



## Kollaard Associates

Engineers

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March 5, 2008

080069

Phoenix Homes  
18 Bentley Avenue  
Nepean, Ontario  
K2E 6T8

Attention: Mr. Bill Buchanan

RE: ADDITIONAL SUBSURFACE INVESTIGATION  
PROPOSED RESIDENTIAL AND  
COMMERCIAL DEVELOPMENT  
O'KEEFE COURT AND FALLOWFIELD ROAD  
OTTAWA, ONTARIO

Dear Sirs:

This letter presents the results of an additional subsurface investigation carried out at the site of the proposed residential and commercial development between O'Keefe Court and Fallowfield Road in the City of Ottawa, Ontario further to the preliminary subsurface investigation carried out at the site by Kollaard Associates Inc. in August 2006. The purpose of this present investigation was to check for the presence of any firm to soft silty clay in the area of the site identified during the preliminary subsurface investigation as underlain by a silty clay deposit.

### BACKGROUND

The results of the above mentioned preliminary subsurface investigation are provided in the Kollaard Associates Inc. Report No. 060445, entitled "Preliminary Subsurface Investigation, Proposed Residential and Commercial Development, O'Keefe Court and Fallowfield Road, Ottawa, Ontario" dated August 2006. That report should be read in conjunction with this present letter.



Professional Engineers  
Ontario

Authorized by the Association of Professional Engineers  
of Ontario to offer professional engineering services.

A series of some 20 test pits were put down at the site for the previous subsurface investigation. Nine of those test pits, numbered 9 and 11 to 18, put down within the "central" portion of the site encountered silty clay material and were terminated in the silty clay at depths of some 3.2 to 3.8 metres below the existing ground surface. Although, the silty clay material is stiff in consistency to the depth encountered at the test pits, in view that the full depth of the silty clay was not penetrated and that silty clay deposits typically decrease in strength with depth, it was considered possible that firm to soft clay exists within the "central" area of the site.

## PROCEDURE

To check for the presence of any firm to soft silty clay material within the "central portion" of the site, two boreholes were put down at the site on February 15, 2008, using a truck mounted drill rig supplied and operated by OGS Inc. of Almonte, Ontario. The boreholes, numbered 1 and 2, were advanced to some 5.5 and 4.4 metres, respectively, below the existing ground surface. Borehole 1 was put down in close proximity of previous test pit 12 and borehole 2 was put down in close proximity of previous test pit 15, as shown on the attached site plan, Figure 1.

The boreholes were detailed sampled and tested below the level at which the adjacent previous test pits had been terminated, using a conventional 50 millimetre OD split spoon sampler in conjunction with standard penetration testing. A standpipe was installed in each of the boreholes for subsequent water level measuring and sampling.

Water levels were measured and water samples obtained at the standpipes on February 27, 2008. A water sample from each standpipe was delivered to Accutest Laboratories Ltd. in Ottawa, Ontario for sulphate testing.

A detailed account of the subsurface conditions encountered at the boreholes is provided in the attached Record of Borehole sheets.

## SUBSURFACE CONDITIONS

### General

As previously indicated, the soil and groundwater conditions encountered at the boreholes put down for this investigation are given on the attached Record of Borehole Sheets. The borehole logs indicate the subsurface conditions at the specific test locations only. Boundaries between zones on the logs are often not distinct, but rather are transitional and have been interpreted.

### Silty Clay

As indicated above the boreholes were sampled and tested below about the level at which the adjacent previous test pits were terminated. Accordingly, borehole 1 was sampled and tested below about 4.0 metres depth and borehole 2 was sampled and tested below about 2.4 metres depth. Boreholes 1 and 2 encountered stiff to very stiff, grey brown to grey silty clay to depths of some 4.0 to 5.0 metres and 2.4 to 3.4 metres, respectively below the existing ground surface.

### Glacial Till

Beneath the silty clay both of the boreholes encountered a deposit of glacial till. The glacial till consist of gravel, cobbles and boulders in a matrix of silty sand with a trace of clay. Standard penetration tests carried out in the glacial till material gave values of 8 and 37 blows for 0.3 metres, indicating a loose to compact state of packing.

Borehole 2 was terminated in the glacial till at depth of about 4.4 metres below the existing ground surface. Borehole 1 was terminated at a depth of about 5.5 metres below the existing ground surface on refusal to auger advancement on a large boulder or the upper surface of the bedrock.

### Groundwater

The water level was measured at the borehole standpipes on February 19, 2008. At that time the water level at borehole 1 was measured at about 2.7 metres below the existing ground surface and at borehole 2 at about 1.0 metre below the existing ground surface.

The results of the laboratory testing of the water samples obtained from the standpipes gave values of 88 and 169 milligrams per litre for sulphate. Based on the above test results a negligible to mild attack of groundwater on concrete can be expected. Accordingly, normal Portland cement in a ratio of 0.5 water to cement may be used for buried concrete elements.

## DISCUSSION


Based on the results of this additional investigation no presence of soft or firm silty clay material is indicated for the site, and no laboratory consolidation testing of the silty clay material is considered warranted. Accordingly, it is considered that the guidelines for foundation design for the "east and west areas" of the site outlined in our preliminary subsurface investigation report mentioned above can also be used for foundation design for rowhouses, single family dwellings and light commercial buildings within the "central area" of the site.

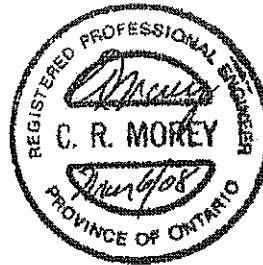
As suggested in the preliminary subsurface investigation report, for final design of any proposed commercial buildings, site/building specific subsurface investigation should be considered in view of the potential for substantial fill thicknesses within proposed building areas.

We trust this letter provides sufficient information for your present purposes. If you have any questions concerning this letter please do not hesitate to contact our office.

Yours truly,

Kollaard Associates Inc.

  
C. R. Morey, P. Eng.



Attachments: Record of Borehole Sheets  
Figure 1

File 080069



**Kollaard Associates**  
Engineers

**RECORD OF BOREHOLE BH1**

P.O. Box 189, 215 SANDERS ST (613) 860-0923  
KEMPVILLE, ONTARIO info@kollaard.ca  
K0G 1A0 FAX (613) 259-0470  
http://www.kollaard.ca

CLIENT: PHOENIX HOMES

ADDITIONAL SUBSURFACE INVESTIGATION  
PROPOSED DEVELOPMENT  
FALLOWFIELD ROAD AND O'KEEFE COURT, OTTAWA, ON.

PROJECT No: 080069  
DATE OF DRILLING  
FEBRUARY 13, 2008

LOCATION: SEE FIGURE 1

DEPTH (m) WATER LEVEL	STRATA DESCRIPTION	STRATA PLOT	ELEV. DEPTH	MOISTURE CONTENT (%)				SAMPLE & TEST DEPTH	N-VALUE BLDVS/0.3m	SHEAR VANE kPa	VANE REMOLD	COMMENTS
				20	40	60	80					
0.00	Probably topsoil, clay, gravel, asphaltic concrete (FILL)	[Pattern]	0.00								<p>Auger cuttings</p> <p>Water level in standpipe at about 2.7 metres depth, February 13, 2008.</p>	
0.00 - 0.30	Probably TOPSOIL	[Pattern]										
0.30 - 3.96	Probably stiff grey brown SILTY CLAY	[Pattern]										
3.96 - 4.56	Stiff grey SILTY CLAY, trace sand and gravel	[Pattern]	3.96					3.96-4.56	7			
4.56 - 5.02	Compact, grey silty sand, some gravel, cobbles and boulders, trace clay (GLACIAL TILL)	[Pattern]	5.02					5.20-5.50	16 / 0.15m 50 / 0.15m			
5.02 - 5.50	End of Borehole -Refusal to advance in glacial till or bedrock at about 5.5 metres below existing ground surface, backfilled with auger cuttings.	[Pattern]	5.50									
5.50 - 6.00												
6.00 - 7.00												
7.00 - 8.00												

DRILL RIG: TRACK MOUNTED CME 55 AUGER: 200 mm HOLLOW STEM.



**Kollaard Associates**  
Engineers

**RECORD OF BOREHOLE BH2**

PO, BOX 109, 215 SANDERS ST (613) 860-0923  
HEMPYVILLE, ONTARIO info@kollaard.ca  
R0G 1A0 FAX (613) 238-0475  
http://www.kollaard.ca

CLIENT: PHOENIX HOMES

ADDITIONAL SUBSURFACE INVESTIGATION  
PROPOSED DEVELOPMENT  
FALLOWFIELD ROAD AND O'KEEFE COURT, OTTAWA, ON.

PROJECT No: 080069  
DATE OF DRILLING  
FEBRUARY 15, 2008

LOCATION: SEE FIGURE 1



DEPTH (m) WATER LEVEL	STRATA DESCRIPTION	STRATA PLOT	ELEV DEPTH	MOISTURE CONTENT (%)				SAMPLE & TEST DEPTH	N-VALUE BLDVS/0.3m	SHEAR VANE KPa	VANE REHOLD	COMMENTS
				20	40	60	80					
0.00	Probably topsoil, clay, gravel, boulders and brick (FILL)	[Pattern]	0.00								Auger cuttings 	
2.20	Probably TOPSOIL	[Pattern]	2.20									
2.30	Probably very stiff grey brown SILTY CLAY	[Pattern]	2.30									
2.44	Very stiff grey brown SILTY CLAY (WEATHERED CRUST)	[Pattern]	2.44					2.44 -3.05	13			
3.35	Compact, grey silty sand, some gravel, cobbles and boulders, trace clay (GLACIAL TILL)	[Pattern]	3.35					3.05 -3.65	8			
4.42	End of Borehole -backfilled with auger cuttings.	[Pattern]	4.42					3.81 -4.42	37			

Water level is standing at about 1.0 metre depth, February 15, 2008.

DRILL RIG: TRACK MOUNTED CME 55 AUGER: 200 mm HOLLOW STEM


FIGURE 1

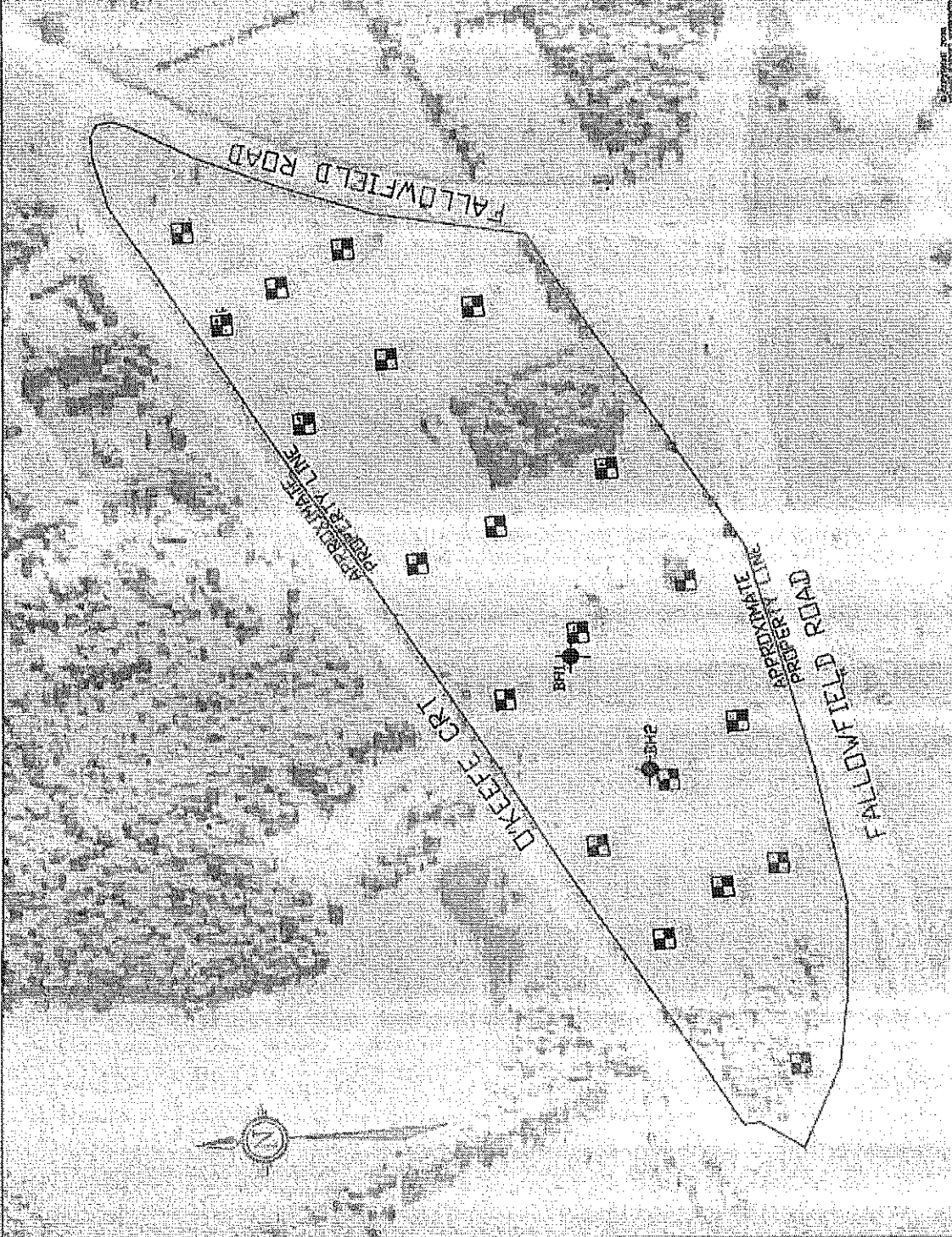
LEGEND

-  Approximate  
Eorcheie Location  
Present Investigation
-  Approximate Test Pit  
Location previous  
investigation by  
Kollzaard Associates  
Inc., August 2006.

REFERENCE PLANE  
City of Ollawag mapping  
website.

SPECIAL NOTE:  
This drawing to be read in  
conjunction with accompanying  
letter.

REV.	NOV. 04	DATE	DESCRIPTION
 <b>Kollzaard Associates</b> Engineers 25 3RD ST. SUITE 211 (613) 860-0923 FALLS CHURCH, VA 22034 FAX: (613) 860-0925 www.kollzaard.com			
CLIENT:	PHOENIX AVENUE		
PROJECT:	ADDITIONAL SUBSURFACE INVESTIGATION		
LOCATION:	FALLOWFIELD ROAD AND DREFFEL CRT CITY OF OLLAWAG ONTARIO		
DESIGNED BY:	DATE:	FEBRUARY 21, 2008	
DRAWN BY:	SCALE:	1:2500	
PROJECT FILE NUMBER: 0800059			



The typical Micro-Cell site, consisting of a concrete pad approximately 3.0 metres X 3.0 metres, may be permitted at a minimum setback of 3.0 metres from property line.

The typical cell site, consisting of a self-support tower, facilities shed, and compound area of approximately 12 metres X 20 metres, may be permitted at a minimum setback of 8.0 metres from property line to the limit of the compound area.

The same relocation requirements in the Telecommunications Industry Master Agreement must apply to any of these installations proposed to be placed at the reduced setbacks noted above.

All other types, including both guyed and self-supporting towers, shall be set back a minimum of 14.0 metres. This setback shall be to the nearest part of the installation, whether above or below ground (i.e. guy wire concrete anchors). Where there is any concern for the safety and operational integrity of the provincial highway due to the size or height of the installation proposed, the Ministry may request a report prepared by a Professional Engineer certified by the Province of Ontario.

All telecommunication towers must be designed to collapse within themselves so it will not fall onto the highway right-of-way.

#### **4.28 Wrecking Yards**

Under the authority of The Public Transportation and Highway Improvement Act and The Highway Traffic Act, the Ministry exercises control over wrecking yards located within the controlled area adjacent to Provincial Highways.

Building and land use, entrance and sign permits are required and the applicant must comply with all requirements of the Ministry's Vehicle Licensing Office.

#### **Applicant Subject to Conditions**

The Ministry will require the following:

- 1) the wrecking operations and equipment shall be screened from the highway by natural means or by a fence at least 2m in height and shall be maintained in a manner satisfactory to the Ministry. Wrecking yards must not be located in low spots, valleys or adjacent to a fill where they are not screened from view,
- 2) the location and operation of the wrecking yard shall be carried out in accordance with all municipal by-laws and restrictions,



- 3) no drains from the wrecking yard or buildings shall be directed to a highway drainage system.

## **5 ADMINISTRATION**

### **5.1 Applications and Permits**

The Public Transportation and Highway Improvement Act places the onus on the individual to secure a permit from the Minister. This must be done before any of the activities described in the "Permit Required" Section.

### **5.2 Applications Adjacent to Controlled Access Highways**

The Field Services Engineer may refer all applications adjacent to controlled-access highways to the Regional Director. The Field Services Engineer may also refer complex/controversial applications to the Regional Director for consideration.

### **5.3 Applicant to be Advised of Restrictions**

Applicants must be fully advised of the restrictions regarding buildings and land use at sites adjacent to a provincial highway. Work must not start before a permit is obtained.

### **5.4 Change of Ownership**

When a permit is issued and the building or property to which it applies changes ownership before the works authorized by the permit commences, the permit shall be void. The new owner or other person concerned must apply for a new permit before work commences. If work has started, the permit remains in force.

The Field Services Engineer will consider each application as recommended by the Corridor Management Officer.

When an application for building and land permit has been recommended for approval, the Corridor Management Officer shall forward the application to the Field Services Engineer for signature.

### **5.5 Field Inspection**

When the works under a permit commence, it is the responsibility of the Corridor Management Officer to ensure that the construction of any buildings/structures is in the location approved by the Ministry. It is essential that MTO Staff including Maintenance Co-ordinators and Superintendents report to the Corridor Management Officer any variation from the conditions of the permit. When a variation has been identified, the Field Services Engineer shall refer to Procedure Regarding Infractions, Chapter 1.

### **5.6 Application For Building And Land Use Permit**

Number: PH-A-20 95-01

Name: Application for Building and Land Use Permit/Entrance Permit

Number of Copies: Three

### **5.7 Building and Land Use Permit**

Number: PH-A-41 95-04

Number of Copies: Three

Destination of Copies:

- 1) Original – Applicant
- 2) Photo copy – Maintenance staff or Co-ordinator
- 3) Photo copy – Area Office copy

### **5.8 Permit Fee**

Refer to Ministry Directive B-7.

## APPENDICES

### TABLE OF TYPE, CLASSIFICATION AND SETBACK DISTANCE

Note: - \* to be referred to the Regional Director.

<u>TYPE OF USE</u>	<u>CLASSIFICATION</u>	<u>SETBACK</u>	
		<u>Class 1</u>	<u>and 2</u>
		<u>P/L</u>	<u>P/L</u>
*Amusement Park	Land Use - Commercial	14m	14m
Arena	Building - Commercial	14m	14m
Ball Park	Land Use - Commercial	14m	14m
Band Stand	Building - Commercial	14m	14m
Barn - Private	Building - Residential	14m	14m
Barn - Public Sale	Building - Commercial	14m	14m
Booster Station			
- telephone, gas, oil, etc	Structure - Commercial	14m	14m
Bleachers	Building - Commercial	14m	14m
Bowling Alley	Building - Commercial	14m	14m
Bowling Green	Land Use - Commercial	14m	14m
Bus Passenger	Structure - Commercial/		
Shelter	Residential	1m	1m
Bus Terminal	Building - Commercial	20m	14m
Car Sales	Building - Commercial	14m	14m
Cemetery (including pets)	Building - Commercial	14m	14m
(Graves)	Land Use - Commercial	27m	27m
Church	Building - Commercial	14m	14m
Chip Truck Stand	Building - Commercial	14m	14m
Community Building	Building - Commercial	14m	14m
Dog Kennel	Building - Commercial	14m	14m
*Drive-In Theatre	Structure - Commercial	14m	14m

<u>TYPE OF USE</u>	<u>CLASSIFICATION</u>	<u>SETBACK</u>	<u>Class 1 and 2</u>	
		P/L	P/L	P/L
Driving Range Tee	Structure - Commercial	14m		14m
Earth Berm (toe of slope)	Land Use - Commercial/ Residential	0.3m		0.3m
Explosive, storage	Building - Commercial	As required by Legislation		
Factory	Building - Commercial	14m		14m
*Fair Ground - Building, rides	Land Use - Commercial	14m		14m
Fence	Structure	0.3m		0.3m
Fire Hall	Building - Commercial	14m		14m
Foundation	Building - Residential	8m		14m
	Building - Commercial	14m		14m
Fruit/Produce Stand	Building - Commercial	14m		14m
Funeral Home	Building - Commercial	14m		14m
Garage	Building - Residential	8m		14m
	Building - Commercial	14m		14m
Gasoline Pump Island and Attendant Booth	Structure - Commercial	6m		14m
Gasoline Canopy / Shelter	Structure - Commercial	3m		14m
Gates	Structure	0.3m		14m
Golf Course Green	Land Use - Commercial	20m		14m
Golf Course Tee	Land Use - Commercial	8m		14m
Grand Stand	Building - Commercial	14m		14m
Greenhouse	Building - Commercial	14m		14m
Hedge/Planting	Land Use	0.3m		0.3m
Heliport	Land Use - Commercial	14m		14m
Hospital	Building - Commercial	14m		14m
Hotel	Building - Commercial	14m		14m
Hydro Sub Station	Structure - Commercial	14m		14m

<u>TYPE OF USE</u>	<u>CLASSIFICATION</u>	<u>SETBACK</u>	<u>Class 1 and 2</u>	
			P/L	P/L
Illumination-Light Standard	Structure - Commercial	0.3m	0.3m	0.3m
Implement Sales / Service	Building - Commercial	14m	14m	14m
Junk Yard	Land Use - Commercial	45m	45m	45m
Landfill Site	Land Use - Commercial	45m	45m	45m
Library	Building - Commercial	14m	14m	14m
Lumber Yard	Building - Commercial	14m	14m	14m
Mail Box (Super / Group)	Structure	0.3m	0.3m	0.3m
Manure Pit	Land Use	14m	14m	14m
Marquee	Structure - Commercial	14m	14m	14m
Mausoleum	Structure - Commercial	14m	14m	14m
Meter Station				
- pipe line, gas, oil	Structure - Commercial	14m	14m	14m
Monument	Structure - Commercial/	14m	14m	14m
Motel	Building - Commercial	14m	14m	14m
Newspaper Dispenser	Structure - Commercial	0.3m	0.3m	0.3m
Noise Attenuation Structure	Structure	0.3m	0.3m	0.3m
Parking Lot	Land Use - Commercial	3m	3m	3m
Pipe Line	Structure - Commercial	3m	14m	14m
*Pit and Quarries	Land Use	30m	30m	30m
Pond				
-Detention/Retention	Land Use	14m	14m	14m
-Other	Land Use - Residential	8m	14m	14m
	Land Use - Commercial	14m	14m	14m
Power / Transmission Line	Structure - Commercial	0.3m	14m	14m
Pumping Station	Building - Commercial	14m	14m	14m
*Race Track	Land Use - Commercial	14m	14m	14m
Radio/Television Station/ Tower	Structure - Commercial	14m	14m	14m

<u>TYPE OF USE</u>	<u>CLASSIFICATION</u>	<u>SETBACK</u>	<u>Class 1 and 2</u>
		P/L	P/L
Residential Dwelling	Building - Residential	8m	14m
- more than 5 units	Building - Commercial	14m	14m
- Class 1 and 2 highways	Building - Commercial	14m	14m
Restaurant	Building - Commercial	14m	14m
Retaining wall	Structure – Residential/ Commercial	0.3m	14m
Roads	Private	8m	14m
- not essential to future viability of development			
Road	Private	8m	14m
- essential to future viability of development			
Road	Municipal	8m	8m
- ROW wide enough to permit relocation road outside 14 m setback in future			
Road	Municipal	8m	14m
- ROW not wide enough to permit relocation road outside 14m setback in future			
Satellite Dish	Structure - Residential/ Commercial	8m 14m	8m 14m
School	Building - Commercial	14m	14m
Septic Tank	Structure - Residential/ Commercial	8m	14m
Septic Bed	Structure - Residential/ Commercial	3m	14m
Service Station	Building - Commercial	14m	14m
Sewage Plant	Structure - Commercial	14m	14m

PERMIT ADMINISTRATION  
Corridor Management and Property Section