

Demolition/Construction Vibration “Zone of Influence” Study

1015-1029 Davis Drive and 22 Hamilton Drive


Proposed Residential Development Town of Newmarket

June 7, 2023
Project: 121-0124.110

Prepared for

Lulu Holdings Inc.

Prepared by



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VALCOUSTICS
Canada Ltd.

Version History

Version #	Date	Comments
1.0	January 12, 2022	Final – Issued to Client
2.0	June 7, 2023	Revised to address Town Comments

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Proposed Residential Development Town of Newmarket

EXECUTIVE SUMMARY

Valcoustics Canada Ltd. (VCL) has been retained to prepare a demolition/construction vibration Zone of Influence (ZOI) study for the construction of the proposed development located at 1015-1029 Davis Drive and 22 Hamilton Drive in the Town of Newmarket. The site is located at the northwest corner of the intersection of Davis Drive and Hamilton Drive.

This report addresses ground-borne vibration associated with the demolition and construction activities that will occur on site, relative to the potential impacts at nearby off-site vibration sensitive uses/structures.

The predicted ZOIs during demolition and construction will extend beyond the legal boundaries of the site to the west, north, and east and includes nearby structures.

Two (2) unattended monitoring locations are recommended for the duration of demolition, excavation and pouring of footings. The northeast monitor should also remain in place during grading and compaction in the northeast corner of the site.

1.0 INTRODUCTION

Valcoustics Canada Ltd. (VCL) has been retained to prepare a demolition/construction vibration Zone of Influence (ZOI) study for the demolition of the existing buildings and the construction of the proposed development located at 1015-1029 Davis Drive and 22 Hamilton Drive in the Town of Newmarket. The site is located at the northwest corner of the intersection of Davis Drive and Hamilton Drive. Valcoustics previously prepared a ZOI Study at the ZBA stage of the project and has since received comments from the Town. This report addresses the comments received and is intended to accompany the Site Plan application for the project.

The proposed project will involve the construction of three blocks of 3-storey townhouses (Blocks A, B and D), one block of 2-storey townhouses (Block E) and two blocks of 2-storey semi-detached dwellings (Blocks C1 and C2).

This report addresses ground-borne vibration associated with the demolition and construction activities that will occur on site, relative to the potential impacts at nearby off-site vibration sensitive uses/structures.

2.0 GENERAL

2.1 DESCRIPTION OF THE SITE

The site is located at 1015 – 1029 Davis Drive and 22 Hamilton Drive in the Town of Newmarket and is bounded by:

- Existing single-family dwellings to the north;
- Hamilton Drive, with existing single-family dwellings and a commercial plaza beyond, to the east;
- Davis Drive with existing single-family dwellings beyond, to the south; and
- Existing single-family dwellings, with Belfry Drive beyond, to the west.

A Context Plan is included as Figure 1. Appendix A contains the Site Plan prepared by A&Architects Inc. dated March 17, 2023 ("Issued for Review").

The site is currently occupied by four detached dwellings which are to be demolished as part of the redevelopment.

2.2 TOWN OF NEWMARKET STAFF REPORT (MARCH 18, 2019)

The Town of Newmarket has produced a staff report entitled "Construction Vibration Issues" (dated March 18, 2019). The staff report provides a discussion of potential construction vibration considerations and vibration limits. It should be noted that, to date, no official town policy or other guidance has been issued with regard to the staff report.

The staff report states that if any of the following activities will be part of the construction, then a zone of vibration influence assessment area extending 30 metres from the property line is to be determined (and all neighbouring properties within this area must be identified).

- Deep foundations;
- Impact pile driving;
- Caisson drilling;
- Soil compaction;
- Large scale earthworks (using heaving machinery like bulldozers, loaders, excavators, or scrapers); and
- Other construction activities that have the potential to cause vibration.

The staff report goes on to state that "where vibrations are expected on neighbouring properties", the following additional steps are to be completed:

- Communication with neighbouring properties (the report suggests that at least one week prior to the commencement of construction, the applicant will notify the ward Councillor, staff, and the owners and occupants of the properties); and
- Pre-construction condition survey.

There is no quantitative vibration amplitude for this step in the process. Based on various other guidelines and standards (including the City of Toronto By-law 514-2008, see later), it is proposed that this “zone of influence” (ZOI) be defined as the area of land wherein the peak particle vibration velocity from construction is equal to or greater than 5 mm/s at any frequency. The above noted additional steps (consultation and pre-construction survey) would apply to those structures which are found to lie within the ZOI (5 mm/s setback).

The staff report also requires that the Engineer comment on the need for vibration monitoring during construction. Lastly, there is some discussion regarding the complaint handling process. If a complaint is received regarding construction vibration, the applicant will require the professional engineer monitoring the project to perform vibration measurements at the complainant’s location during activities representative of the complaint.

3.0 ZOI ASSESSMENT

3.1 VIBRATION CRITERIA

3.1.1 Town of Newmarket Staff Report (March 18, 2019)

The Town of Newmarket staff report includes vibration criteria that are to be used in the assessment and monitoring of potential construction vibration impacts (Reference 1). The staff report contains a brief discussion of perception-based criteria, but the majority of the staff report focusses on criteria to avoid cosmetic/structural damage. The report provides the following criteria:

TABLE 1 NEWMARKET STAFF REPORT VIBRATION LIMITS

Type of Structure	Vibration Limit at Foundation
1. Dwelling with concrete foundations, wood framed, drywall finish or equivalent	5 mm/s
2. Structures that are particularly sensitivity to vibrations due to their age or construction technique	3 mm/s

It should be noted that the criteria are not provided with a reference reporting metric (Root mean square [RMS], Peak Particle Velocity [PPV], or some other basis). Based on the numerical limits, it is assumed that the reference is PPV.

The above noted vibration limits are not provided with any frequency dependence which is out of step with most international standards for vibration limits regarding cosmetic/structural damage (especially standards where the vibration limits are this low). Based on the numerical limits and the descriptions of the types of structures (shown above), it is expected that the limits provided in the staff report are based on the DIN 4150-3 standard (Reference 2). However, in the DIN standard, the most stringent criterion of 5 mm/s (or 3 mm/s in the case of structures that are particularly sensitive to vibration) only applies to vibration in the frequency range between 1 and 10 Hz. In the frequency range where the majority of construction vibration occurs (10 to 50 Hz), the limit is 5 to 15 mm/s for dwellings (3 to 8 mm/s for sensitive structures). Additional information regarding the DIN 4150-3 limits is provided below.

3.1.2 City of Toronto By-Law 514-2008

Although not directly applicable in this context, a summary of the vibration criteria in the City of Toronto construction vibration by-law is presented here. Note that the City of Toronto criteria are similar to the DIN 4150-3 criteria but are slightly less conservative (both sets of criteria are frequency dependent).

According to the City of Toronto By-Law 514-2008, the ZOI is defined as the area of land where the peak particle velocity due to a demolition/construction activity, measured at a point of reception, is equal to or greater than 5 mm/s (PPV) at any frequency or, such greater area where specific site conditions warrant, as identified by a professional engineer. The City of Toronto By-Law 514-2008 ZOI criteria and vibration limits are shown in Table 2.

TABLE 2 BY-LAW ZOI CRITERIA AND VIBRATION LIMITS

Source	Vibration Peak Particle Velocity (mm/s, PPV)			
	ZOI Criteria	Vibration Limits During Construction		
	Any Frequency	Less than 4 Hz	4 Hz to 10 Hz	More than 10 Hz
By-law 514-2008	5	8	15	25

3.1.3 German Standard DIN 4150-3

The DIN 4150-3 standard provides vibration criteria for 3 classes of buildings based on their use/construction. It is assumed that building types 2 and 3 correspond to building types 1 and 2 in the Town of Newmarket staff report.

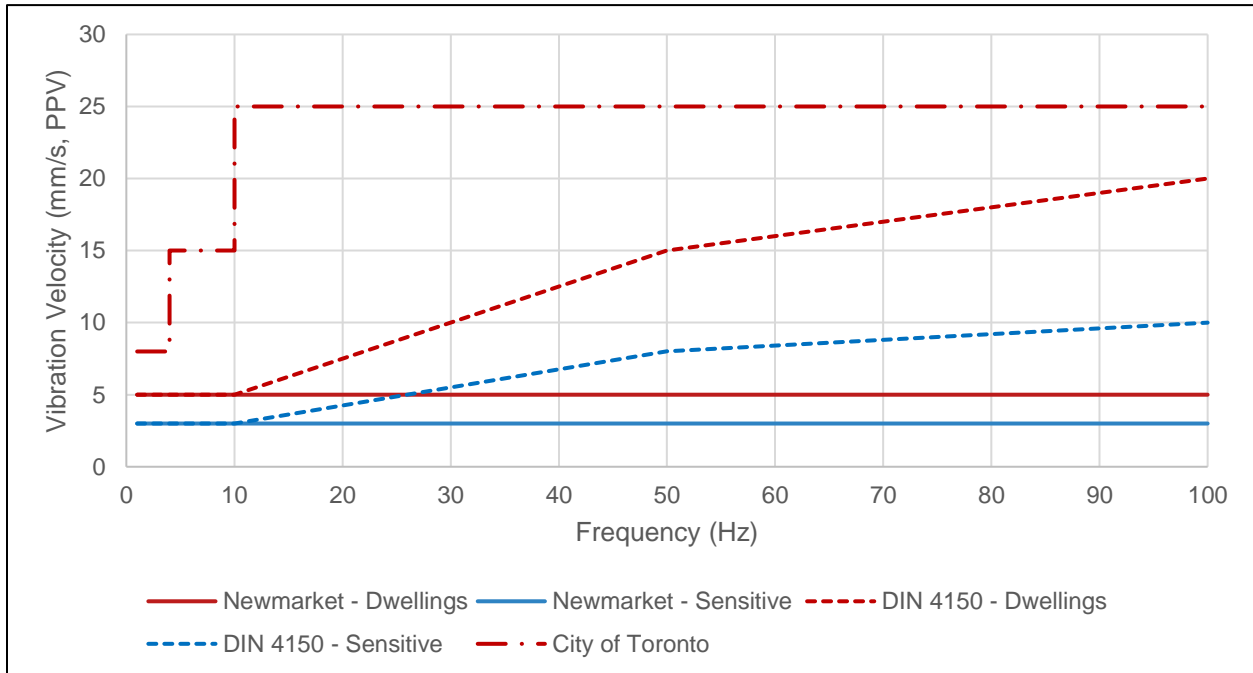
TABLE 3 DIN 4150-3 GUIDELINE VIBRATION LEVELS

Type of Structure	Guideline Value for velocity (foundation), mm/s, PPV		
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz
1. Commercial and industrial	20	20 to 40	40 to 50
2. Dwellings	5	5 to 15	15 to 20
3. "Sensitive to vibration"	3	3 to 8	8 to 10

Note that the criteria in Table 3 for "sensitive" structures is intended to protect the building from "minor damage" (cracking of plaster, etc.).

3.1.4 Summary of Construction Vibration Criteria

Insert A shows the staff report criteria compared against the DIN4150-3 criteria and the City of Toronto criteria. It is clear that the staff report criteria are much more stringent than the other two sources above 10 Hz.



Insert A - Comparison of Various Construction Vibration Criteria

As displacement decreases with increasing frequency (for a given vibration velocity), it is overly stringent to maintain a constant vibration velocity limit for frequencies greater than 10 Hz. As such, it is recommended that the DIN 4150-3 limits for dwellings (as shown in Insert A) be employed for the assessment contained herein.

3.2 PROPERTIES WITHIN THE ZOI ASSESSMENT AREA

In accordance with the requirement of the staff report, the following properties are identified as being fully or partly within the zone of influence assessment area (although this does not mean that properties are within the zone of influence).

- 15, 23, 28, and 34 Hamilton Drive;
- 11, 25, and 29 Belfry Drive; and
- 1005 and 1041 Davis Drive.

3.3 NEARBY HISTORICAL BUILDINGS

There are no historical buildings in the vicinity of the proposed development.

3.4 SOURCES OF DEMOLITION VIBRATION

At this point in the project, the specific demolition plan has not yet been defined. However, it is expected that the highest levels of vibration for demolition are expected to result from sections of the exterior walls, floor or ceiling falling to the ground from various heights.

Other demolition activity on the site is expected to either be lower in vibration magnitude, or further removed from the site boundary such that the impact at the site boundary would be less than that from falling objects.

3.5 SOURCES OF CONSTRUCTION VIBRATION

The highest level of construction vibration is expected to result from excavation for strip footings or basement excavation. It is also expected that some localized compaction may be required around the amenity area in the northeast corner of the proposed development.

Other construction activity on the site is expected to either be lower in vibration magnitude, or further removed from the site boundary such that the impact at the site boundary would be less than that noted above.

3.6 SEWERS, GAS AND WATER MAIN STRUCTURES

The Servicing Plan prepared by Husson, dated July 28, 2021 indicates that there are existing underground services (water mains and sewers) along Davis Drive and Hamilton Drive. The closest structure is a sanitary sewer approximately 4 metres south of the south property line. These structures have been included in the assessment. The Servicing Plan is included as Appendix B.

3.7 PREDICTED ZOI

3.7.1 Vibration Propagation

The vibration propagation model used for this site assumes subsurface conditions that promote the “efficient propagation of vibration”, based on the procedures found in Reference 3. and the geotechnical (soils) report for this site (Reference 4). The subsurface conditions noted in the soils report suggests this site (area) is a candidate for the efficient propagation of ground vibration. This conclusion is based on bedrock being located within approximately 2 to 6 m of the surface. Relative to propagation for standard subsurface conditions, efficient propagation can result in vibration levels up to 10 dB higher. To be conservative, this assessment assumes efficient propagation and therefore a +10 dB adjustment has been applied, which has the net effect of increasing the setback to the 5 mm/s criteria (i.e., a larger ZOI).

Since the vibration velocities presented in this report are based on predictive methods, they should be considered as an approximation, but are representative of what can be expected.

3.7.2 Demolition ZOI

The level of vibration that will be generated by the demolition of the existing buildings can be somewhat unpredictable. Therefore, determining a ZOI for this demolition activity is an approximate technique, and as such, has been determined using what is believed to be a moderate but appropriate safety factor. Actual vibration levels are expected to be less than those predicted in this report.

The reference ground vibration velocity for a mass drop is 3.1 mm/s (peak particle velocity PPV) at 7.6 m. The propagation of the vibration energy (extrapolation of reference data over a distance) has been done following the procedures in Reference 2. The extent of the potential ZOI has been determined by prediction based on the above information.

The extent of the demolition ZOI is based on the maximum PPV at any location off-site caused by any demolition activity on-site. It is assumed that significant demolition activities do not occur simultaneously, and as such vibration levels are considered independently rather than additively (for example, sections of the building impact the ground individually, and not several sections simultaneously).

Figure 2 shows the ZOI (the setback to the 5 mm/s contour) for the entire demolition site based on the predicted vibration levels from the above assessment.

As shown on Figure 2:

- the ZOI extends beyond the legal boundaries of the site to the west, north, and east; and
- the ZOI includes the dwellings at 1005 Davis Drive and 28 Hamilton Drive.

3.7.3 Construction ZOI

The level of vibration that will be generated by the construction can be somewhat unpredictable. Therefore, determining a ZOI for this construction activity is an approximate technique, and as such, has been determined using what is believed to be a moderate but appropriate safety factor. Actual vibration levels are expected to be less than those predicted in this report.

The reference ground vibration velocity for a large excavator is 2.3 mm/s (peak particle velocity-PPV) at 7.6 m. The propagation of the vibration energy (extrapolation of reference data over a distance) has been done following the procedures in Reference 3. The extent of the potential ZOI has been determined by prediction based on the above information.

The extent of the construction ZOI is based on the maximum PPV at any location off-site caused by any construction activity on-site. It is assumed that significant construction activities do not occur simultaneously, and as such vibration velocities are considered independently rather than additively.

Figure 3 shows the ZOI (the setback to the 5 mm/s contour, shaded in yellow) for the construction.

As shown in Figure 3:

- the ZOI for the excavation of the proposed townhouse basements extends beyond the property boundary to the west, north, and east.
- the ZOI includes the dwellings at 1005 Davis Drive and 28 Hamilton Drive.

4.0 ADDITIONAL REQUIREMENTS

4.1 PRE-CONSTRUCTION CONSULTATIONS

In accordance with the staff report, the following parties should receive notification of the commencement of construction at least one week in advance:

- The ward Councillor;
- Town staff;
- The owners and/or occupants of the properties outlined in Section 3.2.

A sample notice is attached as Appendix C.

4.2 PRE-CONSTRUCTION CONDITION SURVEYS

In accordance with the requirement of the staff report, it is recommended that pre-construction condition surveys be conducted for the properties within the 30 m ZOI assessment area (See Section 3.2). The inspection would be expected to document (in photographs or video as well as a written description) the condition of the structures including any deficiencies or issues that are present prior to the start of the construction.

If the owners/occupants of the dwelling will not allow the inspection to proceed, then documentation of any communication sent and/or received should be retained as evidence of the attempted inspection.

4.3 VIBRATION MONITORING PROGRAM

The predicted ZOIs for demolition and construction extend beyond the legal boundaries of the site to the west, north, and east. As such, vibration monitoring is recommended for the demolition and construction activities on the subject site.

In the case of demolition and construction activities, ZOI predictions should be considered approximate. Thus, a monitoring program is important to ensure that vibration at nearby structures do not exceed the acceptable thresholds due to construction activities on site.

4.3.1 Recommended Unattended Monitoring Locations

Recommended vibration monitoring locations are presented graphically in Figure 4.

- Location 1: To the north, the dwelling at 28 Hamilton Drive is within the ZOI for construction. It is recommended that vibration monitoring be done at or near the south facade of the dwelling during demolition, excavation and pouring of footings as well as any grading and compacting activity at the north extent of the site.
- Location 2: To the west, the dwelling at 1005 Davis Drive is within the ZOI for construction. It is recommended that vibration monitoring be done at or near the east facade of the dwelling during demolition, excavation and pouring of footings.

The following additional information is provided:

- The DIN 4150-3 vibration criteria for dwellings are applicable at all locations.
- The tri-axial seismograph transducer must record the peak vector sum PPV at the measurement location for the duration of the monitoring.
- The "cautionary" limit should be set to be lower than the "standard" vibration criteria. The "alarm" limits are the vibration criteria.
- If, at any time, the cautionary limit is exceeded, the site will be contacted and a discussion regarding possible sources of vibration will occur. Activity at this point does not need to cease.
- If the alarm level is exceeded, the site will be contacted and the offending activity will be identified. The site will be responsible for ceasing activity until mitigation can be implemented such that the high vibration level is not repeated. At that point, an event report detailing the event will be submitted to the site contact.

4.3.2 Recommended Attended Monitoring (Underground Services)

It is recommended that for any excavation within 5 m of an underground service, monitoring of the vibration levels should be done. Specific setback distances will be determined once locates have been done for underground services.

4.3.3 General Notes

- For the unattended monitors, it would be preferable to place the monitors inside the structures at the lowest possible levels (basement level). Alternatively, the monitor could be outside the structure in line with the closest building facade to the subject site.
- The recommended unattended monitoring locations are depicted on Figure 4. Note, these locations may change due to site access and building floor plan layouts, etc.
- It should be noted that the provided extent of the 5 mm/s contour includes a 10 dB propagation penalty based on soil conditions that may promote efficient propagation of ground vibrations. As this penalty may be considered conservative, it is possible that actual vibration levels exhibited during construction may not be as high as those predicted in the ZOI analysis.
- Where monitoring is done outdoors, it is recommended that the transducer be dug into the ground such that it is approximately 300 mm below grade. The transducer would then be affixed to the soil using both ground spikes (provided with the equipment) as well as a sandbag.

4.4 COMPLAINT PROCEDURE

If a complaint is received regarding construction vibration from any of the properties within the 30 m ZOI assessment area, the owner or his agent acting at the site will contact VCL to conduct short term attended vibration measurements at the complainant's location.

If the measured vibration amplitude (measured during the offending activity) is found to be in excess of the vibration criteria presented in the ZOI report, adjustments will be made to the construction approach such that excess events are no longer observed. Short term monitoring will continue until such time that it can be demonstrated that the vibration limits are not being exceeded. If required, a long-term vibration monitor, complete with “real-time” reporting capability, may be installed at the complainant’s location such that ongoing data is collected and event follow-up for events in excess of the vibration criteria can be completed.

If during the short-term monitoring the vibration does not exceed the vibration criteria (based on the offending activity), then short term monitoring will be ceased and no further monitoring will be required.

5.0 CONCLUSIONS

The predicted ZOIs for demolition and construction will extend beyond the legal boundaries of the site to the west, north, and east and includes nearby structures.

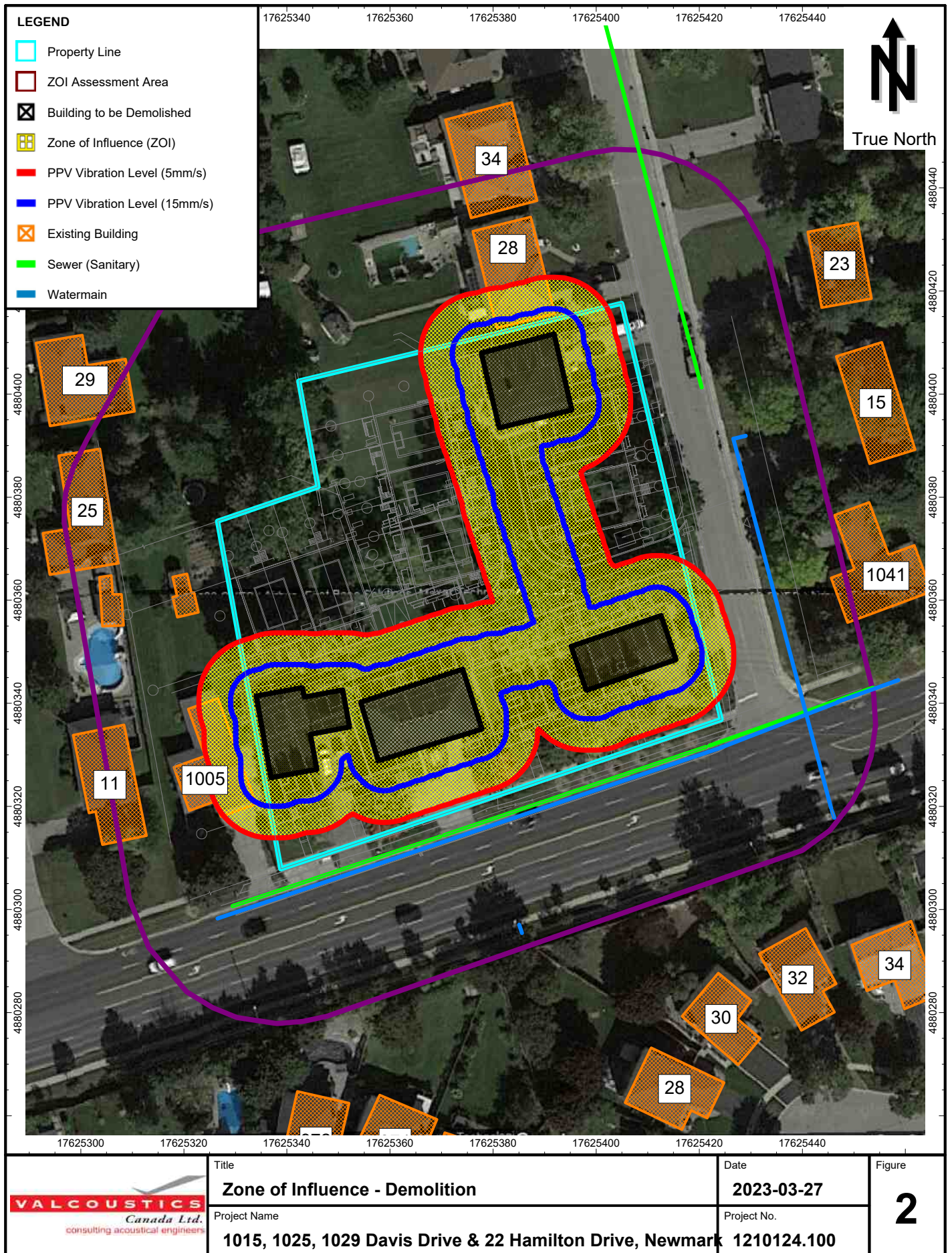
Two (2) unattended monitoring locations are recommended for the duration of demolition, excavation, and pouring of footings. The northeast location should also remain in place during grading and compaction in the northeast corner of the site.

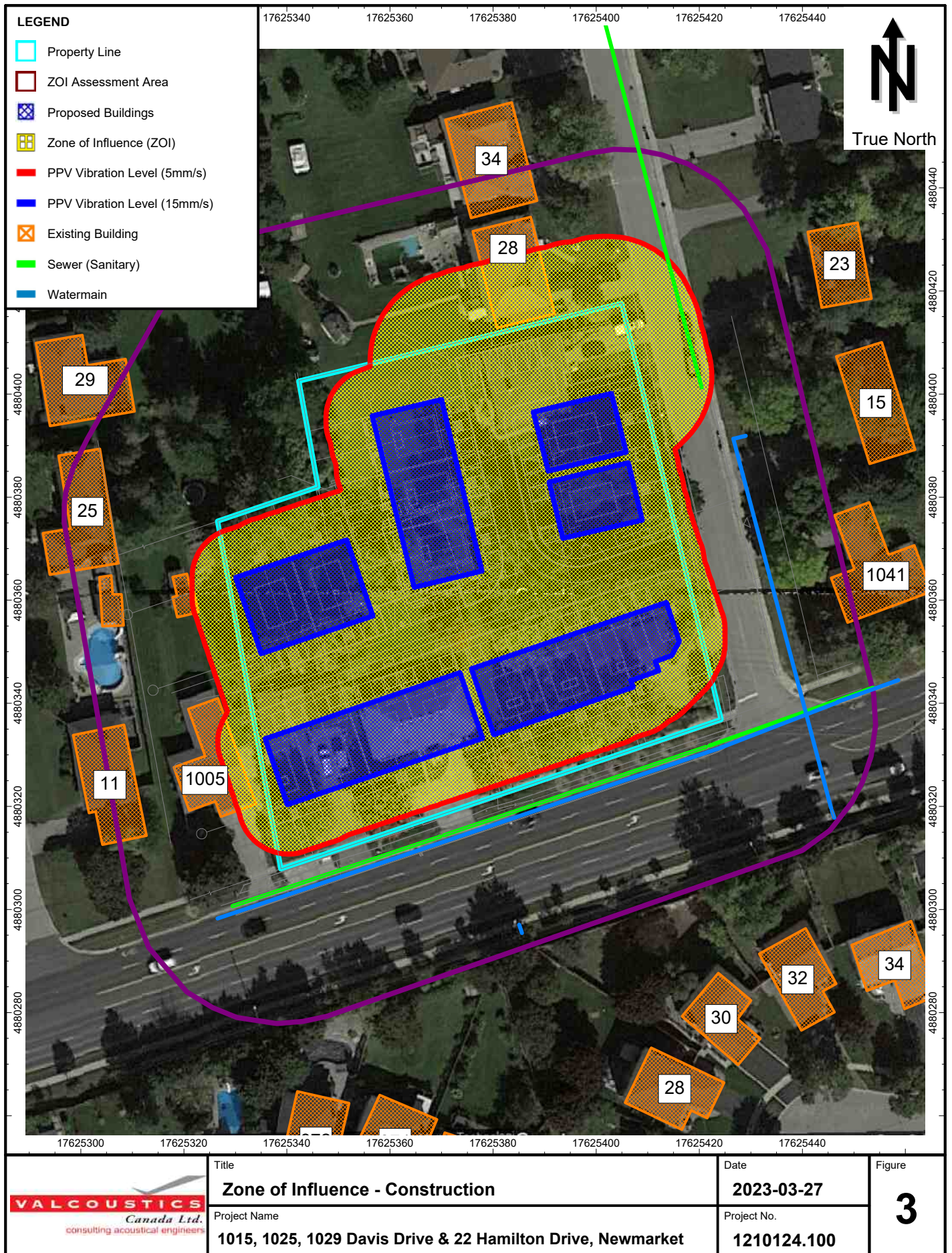
6.0 REFERENCES

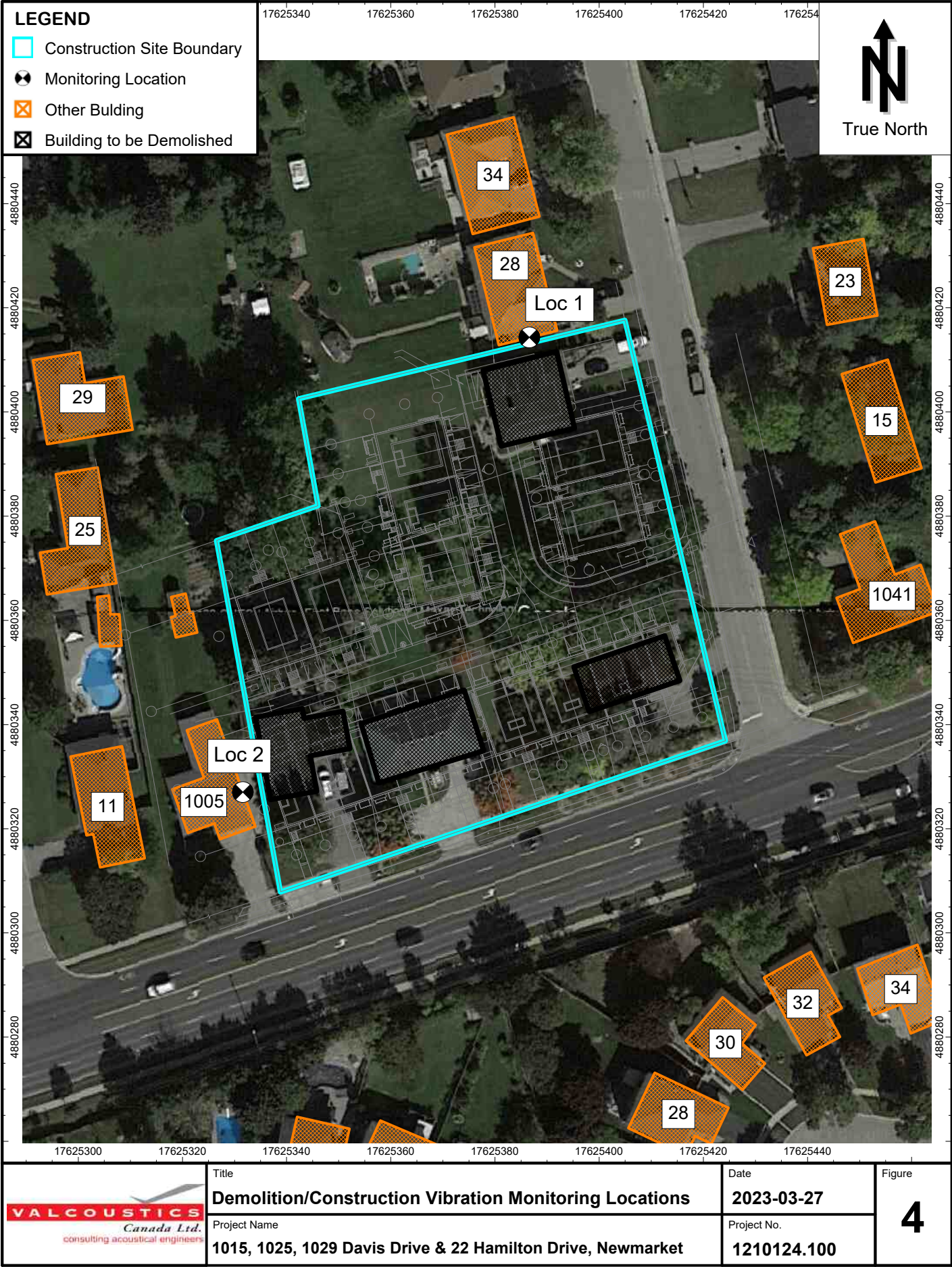
1. “Construction Vibration Issues – Staff Report”, Town of Newmarket, March 18, 2019.
2. DIN 4150-3, “Structural Vibration, Part 3: Effects of Vibration on Structures”, Deutsche Norm, February 1999.
3. “High Speed Ground Transportation Noise and Vibration Impact Assessment”, Harris Miller, Miller and Hanson Inc., October 2005.
4. “A Geotechnical Investigation for Proposed Townhouse Development 1015-1029 Davis Drive and 22 Hamilton Drive, Town of Newmarket”, Soil Engineers Ltd., dated October 2021.

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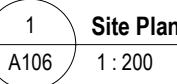









APPENDIX A

PROPOSED SITE PLAN

NOTE:
THE PARKING SPACES CAN BE SIDE BY SIDE ASSUMING MAX 200mm
SPACE FOR COLUMNS BETWEEN THE PARKING SPACES

NOTE:
MUNICIPAL ADDRESS TO BE PROMINENTLY DISPLAYED FOR THE SITE
TO ENABLE IDENTIFICATION FOR EMERGENCY SERVICES. INDIVIDUAL
UNIT NUMBERS NEED TO BE CLEARLY VISIBLE FROM DIRECTION OF
APPROACH



- | | | |
|---|----------------|---|
|  | TYPE A-3 STORY | |
|  | TYPE B-2 STORY | |
|  | AMENITY | |
|  | GAS METER | |
|  | HYDRO METER | |
|  | STOP SIGN | REFER TO BA CONSULTING
DWG FOR MORE INFORMATION. |
|  | FIRE ROUTE | REFER TO BA CONSULTING
DWG FOR MORE INFORMATION. |

3	2023-03-17	Issued for Review
2	2021-10-08	Re Issued for OPA and ZBA Submission
1	2020-08-26	Issued for OPA and ZBA Submission

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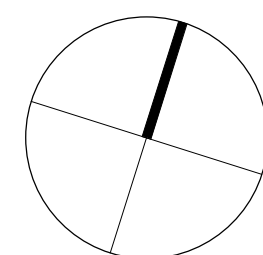


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PROJECT:

1015,1025,1029 Davis Dr-22 Hamilton Dr,
Newmarket, Ontario

CLIENT:



SCALE:
As indicated

DATE: _____

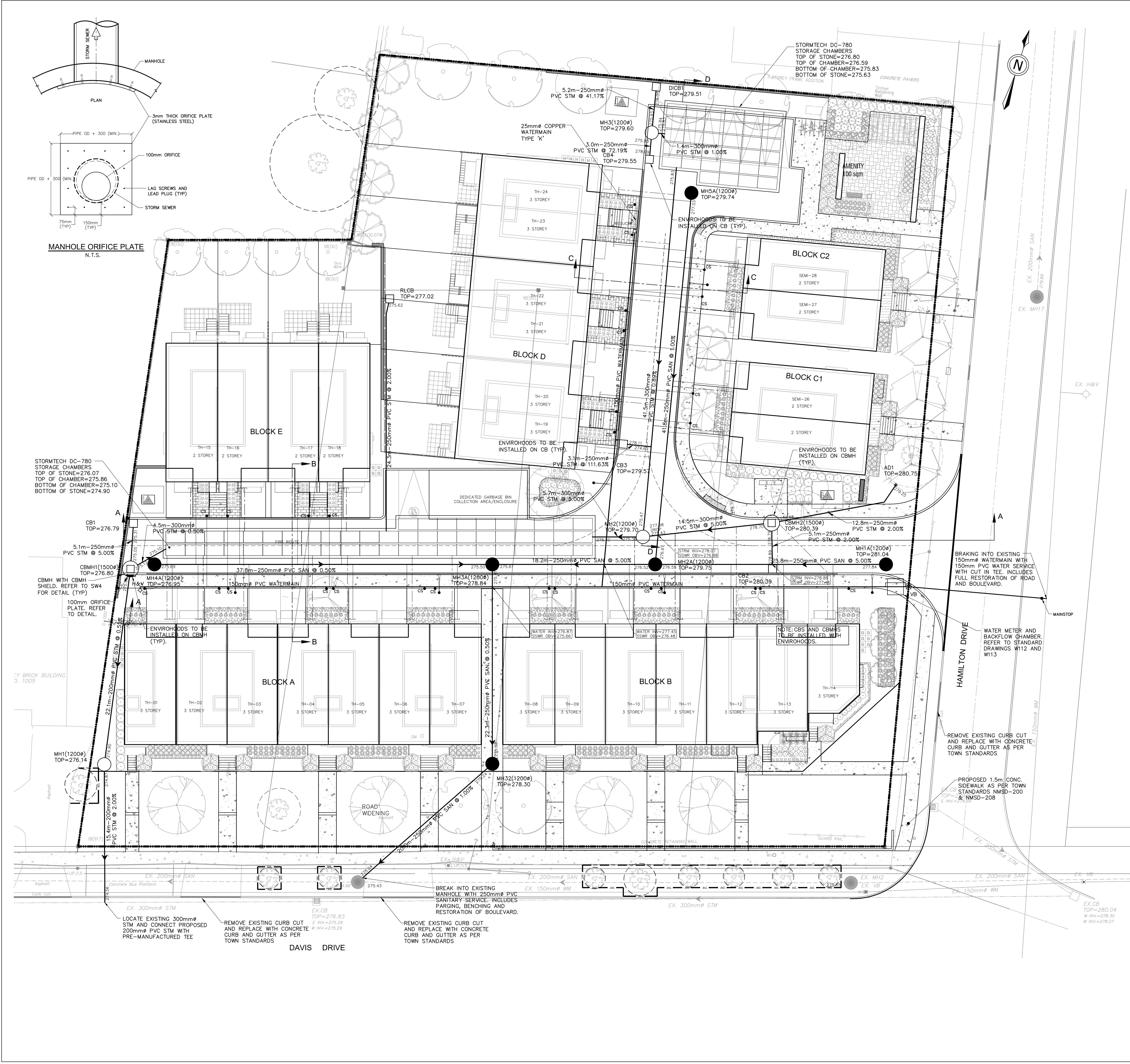
TITLE:
Site Plan

PROJECT NO
17-135

A106

APPENDIX B

SERVICING PLAN



GENERAL NOTES:

1. ALL DIMENSIONS ARE IN METRES (m) AND ALL PIPE SIZES ARE IN MILLIMETERS (mm), UNLESS OTHERWISE SPECIFIED.
2. THE NOTES ON THIS SHEET APPLY TO ALL WORKS UNDER THIS CONTRACT UNLESS OTHERWISE NOTED ON THE PLAN AND PROFILE DRAWINGS AND/OR SPECIFIC DETAIL DRAWINGS.
3. THE STANDARD DRAWINGS OF THE TOWN, ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS (OPSS) AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) CONSTITUTE PART OF THE PLANS OF THIS PROJECT.
4. ORDER OF PRECEDENCE OF STANDARD DRAWINGS IS FIRSTLY TOWN OF NEWMARKET STANDARD DRAWINGS, AND SECONDLY ONTARIO PROVINCIAL STANDARD DRAWINGS.
5. THE STANDARD DRAWINGS INCLUDED WITH THESE PLANS ARE PROVIDED FOR CONVENIENCE ONLY AND ARE NOT TO BE CONSTRUED TO BE A COMPLETE SET FOR THE PURPOSE OF THE CONTRACT OR PROJECT.
6. ALL DIMENSIONS AND ELEVATIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.
7. ALL SITE CONTROL AND EROSION PROTECTION DEVICES ARE TO BE IN PLACE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL CONSTRUCTION IS COMPLETE AND THE GRASS HAS ESTABLISHED.
8. APPROVAL BY THE TOWN'S ENGINEER.
9. NATIVE MATERIAL, SUITABLE FOR BACKFILL, SHALL BE COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY. FOR BACKFILLING WITHIN THE ROADWAY, NATIVE MATERIAL SHALL BE BACKFILLED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.
10. GRANULAR MATERIAL USED FOR BACKFILL SHALL BE PLACED IN LAYERS 150 mm IN DEPTH MAXIMUM AND COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY.
11. MATERIAL SPECIFICATION FOR ALL FRAMES, GRATES, COVERS AND GRATINGS SHALL BE AS PER OPSS 1850. FINISH ON ALL SURFACES SHALL BE PAINTED.

STORM SEWER NOTES:

1. ALL STORM SEWER MAINS OVER 450 mm DIAMETER SHALL BE CONSTRUCTED WITH REINFORCED CONCRETE PIPE.
2. CATCHBASIN LEADS SHALL BE CONSTRUCTED WITH CONCRETE, PVC DR 35, HDPE & RIBBED PVC PIPE WILL NOT BE PERMITTED.
3. CONCRETE PIPE SHALL CONFORM TO THE REQUIREMENTS OF CSA SPECIFICATION A257-M 1982 FOR THE CLASSES SHOWN BELOW:
 - a) NON-REINFORCED CONCRETE PIPE, CSA STANDARD A257.1 CLASS 1, 2 AND 3
 - b) REINFORCED CONCRETE PIPE, CSA STANDARD A257.2 STRENGTH CLASS 50-D, 65-D, 100-D AND 140-D
4. PVC PIPE SHALL CONFORM TO CSA SPECIFICATION B182.1 OR B182.2 OR LATEST REVISION THEREOF. RIBBED PVC PIPE WILL NOT BE PERMITTED.
5. SEWERS SHALL BE CONSTRUCTED WITH BEDDING AS PER OPSS 802.010, UNLESS APPROVED OTHERWISE BY THE TOWN.
6. MANHOLE TOPS ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE. FRAME AND COVER TO BE PER OPSS 401.010, TYPE 'B'. ADJUSTMENTS SHALL BE AS PER NMSD 210.00.
7. SINGLE CATCHBASIN LEADS TO BE 250 mm DIAMETER MINIMUM. DOUBLE CATCHBASIN LEADS TO BE 300 mm DIAMETER MINIMUM.
8. REAR LOT CATCHBASIN LEADS SHALL BE A MINIMUM DIAMETER OF 250 mm AND SHALL BE ENCASED IN CONCRETE FROM CATCHBASIN TO STORM SEWER.
9. REAR LOT CATCHBASINS TO HAVE TOPS AS PER TOWN OF NEWMARKET STANDARD DRAWING NMSD-400.00.
10. CATCHBASIN GRATES ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE. ADJUSTMENTS SHALL BE AS PER NMSD-211.00.
11. WHERE CATCHBASINS ARE CONNECTED DIRECTLY TO SEWERS, PRE-MANUFACTURED TEES SHALL BE USED.
12. SAFETY CHAINS ARE TO BE INSTALLED ON THE DOWNSTREAM SIDE OF ALL MANHOLES ON PIPES 1200 mm AND LARGER AS PER TOWN OF NEWMARKET STANDARD DRAWING NMSD-403.00.
13. STORM SERVICES SHALL BE 150 mm DIAMETER PVC DR 28, WHITE IN COLOR AND ARE TO EXTEND 1.5 m BEYOND ROAD ALLOWANCE LIMIT ONTO PRIVATE PROPERTY AND CAPPED.
14. THE LOCATION OF THE END OF EACH LATERAL IS TO BE MARKED WITH A 50 mm x 100 mm WOOD MARKER PAINTED BLACK.
15. CULVERT SPECIFICATION AS PER OPSS 1810. TO BE ALUMINIZED TYPE 2 AND IS TO BE CONFIRMED ON SITE BY ENGINEER.

WATERMAIN NOTES:

1. WATERMAIN MATERIAL TO BE PVC C-900, CLASS 150 (DR 18). PVC WATERMAIN SHALL INCLUDE #12 TRACER WIRE.
2. CAST IRON MECHANICAL JOINT FITTINGS MEETING AWWA SPECIFICATIONS C-907 AND CSA B138.2 SHALL BE USED ON PVC WATERMAIN 150 mm TO 300 mm IN DIAMETER.
3. ALL DOMESTIC WATER SERVICES SHALL BE 25 mm DIAMETER TYPE 'K' COPPER OR POLYETHYLENE MEETING THE REQUIREMENTS OF CSA B137.1.
4. A MINIMUM OF 0.5m VERTICAL CLEARANCE BETWEEN THE WATERMAIN AND ALL UTILITIES MUST BE KEPT, WHILE STILL MAINTAINING A MINIMUM DEPTH OF COVER AT ALL TIMES.
5. WATERMAIN BEDDING SHALL CONSIST OF CLEAR SAND, 150 mm BELOW AND 300 mm ABOVE THE WATERMAIN (REFER TO OPSS 802.010).
6. MECHANICAL JOINT RESTRAINTS ARE TO BE INSTALLED ON BELLS AND SPIGOT JOINTS FOR ALL WATERMAINS CONSTRUCTED IN FILL MATERIAL AND AT ALL TEES, HORIZONTAL BENDS, VERTICAL BENDS, HYDRANTS, END OF MAINS AND CONCRETE THRUST BLOCKS ARE NOT PERMITTED UNLESS EXPRESSLY APPROVED BY THE TOWN.
7. HYDRANTS SHALL BE MUELLER CENTURY, AVK, CLOW CAVITY OR APPROVED EQUIVALENT COMPRESSION TYPE COMPLETE THREE PORT HYDRANTS WITH 100 mm, 1/2 TURN STORZ NOZZLE FACING THE STREET. THE SIDE PORTS SHALL BE 65 mm DIAMETER THREADED. HYDRANT TEES TO BE ANCHOR STYLE. ALL HYDRANTS TO BE EQUIPPED WITH ANTI-TAMPERING DEVICES.
8. HYDRANTS ARE TO BE PAINTED FIRE ENGINE RED. THE STORZ CAP IS TO BE STEAMER OR PUMPER PORT THREADED CONNECTIONS ARE TO BE PAINTED RED (SAME AS BARREL).
9. REFLECTIVE RINGS COLOUR CODED TO THE HYDRANT FLOW CLASSIFICATION WILL BE INSTALLED ON THE 65 mm PORTS BY THE TOWN.
10. HYDRANT FLANGE ELEVATIONS SHALL BE SET AT A GRADE OF 50 mm TO 150 mm ABOVE THE FINISHED GROUND ELEVATION.
11. A MINIMUM HORIZONTAL SEPARATION OF 2.5 m SHALL BE MAINTAINED BETWEEN THE WATERMAIN AND ANY SEWER.
12. UNLESS SPECIFIED OR APPROVED BY THE TOWN, ALL VALVES SHALL BE MUELLER RESILIENT VALVES OR APPROVED EQUIVALENT. VALVES SHALL HAVE A NON-RISING STEM AND A 50 mm SQUARE OPERATING NUT, OPENING COUNTER-CLOCKWISE.
13. ALL VALVES 300 mm IN DIAMETER AND LARGER SHALL BE INSTALLED INSIDE VALVE CHAMBERS. THESE VALVES SHALL HAVE FLANGED ENDS, A FLANGED TO PLAIN END SPACER AND A VICTAULIC COUPLER SHALL BE INSTALLED INSIDE THE CHAMBER TO PERMIT REMOVAL OF THE VALVE IF NECESSARY. VALVES IN EXCESS OF 2.4 m IN DEPTH SHALL REQUIRE A VALVE STEM EXTENSION.
14. THE CONTRACTOR SHALL INFORM THE TOWN 48 HOURS IN ADVANCE PRIOR TO COMMENCING WORK ON ANY PART OF THE WATER SYSTEM.
15. ALL MECHANICAL FITTINGS SHALL HAVE ZINC ANODES AS PER TOWN STANDARDS.

SANITARY SEWERS NOTES:

1. FLEXIBLE PIPE SHALL BE POLYVINYL CHLORIDE (PVC) DR35 OR APPROVED EQUIVALENT, WITH RUBBER GASKET TYPE JOINTS AND SHALL CONFORM TO CSA B182.1 and CSA B182.2. RIGID PIPE SHALL BE REINFORCED CONCRETE CONFORMING TO CSA A257.2. PIPE JOINTS TO BE RUBBER GASKET AS PER CSA STANDARD A257.3.
2. MAXIMUM PIPE DEFLECTION FROM COMBINED LIVE AND DEAD LOADING SHALL NOT EXCEED ANY CSA, OPS OR MANUFACTURER'S RECOMMENDED SPECIFICATIONS.
3. FLEXIBLE SEWERS SHALL BE CONSTRUCTED WITH BEDDING AND BACKFILL AS PER OPSS 802.010 (GRANULAR "A" FOR BEDDING AND COVER MATERIAL). RIGID SEWERS SHALL BE CONSTRUCTED WITH CLASS "B" BEDDING (GRANULAR "A" MATERIAL) AS PER OPSS 802.030, 802.031 AND 802.032 AS APPLICABLE. MATERIAL MAY BE REPLACED ONLY BY APPROVAL OF THE ENGINEER.
4. PRECAST MAINTENANCE HOLES SHALL BE IN ACCORDANCE WITH OPSS 701.010 (1200 mm DIAMETER). PRECAST MAINTENANCE HOLES GREATER THAN 5 m DEEP SHALL BE CONSTRUCTED WITH A SAFETY PLATFORM IN ACCORDANCE WITH OPSS 404.020. FRAME AND COVER SHALL BE IN ACCORDANCE WITH OPSS 401.010, TYPE 'A'.
5. MAINTENANCE HOLE TOPS (FRAMES) ARE TO BE SET TO BASE COURSE ASPHALT GRADE, AND THEN ADJUSTED TO FINAL GRADE WHEN TOP LIFT OF ASPHALT IS PLACED. GRADE AND CROSSFALL ADJUSTMENT SHALL BE MADE USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSE. ADJUSTMENTS SHALL BE AS PER NMSD-210.00.
6. ALL CONNECTIONS TO THE SANITARY MAIN SHALL BE MADE WITH PRE-MANUFACTURED APPROVED TEES.
7. MAINTENANCE HOLE BENCHING SHALL CONFORM WITH OPSS 701.021 WITH BENCHING TO THE OVERT.
8. DROP STRUCTURES SHALL CONFORM WITH OPSS 1003.020.
9. ALL MAINTENANCE HOLES CONSTRUCTED IN VICINITY OF LOW POINTS IN ROADS OR OUTSIDE OF THE PAVED ROADWAY SHALL HAVE WATERTIGHT LIDS.

KEY PLAN
N.T.S.

LEGEND:

- PROPOSED STORM MANHOLE
- PROPOSED STORM CATCHBASIN
- ✕ VALVE
- ◆ HYDRANT AND VALVE
- EXISTING STORM CATCHBASIN
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- ✕ EXISTING VALVE
- ◆ EXISTING HYDRANT
- DOWNSPOUT
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER

STORMTECH CHAMBER

- PROPOSED 150mm PVC STORM SERVICE
- PROPOSED 125mm PVC SANITARY SERVICE
- PROPOSED 25mm TYPE K WATER SERVICE CONNECTION WITH CURB STOP
- TREE PROTECTION FENCING

BENCHMARK:

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO YORK REGION BM NO.8

ELEVATION: 262.50m

DESCRIPTION: NO.826 DAVIS DRIVE, TABLET SET HORIZONTALLY IN EAST WALL, 7.3m S OF NE CORNER AND 0.3m ABOVE GROUND LEVEL.

REV. NO.	REVISION NOTE	DATE
3	ISSUED SITE PLAN APPLICATION	21-07-00
2	ISSUED FOR REZONING	20-08-21
1	ISSUED FOR SITE PLAN APPLICATION	18-10-05

ENGINEERING • MANAGEMENT
P. 904.769.8888
1000 SHEPPARD AVENUE EAST, SUITE 204
WILLOWDALE, ONTARIO M2H 3P5
HUSSON.CA

APPLICATION FOR OFFICIAL PLAN AMENDMENT & ZONING BY-LAW AMENDMENT

1015, 1025, 1029 DAVIS DRIVE, 22 HAMILTON DRIVE TOWN OF NEWMARKET

FOR COORDINATION
(21-07-28)

SCALE	OWNER NAME	DATE
1:200	LULU HOLDINGS INC.	JULY 28, 2021

SHEET NAME

SERVICING PLAN

PROJECT NO.	SHEET NO.
17932	SW2

APPENDIX C

SAMPLE PRE-CONSTRUCTION NOTICE

Notice of Construction – Construction Vibration

Date: [please complete]

Submitted to: [address of adjacent property]

Please be aware that construction will be proceeding at [insert address here]. You are receiving this notification because your property is within 30 metres of the construction site boundary. Note that this does not necessarily mean that your property will be negatively impacted by vibration from the construction activity. It is expected that construction will begin on [date] and proceed until approximately [date].

[Choose Either] An investigation of the potential construction vibration for the above noted site has been completed and submitted to the Town of Newmarket. The construction vibration zone of influence for the construction activity does not extend to your property, and as such, vibration monitoring is not recommended at your property. However, as your property falls within the 30 metre assessment area, a pre-construction condition survey is required (subject to access provided by the owner/tenant).

[or] An investigation of the potential construction vibration for the above noted site has been completed and submitted to the Town of Newmarket. The construction vibration zone of influence for the construction activity extends to your property, and as such, vibration monitoring is recommended at your property. A meeting to confirm the monitoring location(s) is required and will be coordinated separately. Furthermore, as your property falls within the 30 metre assessment area, a pre-construction condition survey is required (subject to access provided by the owner/tenant).

If you have any questions or comments, please forward them to:

[Insert contact information here]