Province of British Columbia
Ministry of the Environment
WATER INVESTIGATIONS BRANCH

MEMORANDUM

To: Dr. J.C. Foweraker, Head
Groundwater Section
Hydrology Division
Water Investigations Branch

Date: June 20, 1979

File: 93B/9

Fr: A.P. Kohut
Sr. Geological Engineer
Groundwater Section

Re: Proposed Irrigation Schemes
Kersley-Alexandria Area near Quesnel

At the request of Mr. J.D.C. Fuller, Chief of Engineering Division, a review was undertaken of all available groundwater information in the area of the above proposed irrigation schemes near Quesnel. Two areas are currently being examined by the Water Supply Section and for purposes of discussion, these have been arbitrarily designated Areas A and B (Figure 1) lying east and west of the Fraser River respectively. Approximately 6,750 USgpm are required for Area A and 3,875 USgpm for Area B. An analysis of each area based on existing well log data, available geologic and groundwater reports, and air photograph examination is given as follows:

Area A: East Side of Fraser River North of Australian Creek

This area which lies adjacent to the Fraser River is underlain at depth by Tertiary conglomerates, sandstone, greywacke, shale, lignite and minor associated volcanic rocks (Tipper, 1957). Glacial outwash deposits bounded by lacustrine deposits, in the form of terraces and cutbanks, overlie the bedrock within the Fraser Valley at this locale (Tipper, 1971). According to Tipper (1971), during deglaciation of the region, large lakes were impounded along the Fraser River by the northerly retreating ice front, and meltwaters channeled and terraced the surficial deposits during draining of the glacial lakes. The maximum reported thickness of the surficial deposits overlying bedrock in the area is 460 feet from an oil and gas exploration test hole (Table 1) drilled adjacent to the Fraser River in Lot 6726 (Figure 2).

Based on existing soils mapping (Farstad and Laird, 1954), air photograph analysis and well log data, a preliminary map showing the distribution of surficial deposits in the area (Figure 3) has been prepared. Available well log data indicates that the area east of Highway 97 is primarily underlain by lacustrine silt and clay, and prospects for obtaining large groundwater supplies are not favourable in this direction. Livingston examined the area in 1963 and concluded the best

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97

prospects for obtaining groundwater supplies were west of the PGE track within the sand and gravel floodplain terraces of the Fraser River. The potential of these terrace deposits is not adequately known at this time, but it is possible that they may be in hydraulic continuity with the Fraser River which would facilitate recharge. One shallow well (84 feet deep) located on the terrace in Lot 4 north of Australian Creek has a reported well yield of 200 gpm. A schematic west to east cross section (Figure 4) looking north, taken from Livingston (1963) shows the probable subsurface relationships of the deposits in the area. Test drilling would be required in the alluvial terrace areas to ascertain the feasibility of constructing large capacity production wells in these deposits. Prospective areas which should be examined are outlined in Figure 3. Although some sand and gravel beds have been observed in the Tertiary bedrock (Livingston, 1963), test drilling into the bedrock is not recommended as well yields would be expected to be low and water quality may be a problem. The limited groundwater quality data available in the area indicates that locally, high iron and high hardness can be a problem, particularly for deeper wells encountering the bedrock or sand and gravel underlying lacustrine silt and clay.

Area B: West Side of Fraser River near Alexandria Ferry

Similar to Area A, the western side of the Fraser River valley is underlain by Tertiary sedimentary and volcanic rocks mantled by glacial and younger alluvial deposits. At present there are no well logs available in the area. From an analysis of existing soils mapping (Farstad and Laird, 1954) and air photograph interpretation, a preliminary map showing the distribution of surficial deposits has been prepared (Figure 5).

The alluvial terrace deposits adjacent to the Fraser River offer the best potential for constructing high capacity production wells. Near the southwestern portion of the proposed irrigation area, there is some indication of the presence of probable sand and gravel outwash deposits. Test drilling would be required in the above areas to prove up the potential for groundwater development.

Summary and Recommendations

The potential for groundwater development in the Kersley-Alexandria proposed irrigation areas is not adequately known at this time. Prospects, however, for developing large capacity irrigation wells (500 to 1,000 gpm) in the alluvial terrace deposits adjacent to the Fraser River are encouraging. A test drilling and pump testing program would be required to

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prove up these prospects. Construction of minimum 8-inch diameter test production wells are recommended. Prior to commencing any drilling program, a site visit should be made of the area by a groundwater engineer to verify the local geologic conditions and check accessibility of drilling sites.

References

Farstad, L. and D.G. Laird. 1954. Soil Survey of the Quesnel, Nechako, Francois Lake and Bulkley-Terrace Areas in the Central Interior of British Columbia. Report No. 4 of the British Columbia Soil Survey, Canada Department of Agriculture.

Livingston, E. 1963. Possibility of Finding Groundwater at Auxtralian Creek, British Columbia. Water Investigations Branch File 93B/9, British Columbia Ministry of Environment.

Tipper, H.W. 1957. Geology, Quesnel, Cariboo District, British Columbia. Map 12-1959, Geological Survey of Canada.

----------. 1971. Glacial Geomorphology and Pleistocene History of Central British Columbia. Bulletin 196, Geological Survey of Canada.

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APK/js

Attachs.

TABLE 1

SUMMARY OF WELL LOG DATA

NORTH OF AUSTRALIAN CREEK

WELL NO.	DATE COMPLETED	DEPTH (ft.)	TYPE	DIAMETER (in.)	YIELD (gpm)	WATER LEVEL (ft.)	REMARKS
Z10 X12 Y6, 1	1940's	60	Dug	-	-	53	-
Z10 X12 Y5, 1	1964	30	Dug	-	-	28±	In sand
----------, 2	1972	300	Rotary	4½	Dry	-	Mainly clay
Z9 X12 Y31, 1	1930's	42	Dug	-	-	8 to 36	-
----------, 2	1965	226	Rotary	-	-	-	Good supply, high iron and hardness
----------, 3	1969	410	Cable tool	-	Dry	-	Mainly clay
Z9 X12 Y30, 1	1963	72	Drilled	6	5	40	Sand and gravel
Z9 X11 Y24, 1	1931	1,605	Rotary	-	-	-	Oil exploration
----------, 2	1969	110	Cable tool	6	-	29	-
----------, 3,4	1957	50 to 60	Dug	72	-	-	Good supply
Z9 X12 Y19, 1	-	1,380	Rotary	10½	-	-	Oil exploration
----------, 2	1972	100	Rotary	-	1	18	Pulled casing
Z9 X12 Y18, 1a,b	1956	200	Drilled	-	Dry	-	-
----------		300	Drilled	-	Dry	-	-
Z9 X11 Y13, 1	1957	84	Drilled	-	200	64	-
Z9 X12 Y7, 1	1946	25	Dug	-	-	-	Gravel and sand

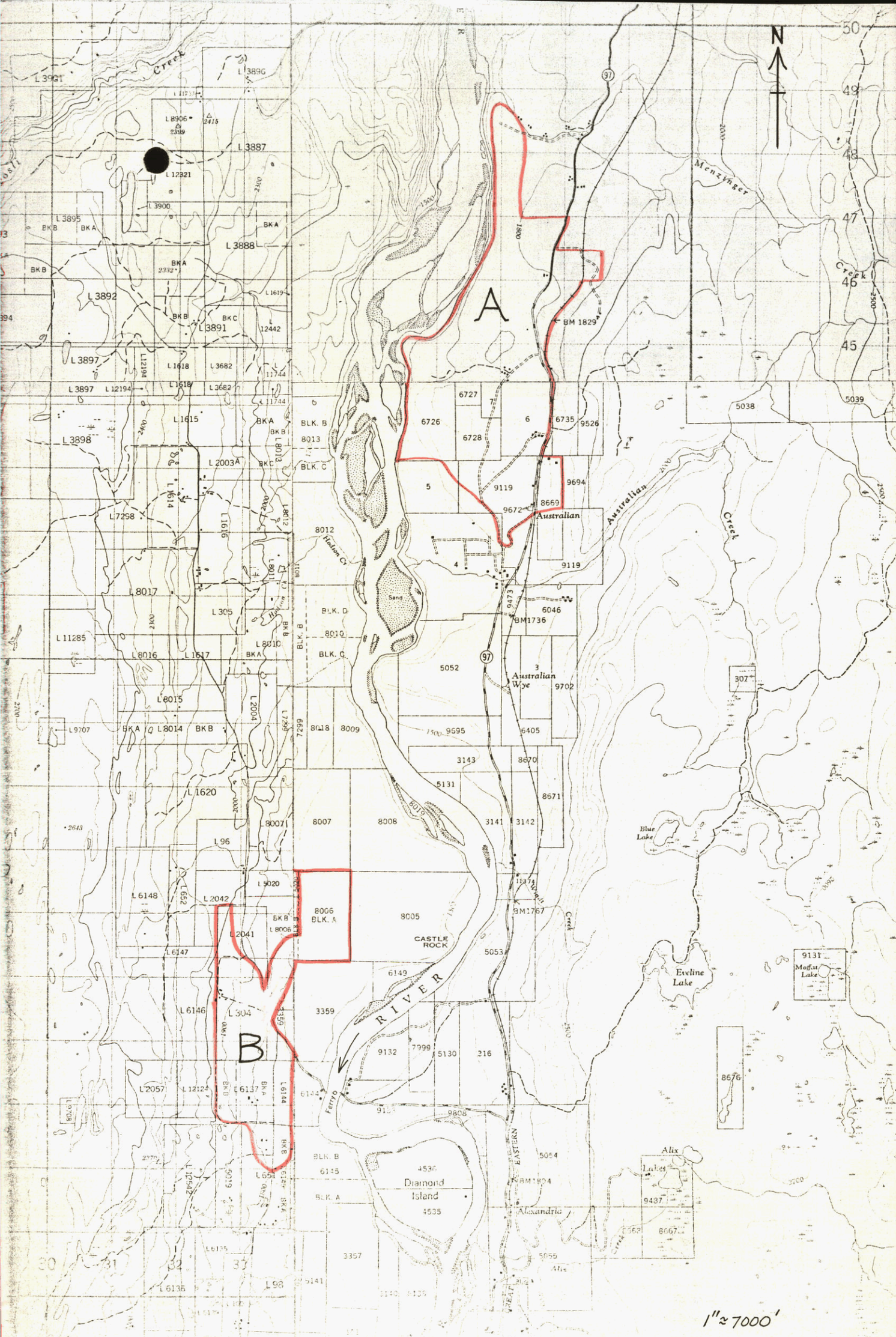
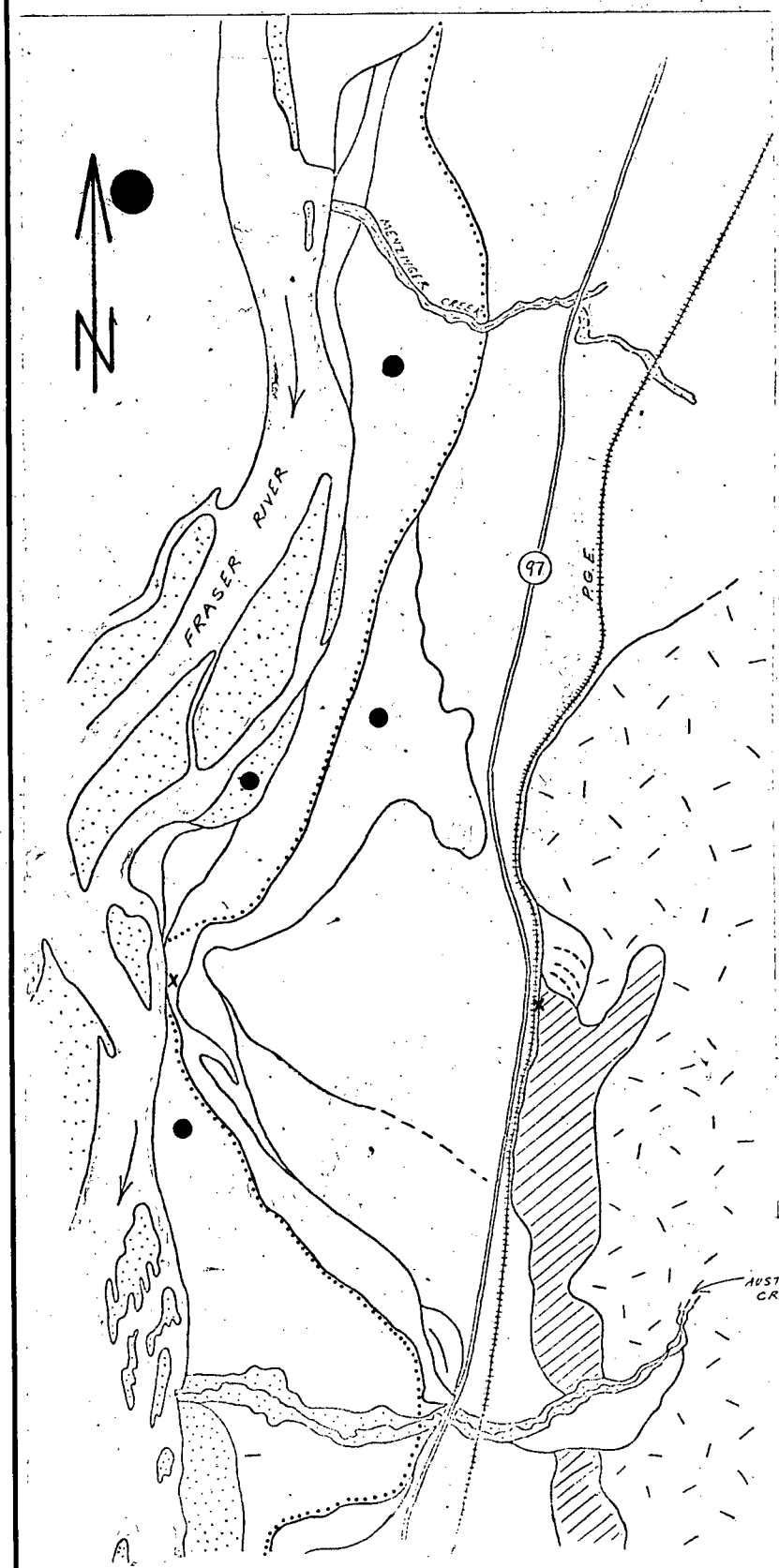

N
A
B
BM 1829
Australian
Australian Creek
Menzinger Creek
Holson Cr
Australian Wye
BM1736
BM1767
BM1804
CASTLE ROCK
RIVER
Ferry
EASTERN
Diamond Island
Alexandria
Alix Lakes
Blue Lake
Eveline Lake
Moffat Lake
BLK. A
BLK. B
BLK. C
BLK. D
Sand
1"≈7000'

FIGURE 1.

4521
4523
6690
2927
191
EASTER
N
5048
Y2
Y1
Y6
7792
Y5
2000
1500
3890
Z10
Z9
4522
6731
GREAT
Men
5031
Y35
Y36
6730
Y31
PACIFIC
D.L. 9.
Y32
2000
6723
6729
1619
4537
5080
Y26
Y25
Y30
Y29
1500
6724
6721
6722
6725
6726
Y23
Y24
6727
6735
9526
Y19
Y20
L 6727
L 7
L 6
L 6726
Y24
L 6728
L 6735
L 9526
Y22
Blk B
L 8013
Y23
Y19
Y20
Blk C
L 5
L 9119
L 9694
R55
R56
L 9672
L 8669
Australian
Y15
Y14
Y13
Y18
Y17
L 8012
Cr
Hodson
L 4
L 9119
Blk D
Blk B
Y10
Y11
Y12
Y7
L 8010
L 9473
L 6046
P G E R/W
I V E R
Blk C
L 5052
X11 X12
L 3
DRILLED WELL
DRILLED WELL DRY
DUG WELL
DUG WELL DRY
ARTESIAN FLOWING
ARTESIAN NON FLOWING
SPRING
WATER QUALITY INADEQUATE
WATER QUANTITY INADEQUATE
1"≈1320'
FIGURE 2



LEGEND

- RECENT ALLUVIUM: SILT, SAND, AND GRAVEL
- CHANNELED TERRACE DEPOSITS: MAINLY SAND AND GRAVEL AND LACUSTRINE SILT.
- SLOPE DEPOSITS: COLUVIUM OVERLYING LACUSTRINE SILT, GLACIRL TILL AND/OR TERTIARY BEDROCK.
- UNDIFFERENTIATED UPLAND DEPOSITS: LACUSTRINE SILT AND/OR GLACIAL TILL OVERLYING TERTIARY BEDROCK.
- SLIDE COMPLEX
- X BEDROCK OUTCROP (LIVINGSTON, 1963)
- AREA FAVOURABLE FOR GROUNDWATER EXPLORATION
- RECOMMENDED DRILLING SITES.

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TO ACCOMPANY REPORT ON

KERSLEY - ALEXANDRIA IRRIGATION AREA A

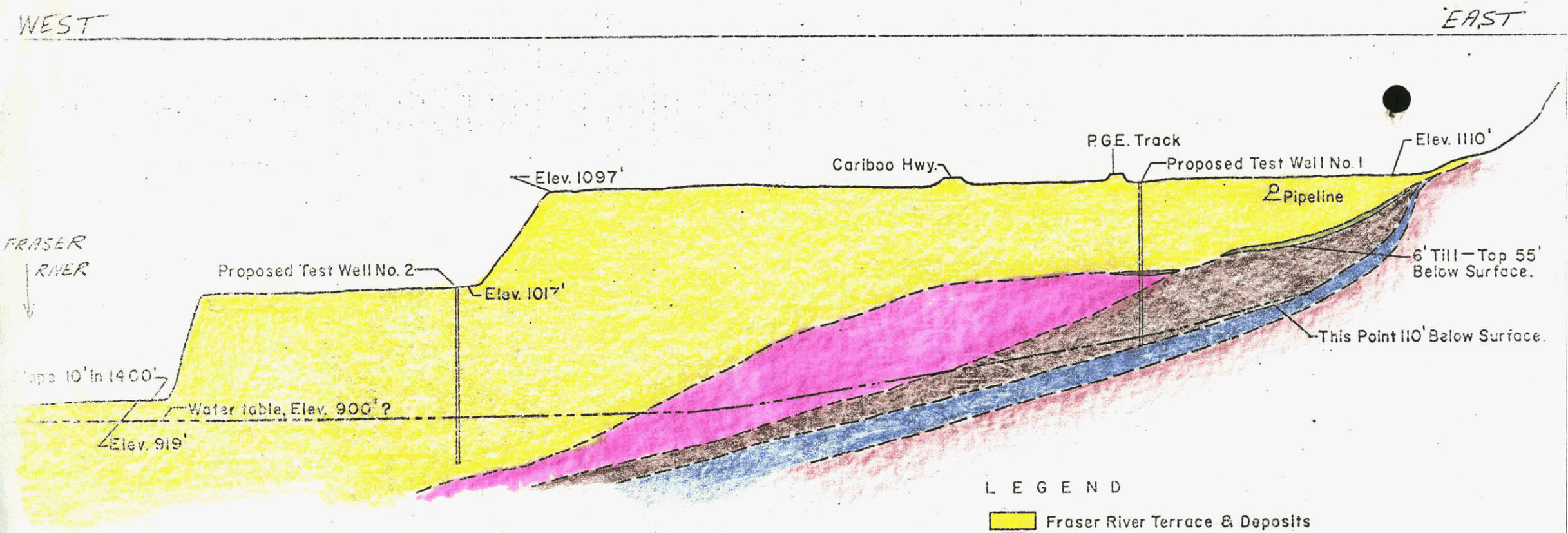
SCALE: VERT. .....
HOR. 1" = 4500'

DATE
June 1979

APK ENGINEER

FILE No. 93-B-9 DWG. No. FIGURE 3

bcil 6660 wrs



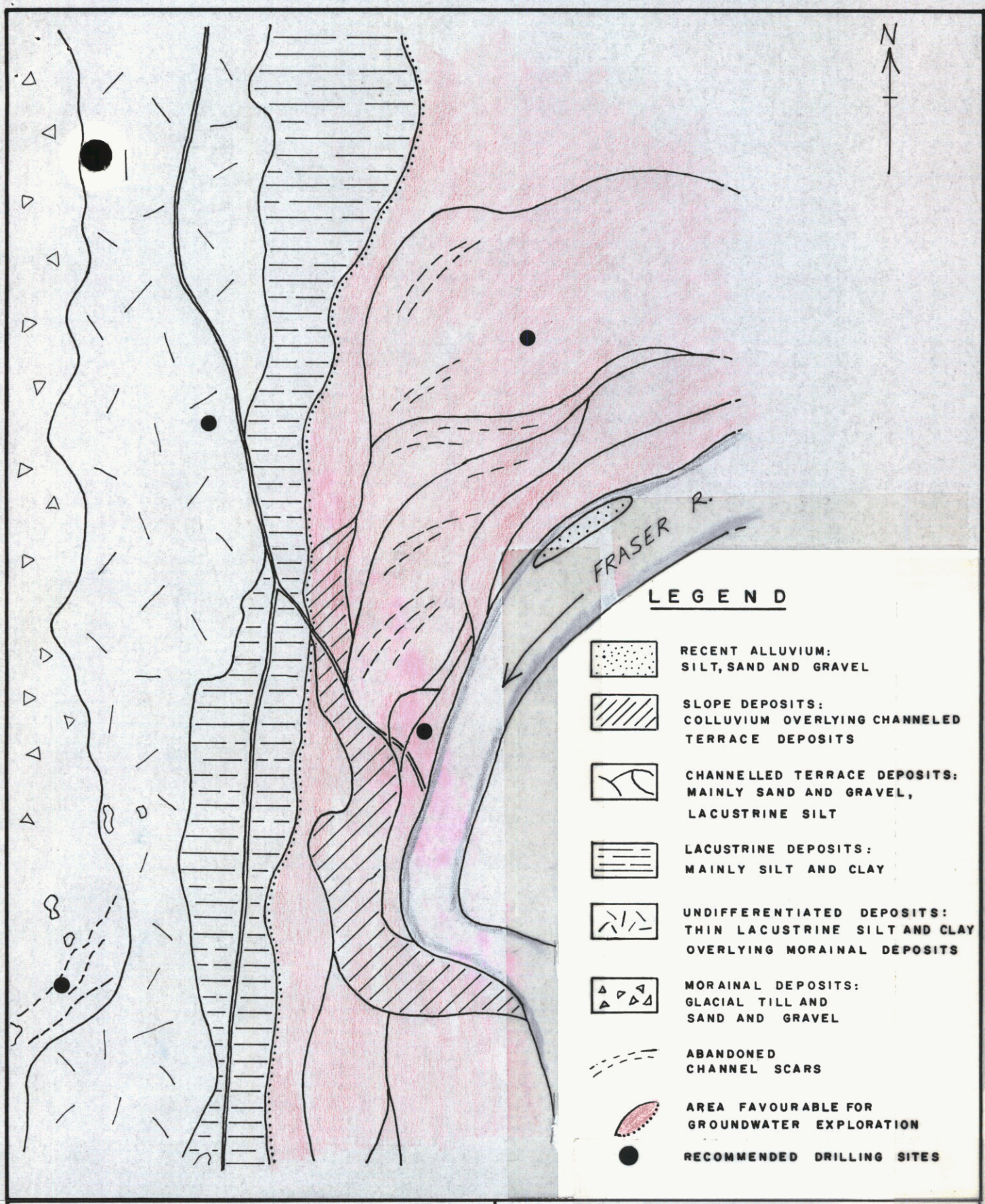
LIKELY GEOLOGIC CROSS SECTION AT AUSTRALIAN CREEK PUMPING STATION, LOOKING NORTH.

SCALE: HOR. 1"= 200'
VERT. 1" = 100'

(From LIVINGSTON, 1963)

N.B. Datum from West Coast Transmission Co. Ltd. Map

FIGURE 4.



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TO ACCOMPANY REPORT ON

KERSLEY – ALEXANDRIA IRRIGATION AREA B

SCALE: VERT. HOR. 1" = 2400'

DATE JUNE 1979

A.P.K. ENGINEER

FILE No. 93 B 9 DWG. No. FIGURE 5

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