



7 September 2006

AMEC Project No. WX15309

Number Ten Architectural Group
310 – 115 Bannatyne Avenue
Winnipeg, Manitoba
R3B 0R3

Dear Mr. Henry Bakker, CET
Project Manager

**Re: Driven Precast Concrete Pile Recommendations
East District Police Station
St. Boniface Industrial Park**

INTRODUCTION

As requested by Mr. George Graham, CET of Crosier Kilgour & Partners Ltd., AMEC Earth and Environmental, a division of AMEC Americas Limited (AMEC), is pleased to provide geotechnical recommendations for the design and installation of driven precast concrete pile foundations for the proposed East District Police Station to be constructed in the St. Boniface Industrial Park in Winnipeg, Manitoba.

BACKGROUND INFORMATION

Based on the information and drawings provided by Number Ten Architectural Group, it was understood that the proposed police station will be two storeys in height and will cover an area of approximately 2,230 m² (24,000 ft²). A crawlspace is expected to underlie most of the main floor and no basement is anticipated. The building construction is expected to consist of open-web steel roof joists supporting a steel deck, and open-web steel floor joists supporting steel deck and concrete topping. The exterior walls will be a combination of concrete block and steel stud, both with brick veneers. The interior partitions will also be a combination of concrete block and steel stud/gypsum board assemblies. The garage floor may be structural concrete although a slab on grade is also possible.

DRIVEN PRECAST CONCRETE PILES

Driven hexagonal precast concrete piles are considered a suitable foundation alternative at this site. Applicable design loads for various precast concrete piles, driven to practical refusal, are summarized in Table I.

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Table I: Allowable Pile Capacity Driven Precast Concrete Piles

Size (mm)	Allowable Capacity (kN)	Final Refusal (blows/25 mm)
300	450	5
350	625	8
400	800	12

The above design capacities are based on the concrete piles being installed with a hammer (drop or diesel) rated for a minimum energy of 40 kJ per blow. Any piles that are damaged, excessively out of plumb or refuse prematurely due to encountering boulders in the till may need to be replaced, pending a review of their load carrying capacity and expected settlement by a qualified geotechnical engineer.

The following additional recommendations are provided and are applicable to the design and installation of driven precast concrete piles for the proposed development:

1. The above allowable values pertain to soil resistance only. The pile cross sections must be designed to withstand the design loads and the driving forces during installation.
2. Pile spacing should not be less than 2.5 pile diameters, measured centre to centre. All piles driven within 5 pile diameters should be monitored for heave and, where heave is observed, piles should be re-driven. Piles that are re-driven should be driven to the refusal criteria outlined above (i.e. re-drive piles for 1 full set).
3. Pre-boring to a maximum depth of about 6 m from grade is recommended at all pile locations, to enhance pile plumbness and alignment, and to reduce the effects of pile heave during driving of adjacent piles. In addition, it should be ensured that all piles are driven a minimum of 3 m past the pre-bore depth and into the dense silt till.
4. A compressible and biodegradable void space (minimum of 150 mm thick) should be constructed below all pile caps and grade beams to accommodate the expansive nature of the underlying soil.
5. The driving of all piles should be documented and approved by qualified geotechnical personnel. The capacities shown in Table I should be confirmed and reported after driving.
6. All piles should be driven continuously to their required design lengths once driving is initiated.

The driven precast concrete end bearing piles driven to practical refusal will develop most of their capacity from tip resistance. Therefore, the reduction of capacity due to group actions can be ignored. Under these conditions, the capacity of pile group can be taken as the number of



the piles in the group multiplied by the allowable capacity of a single pile, provided that above referenced pile spacing is adhered to.

If you have any questions or concerns, please contact the undersigned at your convenience. This report should be read in conjunction with AMEC's geotechnical report for the site, dated 30 June 2006.

Yours truly,

Sincerely,
AMEC Earth & Environmental

Jason Plohman, B.Sc.
Geotechnical Engineer in Training

Reviewed By:

A handwritten signature in black ink, appearing to read "Harley Pankratz". The signature is written over a horizontal line.

Harley Pankratz, P. Eng
Vice President: Manitoba/Saskatchewan

cc: George Graham, CET, Crosier Kilgour & Partners