ITEM	19
MANAGER'S REPORT NO.	37
COUNCIL MEETING	1981 08 10

RE: LETTER FROM MRS. R. WISE
#403 - 1345 WEST 15th AVENUE, VANCOUVER, B.C.
BASEMENT FLOODING AT 4025 NORLAND AVENUE

The subject referred to in Mrs. Wise's letter to Council has been thoroughly reviewed by the Municipal Manager, Municipal Engineer and the Municipal Solicitor. Mrs. Wise has been informed that the Municipality denies liability, and also, that such denial is the reason why the Municipality's insurer refuses to make a payment on her claim.

MUNICIPAL MANAGER'S RECOMMENDATION:

1. THAT the recommendation of the Municipal Engineer be adopted.

* * * * * * * * *

TO: MUNICIPAL MANAGER 81 08 06

FROM: MUNICIPAL ENGINEER

SUBJECT: BASEMENT FLOODING - 4025 NORLAND AVENUE

RECOMMENDATIONS:

1. THAT a copy of this report be sent to Mrs. R. Wise, #403 - 1345 West 15th Avenue, Vancouver, B.C.

REPORT:

The Engineering Department has been aware of the above flooding problem for some time and have monitored the Corporation utilities and the ditch on Norland Avenue. All these have been functioning satisfactorily and in no way should contribute to the above flooding.

In 1981 May we received a copy of a report which was prepared by Piteau & Associates, Geotechnical Consultants, who were commissioned by Mrs. J. Wise to investigate the above flooding problem. A copy of this report is attached and the causes of the flooding and the recommended remedial action are stated in a clear and positive manner and we quote:

" SOURCES OF FLOODING

Based on our observations, we feel that water in the basement could originate from the following sources:

(i) leakage of water service pipes

(ii) water from the roof is not being carried away by perimeter drains which are blocked

(cont'd)

(iii) natural groundwater flow is not being carried away by perimeter drains

(iv) water flowing in the backfill material for the storm sewer and sanitary sewer along the sewer easement on the northern boundary of the property could possibly flow along the sewer lateral connection to the house. Current observations indicate that this is not the case as the water level in the piezometer in Test Pit 2 is below the level of the basement. However, in periods of heavy rain, flows of this nature may be possible.

(v) If water levels in the ditch along Norland Avenue are allowed to rise above the level of the basement, water could flow back through the drains and enter the basement. At the time of the site inspection, water levels in the ditch were estimated to be below the basement floor elevation.

RECOMMENDATIONS

(i) The leak in the water service pipes should be repaired or water flow to the house should be property shut off.

(ii) Water levels in the standpipe piezometer in Test Pit 2 should be monitored during periods of heavy rain to determine if water levels rise above the level of the basement in this test pit. If water levels rise above the basement this would indicate that water may be flowing from the backfill around the storm sewer towards the basement.

(iii) If water levels in the piezometer in Test Pit 2 are observed to be above basement level, it is suggested that you contact the appropriate municipal authorities.

(iv) The perimeter drains should be excavated, cleaned and replaced using proper construction procedures to control all drainage water from the roof as well as "natural" groundwater seepage. These drains should be excavated, cleaned and replaced to the ditch on Norland Avenue to insure that all water collected in the perimeter drains is conveyed to the storm sewer system. These drains should be constructed with acceptable engineering and construction practice. Proper grades should be provided. Adequate filter material should be placed around all drains to insure that they do not become blocked.

(v) Water levels in the ditch along Norland Avenue should be monitored. If water levels in the ditch are observed to be consistently above the level of the outlet of the perimeter drains into the ditch or the basement of the house, the ditch should be reconstructed in such a manner that water from the ditch is not allowed to flow back up drains into the basement or restrict flow of water from the perimeter drains. We suggest you contact the appropriate municipal agencies if this situation develops. ".

The Engineering Department agrees in general with the conclusions as stated by the consultants and would draw Council's attention in particular to section (iv) of "SOURCES OF FLOODING" and section (iv) of the "RECOMMENDATIONS" as quoted above.

for MUNICIPAL ENGINEER

WMR:sp
Attach.

cc: ( ) Municipal Solicitor
( ) Director of Planning

PITEAU & ASSOCIATES
GEOTECHNICAL CONSULTANTS

KAPILANO 100 SUITE 408
WEST VANCOUVER B.C.
CANADA V7T 1A2
TELEPHONE (604) 926 8551
TELEX 04-352578

ITEM 19
MANAGER'S REPORT NO. 37
COUNCIL MEETING 1981 08 10

DOUGLAS R. PITEAU
FREDERIC B. CLARIDGE
DENNIS C. MARTIN
R. ALLAN DAKIN
ALAN F. STEWART

RECEIVED
1981 MAY 25
Land declined 13:19 L
MUNICIPAL MANAGER'S OFFICE

Mrs. J. Wise
P3 - 1345 West 15th Avenue
Vancouver, B.C.
V6H 3R3

Re: Basement Flooding:
4025 Norland Avenue, Burnaby, B.C.

Dear Mrs. Wise:

Mr. D. Martin of Piteau & Associates visited the site on May 15, 1981. A site inspection was made and four test pits were dug on the property in order to ascertain the causes of flooding. Test pit logs and observations in test pits are included in Table 1. All distances and grades presented in this letter are based on estimates which were made using a measuring tape and hand level.

SITE CONDITIONS

The property slopes gently from west to east. Grades of about 4 percent are estimated between the northwest corner of the house and the eastern boundary of the property. The house is approximately 16m from the northern property line along which the sewer easement occurs. The southern boundary of the sewer easement is estimated to be about 13m from the northern side of the house. The basement foundation wall is approximately 1.2m high and the basement floor is estimated to be about 1.0m below ground surface at the northeast corner of the house.

Water was observed to be approximately 10 cm deep in the basement. A water pipe in the basement was leaking at a rate of about 0.5 gallons per minute. This pipe had apparently burst from freezing. Several other leaks in the water pipes were subsequently noted during a second site visit on May 20, 1981.

One vertical connection riser between the downpipe and the perimeter drain on the west side of the house had a standing water level approximately 15 cm below the ground surface. This riser was blocked at a depth of about 20 cm. A drainage ditch which runs from south to north along the west side of Norland Avenue has an estimated grade of 2 percent. The invert of this ditch is estimated to be approximately 0.3 to 0.5m below the basement level of the house. Accurate measurement of elevations and distances would require proper survey techniques.

Test pit logs indicate that soils in the area of the test pits consist of approximately 0.5m of topsoil overlying hard grey "till-like" clayey silt which contains pebbles, cobbles, and occasional sandy layers. Water seepages encountered in Test Pits 2, 3 and 4 indicate that the natural water table is about one meter below ground surface.

Estimated water flows of 0.1-0.2 lps (1-2 gallons per minute) were encountered at a depth of 1.1m in Test Pit 2 (see Table 1). These flows indicate that a significant amount of water could flow toward the house along the sewer lateral connection for the house. This water is most likely flowing within the backfill material for the main storm sewer and sanitary sewer along the northern boundary of the property.

A standpipe piezometer placed in Test Pit 2 between the house and the sewer easement had a static water level about 1.07m below ground surface or about .24 to .31m below the level of the floor of the basement. A standpipe placed in Test Pit 4 approximately 9.8m west of the house had a standing water level about 0.73m below ground surface. The water level in this piezometer is above the basement level; however, the amount of natural groundwater flow in Test Pit 4 appears to be relatively low.

SOURCES OF FLOODING

Based on our observations, we feel that water in the basement could originate from the following sources:

(i) leakage of water service pipes

(ii) water from the roof is not being carried away by perimeter drains which are blocked

(iii) natural groundwater flow is not being carried away by perimeter drains

(iv) water flowing in the backfill material for the storm sewer and sanitary sewer along the sewer easement on the northern boundary of the property could possibly flow along the sewer lateral connection to the house. Current observations indicate that this is not the case as the water level in the piezometer in Test Pit 2 is below the level of the basement. However, in periods of heavy rain, flows of this nature may be possible.

(v) If water levels in the ditch along Norland Avenue are allowed to rise above the level of the basement, water could flow back through the drains and enter the basement. At the time of the site inspection, water levels in the ditch were estimated to be below the basement floor elevation.

The relative contribution of water from each source is difficult to estimate as flows could vary considerably at different times of the year. A properly constructed system of perimeter drains should be capable of controlling all drainage water from the roof as well as any "natural groundwater" flows as observed in the test pits.

We understand that basement flooding was first observed after the storm sewer was installed in 1977. This would indicate that under certain circumstances water flow from the backfill material around the storm sewer could provide a contribution to flooding in the basement. This could be demonstrated by monitoring water levels in the standpipe piezometer in Test Pit 2 during periods of heavy rain.

RECOMMENDATIONS

(i) The leaks in the water service pipes should be repaired or water flow to the house should be properly shut off.

(ii) Water levels in the standpipe piezometer in Test Pit 2 should be monitored during periods of heavy rain to determine if water levels rise above the level of the basement in this test pit. If water levels rise above the basement this would indicate that water may be flowing from the backfill around the storm sewer towards the basement.

(iii) If water levels in the piezometer in Test Pit 2 are observed to be above basement level, it is suggested that you contact the appropriate municipal authorities.

(iv) The perimeter drains should be excavated, cleaned and replaced using proper construction procedures to control all drainage water from the roof as well as "natural" groundwater seepage. These drains should be excavated, cleaned and replaced to the ditch on Norland Avenue to insure that all water collected in the perimeter drains is conveyed to the storm sewer system. These drains should be constructed with acceptable engineering and construction practice. Proper grades should be provided. Adequate filter material should be placed around all drains to insure that they do not become blocked.

(v) Water levels in the ditch along Norland Avenue should be monitored. If water levels in the ditch are observed to be consistently above the level of the outlet of the perimeter drains into the ditch or the basement of the house, the ditch should be reconstructed in such a manner that water from the ditch is not allowed to flow back up drains into the basement or restrict flow of water from the perimeter drains. We suggest you contact the appropriate municipal agencies if this situation develops.

Results of the monitoring suggested above would be extremely useful to determine the main sources of basement flooding.

We trust this information is sufficient for your purposes. If you have any inquiries regarding this problem, please feel free to contact us.

Sincerely yours
for D.R. Piteau & Associates Limited

D.C. Martin, P. Eng.

DCM
attach