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Hydro Geo & Environmental, Inc.

January 30, 2023
Project 3319.23
Kaushal Amit & Kamra Ruchikla
3259 Ridgefield Way
Dublin, CA 94568
c/o Paul Baranets

Re: Proposed Residential Duplex @748 SW Valley St., Camas, WA, 98607.

Subject: Engineering Geologic Hazard & Infiltration Test Report

Introduction

At your request we visited the subject site on January 9, 2023 to perform an engineering geologic, geotechnical reconnaissance of site at 748 SW Valley St., in Camas, WA. It is our understanding that you are going to construct 2-3 story residential duplex on this lot.

This report addresses the engineering geologic and geotechnical issues at the site with respect to new construction. The scope of our work consisted of a site visit, one shallow exploratory test pit, conducting of infiltration test, a limited review of the geologic literature, interpretation of topographic maps, and preparation of this report, which provides our findings, conclusions and recommendations.

Site Description

The site is located on the east side of SW Valley St., in Camas, Washington (Figure1). The lot is vacant currently vegetated with trees and covered by grass, weed and clover to resist erosion. The site is approximately 60 feet wide along the western and eastern boundaries and 167 feet deep along the northern and southern property lines. (Figure2). The site is bounded on the west by paved SW Valley St., on the north, south and east by adjacent residences.

The site lies near the top of the moderately southerly sloping hillside which slopes from 15 % to 20 % at elevations ranging from about 150 -164 feet above sea level (Camas Quad, USGS 7.5 Minute Map). During our site visit we observed no water stream crossing the site.

Geology

The site lies in an area, which has been mapped as Eocene volcanic rocks consisting dark-gray to brown porphyritic basaltic andesite of Columbia River Basalt Group Formation. The basaltic andesite appears to be overlain by a residual, clay soil with scattered angular gravel and cobbles and disintegrated rocks derived from the weathering of the underlying andesite bedrock.

Soils on the site are mapped by the USDA Soil Conservation Services's Soil Survey of Clark County, Washington (1972) as Olympic clay loam, 3 to 8 percent slopes that formed on ridgetops and benches. The rest of the site consists of Olympic stony clay loam, 3 to 30% percent slopes. It is similar to Olympic clay loam that formed in volcanic deeply weathered bedrock.

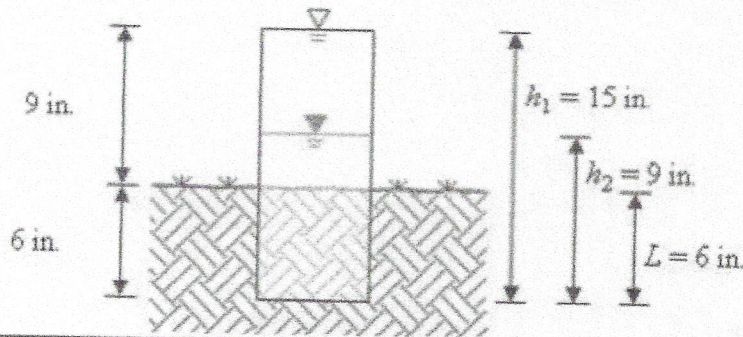
At the time of our visit we excavated one hand dug test pit to a depth of 4 feet. The approximate locations of our subsurface explorations points are shown in the Site Plan, Figure 2. The locations of our subsurface explorations were measured in the field from prominent surface features by pacing and should be considered approximate.

Soil conditions encountered during our site explorations were logged in the field by a representative from our firm. **Test Pit #1** was located at the area of anticipated storm water infiltration trench, as shown on Figure 2 and encountered 1.5-foot layer of dark-brown dry stiff silt fill soil with numerous tree roots and organic matter, underlying by native dark-brown to greyish-brown, damp, dense cobbly gravel with angular basalt rock fragments, and silty sand matrix exposed to a depth of 4 feet below the surface. Test pit was terminated at the depth of 4 feet due to full shovel refusal.

Infiltration Test Results

In accordance with your request, one infiltration tests were conducted on January 9, 2023 at the depths of 4 feet in test pit # 1 located within anticipated area of infiltration trench location for storm water disposal. The test was conducted by driving a six-inch diameter infiltrometer stand pipe into the soil at the above pointed interval and using Single-Ring Falling Head test procedure as suggested by Clark County Stormwater Manual, 2020. The soil was prepared for infiltration testing under saturated conditions by filling the stand pipe with water and thoroughly soaking the test zone for approximately two hours. An engineering associate from HGE coordinated and observed the subsurface conditions and infiltration testing. The infiltration rate noted below is actual infiltration rate measured in the field in undisturbed fine-grained sand soil.

location	Test depth	Field infiltration rate
TP-1	4 feet	240 inches/hour



After the field test procedure has been performed and field drawdown rate determined, the coefficient of permeability was calculated using equation: $K = (L/t) \ln(h_1/h_2)$ where: $k =$ coefficient of permeability (in/hr), $L = 6''$ - length of flow (in), $t = 0.025 \text{ hr.}$, time(hr), $h_1 = 15''$ - initial head (in), $h_2 = 9''$ - final head(in). So, the coefficient of permeability for this test is $K = 122 \text{ in/hr.}$

In accordance with AASHTO classification, tested soils refer to A-2 groups of this classification. In accordance with Unified Soil Classification System, tested soil refer to GM and SM class group symbol (gravelly sand, gravelly silt)

Percentage retained on sieve-	% passing sieve-	
No.4 (4.76 mm)	No. 10 (2.0 mm)	No.200(0.074 mm)
30	30	40
Gravel	Sand	Fines (silt, clay)

CONCLUSIONS- based on the results of the infiltration test, observation of subsurface conditions and our office review, the native site soils appear to have high permeability at the depth of below 4 feet due to dense gravelly & cobbly silt soil and are suitable for subsurface discharge of storm water. Field infiltration rate recorded during this study generally correspond to the range of permeability values reported in the Soil Survey of Clark County, Washington. Differences in infiltration test results noted above may be due to slight areal and depth variations in soil gradation, density, and in-situ moisture content.

Based on Washington Department of Ecology data, the static groundwater table, presumably, lies approximately more than 100 feet below the surface (see Water Well Report ID # BAH 694). You should keep at least 5 feet separation zone between proposed depth of storm water disposal system and groundwater table. Field infiltration rates recorded during this study above, in generally, correspond to the range of permeability values reported in the Soil Survey of Clark County, Washington.

It is recommended that HGE be contacted to observe subsurface conditions at the time of construction to correlate actual soil conditions with those observed during this study. It is also advisable to test the infiltration system to confirm adequate capacity.

Slope Stability and Erosion

The site lies on the side of the southerly sloping hillside. The site slopes downward an average of about 15 -20%, but sometimes may be up to 25% (Based on the existing Clark County Map).

According to the SLIDO (Statewide Landslide Information Layer for Washington), the entire site is out of detailed landslide mapping study area and no landslide inventory south of SW 6th Ave., noticed. Based on SLIDO Map, there are a few landslides occurred just north of Hwy-14. During our site reconnaissance, we did not observe evidence of recent slope instability. Trees on the subject property and immediate area generally appear tall and straight with no obvious sign of growth compensation due to soil creep or slope movement. Due to shallow bedrock in the vicinity, we did not observe any evidence of recent deep or shallow seated movement that would impact the project site. Slope conditions on and adjacent to the site do not vary significantly. However, at the time of our site visit we observed no indications of recent slumping or surface movement activity on the subject site. The site is considered to have a low hazard of slope instability due to shallow bedrock topography. In accordance with the Landslide Hazard Study requirements, we conclude that the landslide hazard risk over the site is relatively uniform, and no recommendation is made to alter the proposed extension in order to locate improvement on the safest part of the property. However, it should be understood by the builder that some assumption of slope instability risk is unavoidable when building on or around slopes. It is our opinion that the proposed residence could be built as proposed. Runoff is slow to medium and the hazard of erosion is slight to moderate.

Regional Seismic Hazards

Abundant recently acquired evidence indicates that a series of geologically recent serious earthquakes related to the Cascadian Subduction Zone have occurred along the coastline of the Pacific Northwest. Evidence suggests as many as thirteen major earthquakes or more have occurred in about the last 7700 years. These earthquakes were accompanied by widespread subsidence of a few inches to a few feet. In addition, settlement, liquefaction and landsliding of some materials is believed to have been commonly associated with seismic events.

These earthquakes would likely have a magnitude 8.0 to 9.0 and are believed to have an average recurrence interval of about 250 to 650 years with a mean near 450 years (Priest, et.al., 1997). Evidence suggests the last major earthquake probably occurred approximately 300 years ago (Jacoby, et. Al, 1997; Satake, et. Al., 1996). Risk associated with these major earthquakes should be considered in light of the low probability of one occurring in any given year and the high consequences resulting from such an occurrence.

Other earthquakes related to shallow crustal movements or earthquakes related to Juan de Fuca Plate have the potential to generate magnitude 6.0 to 7.5 earthquakes. The recurrence interval for these types of earthquakes is difficult to determine from present data, but estimates of 150 years have been given in the literature.

Damage to structures by earthquake motions can be greatly increased due to the liquefaction of underlying soils. Soil liquefaction generally requires the presence of high ground water level and loose sand or silty sand. Based on Clark County data, the possibility of soil liquefaction is considered low to very low.

Seismic Site Class was determined to be Site Class "B". The IBC Seismic Site Class B is applicable for soils within the upper 100 feet of the subsurface profile based on site geology, published shear wave velocities of nearby Quaternary deposits.

The intent of this section is to provide general knowledge of the geologic history and current geologic conditions in the site vicinity. Seismic considerations for design and construction of this type of project are usually guided by the current International Building Code (IBC).

Flooding Hazards

Based on site observations the site is above the 100 year flood elevations.

Conclusions and Recommendations

The main geotechnical concerns at the site, which affect the proposed house, are the presence of some fills and moderate slope. To mitigate for these concerns, the following recommendations should be adhered to during design and construction:

Building loads may be supported on continuous spread footings bearing in undisturbed, native, non-organic, dense gravelly silt soils or properly compacted granular fill placed on these soils. All footings areas should be stripped of all organic soils and any existing fills. We anticipate that non-organic, silty gravel soils will be encountered at depth 1.5 feet, where fill is present, however depths will vary. Fills appear to be present mostly along the HWY 14., and could be up to 4-5 feet thick and were probably dumped during previous adjacent sites development. However the total fill thickness is unknown.

Footings bearing in undisturbed native, non-organic, firm gravelly silt or properly compacted granular fill placed on these soils may be designed for an allowable dead plus live load bearing capacity of 2000 pounds per square foot with an increase of one-third allowed for short term wind or seismic loads.

All cut and fill slopes which are not retained by a properly engineered retaining structure should have a slope angle no steeper than 2 horizontal to 1 vertical (2H: 1V).

For walls not restrained from rotation, we recommend using an equivalent fluid pressure of 33 pcf for design. We recommend using an equivalent fluid pressure of 55 pcf for design of wall restrained from rotation. When computing resistance to lateral loads, we recommend using a base friction coefficient of 0.35 and a passive pressure of 200 pcf for design purposes for footing confined by structural fill. In order to develop this capacity, concrete must be poured neat in excavations or the adjacent confining structural fill must consist of granular soils compacted to 95% relative to ASTM D1557.

Surface water should be diverted from building foundations to approved disposal points by grading the ground surface to slope away from the foundation to prevent ponding near the structures. A footing drain should be installed adjacent to the perimeter footing, sloped to drain, and backfilled with free-draining nominally compacted sand/or gravel. All roof drains should be collected and tight-lined in a separate system independent of the footing drains and discharged to an approved disposal point.

Limitations

Our investigation was based on engineering geological reconnaissance, available published information and our subsurface explorations and analyses. The data presented in this report are believed to be representative of the site. The conclusions herein are professional opinions derived in accordance with current standards of professional practice and no warranty is expressed or implied. The performance of the site during a seismic event has not been evaluated. If you would like us to do so, please contact us.

This report has been prepared and reviewed by the undersigned. This report is void if original seal and signature are not present. Should you have any questions regarding our investigations and this report, please contact our office.

Truly yours,

Hydro Geo & Environmental, Inc.

Mike Golberg, L.E.C.
Principal Engineering Geologist



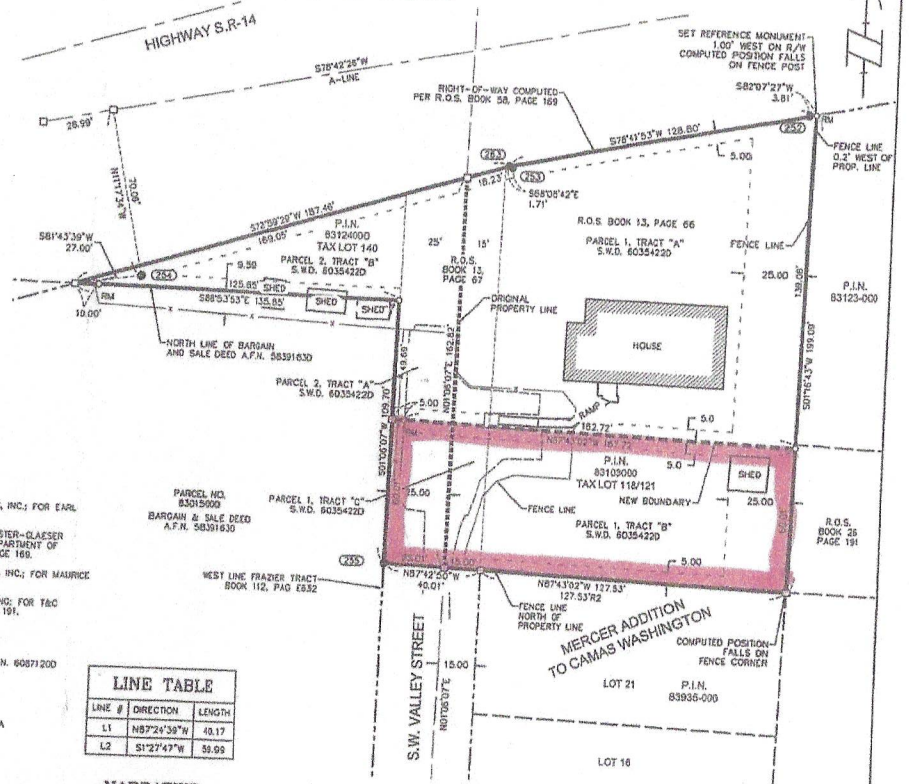
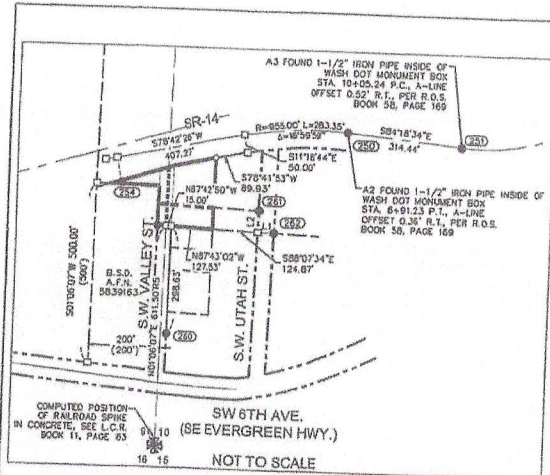
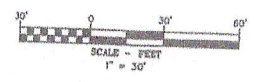
MIKE GOLBERG

Expires 8/27/23

AMENDED RECORD OF SURVEY

BOUNDARY LINE ADJUSTMENT

LOCATED IN THE SW 1/4 OF THE SW 1/4 SECTION 10,
AND THE SE 1/4 OF THE SE 1/4 SECTION 9,
T. 1N., R. 3E., W.M.
CITY OF CAMAS, COUNTY CLARK, STATE OF WASHINGTON.



- LEGEND**
- SET 5/8" x 30" REBAR WITH 1/4" YELLOW PLASTIC CAP (KA 0859002 WA42890)
 - ⊕ FOUND MONUMENT AS NOTED IN DESCRIPTIONS
 - COMPUTED ANGLE POINT, NOT MONUMENTED
 - R.O.S. RECORD OF SURVEY
 - A.F.N. AUDITOR'S FILE NUMBER
 - R1 RECORD DATA PER RECORD OF SURVEY NO.
 - FD FOUND DATA
 - S.W.D. STATUTORY WARRANTY DEED
 - P.I.N. PROPERTY IDENTIFICATION NO.
 - — — EDGE OF ASPHALT
 - - - BUILDING SETBACK LINE
 - — — ORIGINAL BOUNDARY LINE
 - — — NEW BOUNDARY LINE

- MONUMENT INFORMATION**
- (250) FOUND 1-1/2" IRON PIPE INSIDE OF WASH DOT MONUMENT BOX; PER R.O.S. BOOK 58, PAGE 189; (VISITED MARCH 16, 2022)
 - (251) FOUND 1-1/2" IRON PIPE INSIDE OF WASH DOT MONUMENT BOX; PER R.O.S. BOOK 58, PAGE 169; (VISITED MARCH 16, 2022)
 - (252) FOUND 5/8" IRON ROD WITH NO CAP, ORIGIN UNKNOWN, NOT ACCEPTED; (VISITED MARCH 16, 2022)
 - (253) FOUND 5/8" IRON ROD WITH NO CAP, ORIGIN UNKNOWN, NOT ACCEPTED; (VISITED MARCH 16, 2022)
 - (254) FOUND 1/2" IRON ROD, W/ PLASTIC CAP, UNREADABLE, PER BOOK 13, PAGE 66; NOT ACCEPTED; (VISITED MARCH 16, 2022)
 - (255) FOUND 1/2" IRON ROD W/ PLASTIC CAP INSCRIBED PLS 12794, PER BOOK 13, PAGE 66; HELD; (VISITED MARCH 16, 2022)
 - (256) FOUND 3/4" IRON PIPE BENT; 18.38" EAST OF SECTION LINE, SEE REFERENCE 2; (VISITED MARCH 16, 2022)
 - (257) FOUND 1/2" IRON ROD BENT; HELD; (VISITED MARCH 16, 2022)
 - (258) FOUND 1/2" IRON ROD; HELD; (VISITED MARCH 16, 2022)
 - (259) FOUND 4" x 4" CONCRETE POST AT COMPUTED POSITION; HELD; (VISITED MARCH 16, 2022)

AREA TABLE:

PARCEL	ORIGINAL AREA	NEW AREA
PARCEL 83124000	6,976 S.F.	22,871 S.F.
PARCEL 83103000	25,853 S.F.	10,037 S.F.

SURVEY PERFORMED FOR:
AMIT KAUSHAL & KAMRA RUCHIKA
DATE OF MONUMENT: MAY 30, 2022
PROJECT: 22-04-21 BRATE, CO
FILE: 220421.02S LAYOUT TAB: WA SURVEY

KLEIN & ASSOCIATES, MAKES NO WARRANTY AS TO MATTERS OF UNWRITTEN TITLE, ADVERSE POSSESSION, ESTOPPEL, ACCUESCENCE.

BASIS OF BEARINGS
WASHINGTON STATE PLANE COORDINATES SYSTEM
NAD83(2011) EPOCH: 2010, NORTH ZONE,
DERIVED FROM OPUS POST PROCESSING
ESTABLISHED BY O.P.S. OBSERVATION BETWEEN
MONUMENT INFORMATION POINT (230) AND (241)
HAS A BEARING OF S64°18'34"E

- REFERENCED SURVEYS**
- R1. MAP OF MERCER ADDITION TO CAMAS.
 - R2. SURVEY PERFORMED BY GREENWOOD SURVEYS, INC. FOR EARL BURD; RECORDED IN BOOK 13, PAGE 69.
 - R3. MONUMENTATION SURVEY PERFORMED BY MINISTER-CLAESER SURVEYING, INC. FOR WASHINGTON STATE DEPARTMENT OF TRANSPORTATION; RECORDED IN BOOK 58, PAGE 169.
 - R4. SURVEY PERFORMED BY GREENWOOD SURVEYS, INC. FOR MAURICE GOOGLI; RECORDED IN BOOK 13, PAGE 42.
 - R5. SURVEY PERFORMED BY SMART LAND SURVEYING, FOR T&C CONSTRUCTION; RECORDED IN BOOK 26, PAGE 191.

REFERENCED DEEDS
PROPERTY LINE ADJUSTMENT, QUIT CLAIM DEED, A.F.N. 60871200
BARGAIN SALE AND DEED A.F.N. 58391830
STATUTORY WARRANTY DEED, A.F.N. 60354220

PROCEDURES
A CLOSED LOOP TRAVERSE WAS PERFORMED USING A 3" TRIBBLE 68 TOTAL STATION, MEETS MINIMUM STANDARDS AS DESIGNATED IN WAC 332-120-090

SURVEYOR'S CERTIFICATE:
THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE SURVEY RECORDING ACT AT THE REQUEST OF AMIT KAUSHAL, IN NOVEMBER, 2022

JAMES M. KLEIN
PROFESSIONAL LAND SURVEYOR LS #42890



LINE TABLE

LINE #	DIRECTION	LENGTH
L1	N87°24'39"W	40.17
L2	S1°27'47"W	59.05

NARRATIVE
THE PURPOSE OF THIS SURVEY IS TO AMEND THE AREA TABLE, WHICH WAS IN ERROR ON A PREVIOUSLY RECORDED SURVEY PERFORMED BY OUR FIRM.
THE PURPOSE OF THIS SURVEY WAS TO MONUMENT THE EXTERIOR BOUNDARY OF TWO SEPARATE TRACTS FOR A PROPERTY LINE ADJUSTMENT, WHICH IS DESCRIBED IN THAT CERTAIN PROPERTY LINE ADJUSTMENT BY QUIT CLAIM DEED, RECORDED OCTOBER 27, 2022, AUDITOR'S FILE NO. 6007100 0.
A MATHEMATICAL MODEL WAS CREATED BASED ON TWO PREVIOUSLY RECORDED SURVEYS, THE SOUTH AND EAST LINES WERE COMPUTED BASED ON A SURVEY PERFORMED BY GREENWOOD SURVEYS, RECORDED IN BOOK 13 OF SURVEYS PAGE 69, ALONG WITH A SURVEY PERFORMED BY MINISTER-CLAESER SURVEYING INC., RECORDED IN BOOK 58 OF SURVEYS PAGE 169, WHICH WAS USED TO ESTABLISH THE NORTH LINE OF THE SUBJECT TRACT, ALSO BEING THE SOUTHERLY RIGHT-OF-WAY OF STATE ROUTE 14.
RECOVERED MONUMENTS ALONG A-LINE PER MINISTER-CLAESER SURVEY WERE RECOVERED AND HELD TO ESTABLISH SAID NORTH LINE OF THE SUBJECT TRACT.
MONUMENTS FOUND OR ESTABLISHED BY SAID GREENWOOD SURVEY ALONG THE SOUTHERLY RIGHT-OF-WAY OF STATE ROUTE 14 WERE RECOVERED AND HELD.
MONUMENTS RECOVERED ALONG SW VALLEY STREET WERE RECOVERED AND HELD, AS SHOWN ON SAID PROPERTY LINE ADJUSTMENT BY QUIT CLAIM DEED, AND PROPERTY MONUMENTS SET BASED ON SAID

AUDITOR'S CERTIFICATE
FILED FOR RECORD THIS _____ DAY OF _____ 2022
AT _____ M. IN BOOK _____ OF SURVEYS PAGE _____ AT THE
REQUEST OF JAMES M. KLEIN, REGISTERED LAND SURVEYOR, NO. 42890.

COUNTY AUDITOR

KA
Klein & Associates, Inc.
ENGINEERING/SURVEYING/PLANNING
2517 NE 25th Ave • Camas, WA
Main Address: P.O. Box 183, Westport, WA 98671
TEL: 360-687-6200 • FAX: 360-386-2516

OWNER
AMIT KAUSHAL
AND
KAMRA RUCHIKA

SHEET 1 OF 1
WILLAMETTE MERIDIAN
CLARK COUNTY, WASHINGTON

1/4 SEC T. R.
10 IN. 3E.

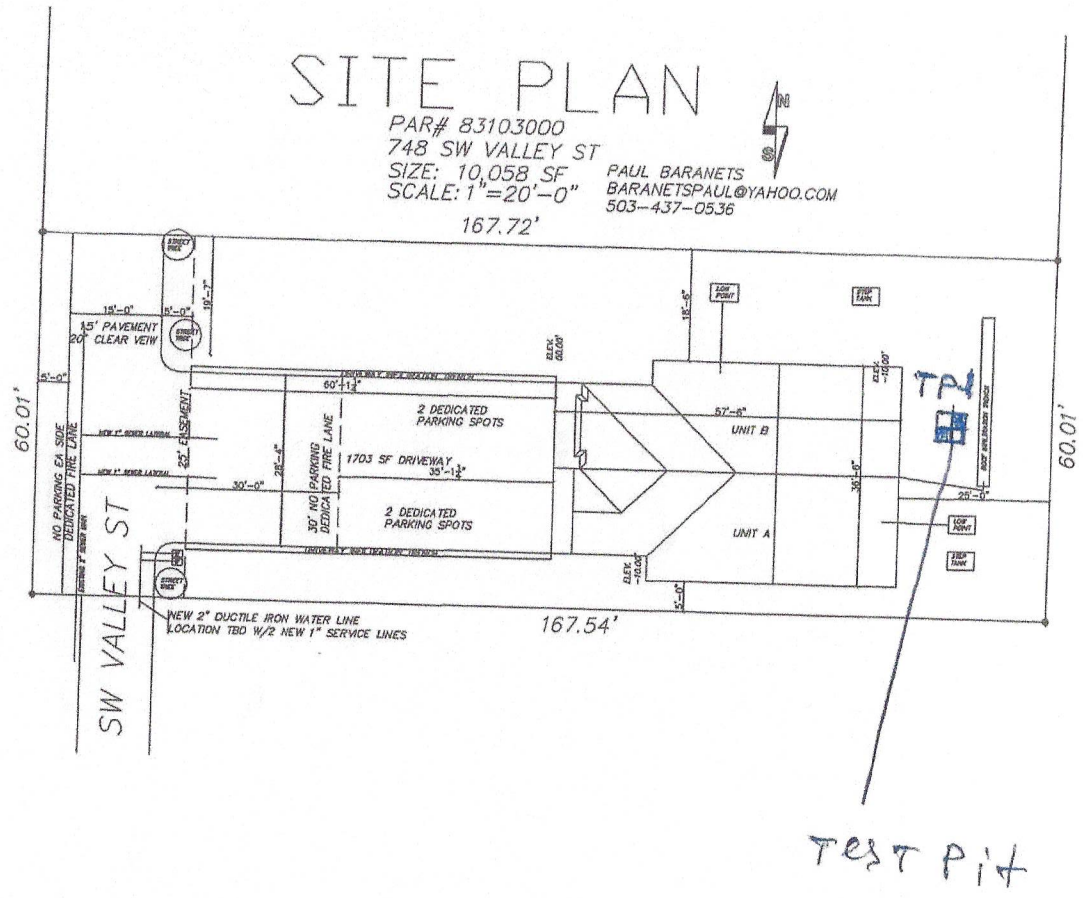
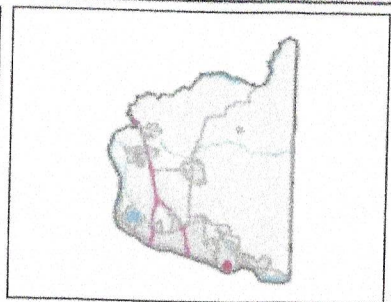


Figure 2



Elevation Map

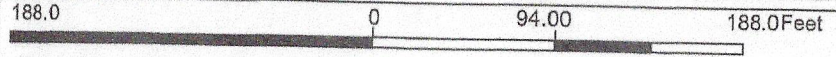


Legend

- Taxlots
- Contours Lines - 2 ft
- Contour Lines - 10 ft
- Contour Lines - 100 ft

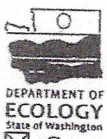
Notes:
 748 SW Valley St., Camas, WA

Figure 3



WGS_1984_Web_Mercator_Auxiliary_Sphere
 Clark County, WA. GIS - <http://gis.clark.wa.gov>

This map was generated by Clark County's "MapsOnline" website. Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.



WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

CURRENT

PAGE ONE

Construction/Decommission ("x" in circle)

Construction
 Decommission ORIGINAL INSTALLATION
 393929 Notice of Intent Number

Notice of Intent No. WE11863
 Unique Ecology Well ID Tag No. BAH 694

RECEIVED

Water Right Permit No. _____
 Property Owner Name Parke and Gail Ball
 Well Street Address 1455 NE Forest Home Rd. NOV 17 2010
 City Camas County Clark WA State Department of Ecology (SWRC)
 Location NE1/4-1/4 NW1/4 Sec 10 Twn 1N R 3E
 (s, t, r Still REQUIRED) EWM
Or
WWM

PROPOSED USE: <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Industrial <input type="checkbox"/> Municipal <input type="checkbox"/> DeWater <input type="checkbox"/> Irrigation <input type="checkbox"/> Test Well <input type="checkbox"/> Other																				
TYPE OF WORK: Owner's number of well (if more than one) <u>1</u> <input checked="" type="checkbox"/> New well <input type="checkbox"/> Reconditioned <i>Method:</i> <input type="checkbox"/> Dug <input type="checkbox"/> Bored <input type="checkbox"/> Driven <input type="checkbox"/> Deepened <input type="checkbox"/> Cable <input checked="" type="checkbox"/> Rotary <input type="checkbox"/> Jetted																				
DIMENSIONS: Diameter of well <u>6</u> inches, drilled <u>505</u> ft. Depth of completed well <u>505</u> ft.																				
CONSTRUCTION DETAILS Casing <input checked="" type="checkbox"/> Welded <u>6"</u> Diam. from <u>+1</u> ft. to <u>182.5</u> ft. Installed: <input checked="" type="checkbox"/> Liner installed <u>4"</u> Diam. from <u>***</u> ft. to <u>***</u> ft. <input type="checkbox"/> Threaded _____" Diam. From _____ ft. to _____ ft.																				
Perforations: <input type="checkbox"/> Yes <input type="checkbox"/> No Type of perforator used _____ SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.																				
Screens: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> K-Pac Location _____ Manufacturer's Name <u>Alloy Machine Works</u> Type <u>30 Slot Stainless</u> Model No. _____ Diam. <u>4.5"</u> Slot size <u>30</u> from <u>471</u> ft. to <u>477</u> ft. Diam. <u>4.5"</u> Slot size <u>30</u> from <u>493</u> ft. to <u>504</u> ft.																				
Gravel/Filter packed: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Size of gravel/sand <u>3/8-</u> " Materials placed from <u>70</u> ft. to <u>505</u> ft.																				
Surface Seal: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No To what depth? <u>34</u> ft. Material used in seal <u>3/8" Holeplug Bentonite</u> Did any strata contain unusable water? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Type of water? _____ Depth of strata _____ Method of sealing strata off _____																				
PUMP: Manufacturer's Name _____ Type: _____ H.P.																				
WATER LEVELS: Land-surface elevation above mean sea level _____ ft. Static level <u>148</u> ft. below top of well Date <u>9-14-2010</u> Artesian pressure _____ lbs. per square inch Date _____ Artesian water is controlled by _____ (cap, valve, etc.)																				
WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, by whom? <u>RWD</u> Yield: <u>35</u> gal./min. with <u>18</u> ft. drawdown after <u>1</u> hrs. Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs. Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs. Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level) <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Time</td> <td style="width: 20%;">Water Level</td> <td style="width: 15%;">Time</td> <td style="width: 20%;">Water Level</td> <td style="width: 15%;">Time</td> <td style="width: 15%;">Water Level</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </table> Date of test <u>9-14-2010</u> Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs. Airstest <u>100</u> gal./min. with stem set at <u>485</u> ft. for <u>1</u> hrs. Artesian flow _____ g.p.m. Date _____ Temperature of water _____ Was a chemical analysis made? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Time	Water Level	Time	Water Level	Time	Water Level	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Time	Water Level	Time	Water Level	Time	Water Level															
_____	_____	_____	_____	_____	_____															
_____	_____	_____	_____	_____	_____															

Lat/Long _____ Lat Deg _____ Lat Min/Sec _____
 Long Deg _____ Long Min/Sec _____
 Tax Parcel No. (Required) 127701000

CONSTRUCTION OR DECOMMISSION PROCEDURE		
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)		
MATERIAL	FROM	TO
Topsoil	0	1
Subsoil	1	3
Clay, Brown	3	15
Weathered Basalt, Broken with		
Brown clay	15	24
Gravel, Black and brown	24	26
Clay, tan	26	32
Clay, blue, tough with some		
brown seams	32	94
Clay, brown, tough	94	101
Clay, brown with silty sand	101	114
Clay, silt & sand, gray	114	119
Clay, brown / orange	119	147
Clay, brown with white and		
brown weathered shale	147	160
Clay, tan	160	175
Basalt, broken, weathered		
reddish brown and tan	175	179
Basalt, reddish brown and tan	179	181
Basalt, gray, hard with some		
fractures	181	242
Shale, gray, dark	242	270
Shale, gray, light and dark	270	280
Shale, gray, light and dark		
some fractured	280	350
Shale, gray, light and dark		
medium soft	350	417
Shale, dark gray, fractured	417	429
Shale, light gray	429	431
SEE PAGE TWO		
Start Date <u>8-11-2010</u>	Completed Date <u>9-14-2010</u>	

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Driller Engineer Trainee Name (Print) Charles L. Ritola
 Driller/Engineer/Trainee Signature _____
 Driller or trainee License No. 1501
 IF TRAINEE: Driller's License No. _____
 Driller's Signature: Charles L. Ritola

Drilling Company Ritola Well Drilling Inc.
 Address PO Box 193
 City, State, Zip Yacolt, WA, 98675
 Contractor's
 Registration No. RITOLD077R0 Date 9-16-2010



WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

Construction/Decommission ("x" in circle)

Construction

Decommission ORIGINAL INSTALLATION

Notice of Intent Number

PROPOSED USE: Domestic Industrial Municipal
 DeWater Irrigation Test Well Other

TYPE OF WORK: Owner's number of well (if more than one) 1
 New well Reconditioned Method: Dug Bored Driven
 Deepened Cable Rotary Jetted

DIMENSIONS: Diameter of well _____ inches, drilled _____ ft.
 Depth of completed well _____ ft.

CONSTRUCTION DETAILS
 Casing Welded _____" Diam. from _____ ft. to _____ ft.
 Installed: Liner installed 4" Diam. from _____ ft. to _____ ft.
 Threaded _____" Diam. From _____ ft. to _____ ft.

Perforations: Yes No
 Type of perforator used _____
 SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: Yes No K-Pac Location _____

Manufacturer's Name _____
 Type _____ Model No. _____
 Diam. _____ Slot size _____ from _____ ft. to _____ ft.
 Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: Yes No Size of gravel/sand _____
 Materials placed from _____ ft. to _____ ft.

Surface Seal: Yes No To what depth? _____ ft.
 Material used in seal _____

Did any strata contain unusable water? Yes No
 Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____
 Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
 Static level _____ ft. below top of well Date _____

Artesian pressure _____ lbs. per square inch Date _____
 Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? Yes No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Airstest _____ gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? Yes No

CURRENT

PAGE TWO

Notice of Intent No. WE11863

Unique Ecology Well ID Tag No. BAH 694

RECEIVED

Water Right Permit No. _____

NOV 17 2010

Property Owner Name Parke and Gail Ball

Well Street Address 1455 NE Forest Home Rd.

WA State Department of Ecology (SWRO)

City Camas County Clark

Location NE1/4-1/4 NW1/4 Sec 10 Twn 1N R 3E
 (s, t, r Still REQUIRED)

EWM
 Or
 WWM

Lat/Long Lat Deg _____ Lat Min/Sec _____

Long Deg _____ Long Min/Sec _____

Tax Parcel No. (Required) 127701000

CONSTRUCTION OR DECOMMISSION PROCEDURE		
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)		
MATERIAL	FROM	TO
~Continued~		
Shale, light, medium and dark gray, medium soft, fractured	431	455
Shale, reddish brown, med	455	475
Shale, reddish brown fractured, water	475	494
Basalt, dark gray, hard highly fractured, water	494	505
PVC LINER INSTALLATION		
PVC {class 200 } 4" Diameter	7'	423'
PVC { schedule 40 } 4" Dia.	423'	471'
S.Screen 4.5" Dia. 30 slot	471'	477'
PVC { schedule 40 } 4" Dia.	477'	493'
S. Screen 4.5" Dia. 30 slot	493'	504'
Steel 4" Dia. Riser {open bottom}	504'	505'
~Water Test~		
Iron - .9 ppm		
Hardness- 1 gpg		
PH - 8		
Start Date 8-11-2010	Completed Date 9-14-2010	

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Contractor's

Registration No. RITOLWD077R0 Date 9-16-2010