INVESTIGATIONS

Geology & Ground Water Resources In Vicinity of the Columbia River And Interstate 5, Clark County Washington. No. 2

> state of washington department of ecology daniel j. evans governor john a. biggs director olympia, washington october, 1971

An investigation of the geology and ground-water resources along State Highway 205 from the Columbia River to Interstate 5. Testing was done to determine the quantity and quality of ground water available for the vapiacement of a well to be destroyed by highway construction. Prepared by Paul A. Eddy, Office of Technical Services, Department of Ecology, Olympia, Washington, February, 1971.

TABLE OF CONTENTS

LIST OF FIGURES	ii
PURPOSE AND SCOPE OF THE INVESTIGATION	1
	1
GEOLOGY AVID GROUND WATER	1
DUMP TEST DATA	2
COACLUSTONS	3
9557 RENCES	4
APPENDIX (Figures)	5
APPENDIX II (Request letter)	12

LIST OF FIGURES

<u>Figu</u>	<u>re</u>	Page
la.	Location map showing well site	- 6
1.	Property outline showing right of way, house served and well site location	- 7
2.	Generalized east-west section across Clark County	- 8
3.	Well schedule	- 9
4.	Drawdown and recovery characteristics of the well	- 10
5.	Chemical analysis	- 11

Purpose and Scope of the Investigation

This study was initated upon receipt of a letter dated September 17, 1970 sent by the Chief Right of Way Agent, Department of Highways, requesting information about present and future ground-water availability and possible adverse effects which could be incurred by construction of the SR 205 freeway.

The scope of this study was set to include several determinations which are:

- 1. Ascertain the availability of ground water to the present site.
- 2. Determine direction of ground-water flow.
- 3. Conduct a pump test in order to obtain specific information about the well behavior.
- 4. Determine possible damage to the well by nearby construction.

The study consisted of a general geologic reconnaissance of the area and a pump test of the well in question. Additional information was obtained from the files of the Department of Ecology.

Location and Topography of the Area

This well in question lies geographically near the southwestern edge of Clark County and is within Township 2 North, Range 2 East of the Willamette Meridan, Section 6. The altitude of the well is approximately 260 feet above sea level and lies on gently rolling flatland. The well in question lies approximately 75 feet north and 30 feet east of the dwelling. (Fig. 1)

Geology and Ground Water

The geology of this area consists of three primary rock units and they are as follows:

Older Consolidated Rocks - Included in this group are the Goble volcanic series, the Eagle Creek formation, the Keechelus andesitic series (Skamania andesite series of Felts, 1939), the Columbia River Basalt, and intrusive rocks of one or two areas such as the Silver Spring granodiorite stock (Felts 1939). With few exceptions these older consolidated rocks crop out only in the foothills and are in areas which are largely uninhabited, the rocks are not economically important as aquifers.

Troutdale Formation - This unit consists of:

Semiconsolidated clay, silt, sand, and gravel and is
the most widespread formation with its' upper unit
considered to be one of the most productive aquifers
in the county. Wells drilled into the sand and gravel
strata of the upper Troutdale formation generally have
a moderate to high permeability thus yielding moderate
to large supplies of water except where the unit has
been badly weathered.

Pleistocene Alluvial Deposits - This unit also goes by the synonym "Portland Delta Gravels" which are sand and gravel which has a comparatively fresh and unweathered appearance. In general the material is well sorted, but the degree of sorting is much better in the finer grained phases than in the coarse phase. In places the gravels are lightly cemented, but not enough so that the porosity is greatly reduced.

The stratigraphic unit in which this well is located is the Pleistocene Alluvial deposits of the Forth Plains area. It has been indicated that wells located between Salmon Creek and Burntbridge Creek obtain moderate yields from coarse sand and gravel which are chiefly the result of reworking the alluvial delta deposits and part of the upper member of the Troutdale Formation. The reworked gravels in the vicinity of this well reach to a depth in excess of 100 feet. This is because the Pleistocene Alluvial deposits filled a valley of the ancestral Columbia River which was cut into the Troutdale Formation. (Fig. 2)

Pump Test Data

The following table indicates the response of this well to pumping. The pump size was a three quarter horsepower pump which yielded 15 gallons per minute during the test. General well information is illustrated on Figure 3.

October 15, 1970

Pumping Date Hour		Water Level Below Top of Casing	Remarks and time interval		
10:15	AM	103.45 105.6	0 30 seconds		
10:16		105.88	1 minute		
10:20		106.88	5 "		
10:26		106.6	11 "		
10:29		106.73	14 "		
10:31		106.78	16 "		
10:33		106.31	18 "		
10:36		106.81	21 "		

10:40 10:50 11:00 11:05 11:10	106.81 106.81 106.81 106.82 106.82 106.82	25 Minutes 35 " 45 " 50 " 55 " 60 minutes
Pump Off		
11:16 11:17	103.8 103.5 103.45 103.45	30 Seconds 1 minute 1 Min. 30 Sec. 2 minutes

Conclusions

Over the sixty minute pump test this well produced approximately 900 gallons of water. The well showed no indication of pumping dry, in fact the water level stabilized at 106.31-32 feet below the top of casing after only 16 minutes of pumping. The pump test had to be restarted twice, each time an additional outlet had to be opened in order for the pump to continue running.

The specific capacity of this well is 4.4 gallons per minute per foot of drawdown based on the conducted pump test. (Fig. 4)

This well will produce the required water of 300 gallons per day (4 person family, 200 gallons per person) pumped on a continuous basis. The well will in fact produce in excess of 7000 gallons per an 8 hour period based on data from the pump test which was run.

The sample tested by the County Health Office indicated that the (M.F.) of bacteria of the coliform group had a count which was less than 1 per 100 milliliter of water. At this level of contamination by non-pathogenic coliform, the risk of contracting disease by drinking the water is virtually zero.

The general direction of ground-water flow is difficult to ascertain but it appears to be toward the northwest in the direction of the unnamed tributary of Salmon Creek.

It is impossible to determine by the conducted pump test the maximum capacity of this well, but it does indicate that a replacement well will have to at least 15 gallons per minute in order to replace the existing well. This quanity will serve the household needs and also dairy needs if required.

REFERENCES

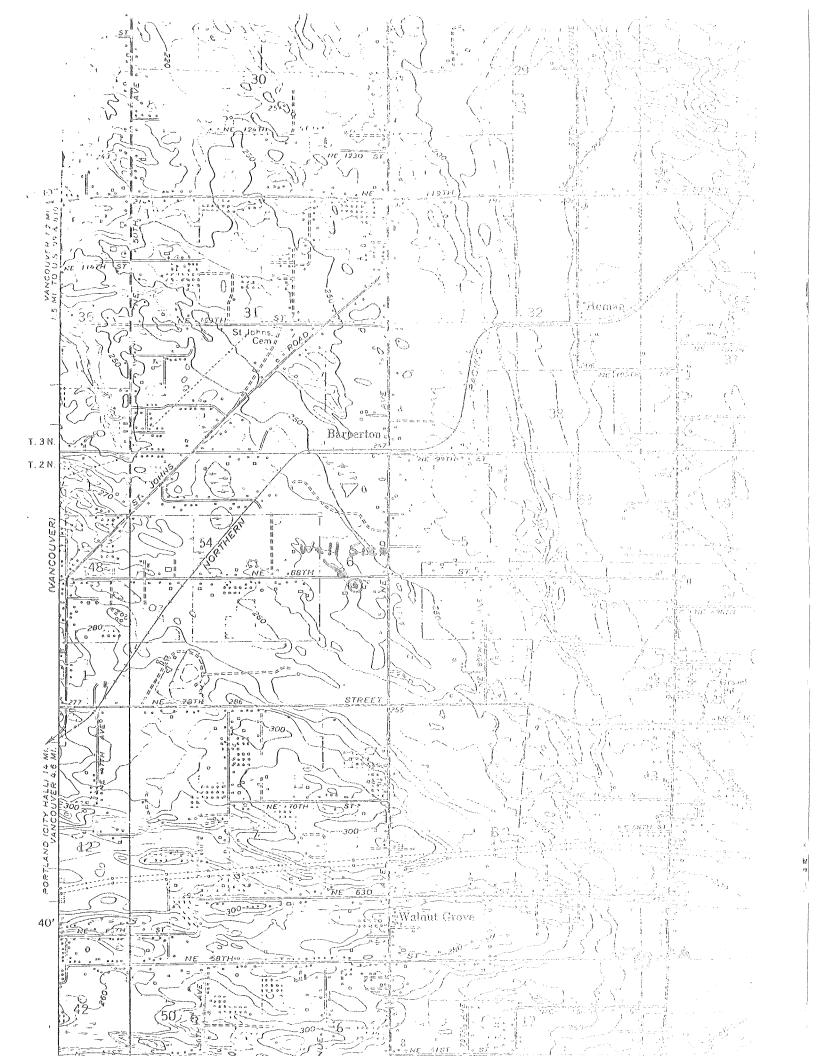
Mundorff, M. J., 1964, Geology and Ground-water Conditions of Clark County, Washington, with a Description of a Major Alluvial Aquifer Along the Columbia River: Washington Department of Conservation Water Supply Bulletin No. 9, pgs. 31, 32, 33 and 49.

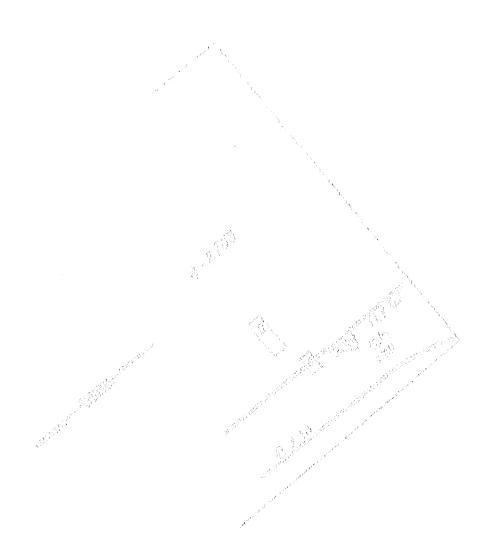
Washington State Department of Health, Bulletin ES No. 4, pg. 10.

APPENDIX 1

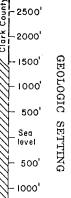
FIGURES 1 - 5

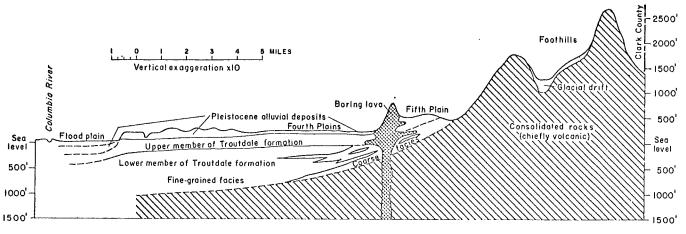
PAGES 6 - 10





King Harry 18



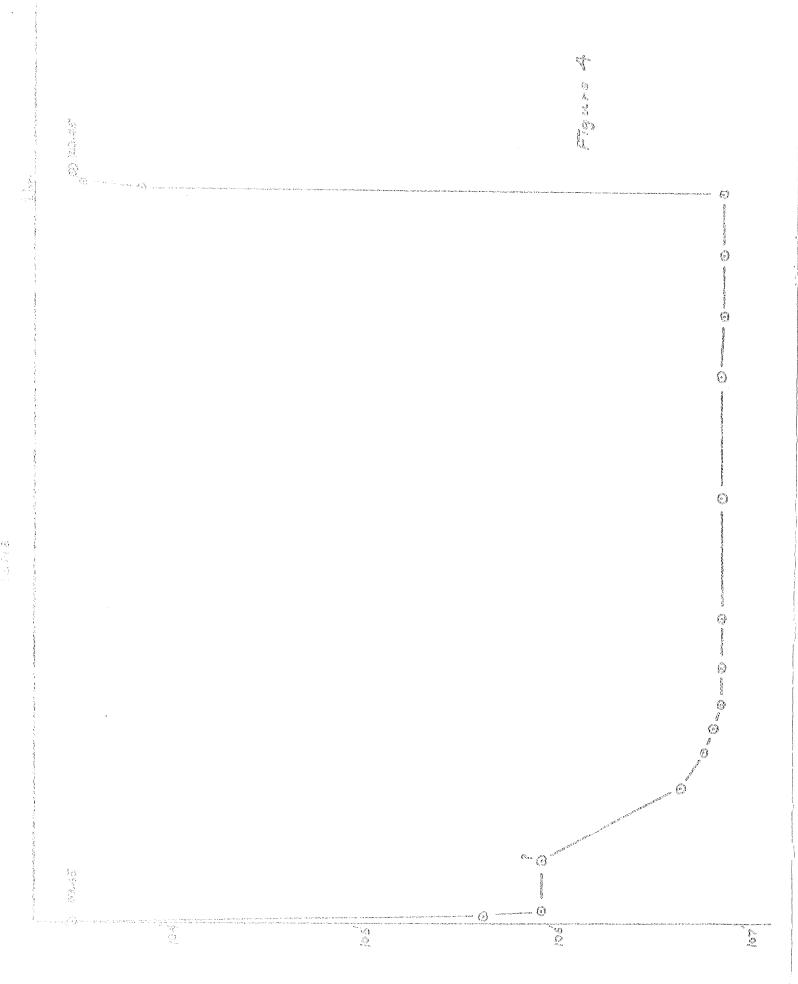


Generalized east-west section across Clark County.

Figure 2

WELL SCHEDULE

	e <u>October</u> 19 70
C	ord by Paul A. Eddy
u	rce of data_Field
	Location: State Washington County Clark
	Map Orchards Well No. 2/2E-6 NE 1/4 SE 1/4
	Owner Larry Hess Address 6811 N. E. 88th
	TenantAddress
	DrillerAddress
	Topography Rolling flatland
	Elevation 260 ft. above Sea level
	Type: Dug, drilled driven, bored, jetted 19
	Depth: Reptft. Measf
	Casing: Diam. 8 in., to in., Type
	Depth ft., Finish
	Chief Aquifer From ft. to f
	0 thers
	Water level 103.45 ft. meas. October 19 70 above at LSD
	which isft. above surface
	Pump: Type Gould Capacity G.M.
	Power: Kind Horsepower 3/4
	Yield: Flow G.M., Pump 15 G.M., Meas., Rept., Est.
	Drawdown 2.37 ft. after 1 hours pumping 15 G.M
	User: Dom., Stock, PS., RR., Ind., Irr., Obs.
	Taste, odor, color Good, none, none Sample Yes



UNITED STATES DEPARTMENT OF THE INTERPOR GEOLOGICAL SURVEY GROUND WATER ANALYSIS

STATE OF STA	de de de Oderes de 1900 de 190 Transportante de 1900 de 1900 A la companya de 1900	ricaniero (redice de ricaniero) Control de ricaniero (redice Control de ricaniero (redice Control de ricaniero)	sed to (ft)	100 03. (0)	gitude L1, Tocal vell No. Vater u Diam. (in) g Pate Waf opear, vhen colle. Remarks	272-685	
ADDITION CONTRACTOR OF THE PROPERTY OF THE PRO	Commission (1971), the measuring of sections of the section of the		THE WILLIAM STREET TO THE STREET WAS AND THE WORLD WAS A STREET TO STREET TO STREET THE	E POT TE ETTE ATTE ATTE ETTE ETTE ETTE ETTE	ATTO BLOGGE, A. C.		er var der terest var viva
Specific (mlc)	conduc	tanc t 25	e C () Liver and the confidence of the confidenc		pH 7.0 Ten	p,(9f)	a the free transport parents
of the state by parties assessed at many a conventioning a parties where	NA faroes makenik birka memasangges	to explorate the second	mg/l	meg	The state of the contraction of the state of	mg/1	we a
Emerginate for warmer to the six of the middle of Common.	and the second s	en a sammer ar gregor i seggi	žožoni ,	* Æķno		Szpon	Z
Silica (SiO ₂)		etre are 17 pages to the	38		Bicarbonate (NCO3)	63	1.08
CONTRACTOR STATE OF THE STATE O				A Progress Million II. III van German Japan v	Carbonate (603)	1 0	0.00
Calcium (Ca)	alente (1990) et sier een verkelikkenske van die verke (1 1900 – 1900) en verkelik van die verkelik 1901 – 1900 – 1900 – 1900 – 1900 – 1900 – 1900 – 1900 – 1900 – 1900 – 1900 – 1900 – 1900 – 1900 – 1900 – 1900		I.A.	0.70	Sulfate (SO4)	6.8	0.14
Magnesium (Mg)		6.2	0.51	Chloride (C1)	3,8	0,11	
Sodium (Na)		5.2	0.23	Fluoride (F)	0.1	0.01	
Potassium (K)		2.5	0.06	Witrate (NO3)	The second secon	0 . L8	
Strontium (Sr)		∢0.05	Company of the American Company of the Company of t	O-Phosphate (PO4)	the first with the telephone on the common special parts.	manifest of the second of the	
Githium (Li)		≪0.02	Part Committee of the C	Control of developed the control of the form of control and developed and least as a filled the gase amount of the	The second section of the section of the section of the second section of the section of t	real laboral section projection and the constitution of the consti	
Tabellalas verrigeli illerensiini val e eelalas val valka val val val val val val val val val va	o FAT VIII - FO OUT IN 100 THE MAN TO THE PERSON OF THE PE	20° 23° 140°41' (8°1)		A PAGE TO STREET OF THE STREET	And manager from \$10000 pt promote states at 12000 pt promote states at 12000 pt profession and an experience of the states of t	The first of the state of the s	e Mare e Bhair, chuire e mhair e i cogar e e
rotal	enderstättigt for Stadenstader staden in Berkenberg	Total die EER (English voorgewen)	নি বিষয়ে কৰিব চুক্তি প্ৰতিষ্ঠিত কৰিব কৰা আমাৰ্ক্তিক কোনাৰ কৰিব কৰা কৰিব কৰা কৰিব কৰা কৰিব কৰা কৰিব কৰা কৰিব ক	1.50	Total	en fim it mengati serieszi, net pelet en en it operation. Hermen min telepene et enteretek en et et te et elektrische en et et en et et en et et elektrische en et et e	ATTER AND THE RESIDENCE AND THE WAY TO SEE AND THE SECURITY OF
ing Terresignation (A. A. Carenasia) and section for the contraction of the contraction of the contraction of A. Carenas (A. Carenas and	mg/1	maesta is enversan Nomenomiaes esca	iku algaz irikarrus ramour (heriz estan ezente) ale, esta ezente en en e	128/1	And the filter are the first the first the second s	eri kerek darah kusawan era arraga (p. p.).	. J. 67
te on a market of the second o	Xism			acapin	g ta talaka namara, pengungganan pangganga 1985an na 1954 na dan menambahkan pendaggan pendaggan 1976 dan 1988	80 ത്. ന്ന്ന് ഭിന്ന് വിവര്യ പ്രവാധ പ്രവാദ്യ പ്രവാദ്യ വ്യവ്യാദ്യം വ	1990ek
Aluminum (Al)	0.04	Nic	kel (Ni)	<0.05	Dissolved solids: Residue on evap, at	. 7000pt	1.33.
Iron (Fe)	0.47	Zi.v	e (Zn)	0.25	Calculated	Procedure (SAS) — No. Autorian Andreadorian — Andreadorian (Antreadorian) O median Marian de procedure (Antreadorian)	119
Manganese (Mn)(0.02		irin Bir Terler (1964 orta 1978 amog ille kananasındır.	er and anyon terminal engine of	Hardness as CaCOs Noncarbonate	and the second s	P. J. Warren	
otal Chromium (Cr)	(0.03	era Nabrotraria	readentates da a arrage establishes amore esperado (da).		Color	ntitituutitut ja Auddin on rotes veen varingen, <u>porva</u> e	oniaren errenakara A
opper (Cu) (0.05		M. C.	Boron (B)	· "阿尔比尔· · · · · · · · · · · · · · · · · · ·	0		
ueed (Pb)	(0.1		endergetijkelige tot til forstellere gestelle gestelle state of engeleg designe.		Section of the sectio	ത് ക്രീപ് 2500 ന് 27 ജന്മത്താന മോഗ്രാപ്പം പച്ച പ	ta kiri isate saka gara damay nyayan ngari saa
ab. No. 5124	a contracting and an extension of)- ಪ್ರವಾಣ ಸಾರ್ವಹಣ್ಣು - ಪ್ರವಾಣ ಸಾರ್ವಹಣ್ಣು	re allangu i puritikan perintengan perintengan perintengan perintengan perintengan perintengan perintengan per PILOLO	entre l'annaire manne en esla c Parlitte mains introduction parademise : A	endimentaria anticoloria menteraria mente formatita de increadade en la constala de la constala anticoloria de Entre formation de anticoloria de entre formation de la constala de entre entre se de entre formation de la co PNO SCC DE LA CONTRACTION DEL CONTRACTION DE LA CONTRACTION DE LA CONTRACTION DEL CONTRACTION DE LA CONTRACTION DE LA CONTRACTION DE	erika ing manggan panggan pang	ter de arabisana paosego proposer

APPENDIX II

REQUEST LETTER

PAGE 13

STATE OF WASHINGTON DANIEL J. EVANS, GOVERNOR

COMMISSIONERS

GEORGE D. ZAHN, CHAIRMAN

ROBERT L. MIKALSON

HAROLD WALSH

BAKER FERGUSON
WALLA WALLA

JOHN N. RUPP

LORENZ GOETZ, SECRETARY

STATE OF THE STATE

WASHINGTON STATE HIGHWAY COMMISSION DEPARTMENT OF HIGHWAYS

G. H. ANDREWS, DIRECTOR
HIGHWAYS-LICENSES BUILDING
OLYMPIA
September 2, 1970

DISTRICT OFFICES

NO. 1 SEATTLE 98108

NO. 2 WENATCHEE 98801

NO. 3 OLYMPIA 98501 P. O. BOX 327

NO. 4 VANCOUVER 98663

NO. 5 YAKIMA 98901 P. O. BOX 52

NO. 6 SPOKANE 99205 N. 2714 MAYFAIR ST.

NO. 7 BELLEVUE 98004 10506 N.E. 4TH ST.

H. M. Ahlquist, Director Department of Ecology Water Resources Division Olympia, Washington 98501

> Re: SR 205, Columbia River to Jct. SR 5 Parcel 4-2788

Dear Sir:

Attached hereto are maps illustrating approximate location of premises owned by Larry Hess et ux., a portion of which has been conveyed to the State of Washington in connection with the above identified project. The map marked "A" serves to illustrate the general area, while that marked "B" serves to illustrate the more specific location.

In the negotiated settlement of the above parcel the State has entered into a Well Agreement with Hess, under which, the State is to bear the expense of construction of a new well on his remaining property (not larger than 6 inch drilled, cased) to such depth as will supply it with an amount of water equal to the supply taken from the existing water supply, etc.

To assure compliance, on the State's part, of this agreement, we would like to ask your Department's assistance in making a test of the existing well as to volume and potability.

For purposes of arranging for, and in accomplishing this test, our Mr. Syd Wellman in Vancouver (Scan Telephone 80732-1251) stands ready to assist you in any way necessary. Thank you for your help in this matter.

Very truly yours,

G. H. ANDREWS

Director of Highways

By: J. ARNOLD COBLEY Chief Right of Way Agent

Attachment

GHA:cc JAC:PAW