

BROWN, EROMAN & ASSOCIATES LTD.
1401 BEWICKE AVENUE, NORTH VANCOUVER, BRITISH COLUMBIA V7M 3C7
TELEPHONE 988-1557

78-082

August 1st, 1978

Macleod Geotechnical Ltd.
1451 Marine Drive
West Vancouver, B. C.
V7T 1B8

Attention: Mr. G. Macleod, P. Eng.

Subject: New Westminster Courthouse
B.C.B.C. Project No. 0309
Temporary Dewatering

Dear Sirs:

Attached please find:

1. Well and Piezometer Location Map.
2. Logs of nine dewatering wells.
3. Logs of three new piezometers.
4. Geologic cross-section around perimeter of northern part of the excavation.

History

The temporary dewatering system was started with all nine wells pumping on Friday, July 21st at approximately 1530 hours. The standby generator powered the system until 2130 hours on July 22nd when Hydro Power was connected. Wells 6 to 9 inclusive are pumping at rates that are close to 12 USgpm while wells 1 to 5 exclusive of well 3 have pumping rates that vary from 2.9 to 5.6 USgpm. Well 3 produced so little water (less than $\frac{1}{2}$ gpm) that it was shut off.

The system was monitored continuously while the well flows were "tuned" until 1200 hours Friday, July 28th, 1978. The water levels in the wells are dropping very slowly so that monitoring once every second day is all that is needed at this time.

...2

78-082

August 1st, 1978

Macleod Geotechnical Ltd.

The total flow from the system is 64.1 USgpm (0900 July 31st, 1978) and as of the same time a total of 866,000 gallons have been pumped from the site. The design flow rate was calculated to be 54 USgpm. The water is clear, clean and drinkable.

An automatic, seven day recorder is set in piezometer 8 located outside the central part of the northern wall of the excavation.

The latest readings were measured on July 31st, 1978, and are:

Time	Well	Depth to water (feet)	Elevation of water (feet)	Flow USgpm	Total US gallons
0950	1	77.43	20.5	5.6	80,510
0900	2	72.25	32.3	3.2	44,180
0900	3	48.92	63.6	not pumping	
0905	4	76.40	35.7	2.9	47,100
0910	5	60.90	50.3	4.0	63,490
0920	6	67.82	43.5	12.2	154,570
0925	7	66.49	44.5	12.0	151,540
0930	8	62.76	42.9	11.7	159,350
0935	9	50.60	49.2	<u>12.5</u>	<u>165,270</u>
Totals.....				64.1	<u>866,010</u>

0900 July 31st 9 days 12960
 1530 July 21st 9 hour 540
 8 hr 480
 30 mi 30

....3

$$866010 / 14,010 = 62 \text{ gpm}$$

78-082

August 1st, 1978

Macleod Geotechnical Ltd.

<u>Piezometers</u>	<u>Elevation of water (feet)</u>
4	67.7
7A	dry
7B	dry
7C	44.4
8	55.0
9	52.4

Piezometers 1, 2, 3, 5 and 6 have been lost by construction work. The last reading obtained from piezometer 3 showed a water level at an elevation of 60.1 feet on July 28th, 1978. This piezometer is reading the water levels between elevations of 38 to 50 feet. As will be noted the piezometer is located approximately 75 feet south of the "U" of wells. Its readings support our judgment that the wells would intercept water flowing southwards through the ground and keep the southern part of the excavation dry enough to excavate.

On Saturday July 29th, 1978 the electricians had to turn the system off for four hours. The recorder on piezometer 8 showed that the water level rose approximately 15 feet to approximate elevation of 70 feet during this period. It also showed that it took 24 hours for the water level to drop the 15 feet. This indicates that when the excavation is at elevation 68 feet and the general drawdown water level is at elevation 65 feet the system cannot be shut down for more than half an hour.

78-089

August 1st, 1978

Macleod Geotechnical Ltd.

Comments

Examination of the cross-section will show that the excavation will probably cut into the top of the water-bearing sand and gravel zone as shown by the log of well 6. A channel filled with sand and gravel will probably cut diagonally across the excavation from well 6 to well 9. Since the silt cap covering these gravels will be thin, boils will start almost as soon as the water level reaches excavation level at 68 feet.

We believe that the temporary dewatering system can be operated with casual inspections by personnel of this office every two to three days until the excavation reaches elevation 80 feet in the northern part of the site. The excavation can proceed to elevation 69 feet in the southern part of the site to an east-west line (project grid) that is 40 feet south of well 1. Once the excavation exceeds these limits constant monitoring of the dewatering system must resume.

Plans should be made to store approximately 20 yards of graded filter sand and gravel to use as temporary filters if water-bearing lenses are encountered and if the flow of water from these lenses begin to move ground. This will only be needed outside of the shored parts of the excavation.

When the plumbing trenches are finalized their elevation should be reviewed to decide whether or not extra dewatering will be required.

Four copies of this letter with the attachments are sent so that you can distribute them as required. If more are needed please call.



78-089

August 1st, 1978

Macleod Geotechnical Ltd.

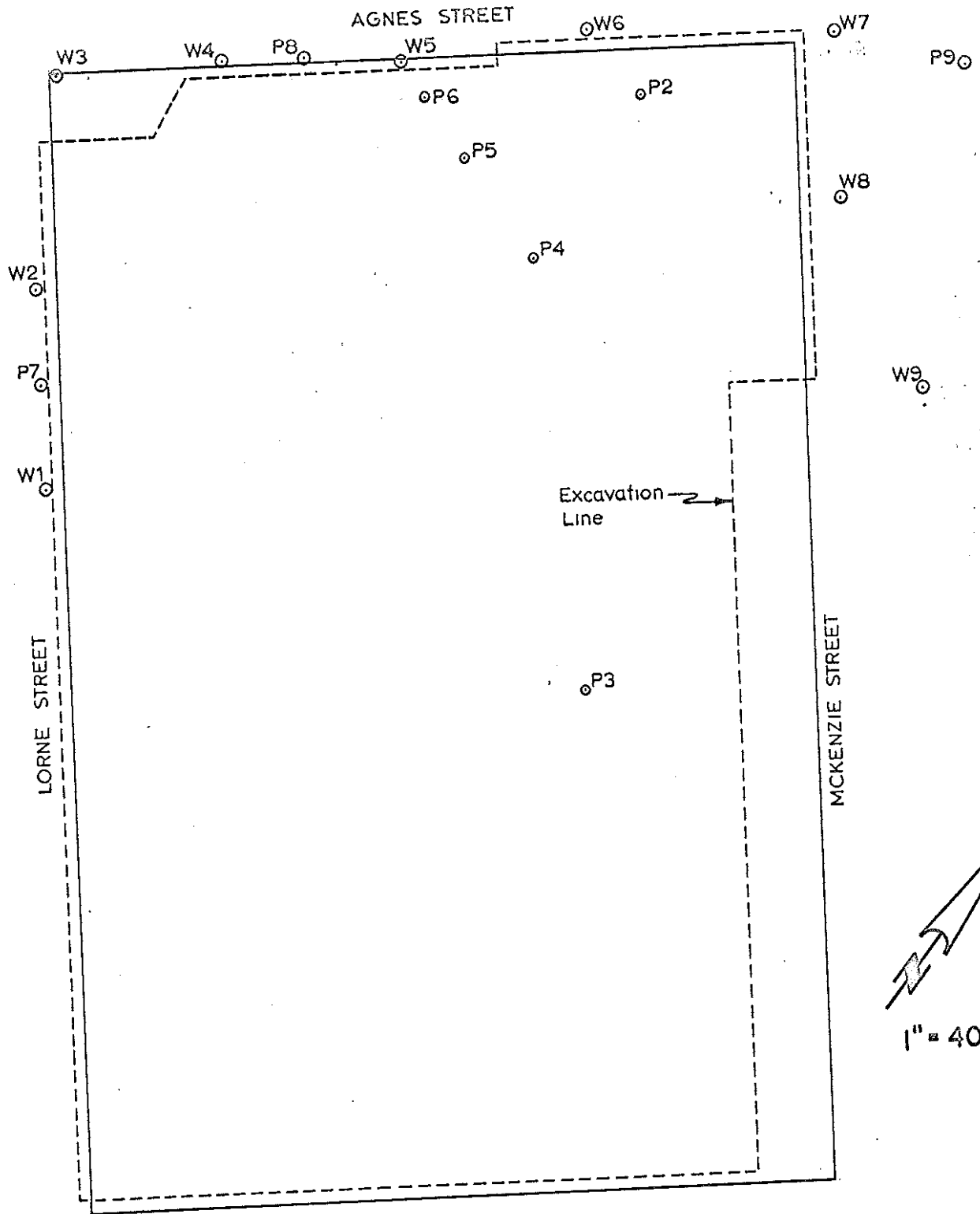
If any of the above needs amplification or clarification
please do not hesitate to call.

Yours truly

BROWN, ERDMAN & ASSOCIATES LTD.

W. L. BROWN, P. Eng.

WLB/sa
Encls:

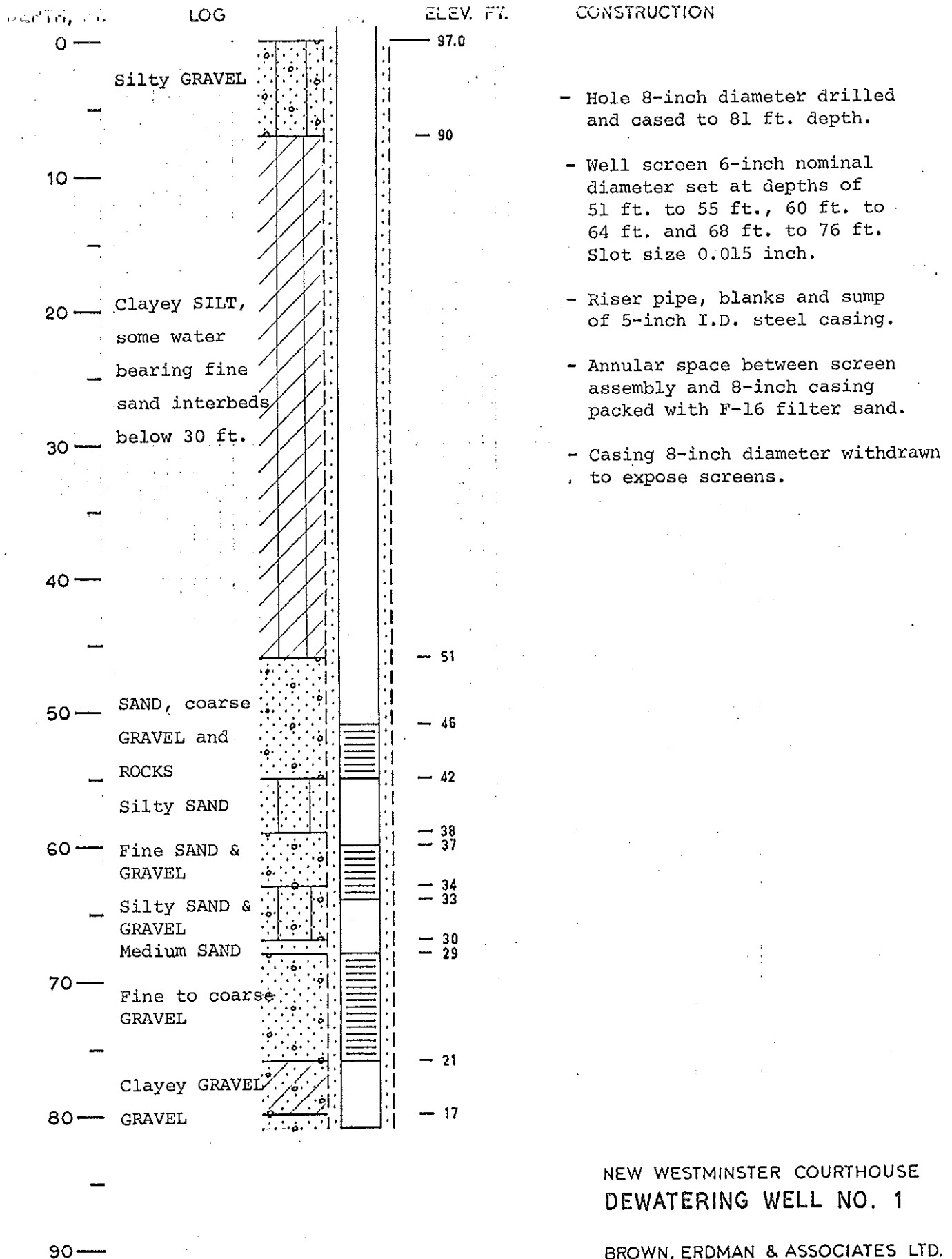


**NEW WESTMINSTER COURTHOUSE
DEWATERING WELL AND
PIEZOMETER LOCATIONS**

MACLEOD GEOTECHNICAL LTD.
BROWN, ERDMAN & ASSOCIATES LTD.
JULY 1978 HWR 78-082



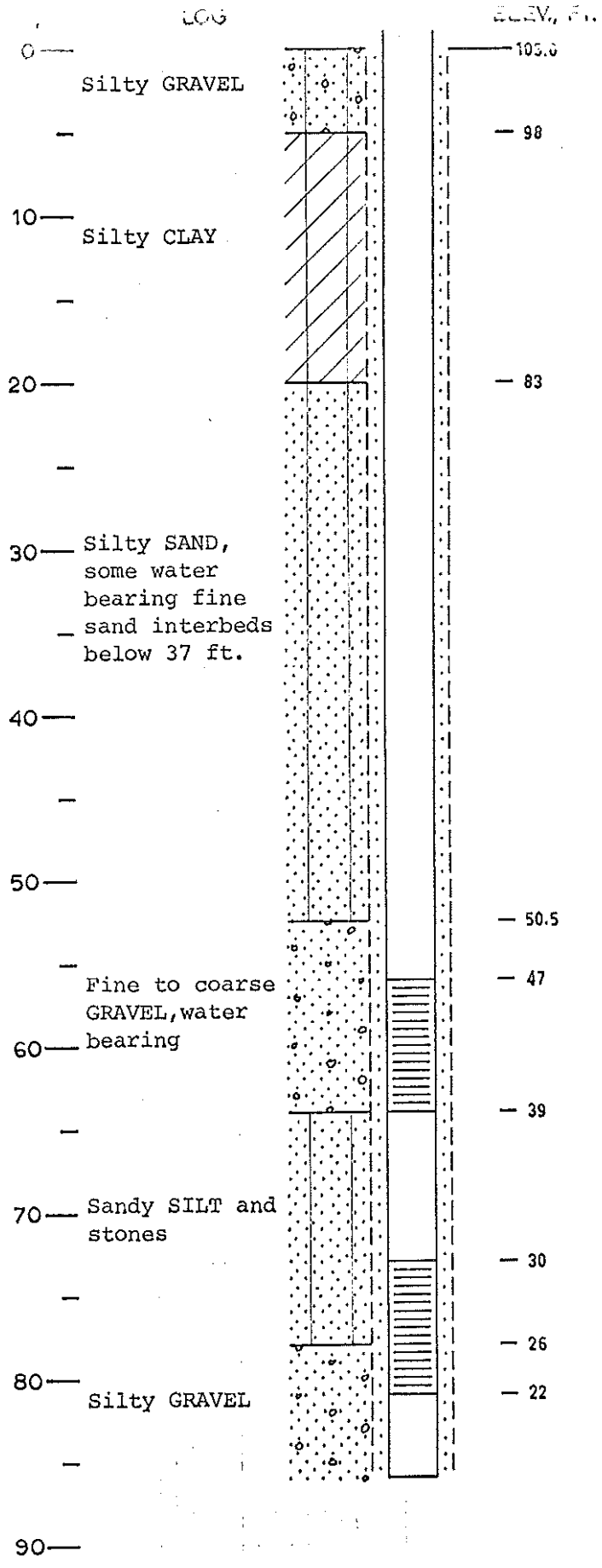
WTN 108043



NEW WESTMINSTER COURTHOUSE
DEWATERING WELL NO. 1

BROWN, ERDMAN & ASSOCIATES LTD.
JULY 1978 HWR 78-082

WTN 108044

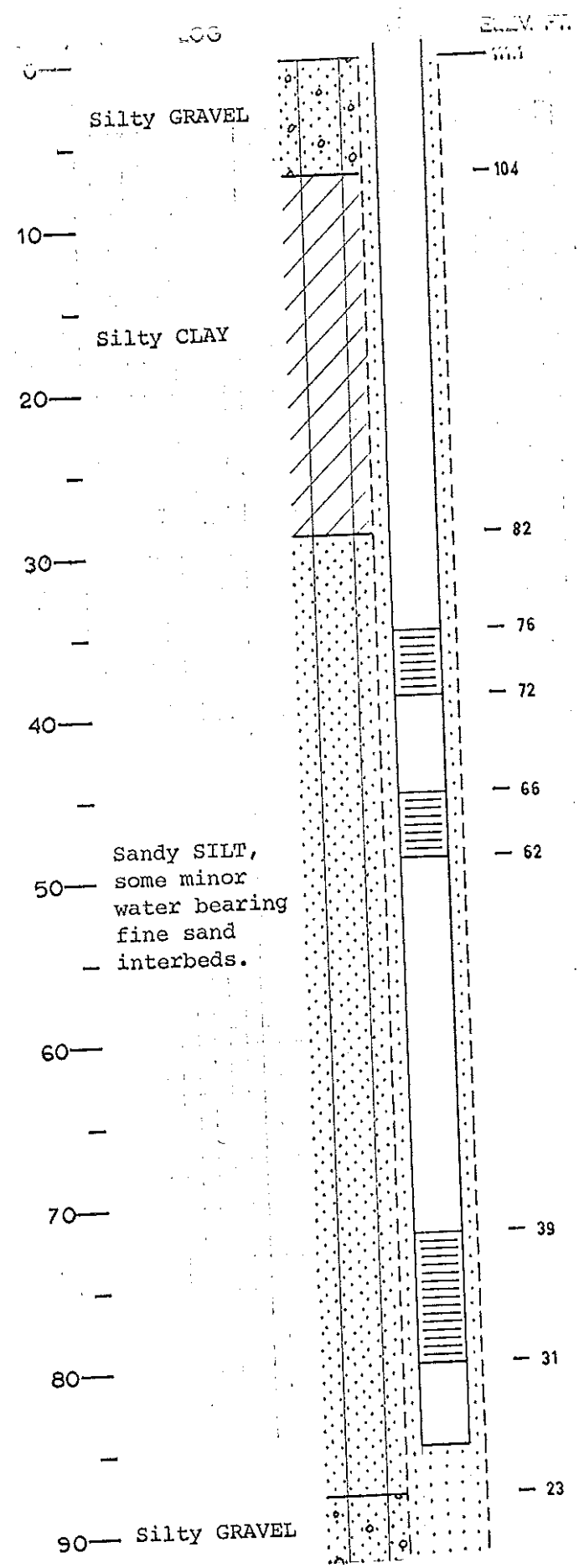


- Hole 8-inch diameter drilled and cased to 86 ft. depth.
- Well screen 6-inch nominal diameter set at depths of 56 ft. to 64 ft. and 73 ft. to 81 ft. Slot size 0.015 inch.
- Riser pipe, blanks and sump of 5-inch I.D. steel casing.
- Annular space between screen assembly and 8-inch casing packed with F-16 filter sand.
- Casing 8-inch diameter withdrawn to expose screens.

NEW WESTMINSTER COURTHOUSE
DEWATERING WELL NO. 2
 MACLEOD GEOTECHNICAL LTD.
 BROWN, ERDMAN & ASSOCIATES LTD.
 JULY 1978 HWR 78-082



WTN 108045



CONSTRUCTION

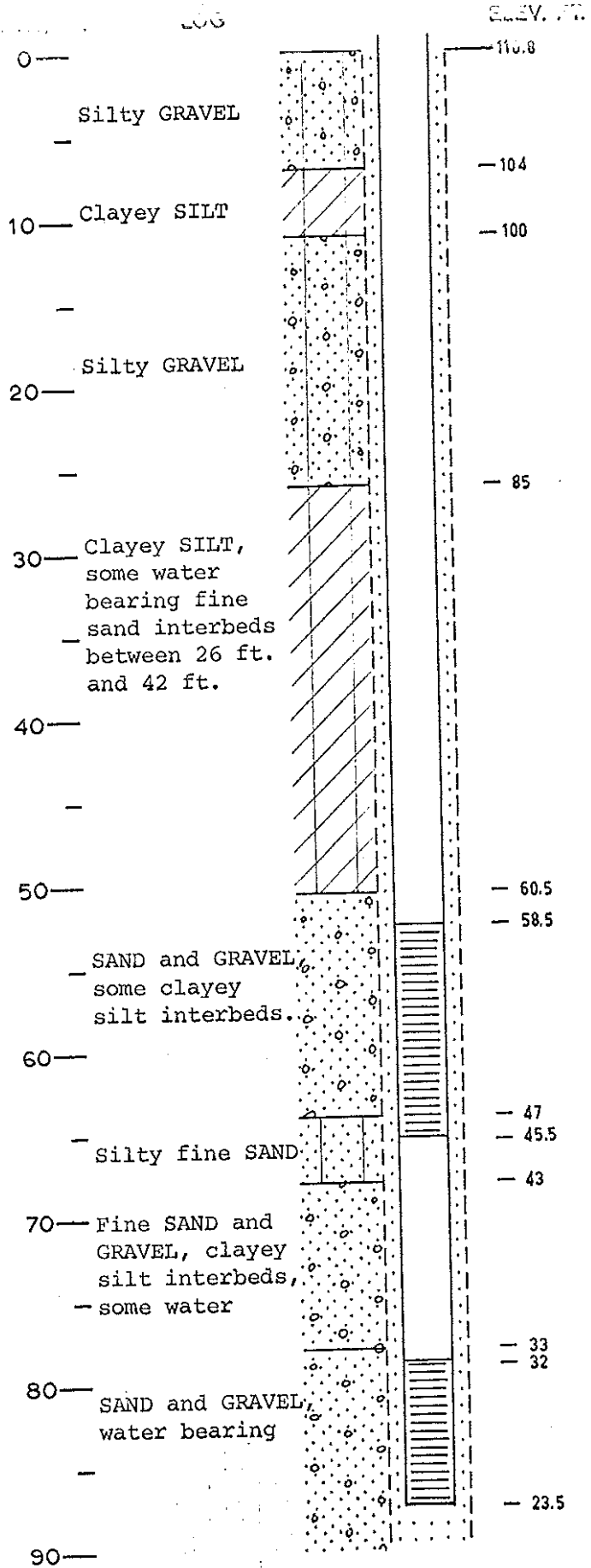
- Hole 8-inch diameter drilled and cased to 92 ft. depth.
- Well screen 6-inch nominal diameter. Slot size 0.010 inch set at depths of 35 ft. to 39 ft. and slot size 0.015 inch set at depths of 45 ft. to 49 ft. and 72 ft. to 80 ft.
- Riser pipe, blanks and sump of 5-inch I.D. steel casing.
- Annular space between screen assembly and 8-inch casing packed with F-16 filter sand.
- Casing 8-inch diameter withdrawn to expose screens.

NEW WESTMINSTER COURTHOUSE
DEWATERING WELL NO. 3

MACLEOD GEOTECHNICAL LTD.
BROWN, ERDMAN & ASSOCIATES LTD.
JULY 1978 HWR 78-082



WTN 108046

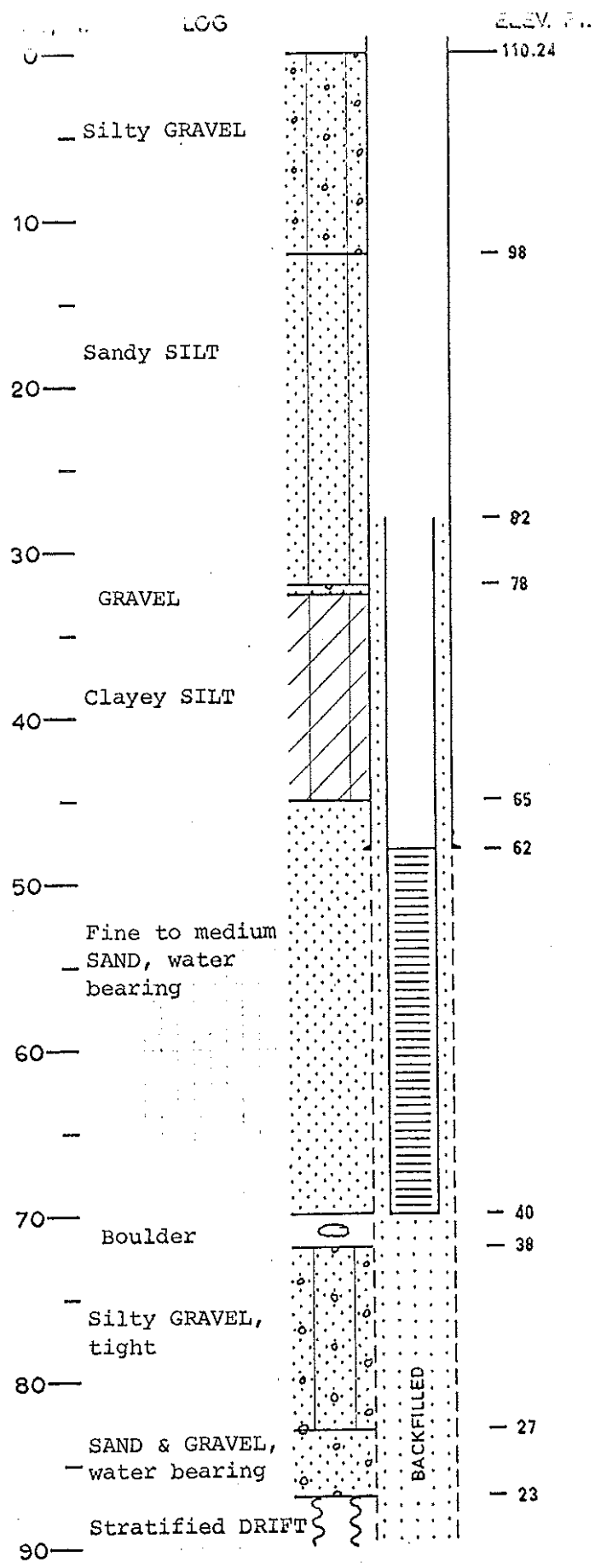


- Hole 8-inch diameter drilled and cased to 90 ft. depth.
- Well screen 6-inch nominal diameter set at depths of 53 ft. to 65 ft. and 79 ft. to 87 ft. Slot size 0.015 inch.
- Riser pipe and blank of 5-inch I.D. steel casing.
- Annular space between screen assembly and 8-inch casing packed with F-16 filter sand.
- Casing 8-inch diameter withdrawn to expose screens.

NEW WESTMINSTER COURTHOUSE
 DEWATERING WELL NO. 4
 MACLEOD GEOTECHNICAL LTD.
 BROWN, ERDMAN & ASSOCIATES LTD.
 JULY 1978 HWR 78-082



WTN 108047



CONSTRUCTION

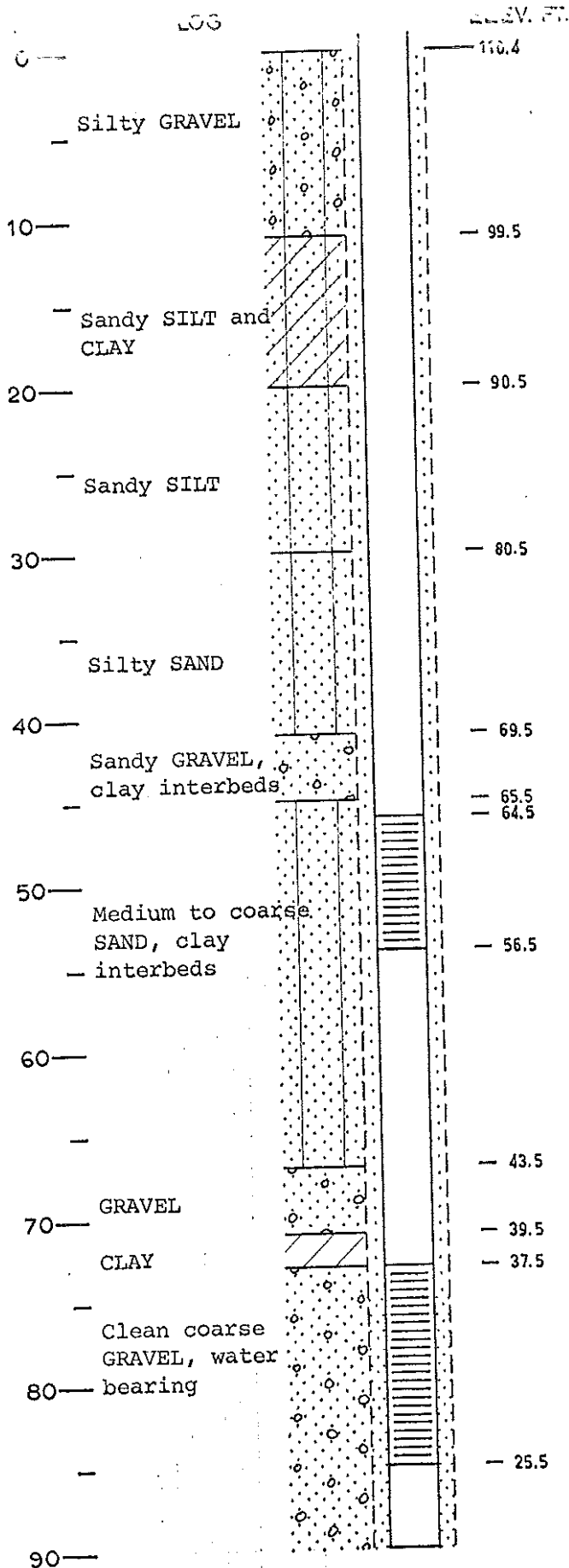
- Hole 8-inch diameter drilled and cased to 105 ft. depth
- Well screen 6-inch nominal diameter set between 48 ft. and 70 ft. depths. Slot size 0.020 inch.
- Annular space between screen and casing packed with F-16 filter sand.
- Casing withdrawn to 48 ft. depth to expose screen.

NEW WESTMINSTER COURTHOUSE
 DEWATERING WELL NO. 5
 TEST WELL

MACLEOD GEOTECHNICAL LTD.
 BROWN, ERDMAN & ASSOCIATES LTD.
 JULY 1978 HWR 78-082



WIN 108048



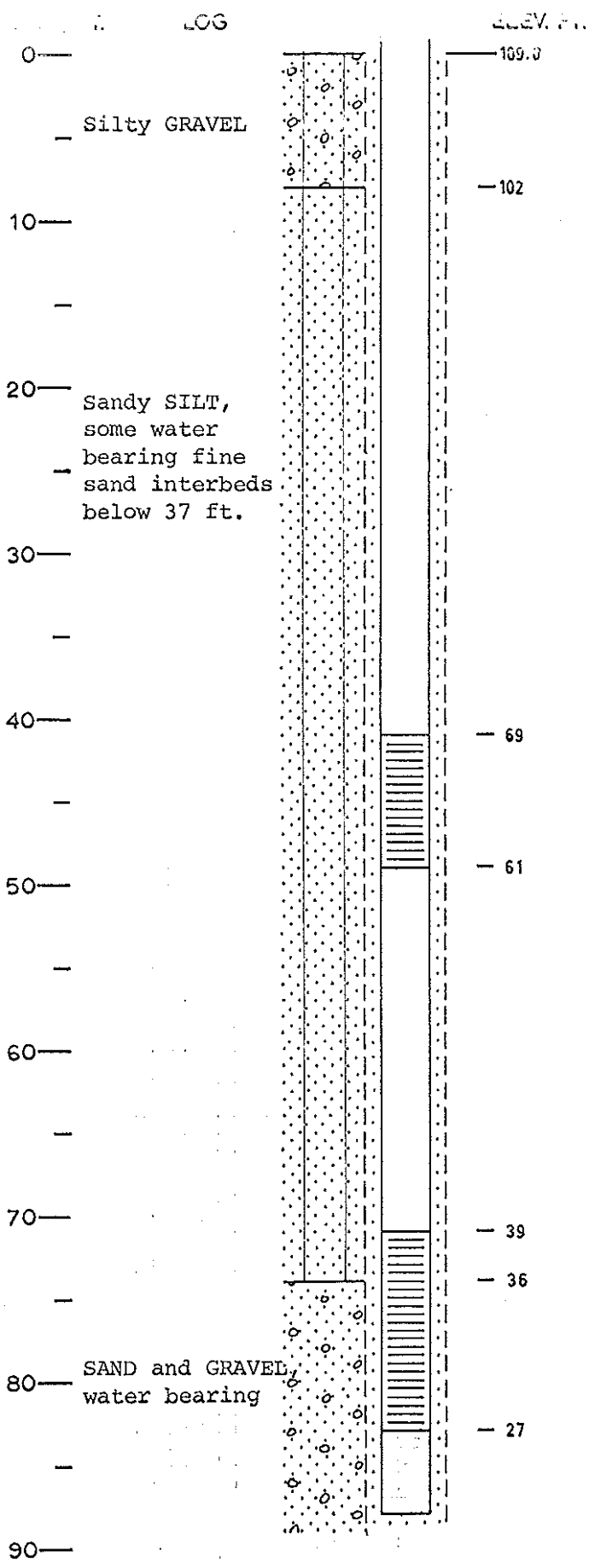
CONSTRUCTION

- Hole 8-inch diameter drilled and cased to 90 ft. depth.
- Well screen 6-inch nominal diameter set at depths of 46 ft. to 54 ft. and 73 ft. to 85 ft. Slot size 0.015 inch.
- Riser pipe, blank and sump of 5-inch I.D. steel casing.
- Annular space between screen assembly and 8-inch casing packed with F-16 filter sand from 75 ft. depth to surface.
- Casing 8-inch diameter withdrawn to expose screens.

NEW WESTMINSTER COURTHOUSE
 DEWATERING WELL NO. 6
 MACLEOD GEOTECHNICAL LTD.
 BROWN, ERDMAN & ASSOCIATES LTD.
 JULY 1978 HWR 78-082



WTN 108049

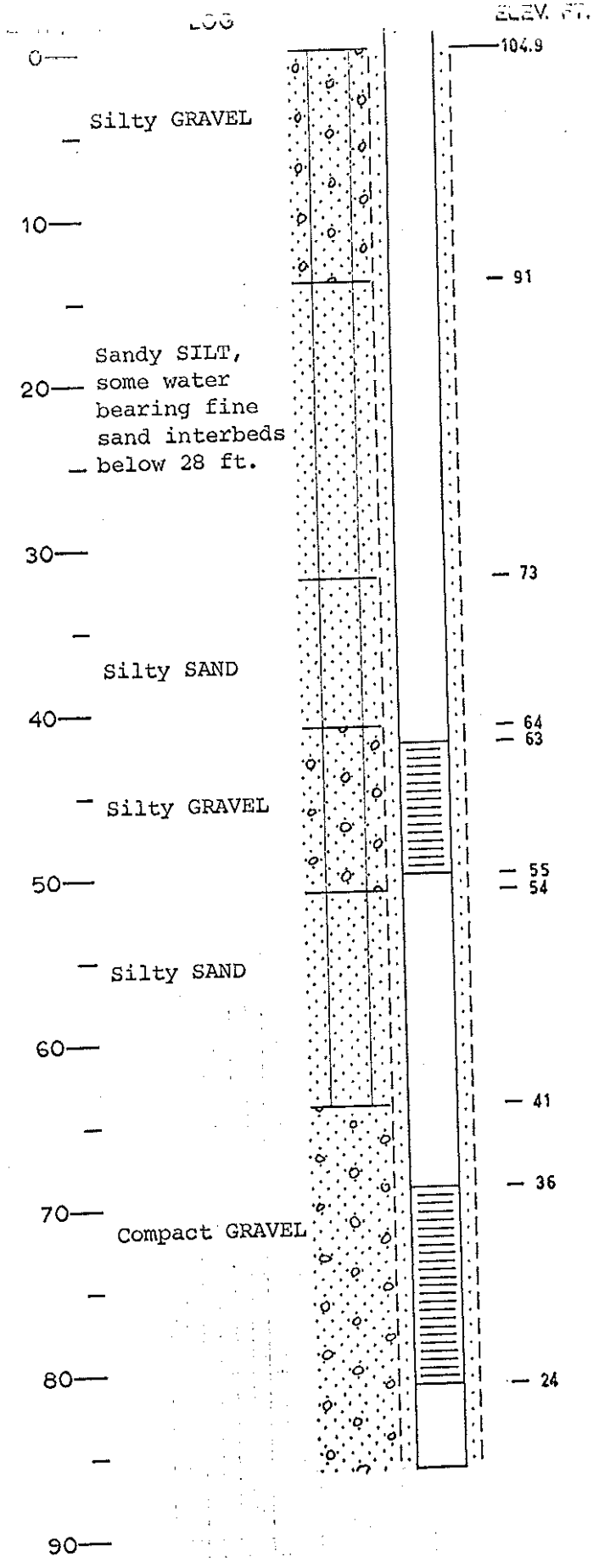


- CONSTRUCTION
- Hole 8-inch diameter drilled and cased to 89 ft. depth.
 - Well screen 6-inch nominal diameter set at depths of 41 ft. to 49 ft. and 71 ft. to 83 ft. Slot size 0.015 inch.
 - Riser pipe, blank and sump of 5-inch I.D. steel casing.
 - Annular space between screen assembly and 8-inch casing packed with F-16 filter sand.
 - Casing 8-inch diameter withdrawn to expose screens.

NEW WESTMINSTER COURTHOUSE
DEWATERING WELL NO. 7
MACLEOD GEOTECHNICAL LTD.
BROWN, ERDMAN & ASSOCIATES LTD.
JULY 1978 HWR 78-082



WTN 108050



CONSTRUCTION

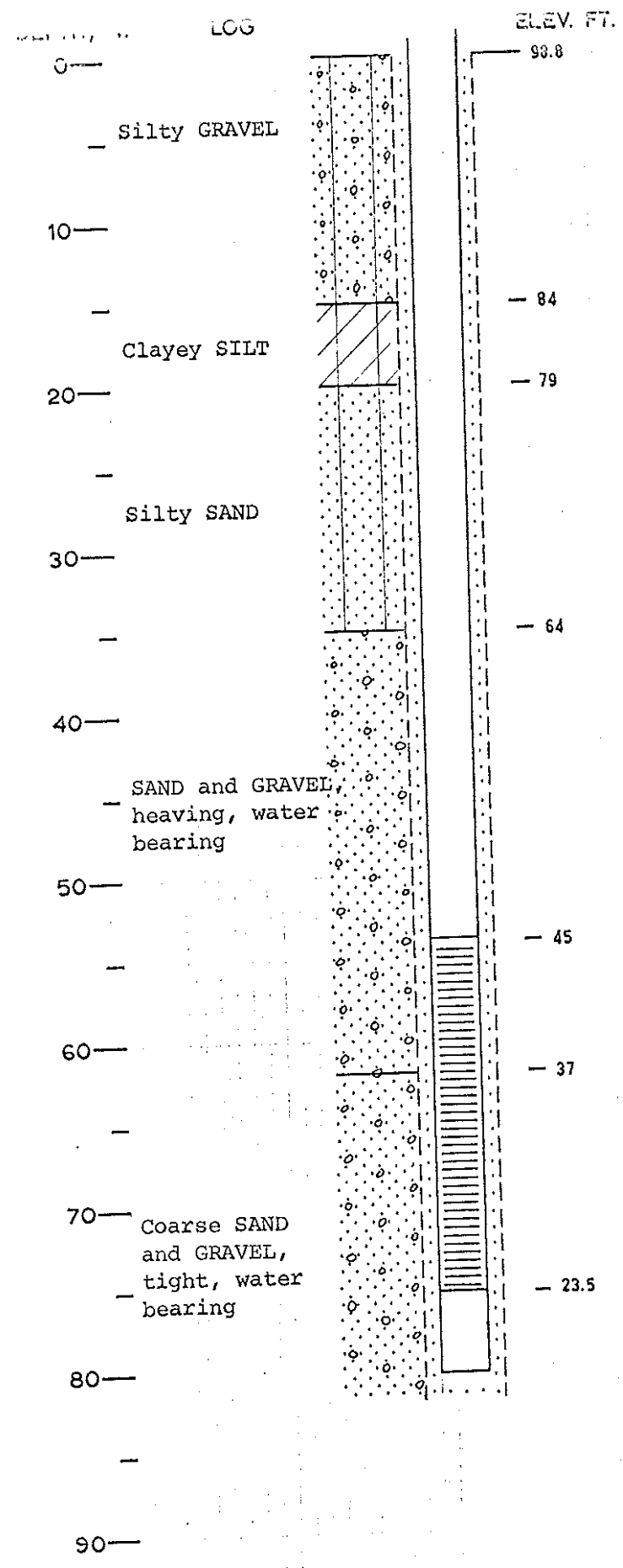
- Hole 8-inch diameter drilled and cased to 86 ft. depth.
- Well screen 6-inch nominal diameter set at depths of 42 ft. to 50 ft. and 69 ft. to 81 ft. Slot size 0.015 inch.
- Riser pipe, blank and sump of 5-inch I.D. steel casing.
- Annular space between screen assembly and 8-inch casing packed with F-16 filter sand.
- Casing 8-inch diameter withdrawn to expose screens.

**NEW WESTMINSTER COURTHOUSE
DEWATERING WELL NO. 8**

MACLEOD GEOTECHNICAL LTD.
BROWN, ERDMAN & ASSOCIATES LTD.
JULY 1978 HWR 78-082



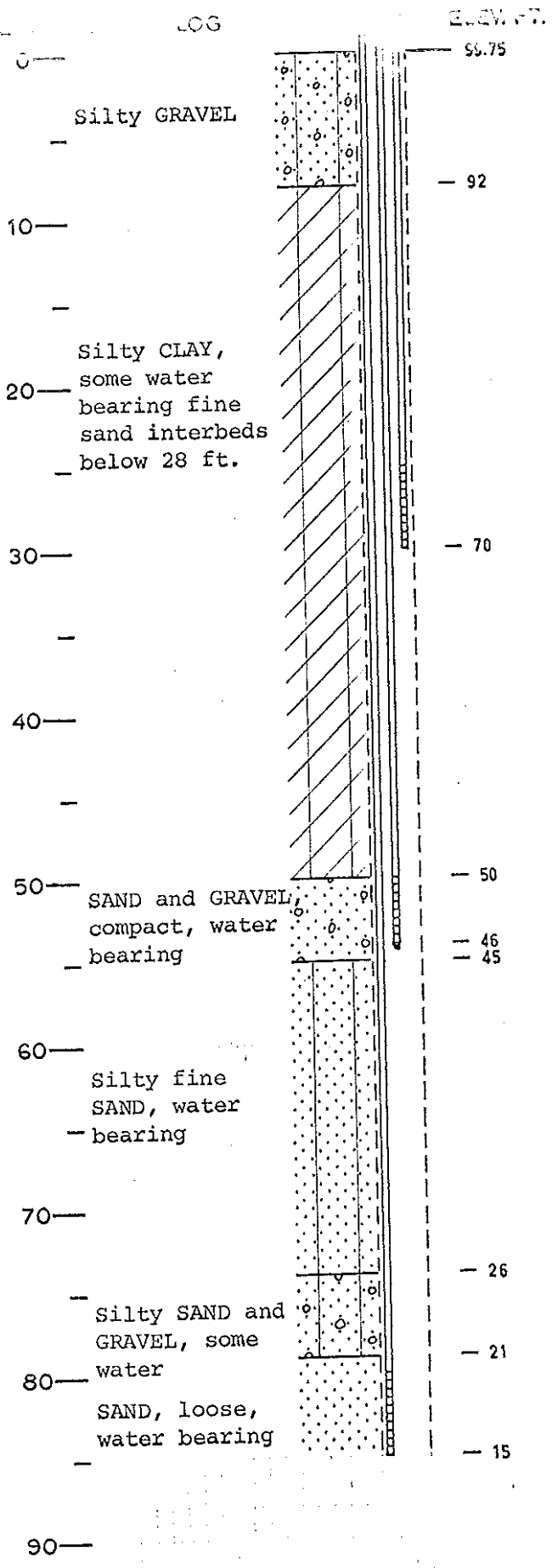
WTN 108051



- CONSTRUCTION**
- Hole 8-inch diameter drilled and cased to 82 ft. depth.
 - Well screen 6-inch nominal diameter set at depths of 54 ft. to 80 ft. Slot size 0.015 inch.
 - Riser pipe and sump of 5-inch I.D. steel casing.
 - Annular space between screen assembly and 8-inch casing packed with F-16 filter sand.
 - Casing 8-inch diameter withdrawn to expose screens.

NEW WESTMINSTER COURTHOUSE
 DEWATERING WELL NO. 9
 MACLEOD GEOTECHNICAL LTD.
 BROWN, ERDMAN & ASSOCIATES LTD.
 JULY 1978 HWR 78-082

WTN 108052,



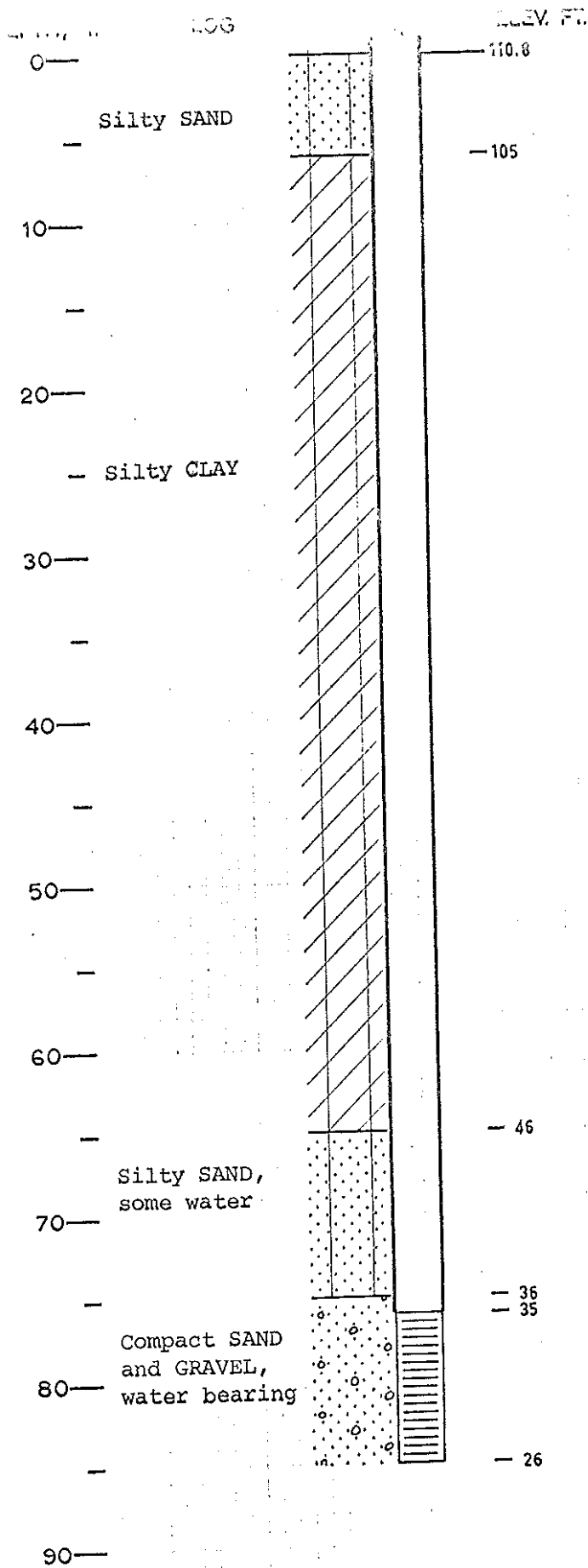
- CONSTRUCTION
- Hole 6-inch diameter drilled and cased to 85 ft. depth.
 - Piezometers set with slots at depths of 25 ft. to 30 ft., 50 ft. to 55 ft. and 80 ft. to 85 ft.
 - Piezometers packed with F-9 filter sand as 6-inch casing withdrawn. Bentonite seal placed at selected depths in hole to seal between respective water bearing layers.

NEW WESTMINSTER COURTHOUSE
PIEZOMETER NO. 7

MACLEOD GEOTECHNICAL LTD.
BROWN, ERDMAN & ASSOCIATES LTD.
JULY 1978 HWR 78-082



WTN 108053



CONSTRUCTION

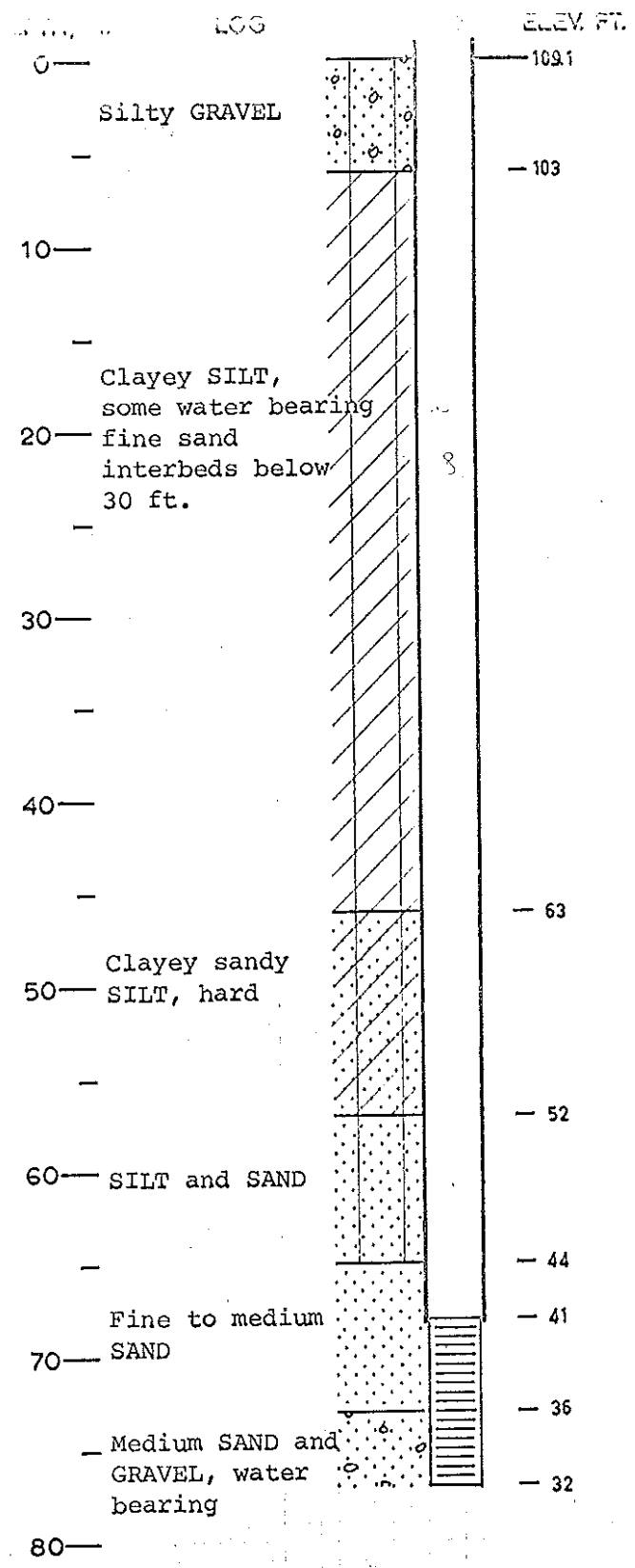
- Hole 6-inch diameter drilled and cased to 85 ft. depth.
- Well screen 6-inch nominal diameter set at depths of 76 ft. to 85 ft. Slot size 0.010 inch.
- Casing withdrawn to 76 ft. to expose screen.

NEW WESTMINSTER COURTHOUSE
PIEZOMETER NO. 8

MACLEOD GEOTECHNICAL LTD.
BROWN, ERDMAN & ASSOCIATES LTD.
JULY 1978 HWR 78-082



WTN 108054



CONSTRUCTION

- Hole 6-inch diameter drilled and cased to 77 ft. depth.
- Well screen 6-inch nominal diameter set at depths of 68 ft. to 77 ft. Slot size 0.010 inch.
- Casing withdrawn to 68 ft. depth to expose screen.

NEW WESTMINSTER COURTHOUSE
PIEZOMETER NO. 9
MACLEOD GEOTECHNICAL LTD.
BROWN, ERDMAN & ASSOCIATES LTD.
JULY 1978 HWR 78-082

