

DEWATERING FOR
VLC PROPERTIES ON
LOT "C" E.N. KENT AVENUE
VANCOUVER, B.C.
FOR
SCS ENGINEERING LIMITED

July, 1990

INTRODUCTION

Three dewatering wells were drilled on Lot "C" and adjacent Lot "D". These wells and their hydrogeology were described in our report of May, 1990. During the construction of a piezometer to measure the response to the pumping of these dewatering wells a high head artesian aquifer was found at the south-west corner of the proposed deep excavation on Lot "C". This was the first indication that such a high head aquifer was present at depth on the site. An additional dewatering well (Well 4) was required in this corner of the site to reduce this pressure and prevent disruption of the excavation.

DRILLING

Well 4 was drilled on the south-west corner of the proposed deep excavation. The well was drilled with 8-inch diameter casing to a depth of 63 feet. The lithology of the sediments found in this well is as follows:

Depth (feet)	Elevation (feet)	Lithology
0 - 56	132 - 76	Till with cobbles
56 - 60	76 - 72	Sand and gravel with silt beds <u>Water-Bearing.</u> Static water level elevation 143 feet (plus 11 feet above ground)
60 - 63	72 - 69	Sand and gravel, silty
63 -	69 -	Clay, blue

The well was screened with 8.6 feet of stainless steel, continuous wire wound well screen with a slot opening of 18/1000 inch. This screen assembly was set between depths of 54 and 62.6 feet. Five inch diameter steel casing was carried to surface. As the 8-inch working casing was removed the annular space was filled with 2/12 target sand to a depth of 10 feet above the screen.

Well development was done by bailing until the sand pack was stabilized and the fine silts had been removed from the formation adjacent to the well screen.

PUMP TEST

The well was tested with a submersible pump powered by a portable electrical generator. The well was pumped at 12 U.S. gallons per minute for 100 minutes and recovery measurements were made for 20 minutes after the pump was shut down.

Transmissivities were calculated from the drawdown and recovery data. The transmissivity of the aquifer at the well ranges from 226 to 260 U.S. gallons per day per foot. A negative (impervious) boundary is present adjacent to the well. This reduces transmissivity to between 115 and 154 U.S. gpd/ft. While the pump test data does not indicate the position of this negative boundary we do know that wells numbered 1, 2 and 3 had much lower static water levels so it is concluded that the negative boundary lies between well 4 and wells 1 and 3. The distance the boundary is from well 4 cannot be determined from the presently available data.

A storage coefficient could not be calculated using the existing piezometers because of their shallow depth and/or proximity to the pumping well.

The recovery data indicates that the aquifer is being recharged and is areally extensive.

SYSTEM OPERATION

A dewatering pump was set in the well and pumping started at 1400 hours on June 25, 1990. On June 27th the water level in the well was at a depth of 53 feet (elevation 79 feet). Available information indicates that the underside of the strip footing is at elevation 113.9 feet. Using the following coefficients for the aquifer we calculate that the drawdown should be:

Transmissivity	= 150 U.S. gpd/ft.
Coefficient of Storage	= 1×10^{-4} (estimated)
Quantity of Water Pumped	= 5 U.S. gpm
Time	= 10 days

The calculated drawdown at the mid-point (100 feet from the pumping well) on the south side of the excavation would be 22 feet. If the static water level at this point is 143 feet the drawdown water level would be at elevation 121 feet. The underside of the strip footing in this area is shown to be at elevation 113.9 feet. The uplift caused by the water pressure would be 7.1 feet which is equivalent to 3.6 feet of soil.

Well 3, in the north-west corner of the excavation, now has a drawdown water elevation of 106.9 feet or 9 feet below the underside of the strip footings. The drawdown in well 3 is caused by the pumping of well 1 at the south-east corner of the Cressey excavation on Lot "D". To prevent possible blow out it will be necessary for well 1 to be in operation during excavation

and early construction on Lot "C". If this is not the case then it will be necessary to operate a pump in well 3.

PERMANENT RELIEF WELLS

Presently available data indicate that permanent gravity relief wells will be required on Lot "C". These wells should be constructed after the bulk excavation is to grade and before the bottom floor of the building is constructed. If any of the above needs amplification or clarification please do not hesitate to contact us.

Yours truly,

BROWN, ERDMAN & ASSOCIATES LTD.

R.B. Erdman