

CRA
Consulting Engineers

May 8, 1984

Mr. Bob Leach
Gartner Lee Associates Limited
Toronto-Buttonville Airport
Armadale Building, Suite 10
Markham, Ontario
L3P 3J9

Dear Bob:

Re: Review of Burlington Landfill Site, Application
For Continued Use, Volume 2, Hydrogeology March 1984

On behalf of the City of Burlington, Conestoga-Rovers & Associates Limited (CRA) has been retained through Ecoplans Limited (ECP) to review Volume 2, Burlington Landfill Site Application for Continued Use, March 1984. This report specifically deals with geologic and hydrogeologic aspects of the Burlington Landfill Site and the proposed expansion. The report was prepared for M.M. Dillon Limited (MMD) by Gartner Lee Associates Limited (GL).

CRA has now completed our review, and would like to present the following comments and/or raise the following questions pertaining to the report in question.

1) GEOLOGY

Through review of the Volume 2 report and other various reports on the Burlington Landfill Site and adjacent areas, we are in general concurrence with the geology as interpreted and presented in the report by GL.

2) GENERAL HYDROGEOLOGY

CRA is in general concurrence with the hydrogeology of the site as presented by GL. This would include general groundwater flow direction, and permeability calculations. Some minor clarification is required as to interpretation of groundwater contours in areas where monitoring data is not available, however none of these clarifications should change the major hydrogeologic assessment of the site as presented.

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CONESTOGA-ROVERS & ASSOCIATES LIMITED
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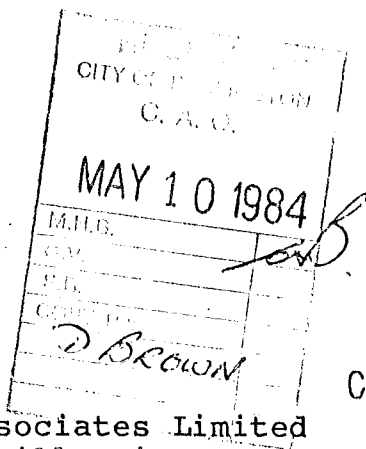
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3) GROUNDWATER MONITORING AND CHEMISTRY

A number of questions have been raised after review of the groundwater monitoring and chemistry results and the interpretations made on these results as presented in the Volume 2 report. The following presents a point form summary of areas where CRA feels further review and clarifications are required.

- Well Construction - Further information than is provided in the report should be provided to determine well construction and installation techniques, and verification of proper functioning of the wells, especially the well seals.
- Well Development and Sampling - Inadequate information has been supplied in the report as to whether the wells were developed and stabilized hydraulically and chemically before detailed sampling was performed. Little information is provided as to how or how many times wells were bailed to see if they obtained chemical equilibrium. No mention has been made in the Volume 2 report as to how it was ensured the wells were at chemical equilibrium before sampling.

Exact detailed sampling techniques have also not been outlined in the Volume 2 report. Numerous well piezometer chemical data shows that they may not have reached equilibrium at selected wells.

- Background Water Chemistry - No definition of background water chemistry or range in chemistry results have been summarized in the Volume 2 report. This makes it difficult to compare downgradient results with background.

The depths, soil units and location of background wells also make comparison of some downgradient well chemistry, with background chemistry difficult.

- Statistical Analysis - No mention has been made in the Volume 2 report of the statistical significance of the

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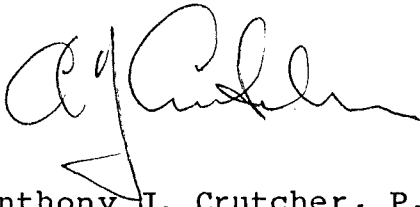
chemical data. This is important to see if, based on the amounts of data used, differences in chemistry from background to downgradient wells are significantly different.

- Leachate Plume Interpretation and Attenuation - Based on the chemical data as contained in the Volume 2 report, CRA believes it is impractical to make a definitive conclusion as to the existence or non-existence of a leachate plume and apparent attenuation capacities of the underlying shale at the Burlington Landfill Site.

It is understood however, that there may be more data and information on the leachate plume that CRA has not been a party to at this time, and we look forward to discussing this and the above mentioned points with you further at our meeting of May 9, 1984.

Yours very truly,

CONESTOGA-ROVERS & ASSOCIATES LIMITED



Anthony J. Crutcher, P. Eng.

AJC:dp

c.c. City of Burlington