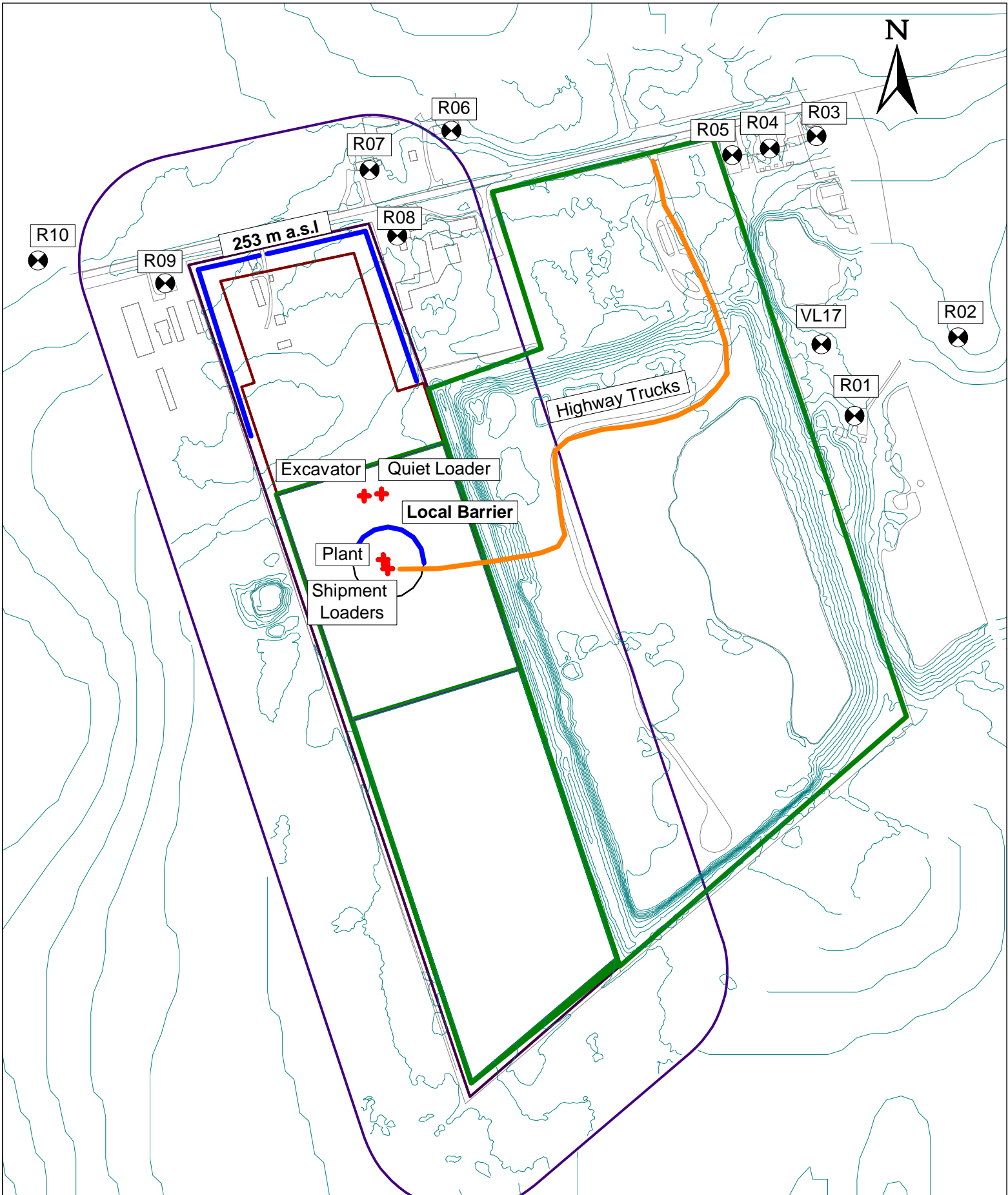
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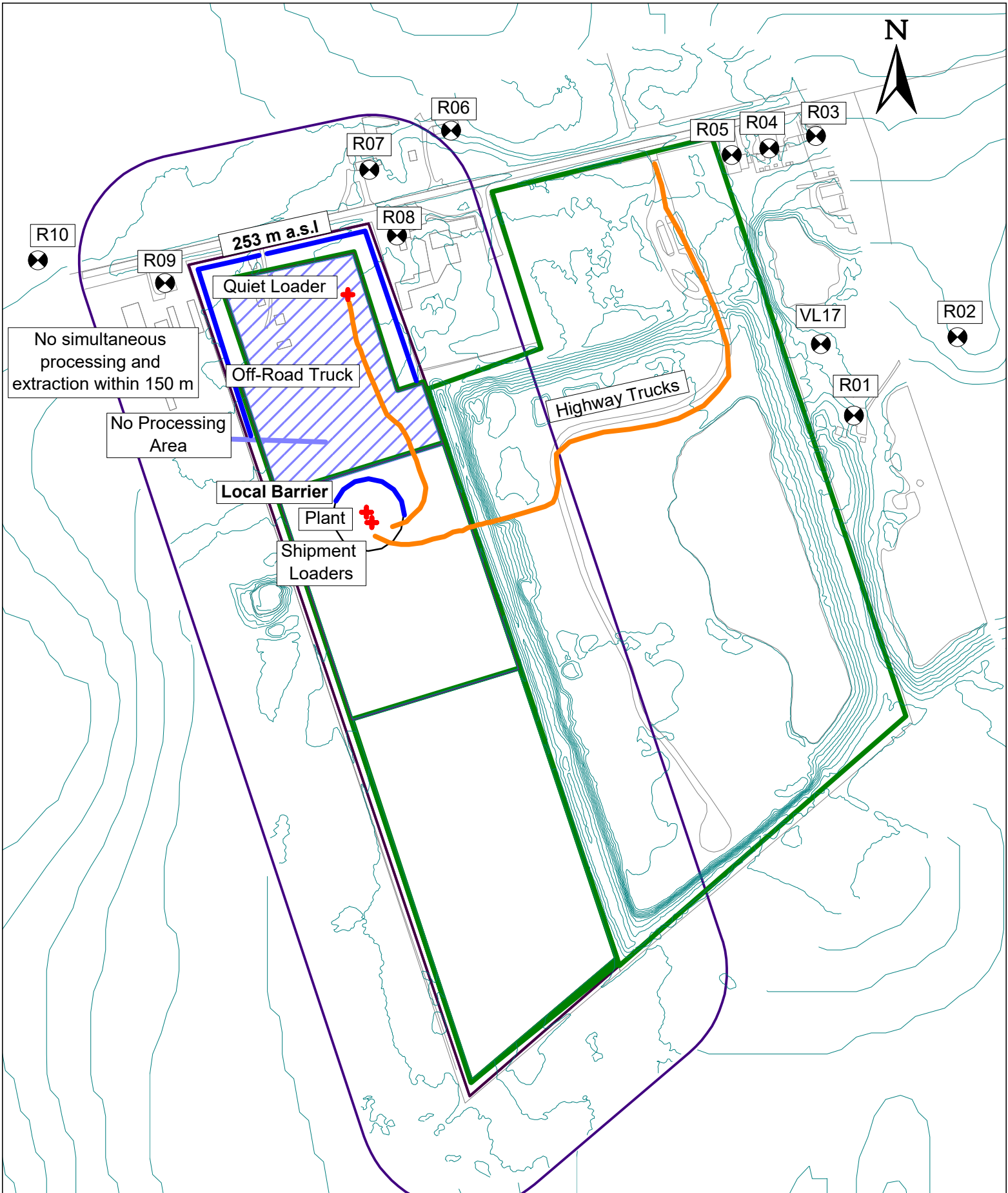
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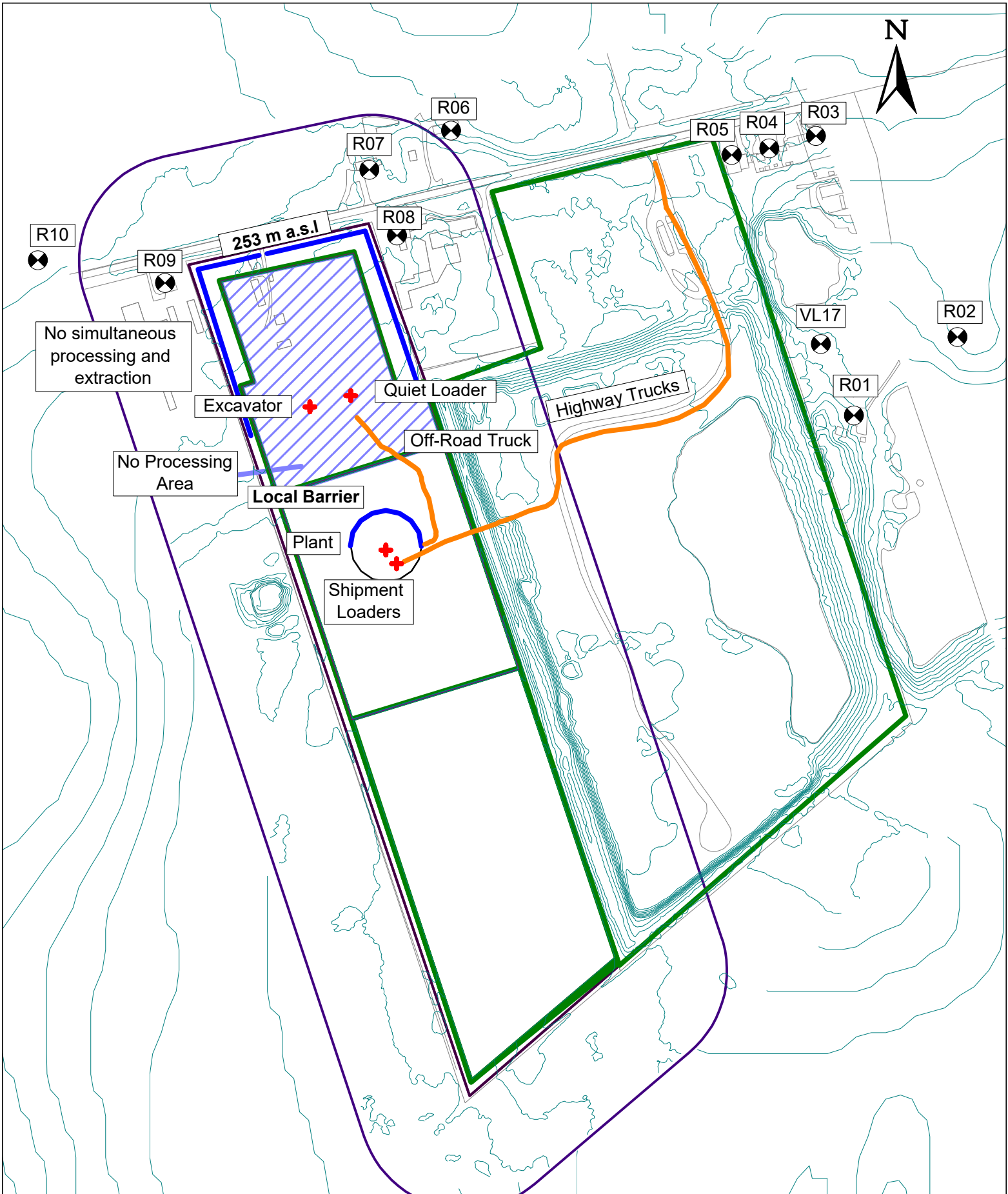
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	Project ID: 18327.00	Project Name Lafarge Brantford Pit Extension	Figure 6
	Scale: NTS Drawn by: DF Reviewed by: DF Date: April 28, 2020 Revision: 1	Figure Title Noise Impact Predictions Phase 2 - Below Water	



	Project ID: 18327.00	Project Name Lafarge Brantford Pit Extension	<h1>Figure 7</h1>
	Scale: NTS Drawn by: DF Reviewed by: DF Date: April 28, 2020 Revision: 1	Figure Title Noise Impact Predictions Phase 3 - Above Water	



	Project ID: 18327.00	Project Name Lafarge Brantford Pit Extension	Figure 8
	Scale: NTS Drawn by: DF Reviewed by: DF Date: April 28, 2020 Revision: 1	Figure Title Noise Impact Predictions Phase 3 - Below Water	

Appendix A
Noise Control Recommendations

General:

1. The hours of operation shall be as described in Table A. There will be no operations on Sundays and Holidays. On occasion, in order to meet specific contract requirements, shipping of materials outside the regular hours of operation is permitted. A response to emergencies is not limited by the hours of operations shown on the site plan.

Table A: Operating Hours for the proposed Brantford Pit Extension

Time of Day	Day of Week	Operations
06:00 to 07:00	Monday to Saturday	Shipping and Loading Operations Only
07:00 to 19:00	Monday to Saturday	Full Operation – Extraction, Processing, Loading & Shipping

2. The extraction, processing and shipment equipment operating in the proposed pit is limited to:
 - One (1) Processing Plant
 - One (1) Dragline or Excavator
 - Two (2) Extraction Loaders
 - Two (2) Shipment Loaders
 - Conveyors
 - 20 Off-Road Truck trips/hr (40 passes/hr)
 - 20 Highway truck trips/hr (40 passes/hr)
3. The aggregate pit equipment shall satisfy the noise emissions levels listed in Table B. If desired, a regular Extraction Loader (maximum 74 dBA) may be replaced with two Quiet Extraction Loaders (maximum 70 dBA) wherever a regular Extraction Loader is permitted.

Table B: Reference Sound Pressure Levels of Aggregate Pit Equipment

Equipment	Reference Sound Pressure Level at 30 m (dBA)
Processing Plant	84
Extraction Loader	74
Quiet Extraction Loader	70
Dragline or Excavator	74
Shipment Loader	67 ¹
Conveyors	44 ²
Off-Road Truck – 30km/hr	75
Highway Truck – 25 km/hr	65

1-The shipment loaders were assumed to operate at a 50 % duty cycle.

2-Reference sound level for conveyors is reported in dBA per metre at a distance of 30 m.

4. The sound emissions of all construction equipment involved in site preparation and rehabilitation activities shall comply with the sound level limits specified in the MECP publication NPC-115 “Construction Equipment”.
5. New equipment technology or different configurations may allow proposed changes to any portion of the extraction and processing operations including additional equipment to operate on the site, equipment to be substituted, and/or different berm heights, while still meeting the applicable sound level limits. Changes may be permitted to the site operations and noise controls provided that the changes still meet the sound level limits, as confirmed through documentation prepared by a Professional Engineer specializing in noise control.
6. An acoustic barrier is required to be solid, with no gaps or openings, and shall satisfy a minimum area density of 20 kg/m². It could take the form of a pit face, stockpile, acoustic fence, ISO containers, a combination of these, or any other construction satisfying the requirements of an acoustic barrier.
7. Above water extraction shall proceed in a northerly direction and the working face shall have a minimum height of 7 m from the pit floor. All extraction and processing equipment shall operate on the pit floor only.
8. The processing plant shall be located at a pit floor elevation of 239 m a.s.l. or lower.
9. During below water extraction, only a single Quiet Extraction Loader shall operate at the Dragline or Excavator stockpile, or at the working face.
10. No processing shall occur in the lands located within 250 m of the north property line, also described as the Phase 3 area.

Phase 1:

11. During operations in Phase 1, an 8 m high acoustic barrier shall be located within 80 m of the Processing Plant, between the plant and Receptors R08 and R09. This can be satisfied by a working face or stockpiles.

Phase 2:

12. Prior to extraction in Phase 2, an acoustic barrier with a minimum top of barrier elevation of 253 m a.s.l. shall be installed along the north, west, and east boundary of Phase 3 as shown on the Operational Plan. An approximately 10 m wide gap is permitted in the north section at the location of the existing driveway as shown on the Operational Plan. A slope of 3:1 or steeper is required on either side of this access point. This barrier shall remain in place during all operations in Phase 2 and Phase 3.
13. During operations in Phase 2, an 8 m high acoustic barrier shall be located within 40 m of the Processing Plant, between the plant and Receptors R01 to R10. This can be satisfied by a working face or stockpiles.

Phase 3:

14. During operations in Phase 3, an 8 m high acoustic barrier shall be located within 40 m of the Processing Plant, between the plant and Receptors R01 to R10. This can be satisfied by a working face or stockpiles.
15. During operations in Phase 3, only one Quiet Extraction Loader along with a Dragline or Excavator are permitted. Off-Road Trucks or Conveyors may be used to transport material from the extraction area to the processing area outside of the Phase 3 lands.
16. No processing shall occur anywhere on site while above water extraction is occurring within 150 m of the north extraction limit.
17. No processing shall occur anywhere on site while below water extraction is occurring within the Phase 3 area.

Appendix B
Sample Stationary Source Noise Calculations

Sound Power Data

Source ID	63	125	250	500	1000	2000	4000	8000	A	Lin
Processing Plant (crushing & screening)	123	122	121	117	117	115	110	102	122	128
Extraction Loader	116	111	107	105	108	106	102	101	112	120
Quiet Extraction Loader	120	113	109	104	101	98	94	91	107	124
Shipment Loader	120	113	109	104	101	98	94	91	107	124
Conveyors	93	91	84	78	72	67	61	52	81	96
Off-Road Truck (30 km/hr)	108	109	110	109	108	106	101	97	112	117
Highway Truck (25 km/hr)	106	100	98	100	100	96	88	78	103	111

Appendix C
Qualifications of the Authors

Derek Flake **M.Sc., P.Eng.**

Profile

Derek is an employee of Aercoustics Engineering Limited, an engineering consulting company specializing in acoustics, noise and vibration. Prior to that, he worked for several years at another acoustics, noise and vibration firm and he completed a Master of Science in the field of ultrasound transducer design. Derek is a Professional Engineer with the Professional Engineers Ontario.

Derek has been recognized by the Local Planning Appeal Tribunal (LPAT) and previously by the Ontario Municipal Board (OMB) as an expert in environmental noise and has provided expert opinion testimony to the Board and in civil litigation.

Employment History

2012 – Present Acoustical Engineer, Aercoustics Engineering Limited

2009 – 2012 Engineering Intern, Jade Acoustics Incorporated

Additional Activities / Committees

2019 – Present Officer on the Board of Directors and Chair of the Membership Committee at the Air & Waste Management Association (A&WMA) Ontario Section (OS)

2018 – Present Member of Environment Committee at the Ontario Sand, Stone and Gravel Association (OSSGA)

2014 – Present Member of Training and Development Committee at the Ontario Sand, Stone and Gravel Association (OSSGA)

Education

Master of Science (M.Sc.) Medical Biophysics (Ultrasound Physics)
University of Toronto

Bachelor of Applied Science (B.A.Sc.) Engineering Physics (Mechanical)
Queen's University

Professional Registration / Affiliations

Licensed Professional Engineer with the Professional Engineers of Ontario (PEO)

Courses and Speaking Events

Instructor, Municipal Law Enforcement Officers' Association (MLEOA) Environmental Noise training courses. This is an annual four-day training program which provides the officers with an understanding of sound measurement and its relationship with environmental noise impact. The officer is trained in the utilization of technical equipment required in the application of sound measurement theories. This course also covers the unique elements of qualitative noise regulations and is authorized by the Ministry of the Environment and Climate Change.

Speaker, "Overview of Noise & Vibration Issues in Land-Use Planning", A&WMA OS Environment Issues in Land-Use Planning, Guelph, October 30, 2019.

Attended A&WMA Course "Consultant Liability and Expert Witness Testimony", Guelph, 2019.

Speaker, "Environmental Noise: Modelling Techniques to Quiet your Acoustic Troubles", ACE 2019, Quebec City, 2019.

Attended PSMJ Resources Project Management Bootcamp, Toronto, 2016.

Attended OSSGA Health and Safety Seminar courses "*Aggregates 101*" and "*Aggregates 201*", Toronto, 2015. Mr. Flake both attended and aided in the development for parts of the course.

Speaker, "*The New NPC-300 Noise Guideline: What does it mean for your noise by-law?*" MLEOA Annual General Meeting, Kingston, 2014.

Professional Activities

Land Use Planning

In the field of environmental acoustics, Mr. Flake has completed numerous projects involving noise impact from planned stationary sources as well as noise impact studies for proposed new noise sensitive uses. These projects included conducting studies for proposed operations and developments and addressing noise concerns for existing operations. Peer reviews of noise studies prepared by other acoustic consultants were also conducted by Mr. Flake. In the land use planning process, Mr. Flake has completed studies which provide assessments of the noise impact on proposed residential, commercial, institutional and industrial developments from the local environment which includes noise from road, rail, and aircraft traffic and stationary noise sources such as industrial and commercial uses. Also, vibration measurements and studies were conducted to assess vibration from rail traffic such as trains, streetcars and subways. The studies include recommendations for noise control of the sources, dwelling building components, wall, window, and door constructions to satisfy the Ministry of Environment, Conservation and Parks noise guidelines.

In addition, Mr. Flake has conducted architectural drawing reviews and provided design advice for residential and commercial developments. These have ensured the construction plans will meet the municipal and Ontario Building Code requirements.

Environmental Compliance Approvals & EASR

Mr. Flake was involved in noise and vibration impact studies for industrial, institutional and commercial uses. He has prepared Acoustic Assessment Reports for use in applications for Environmental Compliance Approvals (ECA) and the Environmental Activity & Sector Registry (EASR). These studies provided conceptual as well as detailed designs of noise mitigation to reduce in-plant noise or noise emission into the environment. In-plant projects generally involved noise surveys, detailed noise and vibration measurements of equipment, data analysis and computer modelling of noise controls to evaluate effectiveness. In some cases, detailed designs and specifications have been provided. Mr. Flake has a good record of submitting applications that are accepted as fully complete according to MECP records.

Aggregates

Mr. Flake has done work in the aggregates industry which involved the preparation and support of noise impact studies to determine technical feasibility of aggregate licence applications to the Ministry of Natural Resources & Forestry. This work included preparing the noise impact studies, supporting the findings at public meetings, and performing acoustic audits to confirm compliance with the noise requirements.

Mining

Mr. Flake has acted as a third-party peer reviewer for the City of Timmins, overseeing all aspects of environmental compliance (including acoustics, noise & vibration) for the Hollinger Pit Open Mine in Timmins.

Acoustic Audits were also conducted at Goldcorp's Red Lake Balmerton & Cochenour sites.

Renewable Energy

Mr. Flake has performed IEC 61400 testing of Wind Turbines and Transformer Station noise audits.

Noise Source Investigations and Room Acoustics

Mr. Flake has completed several projects involving design of spaces where sound privacy and room acoustics were critical. These projects have included noise complaint investigation, room acoustics, mechanical noise, noise measurements to quantify sound isolation, and environmental noise impact. Examples of spaces include cinemas, offices, hospitals and residential condominiums.

End of Report
