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301 Palladium Ltd. c/o Citant Group Ltd.  
4015 Carling Avenue, Suite 201  
Ottawa, ON  
K2K 2A3

March 17, 2016

Attention: Mr. Peter Clare RQS

Subject: Geotechnical Investigation Program for 301 Palladium Drive, Ottawa Ontario  
Report Amendment #1

*DST File No.: IN-SO-021872*

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## 1. INTRODUCTION

Based on your e-mail dated February 16, 2016, regarding the City of Ottawa comments, DST Consulting Engineers Inc. (DST) has prepared the following supplemental letter subsequent to the completion of the final report, titled, "Geotechnical Investigation Report - 301 Palladium Drive Ottawa Ontario", DST File No.: IN-SO-021872, dated October 2015. DST's responses to the City of Ottawa comments are provided below.

### Question 1:

Please note that DST Consulting Engineers Inc. is required to submit a letter to the City of Ottawa signing off on the Grading Plan prepared by Erion Associates to verify that DST Consulting Engineers Inc. has reviewed the proposed grading and accepts that the grading is in conformance with the recommendations of the Geotechnical Investigation Report.

DST has reviewed all the drawings submitted by Erion Associates related to the grading and servicing plan for the proposed commercial building at 301 Palladium Drive. Based on our records, DST has completed the geotechnical investigation program using the following drawings:

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- “Site Services and Grading Plan (Composite), Proposed Commercial Building, 301 Palladium Drive, Kanata, Ontario”, Drawing No. SSG-1, dated Sept. 2015. Date of last revision: October 19, 2015, prepared by Erion Associates; and,
  - “Site Services and Grading Plan (Composite), Proposed Commercial Building, 301 Palladium Drive, Kanata, Ontario”, Drawing No. SSG-1 (Project No. EA 14-288), dated Sept. 2015. Date of last revision: March 7, 2016, prepared by Erion Associates.

Based on DST’s review of both drawings, the grading and servicing shown in the drawing of March 7, 2016, is in conformance with the recommendations of the Geotechnical Investigation Report.

Question 2:

Please indicate if a temporary MOECC permit to take water (PTTW) is required based on the groundwater monitoring conducted. As per the *City of Ottawa Geotechnical Guidelines, September 2007, Section 3.3.4, where excavations are required to construct buildings, the need for a PTTW from the MOECCC is expected to be discussed. The report should clearly indicate if a PTTW is required so the application process can be completed as the application process is understood to take 4 to 5 months.*

The Groundwater levels were measured in the standpipe piezometers installed in Boreholes BHs 1, 4, 5 and 6 on October 21, 2015 (26 days following completion of drilling), and the measurements varied between 98.4 m and 100.9 m below grade. It is anticipated that excavations will extend below the groundwater level in some areas of the site. However, the ground water level was found to be within a low permeability layer (silty clay), and, thus, groundwater control during construction may be achieved by conventional sump pump techniques; however, the groundwater levels may fluctuate seasonally and in response to climatic conditions. If the groundwater levels remain at the same approximate elevations, there is no need to apply for a temporary MOECC permit to take water (PTTW) and the possible dewatering will be most likely within the 50,000 litres per day.

Question 3:

Please provide a tree planting restrictions section in the report as silty clay deposits were determined to be present on the site. Silty clay is highly sensitive to water depletion by trees of high water demand during periods of dry weather

The site is underlain by marine clay. Therefore, the planting of trees should be in accordance with the City of Ottawa document titled, "Trees and Foundation Strategy in Areas of Sensitive Marine Clay in the City of Ottawa". Trees that do not meet the requirements outlined in this document should be equipped with a tree barrier root system.

Question 4:

A seismic Site Classification is required to be identified as per the Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa, September 20, Section 3.3.3 Seismic Design and Seismic Liquefaction.

The subsurface soil and bedrock conditions at the site were examined in relation to Table 4.1.8.4.A. of the 2010 Ontario Building Code (OBC). The site is underlain by very loose to compact fill, firm to hard clay-silty, loose to very dense till mantling limestone bedrock. Based on the subsurface conditions and the calculated average N-value, shear strength and estimated shear wave velocity of the layers. The site has been classified as Class D for seismic site response.

In accordance with the 2010 National Building Code of Canada (NBCC) hazard calculation, the peak ground acceleration (PGA) is expected to be equal to 0.316 g at this site. A copy of the seismic hazard calculation for this site corresponding to 2% probability of exceedance in 50 years (approximately 1 in 2400 years) is included in Appendix A. The subsurface soils are not considered to have a potential to liquefy during a seismic event.

Question 5:

Please provide discussion in the report regarding the borehole configuration shown on the Borehole Location Plan.

It is indicated in section 4 (Scope of Services), of the Geotechnical Investigation Report - 301 Palladium Drive Ottawa Ontario", DST File No.: IN-SO-021872, dated October, DST has completed the following scope of work to meet the project requirements:

*Fieldwork:*

- Placement of three (3) boreholes within the proposed building footprint (BH2, BH3 and BH4) and advanced to auger refusal depths on inferred bedrock and termination depth of 4.3 to 8.9 m. Bedrock was confirmed in Borehole BH3 by coring a 4.2 m length of bedrock. These boreholes provide information the geotechnical information for the building foundation and excavation works.
- Placement of three (3) boreholes (BH1, BH5 and BH6) within the proposed exterior of the building and parking lot area. The boreholes were advanced to depths ranging from 3.6 to 4.8 m. These boreholes provide the geotechnical information for the pavement design and excavation works.
- Installation of standpipe piezometer in four (4) boreholes for the monitoring of the groundwater levels. Locations of the advanced boreholes are shown in Appendix B of the report.

Question 6:

Please provide the applicable thresholds for conductivity, chloride, sulphate and pH as per the Canadian Standards Association, or other satisfactory bodies in the report.

In addition to section 7 of the final geotechnical investigation report prepared by DST, DST has included the applicable thresholds for conductivity, chloride, sulphate and pH in table 1 shown below.

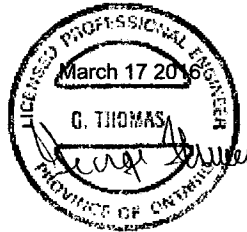
**Table 1 Additional Requirements for Concrete Subjected to Sulphate Attack**

S-1	Very Severe	> 2.0	HS or HSb
S-2	Severe	0.20 – 2.0	HS or HSb
S-3	Moderate	0.10 – 0.20	MS, MSb, LH, HS, or HSb

\*Information from Table 3 of CSA Standards A23.1-04

Yours truly,  
DST CONSULTING ENGINEERS, INC

George Thomas, P. Eng.  
Senior Principal



# 2010 National Building Code Seismic Hazard Calculation

INFORMATION: Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836  
Western Canada English (250) 363-6500 Facsimile (250) 363-6565

Requested by: , DST Consulting Engineers

February 22, 2016

Site Coordinates: 45.3003 North 75.9081 West

User File Reference: 301 Palladium Drive

## National Building Code ground motions:

2% probability of exceedance in 50 years (0.000404 per annum)

Sa(0.2)	Sa(0.5)	Sa(1.0)	Sa(2.0)	PGA (g)
0.619	0.299	0.134	0.045	0.316

**Notes.** Spectral and peak hazard values are determined for firm ground (NBCC 2010 soil class C - average shear wave velocity 360-750 m/s). Median (50th percentile) values are given in units of g. 5% damped spectral acceleration (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are tabulated. Only 2 significant figures are to be used. *These values have been interpolated from a 10 km spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the calculated values.*

## Ground motions for other probabilities:

Probability of exceedance per annum	0.010	0.0021	0.001
Probability of exceedance in 50 years	40%	10%	5%
Sa(0.2)	0.085	0.240	0.376
Sa(0.5)	0.042	0.119	0.181
Sa(1.0)	0.017	0.054	0.085
Sa(2.0)	0.0060	0.017	0.027
PGA	0.036	0.118	0.195

## References

**National Building Code of Canada 2010 NRCC no. 53301**; sections 4.1.8, 9.20.1.2, 9.23.10.2, 9.31.6.2, and 6.2.1.3

**Appendix C: Climatic Information for Building Design in Canada** - table in Appendix C starting on page C-11 of Division B, volume 2

**User's Guide - NBC 2010, Structural Commentaries NRCC no. 53543** (in preparation)  
**Commentary J: Design for Seismic Effects**

**Geological Survey of Canada Open File xxxx**  
Fourth generation seismic hazard maps of Canada: Maps and grid values to be used with the 2010 National Building Code of Canada (in preparation)

See the websites [www.EarthquakesCanada.ca](http://www.EarthquakesCanada.ca) and [www.nationalcodes.ca](http://www.nationalcodes.ca) for more information

Aussi disponible en français

