

Adverse Soils Conditions

Address(&lot):1500 Thomas Argue - Carp Airport Phase 1-D07-16-13-0012 and D07-16-05-0035

Subdivision, Phase, Builder: Carp Airport, Phase 1, Pheonix Homes

Geotechnical Memo (s) & Report (s) referenced: PG2450-2 July 22,2013/PG2450-Memo.11R1/PG2450-LET.02

Notes: Trees to be 5m from foundation walls.


May 20, 2015

Permit Approvals - requirements at permit application		
Site Class A, B, C, D, E or F	<div><div>REVIEWED</div><div>By B Cheer at 0:43 am, May 30, 2018</div></div> <div>A, B, C, D - Standard Procedure unless dictated by other factors</div>	
Bearing Capacity Kpa	<div>75 kPa or greater, part 9 fdtn - Standard Procedure unless dictated by other factors</div> <div><div>City of Ottawa</div><div>NOV 19 2020</div><div>BCSB</div><div>580 Terry Fox Dr.</div></div>	
Maximum Permissible Grade Raise Identified	Part 4/9	<div>Part 9 & 4 Foundation Requirements</div> <div>Geotechnical Engineer</div> <div><ul style="list-style-type: none">Confirmation of part 9/4 foundationPart 9 only - Lot specific bearing capacity values at the USF as a function of founding elevation, including footing restrictionsPart 4 only - Soil design bearing capacity, SLS and ULS at USF as a function of founding elevation, including footing restrictionsFooting sizes and the effects of long term groundwater lowering accounted forExisting grade elevation, proposed finished grade elevation, maximum allowable grade raise, actual grade raise, proposed USF elevationCalculated post construction settlements (include special requirements for foundation construction where calculated settlements are more than 25mm total and 20mm differential)</div>
	Additional for part 4	<div>N/A</div>
Light Weight Fill Required	<div>Part 9&4 Foundation Requirements</div> <div>Geotechnical Engineer</div> <div><ul style="list-style-type: none">Confirmation of part 9 Foundation (site conditions may dictate part 4 design as determined by geotechnical engineer)Lot Specific, backfill, engineered fill detailsCalculated post construction settlements, (include special requirements for footing and foundation wall construction where calculated settlements are more than 25mm total and 20mm differential).</div>	

Adverse Soils Conditions

Address(&lot):1500 Thomas Argue - Carp Airport Phase 1-D07-16-13-0012 and D07-16-05-0035
Subdivision, Phase, Builder: Carp Airport, Phase 1, Pheonix Homes
Geotechnical Memo (s) & Report (s) referenced: PG2450-2 July 22,2013/PG2450-Memo.11R1/PG2450-LET.02
Notes: Trees to be 5m from foundation walls.

May 20, 2015

Building Inspection - requirements at key inspection stages		
Site Class A,B,C,D,E or F	<div>REVIEWED</div> <div>By B Cheer at 0:44 am, May 30, 2018</div> <div></div> <p>A, B, C, D - Standard Procedure unless dictated by other factors</p>	
Bearing Capacity Kpa	<p>75 kPa or greater, part 9 fdtn - Standard Procedure unless dictated by other factors</p>	
Maximum Permissible Grade Raise Identified	Part 4/9	<p>Part 9 or 4 fdtn</p> <p>Excavation Inspection - Geotechnical Engineer</p> <p>Confirm bearing capacity at USF meets/exceeds minimum design requirements.</p> <p>Final Inspection - Geotechnical Engineer</p> <ul style="list-style-type: none">• Lot specific letter signed under professional seal confirming that the grade raise, is as recommended (reference all geotechnical reports)• Expected post construction settlement limits of 25 mm total and 20 mm differential will not be exceeded.
	Additional for part 4	<p>N/A</p>
Light Weight Fill Required	<p>Part 9 or 4 foundation design</p> <p>Excavation Inspection - Geotechnical Engineer</p> <p>Confirm bearing capacity at USF meets/exceeds minimum design requirements.</p> <p>Framing Inspection - Geotechnical Engineer/Designate</p> <p>Lot specific site review memo confirming light weight fill has been placed in accordance with geotechnical engineers recommendations.</p> <p>Final Inspection - Geotechnical Engineer</p> <ul style="list-style-type: none">• Lot specific letter signed under professional seal confirming that the installed backfill, lightweight fill, granular fill are installed as recommended (reference all geotechnical reports)• Expected post construction settlement limits of 25 mm total and 20 mm differential will not be exceeded.	

re: Grading Plan Review
Carp Airport Servicing and Residential Development - Phase 1
Diamondview Road - (Carp) Ottawa
to: Phoenix Homes - Mr. Sandy Pollock - spollock@phoenixhomes.ca
date: May 11, 2018
file: PG2450-MEMO.11 Revision 1

REVIEWED

By B Cheer at 0:44 am, May 30, 2018

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a grading plan review for Phase 1 within the proposed aforementioned residential development. This memorandum should be read in conjunction with Paterson Report PG2450-2 dated July 22, 2013.

Relevant design information for the subject site is presented in Table 1 - Summary of Grading Design Details and Lightweight Fill Recommendations, attached. The design information includes the following:

- ☐ Lot number
- ☐ Civic address
- ☐ Original ground surface elevation (front and rear)
- ☐ Proposed finished grade elevation (front and rear)
- ☐ Underside of footing elevation
- ☐ Bearing capacity
- ☐ Seismic site class
- ☐ Permissible grade raise
- ☐ Exceedance of permissible grade raise (if applicable)
- ☐ Location of lightweight fill requirements



Grading Plan Review

Paterson reviewed the following plan prepared by Novatech Engineering Consultants Ltd. (Novatech) regarding the aforementioned development:

- ☐ Grading Plan - Project No. 102085-01, Drawing No. 102085-GR1, Revision 14 dated March 14, 2018.

The above noted grading plan is in general conformance with our recommendations and is satisfactory from a geotechnical perspective. However, lightweight fill is required in one Lot as noted in the attached Table 1 - Summary of Grading Design Details and Lightweight Fill Recommendations.

REVIEWED

By B Cheer at 0:45 am, May 30, 2018

Lightweight Fill Requirements

The lightweight fill should consist of the following:

- ☐ Garage EPS Type 22
- ☐ Porch EPS Type 19

The lightweight fill installation will also minimize differential settlements between the garage, porch and basement. Lightweight fill placement should be completed as follows:

- ☐ Lightweight fill should be placed on a leveled surface (sand can be used to provide an adequate leveling surface).
- ☐ Place a polyethylene layer over the LWF prior to placing granular material.
- ☐ Minimum granular thicknesses over the lightweight fill should be as follows:
 - ☐ Porch 150 mm of OPSS Granular A
 - ☐ Garage 300 mm of OPSS Granular A

The site class for seismic site response can be taken as Class E for the foundations considered at this site. The soils underlying the proposed shallow foundations are not susceptible to liquefaction. Reference should be made to the latest revision of the 2012 Ontario Building Code for a full discussion of the earthquake design requirements.

We trust that this information satisfies your requirements.

Refer to Attached Memo
PG2450-LET.02 for updated
Site Class

Paterson Group Inc.



Nathan F. S. Christie, P.Eng.



David J. Gilbert, P.Eng.



Paterson Group Inc.

Head Office and Laboratory
154 Colonnade Road South
Ottawa - Ontario - K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

Northern Office and Laboratory
63 Gibson Street
North Bay - Ontario - P1B 8Z4
Tel: (705) 472-5331 Fax: (705) 472-2334

St. Lawrence Office
993 Princess Street - Suite 100
Kingston - Ontario - K7L 1H3
Tel: (613) 542-7381

Table 1 - Summary of Grading Design Details and Lightweight Fill Recommendations
West Capital Developments c/o Novatech - Carp Airport - Phase 1

Lot Number	Civic Address	Original GS Front (m)	Proposed GS Front (m)	Original GS Rear (m)	Proposed GS Rear (m)	Underside of Footing Elevation (m)	Bearing Capacity (kPa)	Seismic Site Class	Permissible Grade Raise (m)	Exceeding Permissible Grade Raise Front (m)	Exceeding Permissible Grade Raise Rear (m)	Minimum Thickness LWF In Garage and Front Porch (m)	Minimum Thickness LWF extending 2.4 m Beyond the building face (m)
Lot 1	43 Sopwith Private	116.96	117.74	116.99	117.74	115.50	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 2	41 Sopwith Private	116.88	117.79	116.90	117.79	115.55	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 3	39 Sopwith Private	116.86	117.84	116.77	116.84	115.60	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 4	37 Sopwith Private	116.80	117.89	116.77	117.89	115.65	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 5	35 Sopwith Private	116.68	118.01	116.57	118.01	115.77	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 6	33 Sopwith Private	116.50	117.99	116.50	117.99	115.75	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 7	31 Sopwith Private	116.02	117.94	116.04	117.84	115.70	100	Class D	1.50	0.42	0.30	0.90	n/a
Lot 8	29 Sopwith Private	115.99	117.52	116.04	117.50	115.51	100	Class D	1.50	0.03	n/a	n/a	n/a
Lot 9	27 Sopwith Private	115.99	117.50	115.99	117.50	115.45	100	Class D	1.50	0.01	0.01	n/a	n/a
Lot 10	25 Sopwith Private	115.94	117.32	115.99	117.32	115.18	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 11	23 Sopwith Private	115.72	117.30	115.65	117.30	115.13	100	Class D	1.50	0.08	0.15	n/a	n/a
Lot 12	21 Sopwith Private	115.72	117.16	115.42	117.06	114.97	100	Class D	1.50	n/a	0.14	n/a	n/a
Lot 13	19 Sopwith Private	115.69	117.01	115.42	116.91	114.87	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 14	17 Sopwith Private	115.58	116.90	115.26	116.80	114.70	100	Class D	1.50	n/a	0.04	n/a	n/a
Lot 15	15 Sopwith Private	115.44	116.89	115.12	116.79	114.65	100	Class D	1.50	n/a	0.17	n/a	n/a
Lot 16	13 Sopwith Private	115.42	116.68	115.25	116.68	114.44	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 17	11 Sopwith Private	115.36	116.63	115.25	116.63	114.39	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 18	70 Wingover Private	114.90	116.24	115.08	116.34	114.00	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 19	72 Wingover Private	114.80	116.17	114.75	116.17	113.93	100	Class D	1.51	n/a	n/a	n/a	n/a
Lot 20	74 Wingover Private	114.52	116.07	114.56	116.13	113.90	100	Class D	1.50	0.05	0.07	n/a	n/a
Lot 21	77 Wingover Private	114.55	115.94	114.61	115.94	113.80	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 22	75 Wingover Private	114.55	116.14	114.61	116.14	113.95	100	Class D	1.50	0.09	0.03	n/a	n/a
Lot 23	73 Wingover Private	114.72	116.23	114.63	116.23	114.04	100	Class D	1.50	0.01	0.10	n/a	n/a
Lot 24	71 Wingover Private	115.00	116.45	115.00	116.35	114.21	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 25	69 Wingover Private	115.11	116.50	115.05	116.50	114.26	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 26	67 Wingover Private	115.25	116.65	115.25	116.65	114.41	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 27	65 Wingover Private	115.43	116.70	115.50	116.70	114.46	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 28	534 Albert Boyd Private	115.91	116.54	115.54	116.54	114.30	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 29	532 Albert Boyd Private	115.91	116.64	115.55	116.64	114.40	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 30	530 Albert Boyd Private	116.06	116.62	115.41	116.62	114.38	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 31	528 Albert Boyd Private	115.95	116.57	115.41	116.57	114.33	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 32	526 Albert Boyd Private	115.94	116.61	115.51	116.71	114.47	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 33	10 Sopwith Private	115.34	116.65	115.83	116.65	114.41	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 34	12 Sopwith Private	115.60	116.70	116.10	116.70	114.46	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 35	14 Sopwith Private	115.53	116.90	115.88	116.90	114.66	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 36	16 Sopwith Private	115.66	116.95	115.82	116.95	114.71	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 37	18 Sopwith Private	115.66	117.07	115.82	117.07	114.83	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 38	20 Sopwith Private	115.75	117.12	115.85	117.12	114.88	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 39	22 Sopwith Private	115.80	117.22	115.87	117.22	114.98	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 40	24 Sopwith Private	115.80	117.27	115.95	117.27	115.03	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 41	26 Sopwith Private	115.91	117.43	116.05	117.43	115.19	100	Class D	1.50	0.02	n/a	n/a	n/a
Lot 42	28 Sopwith Private	115.94	117.48	116.19	117.48	115.24	100	Class D	1.50	0.04	n/a	n/a	n/a
Lot 43	30 Sopwith Private	116.09	117.58	116.49	117.58	115.34	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 44	32 Sopwith Private	116.14	117.73	116.54	117.73	115.49	100	Class D	1.50	0.09	n/a	n/a	n/a
Lot 45	38 Sopwith Private	116.50	118.03	116.29	117.93	115.79	100	Class D	1.50	0.03	0.14	n/a	n/a
Lot 46	40 Sopwith Private	116.81	117.86	116.60	117.86	115.62	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 47	42 Sopwith Private	116.81	117.84	116.70	117.84	115.60	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 48	44 Sopwith Private	116.83	117.73	116.70	117.73	115.49	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 49	500 Albert Boyd Private	116.78	117.08	116.54	117.18	114.84	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 50	502 Albert Boyd Private	116.68	116.98	116.54	117.08	114.84	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 51	504 Albert Boyd Private	116.44	117.05	116.23	117.05	114.81	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 52	506 Albert Boyd Private	116.38	117.10	116.08	117.10	114.86	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 53	508 Albert Boyd Private	116.14	117.04	115.95	117.04	114.80	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 54	510 Albert Boyd Private	115.98	117.00	116.00	117.00	114.76	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 55	512 Albert Boyd Private	115.98	116.89	115.83	116.89	114.65	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 56	514 Albert Boyd Private	116.01	116.79	115.83	116.79	114.55	100	Class D	1.50	n/a	n/a	n/a	n/a



Table 1 - Summary of Grading Design Details and Lightweight Fill Recommendations													
West Capital Developments c/o Novatech - Carp Airport - Phase 1													
Lot Number	Civic Address	Original GS Front (m)	Proposed GS Front (m)	Original GS Rear (m)	Proposed GS Rear (m)	Underside of Footing Elevation (m)	Bearing Capacity (kPa)	Seismic Site Class	Permissible Grade Raise (m)	Exceeding Permissible Grade Raise Front (m)	Exceeding Permissible Grade Raise Rear (m)	Minimum Thickness LWF In Garage and Front Porch (m)	Minimum Thickness LWF extending 2.4 m Beyond the building face (m)
Lot 57	516 Albert Boyd Private	115.98	116.70	115.84	116.75	114.51	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 58	518 Albert Boyd Private	115.83	116.63	115.96	116.73	114.49	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 59	520 Albert Boyd Private	115.83	116.70	116.03	116.70	114.46	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 60	522 Albert Boyd Private	115.98	116.68	115.85	116.68	114.44	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 61	501 Albert Boyd Private	116.74	117.22	116.82	117.22	114.98	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 62	503 Albert Boyd Private	116.74	117.15	116.76	117.22	114.91	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 63	505 Albert Boyd Private	116.44	117.20	116.60	117.22	114.96	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 64	507 Albert Boyd Private	116.39	117.25	116.46	117.25	115.01	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 65	509 Albert Boyd Private	116.20	117.25	116.46	117.25	115.01	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 66	511 Albert Boyd Private	116.13	117.20	116.39	117.20	114.96	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 67	513 Albert Boyd Private	116.11	117.05	116.15	117.05	114.81	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 68	515 Albert Boyd Private	116.11	117.00	116.15	117.03	114.76	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 69	517 Albert Boyd Private	115.95	116.86	116.29	116.90	114.62	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 70	519 Albert Boyd Private	115.95	116.90	116.29	116.90	114.66	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 71	523 Albert Boyd Private	115.96	116.77	116.00	116.87	114.51	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 72	525 Albert Boyd Private	115.96	116.75	115.99	116.75	114.51	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 73	527 Albert Boyd Private	115.99	116.78	115.99	116.78	114.54	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 74	529 Albert Boyd Private	115.91	116.78	115.97	116.78	114.54	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 75	531 Albert Boyd Private	115.88	116.75	115.97	116.75	114.51	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 76	533 Albert Boyd Private	115.88	116.75	115.98	116.75	114.51	100	Class D	1.50	n/a	n/a	n/a	n/a
Lot 151	45 Sopwith Private	116.96	117.69	116.99	117.69	115.45	100	Class D	1.50	n/a	n/a	n/a	n/a
Proposed grade raise information was based on the following grading plan prepared by Novatech Engineering Consultants. - Grading Plan, Project No. 102085-01, Drawing No. 102085-GR1 to 102085-GR4, Revision 7, dated September 26, 2013 and Grading Plan, Project No. 102085-01, Drawing No. 102085-GR5 to 102085-GR9, Revision 5, dated September 26, 2013 - Original ground surface elevations refer to native ground surface excluding existing fill.													





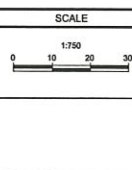
REFER TO DRAWING 102085-PH FOR PHASE LIMITS
REFER TO DRAWING 102085-NT FOR NOTES AND TABLES

- LEGEND**
- SWALE @ 1.5%
 - PROPOSED ELEVATION
 - EXISTING ELEVATION
 - PROPOSED SWALE ELEVATION
 - PROPOSED HIGH POINT ELEVATION
 - PROPOSED SLOPE ELEVATION
 - PROPOSED VERTICAL POINT OF INTERSECTION ELEVATION
 - TOP OF FOUNDATION ELEVATION (STANDARD @ BASEMENT HEIGHT)
 - TOP OF FOUNDATION ELEVATION (OF BASEMENT HEIGHT)
 - MINIMUM UNDERSIDE OF FOOTING ELEVATION
 - PROPOSED TERRACE ELEVATION
 - DRIVEWAY & PROPERTY GRADE
 - PROPOSED HYDRANT LOCATION
 - PROPOSED TOP OF BOTTOM FLANGE
 - CS SWALE AND DIRECTION OF FLOW
 - PROPOSED REAR YARD CATCHBASIN
 - PROPOSED STORM MANHOLE
 - PROPOSED REAR YARD LANDSCAPE CATCHBASIN ELBOW
 - PROPOSED REAR YARD LANDSCAPE CATCHBASIN TEE
 - TERACING
 - MAJOR OVERLAND FLOW
 - DEVELOPMENT SETBACK
 - 1.8m CONCRETE SIDEWALK
 - STONE/STUMP PATH
 - FISH COMPENSATION AREA
 - CULVERT ID
 - PROPOSED CULVERT (REFER TO 102085-HT)
 - PROPOSED DITCH COMPLETE WITH CLEAR STONE TRENCH
 - PROPOSED DITCH COMPLETE WITH SUBDRAIN

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



NO.	REVISION	DATE	BY	NO.	REVISION	DATE	BY
14.	PHASE 1 BARRIER CURB AND REAR OF LOTS 44-49, 61-76	MAR 14/18	ARM	6.	REVISED AS PER CITY / MIVC COMMENTS	NOV 28/13	DJC
13.	REVISIONS FOR CONSTRUCTION ISSUE	APR 7/17	DJC	7.	REVISED AS PER CITY / MIVC COMMENTS	SEPT 26/13	MSP
12.	ENTRANCE GATES REMOVED	APR 19/16	DJC	8.	REVISED AS PER CITY / MIVC COMMENTS	MAY 28/13	MSP
11.	ISSUED FOR TENDER	FEB 26/15	DJC	5.	ISSUED TO GEOTECHNICAL CONSULTANT	APR 24/13	DJC
10.	REVISED AS PER CITY COMMENTS	NOV 21/14	DJC	4.	REVISED AS PER CITY COMMENTS	MAR 6/12	MSP
9.	ISSUED FOR PHASE 1 RESIDENTIAL REGISTRATION	OCT 19/14	DJC	3.	ISSUED TO CITY OF OTTAWA	NOV 21/11	MSP
				2.	ISSUED TO CITY OF OTTAWA	MAY 20/08	CMS
				1.	PRELIMINARY DESIGN	DEC 21/07	LAR



DESIGN
CAH/MSP
CHECKED
MSP/SMG
DRAWN
CAH
CHECKED
MSP
APPROVED
JGR

FOR REVIEW ONLY



CITY OF OTTAWA
WEST CAPITAL AIRPARK

GRADING PLAN

PROJECT NO.	102085-01
REV	REV # 14
DRAWING NO.	102085-GR1

154 Colonnade Road South
Ottawa, Ontario
K2E 7J5
Tel: (613) 226-7381
Fax: (613) 226-6344

May 18, 2018
Report: PG2450-LET.02

Phoenix Homes
18A Bentley Avenue
Ottawa, Ontario
K2E 6T8

Geotechnical Engineering
Environmental Engineering
Archaeological Studies
Hydrogeology
Geological Engineering
Materials Testing
Building Science
Archaeological Services

www.patersongroup.ca

Attention: **Mr. Sandy Pollock**

Subject: **Seismic Shear Wave Velocity Testing Results
Proposed Residential Development
Carp Road - Ottawa**

REVIEWED

By B Cheer at 0:48 am, May 30, 2018

Dear Sir,

Further to your request, Paterson Group (Paterson) has completed site specific shear wave velocity testing to determine seismic site classification for the proposed residential development to be located on Carp Road in Ottawa, Ontario.

The present report should be read in conjunction with Paterson Report PG2450-2 - dated July 22, 2013.

Design for Earthquakes

Shear wave velocity testing was completed for the subject site to accurately determine the applicable seismic site classification for the proposed buildings in accordance with Table 4.1.8.4.A of the Ontario Building Code (OBC) 2012. The shear wave velocity testing was completed by Paterson personnel. The results of the shear wave velocity test are attached to the present report.



REVIEWED

By B Cheer at 0:48 am, May 30, 2018

Field Program

The seismic array testing location was placed on the west portion of the site in an approximate east-west direction, as presented in Drawing PG2450-5 - Seismic Survey Location Plan attached to the present letter report. Paterson field personnel placed 24 horizontal 4.5 Hz geophones mounted to the surface by means of two 75 mm ground spikes attached to the geophone land case. The geophones were spaced at 3 m intervals and connected by a geophone spread cable to a Geode 24 Channel seismograph.

The seismograph was also connected to a computer laptop and a hammer trigger switch attached to a 12 pound dead blow hammer. The hammer trigger switch sends a start signal to the seismograph. The hammer is used to strike an I-Beam seated into the ground surface, which creates a polarized shear wave. The hammer shots are repeated between four (4) to eight (8) times at each shot location to improve signal to noise ratio. The shot locations are also completed in forward and reverse directions (i.e. striking both sides of the I-Beam seated parallel to the geophone array). The shot locations are located at 30, 4.5 and 3 m away from the first and last geophones, and at the centre of the seismic array.

Data Processing and Interpretation

Interpretation for the shear wave velocity results were completed by Paterson personnel. Shear wave velocity measurement was made using reflection/refraction methods. The interpretation is performed by recovering arrival times from direct and refracted waves. The interpretation is repeated at each shot location to provide an average shear wave velocity, $V_{s_{30}}$, of the upper 30 m profile, immediately below the proposed foundations. The layer intercept times, velocities from different layers and critical distances are interpreted from the shear wave records to compute the bedrock depth at each location. The bedrock velocity was interpreted using the main refractor wave velocity, which is considered a conservative estimate of the bedrock velocity due to the increasing quality of the bedrock with depth. It should be noted that as bedrock quality increases, the bedrock shear wave velocity also increases.

Based on the test results, the average overburden seismic shear wave velocity is 185 m/s and the bedrock shear wave velocity is 1,637 m/s. The overburden thickness below underside of footing is assumed to be approximately 18 m to account for the proposed basements.



REVIEWED

By B Cheer at 0:48 am, May 30, 2018

The V_{s30} was calculated using the standard equation for average shear wave velocity provided in the OBC 2012, and as presented below.

$$V_{s30} = \frac{\text{Depth}_{\text{OfInterest}} (m)}{\left(\frac{\text{Depth}_{\text{Layer1}} (m)}{V_{s\text{Layer1}} (m/s)} + \frac{\text{Depth}_{\text{Layer2}} (m)}{V_{s\text{Layer2}} (m/s)} \right)}$$
$$V_{s30} = \frac{30m}{\left(\frac{18m}{184.6m/s} + \frac{12m}{1,637m/s} \right)}$$
$$V_{s30} = 274m/s$$

Based on the results of the seismic testing, the average shear wave velocity, V_{s30} , beneath the foundations is 274 m/s. Therefore, a **Site Class D** is applicable for design of the proposed buildings, as per Table 4.1.8.4.A of the OBC 2012. The soils underlying the subject site are not susceptible to liquefaction.

We trust that this information satisfies your requirements.

Best Regards,

Paterson Group Inc.



Nathan Christie, P.Eng.



David J. Gilbert, P.Eng.

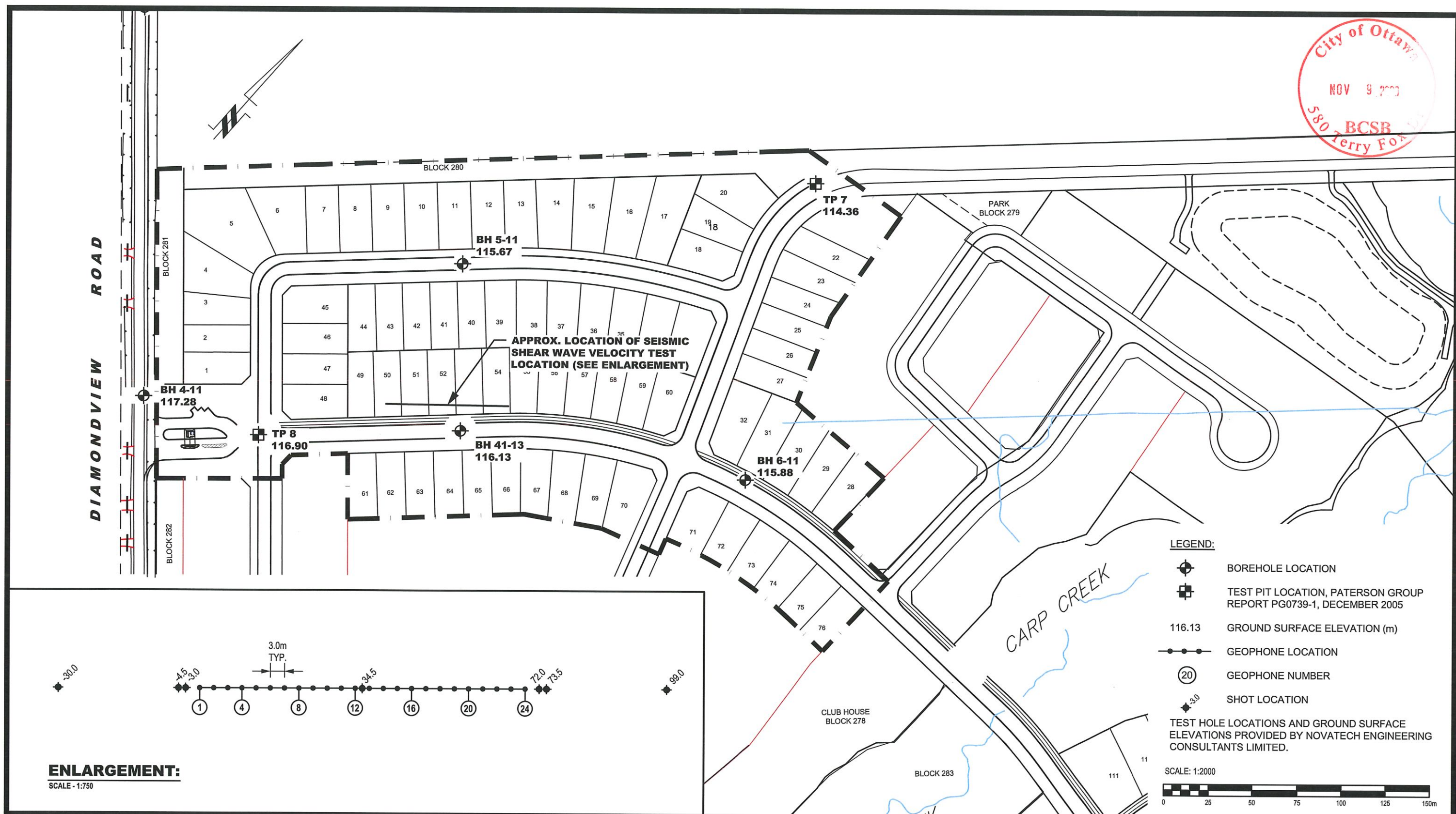
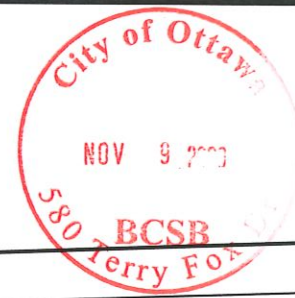
Attachments

- ☐ Figure 1 and Figure 2 - Seismic Shear Wave Velocity Profiles
- ☐ Drawing PG2450-5 - Seismic Survey Location Plan

Report Distribution:

- ☐ Phoenix Homes (email)
- ☐ Paterson Group (1 copy)





ENLARGEMENT:
SCALE - 1:750

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
0			

OTTAWA,
Title:

WEST CAPITAL DEVELOPMENTS
GEOTECHNICAL INVESTIGATION
CARP AIRPORT

ONTARIO

SEISMIC SURVEY LOCATION PLAN

Scale:	1:2000	Date:	05/2018
Drawn by:	MPG	Report No.:	PG2450
Checked by:	NC	Dwg. No.:	PG2450-5
Approved by:	DJG	Revision No.:	0

pl:\t\road drawings\geotechnical\pg2450-5 seismic.dwg