

WATER RESOURCES DEPARTMENT

MEMO

17 February, 2002

TO: Application G- 17496
FROM: GW: GERALD H. GRONDIN (Reviewer's Name)
SUBJECT: Scenic Waterway Interference Evaluation

YES
The source of appropriation is within or above a Scenic Waterway
X NO

YES
Use the Scenic Waterway condition (Condition 7J)
X NO

Per ORS 390.835, the Ground Water Section is able to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.

X Per ORS 390.835, the Ground Water Section is unable to calculate ground water interference with surface water that contributes to a scenic waterway; therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway.

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Table with 12 columns: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec. All cells are empty.

**PUBLIC INTEREST REVIEW FOR GROUND WATER APPLICATIONS**

TO: Water Rights Section Date 17 February 2012  
 FROM: Ground Water/Hydrology Section Gerald H. Grondin  
Reviewer's Name  
 SUBJECT: Application G- 17496 Supersedes review of N.A.  
Date of Review(s)

**PUBLIC INTEREST PRESUMPTION; GROUNDWATER**

**OAR 690-310-130 (1)** *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525. Department staff review ground water applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. This review is based upon available information and agency policies in place at the time of evaluation.*

**A. GENERAL INFORMATION:** Applicant's Name: Klamath County School District County: Klamath

- A1. Applicant(s) seek(s) 0.891 (400 gpm) cfs from one production well to one or two injection well (s) well(s) in the Klamath River Basin, in the Lost River sub-basin Quad Map: Bonanza
- A2. Proposed use: Heat Exchange Seasonality: Year-Round (365 days)
- A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	KLAM 13391	1	Basalt Unit	- 0.891	39S/11E-sec 10 CBB	1990'N, 640'E fr SW cor S 10
2	Not drilled	2	Basalt Unit	+0.891	39S/11E-sec 09 DAA	10'S, 25'W fr W qtr cor Sec 10
3	Not drilled	3	Basalt Unit	-0.891	39S/11E-sec 10 CBB	500'S, 620'E fr W qtr cor Sec 10
4						

\* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	4148	88	39.50	01/11/12	90	?	0 to 40	?	?	?	?	?
2	4154	?	45.50	01/11/12	TBD	TBD	TBD	TBD	TBD	?	?	?
3	4151	?	42.50	01/11/12	TBD	TBD	TBD	TBD	TBD	?	?	?

Use data from application for proposed wells.

A4. Comments: \_\_\_\_\_

Proposed groundwater use is for heat exchange for heating and cooling the school.

Owner well 1 (KLAM 13391) is currently used as an exempt well supplying water to the school up to 15,000 gallons per day. This application proposes to use the well for groundwater injection after the water has been used for heat exchange. The water well report indicates it obtains groundwater from gray cinders at the bottom 2 feet in the well. This is part of the basalt unit which begins 8 feet below land surface at the well.

Owner well 2 (not drilled yet) is proposed to be the production well to obtain groundwater for the heat exchange. This application proposes to obtain groundwater from the basalt unit.

Owner well 3 (not drilled yet) is proposed to be an alternate injection well if the school decides not to use owner well 1 for injection. The proposed geologic unit is not identified. This review recommends the basalt unit via a permit condition.

The static water level is based on OWRD groundwater level measurements at nearby wells KLAM 13353 and KLAM 50318 on 11 January 2012.

A5.  Provisions of the N.A. Basin rules relative to the development, classification and/or management of ground water hydraulically connected to surface water  are, or  are not, activated by this application. (Not all basin rules contain such provisions.)

Comments: \_\_\_\_\_

No basin rule applies. Only the Klamath River Compact ORS 542.610 to 542.630 applies to the Klamath basin. However, the compact applies to surface water only, not groundwater.

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A6.  Well(s) # N.A., \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: \_\_\_\_\_

Comments: \_\_\_\_\_

Currently, there is no administrative area.

However, this is the Bonanza sub-area where no additional (net increase) groundwater use should occur. Additional groundwater use would add to ongoing groundwater interference problems with Bonanza Big Springs. Permits with post 1990 priority dates have been conditioned to require shutting the well off whenever the groundwater level is less than 0.5 feet above the Lost River stage at Bonanza Big Springs Park. This condition was the result of a settlement agreement with the permit holders.

This application proposes no additional (net increase) groundwater use, because it proposes to inject 100 percent of the water pumped after it has passed through the heat exchange. To ensure this occurs, no net groundwater use must be included as a permit condition where 100% of the groundwater extracted must be injected to the same water bearing zone.

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**B. GROUND WATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070**

B1. Based upon available data, I have determined that ground water\* for the proposed use:

- a.  is over appropriated,  is not over appropriated, or  cannot be determined to be over appropriated during any period of the proposed use. \* This finding is limited to the ground water portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b.  will not or  will likely be available in the amounts requested without injury to prior water rights. \* This finding is limited to the ground water portion of the injury determination as prescribed in OAR 690-310-130;
- c.  will not or  will likely to be available within the capacity of the ground water resource; or
- d.  will, if properly conditioned, avoid injury to existing ground water rights or to the ground water resource:
  - i.  The permit should contain condition #(s) 7B, 7F, 7L, 7N (modified), 7T (measuring tube for each well), the "large" water use condition (flow meter required at each well), and special conditions (see below);
  - ii.  The permit should be conditioned as indicated in item 2 below.
  - iii.  The permit should contain special condition(s) as indicated in item 3 below;

- B2. a.  Condition to allow ground water production from no deeper than \_\_\_\_\_ ft. below land surface;
- b.  Condition to allow ground water production from no shallower than \_\_\_\_\_ ft. below land surface;
- c.  Condition to allow ground water production only from the \_\_\_\_\_ ground water reservoir between approximately \_\_\_\_\_ ft. and \_\_\_\_\_ ft. below land surface;
- d.  Well reconstruction is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Ground Water Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): \_\_\_\_\_

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B3. Ground water availability remarks: \_\_\_\_\_

**Groundwater in the Bonanza area is determined to be over appropriated (see paragraph below). No additional (net increase) groundwater use should occur. This application does not propose any additional (net increase) groundwater use.**

**Long term state observation well groundwater level data related to state observation wells 282 (KLAM 2374), 288 (KLAM 13427), and 286 (KLAM 12404) definitely show climatic influences. Additionally, they appear to show a gradual decline may be occurring in the Bonanza sub-area when comparing climate cycle peaks. Over the complete record, the decline may be 0.5 to 0.7 feet per decade (0.05 to 0.07 per year). Since the 1990s, the decline may have steepened to 1.0 to 1.25 feet per decade (0.10 to 0.13 feet per year). Any additional (net increase) groundwater use in the Bonanza sub-area risks increasing the decline rate. This application does not propose any additional (net increase) groundwater use.**

This is the Bonanza sub-area where no additional (net increase) groundwater use should occur. Additional groundwater use would add to ongoing groundwater interference problems with Bonanza Big Springs. In relation to this, permits with post 1990 priority dates have been conditioned to require shutting the well off whenever the groundwater level is less than 0.5 feet above the Lost River stage at Bonanza Big Springs Park. This condition was the result of a settlement agreement with the permit holders. So, any additional (net increase) groundwater use would increase the likelihood that these settlement related wells would be required to shut off. This application does not propose any additional (net increase) groundwater use.

This application proposes no additional (net increase) groundwater use, because it proposes to inject 100 percent of the water pumped after it has passed through the heat exchange. To ensure this occurs, no net groundwater use must be included as a permit condition where 100% of the groundwater extracted must be injected to the same water bearing zone (see below).

If a permit is issued, the following conditions should be included: 7B, 7F, 7L, 7N (modified), 7T (measuring tube for each well), the "large" water use condition (flow meter required at each well), and special conditions (see below):

7N, the measurement condition modified (merge part "B" and "C" to read "Annual water-level measurements reveal a water-level decline of 3 or more feet:", and replace part "D" with "OWRD groundwater section staff approved static ground water level measurements at OWRD monitoring well KLAM 50318 at Bonanza Big Springs Park is below 4,106.72 ft elevation msl (note: 4,106.72 ft elevation msl is 6.0 feet below land surface at well KLAM 50318)", and insert the following to the last paragraph after "no action is necessary because...": insert "...the use is not contributing to the decline or contributing to the groundwater level being below 4,106.72 ft elevation msl, or because...").

7T, the measuring tube condition modified (add "For existing wells with a pump installed, installation of the measuring tube shall occur when the pump is removed or replaced and/or when the well is deepened or reconstructed or altered.").

The "large" water use condition (require a flow meter at each well; each flow meter shall be located within 50 feet of the wellhead, and adjacent to each flow meter shall be a clearly visible monument with a sign noting the flow meter).

Well construction condition ("All wells shall be constructed to extract or inject groundwater from and to the same or adjoining water-bearing zone within the basalt unit below the basin sediments. To meet this criterion, each well shall have at minimum continuous casing and continuous seal from land surface, through the sediment to the productive portion of the basalt unit. Additionally, there shall be no more than 100 feet difference when comparing the well bottom elevation for any two of the permitted wells").

Special condition for no net groundwater use: "This permit is valid if and only if 100 percent of the groundwater extracted from the production well(s) is injected in the authorized injection well(s) which can be confirmed by flow meter data. Otherwise, the use is invalid and subject to regulation, including possible immediate cancellation of the permit."

Special condition for low temperature geothermal wells used for heating: "All water produced under this permit shall be injected into the authorized well(s). Prior to receiving a certificate of water right, the permit holder shall submit documentation affirming that any applicable additional requirements of the Department's Division 230 rules have been met."

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**C. GROUND WATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040**

C1. 690-09-040 (1): Evaluation of aquifer confinement:

Well #	Aquifer or Proposed Aquifer	Confined	Unconfined
1	Basalt Unit	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Basalt Unit	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Basalt Unit	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: \_\_\_\_\_

System is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement. Generally, low transmissivity (low permeability) sediment of varying thickness overlies high transmissivity (high permeability) basalt. Groundwater occurs in both the sediment unit and the basalt unit. Groundwater is vertically connected within each unit and between each unit. This is based upon investigations by Gannett and others (2007) and Grondin (2004).

Water well reports (well logs) for wells in the general area indicate the sediment thickness varies from less than 25 feet at proposed well KLAM 13391, well KLAM 13353, and KLAM 50318, to about 125 feet at well KLAM 10460 and well KLAM 10378, to between 175 feet to 210 feet at well KLAM 51922, KLAM 10416, and KLAM 10242, and to deeper at other wells.

C2. 690-09-040 (2) (3): Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Lost River/Bonanza Big Springs	4108.5	4104	1840	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Lost River/Bonanza Big Springs	4108.5	4104	2740	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	Lost River/Bonanza Big Springs	4108.5	4104	1920	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: \_\_\_\_\_

Grondin (2004) shows groundwater flow in the Upper Lost River sub-basin is generally from the uplands to the adjoining valley where it converges and moves down valley. Some groundwater discharge to the Lost River occurs via seepage through the river bed. Most groundwater discharge to the river occurs at springs. In the Bonanza sub-area, most groundwater converges down Langell Valley and Yonna Valley toward the Town of Bonanza and discharges to the Lost River at Bonanza Big Springs. The remaining groundwater moves down valley from Bonanza toward Harpold gap.

Water Availability Basin the well(s) are located within: LOST RIVER > TULE L - AT HARPOLD DAM

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked  box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < 1/4 mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1	<input type="checkbox"/>	<input type="checkbox"/>	N.A	N.A.	<input type="checkbox"/>	89.5	<input type="checkbox"/>	0.00	<input type="checkbox"/>
2	1	<input type="checkbox"/>	<input type="checkbox"/>	N.A	N.A.	<input type="checkbox"/>	89.5	<input type="checkbox"/>	0.00	<input type="checkbox"/>
3	1	<input type="checkbox"/>	<input type="checkbox"/>	N.A	N.A.	<input type="checkbox"/>	89.5	<input type="checkbox"/>	0.00	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

	SW #		Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: \_\_\_\_\_

**All the proposed wells are between 0.25 mile and 1.00 mile from the Lost River/Bonanza Big Springs.**

**The application proposes and this review is based upon no net use of groundwater (net use = 0.0 gpm) where 100 percent of the groundwater extracted is injected back to the same source. So no calculation was conducted. If less than 100 percent of the groundwater extracted is injected to the same source, this review is invalid and the permit should not be issued.**

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C4a. 690-09-040 (5): Estimated impacts on hydraulically connected surface water sources greater than one mile as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
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Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation:

All the proposed wells are between 0.25 mile and 1.00 mile from the Lost River/Bonanza Big Springs.



C4b. 690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.

C5.  If properly conditioned, the surface water source(s) can be adequately protected from interference, and/or ground water use under this permit can be regulated if it is found to substantially interfere with surface water:

- i.  The permit should contain condition #(s) \_\_\_\_\_;
- ii.  The permit should contain special condition(s) as indicated in "Remarks" below;

C6. SW / GW Remarks and Conditions \_\_\_\_\_

**This review is based upon no net use of groundwater (net use = 0.0 gpm) where 100 percent of the groundwater extracted is injected back to the same source. If the capability or the intent is for less than 100 percent of the groundwater extracted to be injected to the same source, this review is invalid and the permit should not be issued.**

**Groundwater in the Bonanza area is determined to be over appropriated (see paragraph below). No additional (net increase) groundwater use should occur. This application does not propose any additional (net increase) groundwater use.**

**Long term state observation well groundwater level data related to state observation wells 282 (KLAM 2374), 288 (KLAM 13427), and 286 (KLAM 12404) definitely show climatic influences. Additionally, they appear to show a gradual decline may be occurring in the Bonanza sub-area when comparing climate cycle peaks. Over the complete record, the decline may be 0.5 to 0.7 feet per decade (0.05 to 0.07 per year). Since the 1990s, the decline may have steepened to 1.0 to 1.25 feet per decade (0.10 to 0.13 feet per year). Any additional (net increase) groundwater use in the Bonanza sub-area risks increasing the decline rate. This application does not propose any additional (net increase) groundwater use.**

**This is the Bonanza sub-area where no additional (net increase) groundwater use should occur. Additional groundwater use would add to ongoing groundwater interference problems with Bonanza Big Springs. In relation to this, permits with post 1990 priority dates have been conditioned to require shutting the well off whenever the groundwater level is less than 0.5 feet above the Lost River stage at Bonanza Big Springs Park. This condition was the result of a settlement agreement with the permit holders. So, any additional (net increase) groundwater use would increase the likelihood that these settlement related wells would be required to shut off. This application does not propose any additional (net increase) groundwater use.**

**This application proposes no additional (net increase) groundwater use, because it proposes to inject 100 percent of the water pumped after it has passed through the heat exchange. To ensure this occurs, no net groundwater use must be included as a permit condition where 100% of the groundwater extracted must be injected to the same water bearing zone (see below).**

**If a permit is issued, the following conditions should be included: 7B, 7F, 7L, 7N (modified), 7T (measuring tube for each well), the "large" water use condition (flow meter required at each well), and special conditions (see below):**

**7N, the measurement condition modified (merge part "B" and "C" to read "Annual water-level measurements reveal a water-level decline of 3 or more feet:", and replace part "D" with "OWRD groundwater section staff approved static ground water level measurements at OWRD monitoring well KLAM 50318 at Bonanza Big Springs Park is below 4,106.72 ft elevation msl (note: 4,106.72 ft elevation msl is 6.0 feet below land surface at well KLAM 50318)", and insert the following to the last paragraph after "no action is necessary because...": insert "...the use is not contributing to the decline or contributing to the groundwater level being below 4,106.72 ft elevation msl, or because...").**

**7T, the measuring tube condition modified (add "For existing wells with a pump installed, installation of the measuring tube shall occur when the pump is removed or replaced and/or when the well is deepened or reconstructed or altered.").**

**The "large" water use condition (require a flow meter at each well; each flow meter shall be located within 50 feet of the wellhead, and adjacent to each flow meter shall be a clearly visible monument with a sign noting the flow meter).**

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**Well construction condition** ("All wells shall be constructed to extract or inject groundwater from and to the same or adjoining water-bearing zone within the basalt unit below the basin sediments. To meet this criterion, each well shall have at minimum continuous casing and continuous seal from land surface, through the sediment to the productive portion of the basalt unit. Additionally, there shall be no more than 100 feet difference when comparing the well bottom elevation for any two of the permitted wells").

**Special condition for no net groundwater use:** "This permit is valid if and only if 100 percent of the groundwater extracted from the production well(s) is injected in the authorized injection well(s) which can be confirmed by flow meter data. Otherwise, the use is invalid and subject to regulation, including possible immediate cancellation of the permit."

**Special condition for low temperature geothermal wells used for heating:** "All water produced under this permit shall be injected into the authorized well(s). Prior to receiving a certificate of water right, the permit holder shall submit documentation affirming that any applicable additional requirements of the Department's Division 230 rules have been met."

References Used:

Gannett, M.W., Lite, K.E., La Marche, J.L., Fisher, B.J., and Polette, D.J. 2007. Ground-Water Hydrology of the Upper Klamath Basin, Oregon and California. USGS Scientific Investigations Report 2007-5050.

USGS. 2005. Assessment of the Klamath Project pilot water bank: a review from a hydrologic perspective. Prepared by the U.S. Geological Survey Oregon Water Science Center, Portland, Oregon for the U.S. Bureau of Reclamation Klamath Basin Area Office, Klamath Falls, Oregon, May 3, 2005.

Grondin, G.H., 2004. Groundwater in the Eastern Lost River Sub-Basin, Langell, Yonna, Swan Lake, and Poe Valleys of Southeastern Klamath County, Oregon. Groundwater Report 41, Oregon Water Resources Department, Salem, Oregon.

Sammel, E.A. 1980. Hydrogeologic Appraisal of the Klamath Falls Geothermal Area, Oregon. USGS Professional Paper 1044-G, 45 p.

Leonard, A.R. and Harris, A.B. 1974. Groundwater in selected areas in the Klamath Basin, Oregon. OWRD Groundwater Report No. 21, 104 pgs.

Hydrographs and water well reports for wells KLAM 2374, KLAM 12404, KLAM 13427, KLAM 50318, KLAM 51922..

USGS Bonanza quadrangle map (1:24:000 scale)

**D. WELL CONSTRUCTION, OAR 690-200**

D1. Well #: 1 Logid: KLAM 13391

D2. **THE WELL does not meet current well construction standards based upon:**

- a.  review of the well log;
- b.  field inspection by \_\_\_\_\_;
- c.  report of CWRE \_\_\_\_\_;
- d.  other: (specify) \_\_\_\_\_

D3. **THE WELL construction deficiency:**

- a.  constitutes a health threat under Division 200 rules;
- b.  commingles water from more than one ground water reservoir;
- c.  permits the loss of artesian head;
- d.  permits the de-watering of one or more ground water reservoirs;
- e.  other: (specify) No well seal is identified

D4. **THE WELL construction deficiency is described as follows:** No well seal is identified.

The well shall have at minimum continuous casing and continuous seal from land surface, through the sediment to the productive portion of the basalt unit.

- D5. **THE WELL**
  - a.  was, or  was not constructed according to the standards in effect at the time of original construction or most recent modification.
  - b.  I don't know if it met standards at the time of construction.

D6.  **Route to the Enforcement Section.** I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Enforcement Section and the Ground Water Section.

**THIS SECTION TO BE COMPLETED BY ENFORCEMENT PERSONNEL**

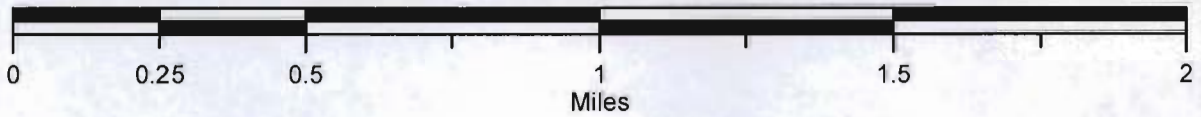
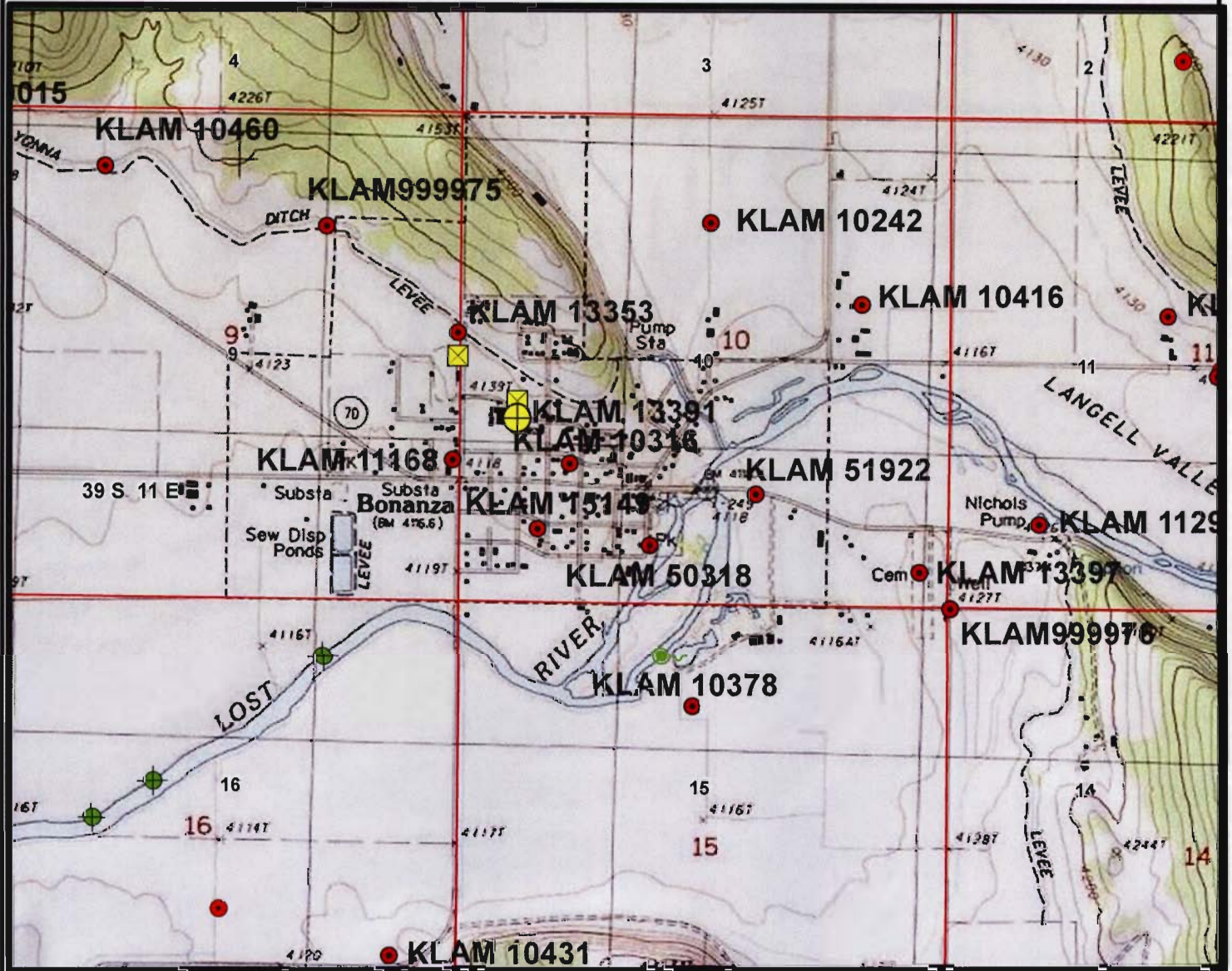
D7.  Well construction deficiency has been corrected by the following actions: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_, 200\_\_\_\_\_  
(Enforcement Section Signature)

D8.  **Route to Water Rights Section (attach well reconstruction logs to this page).**

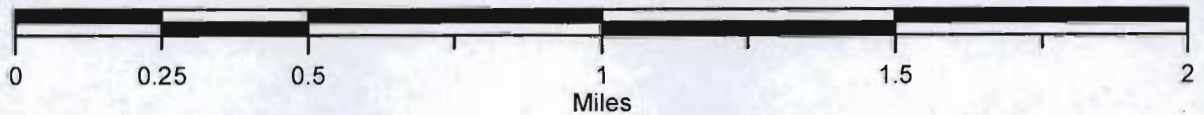
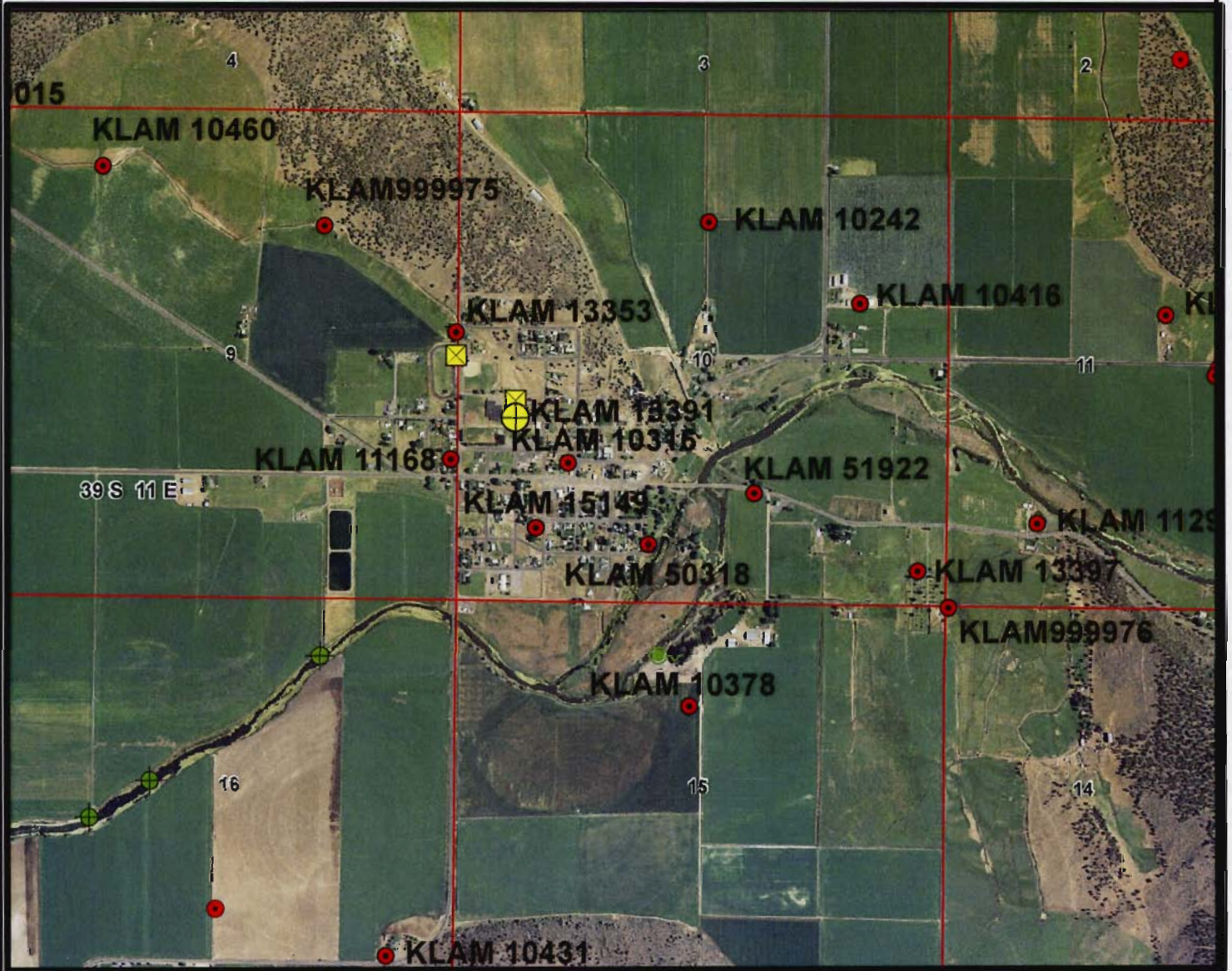
# Permit Application G-17496

## Klamath County School District



**Yellow = Proposed POA**  
**Red & Blue = Other Wells**  
**Green = Surface Water Rights**

# Permit Application G-17496 Klamath County School District



**Yellow = Proposed POA**  
**Red & Blue = Other Wells**

**Green = Surface Water Rights**

STATE ENGINEER  
Salem, Oregon

Klamath 13391  
Klamath 13391  
Well Record

STATE WELL NO. 39/11-10M(1)  
COUNTY Klamath  
APPLICATION NO.

OWNER: Bonanza School

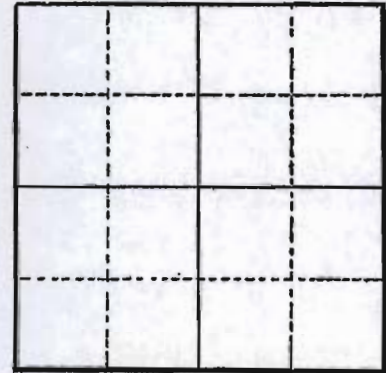
MAILING ADDRESS:

LOCATION OF WELL: Owner's No.

CITY AND STATE:

NW SW 10 39 N. 11 E.  
1/4 1/4 Sec. T. S., R. W., W.M.

Bearing and distance from section or subdivision corner



Section

Altitude at well 4,140

TYPE OF WELL: Drilled Date Constructed

Depth drilled 90 Depth cased 40 ft.

CASING RECORD: 8 inches, 40 ft.

FINISH:

AQUIFERS: Gray cinders from 88 ft. to 90 ft.

WATER LEVEL: 31+ feet below land surface, 1948

PUMPING EQUIPMENT: Type centrifugal H.P.  
Capacity G.P.M.

WELL TESTS:  
Drawdown ft. after hours G.P.M.  
Drawdown ft. after hours G.P.M.

USE OF WATER Domestic Temp. °F., 19

SOURCE OF INFORMATION USGS

DRILLER or DIGGER

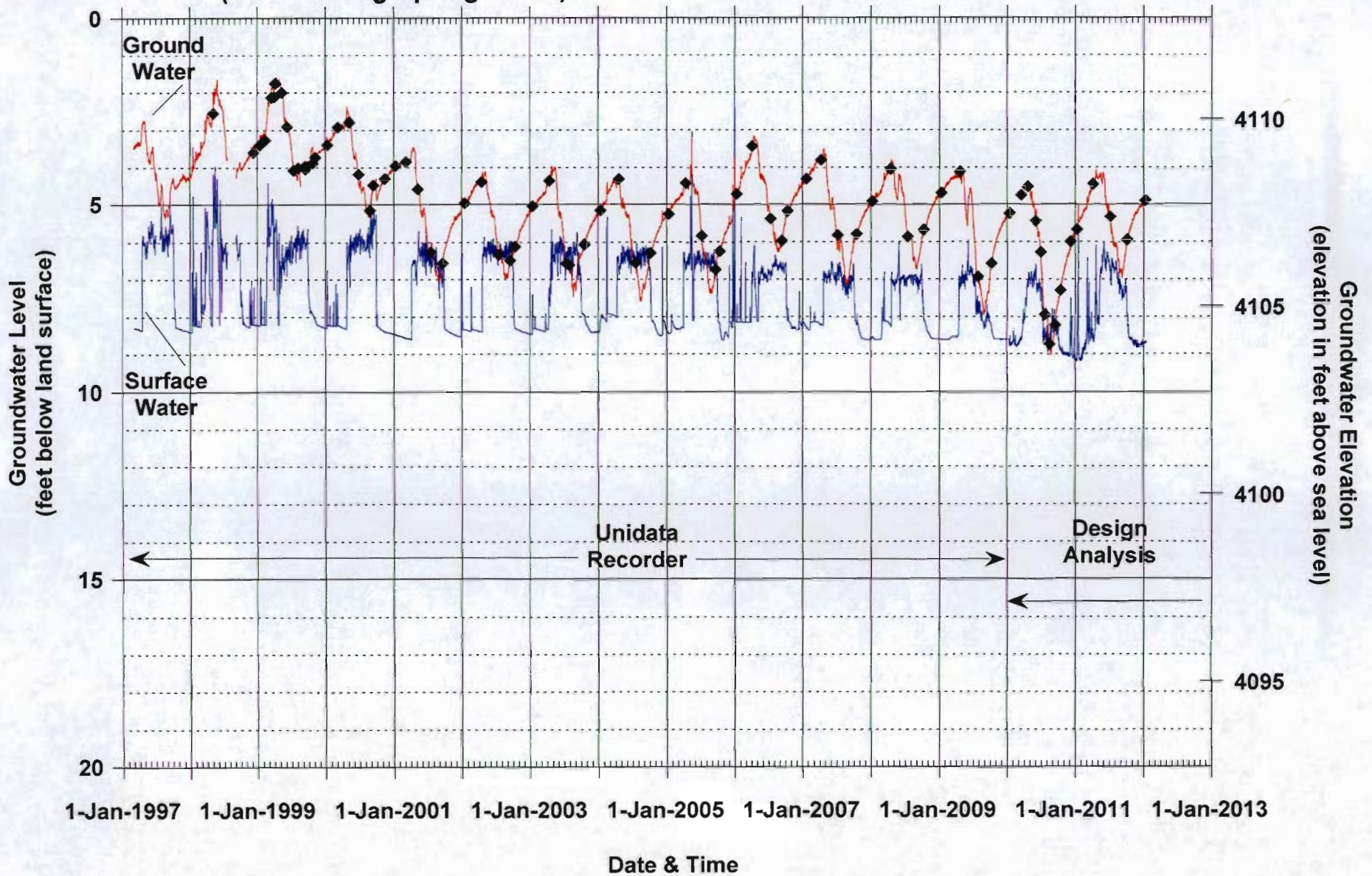
ADDITIONAL DATA:  
Log Water Level Measurements Chemical Analysis Aquifer Test

REMARKS: Hardness 60ppm, chloride 3ppm.



**KLAM 50318**  
**T39S/R11E-sec 10 cdd**  
**Bonanza**  
**(Bonanza Big Springs Park)**

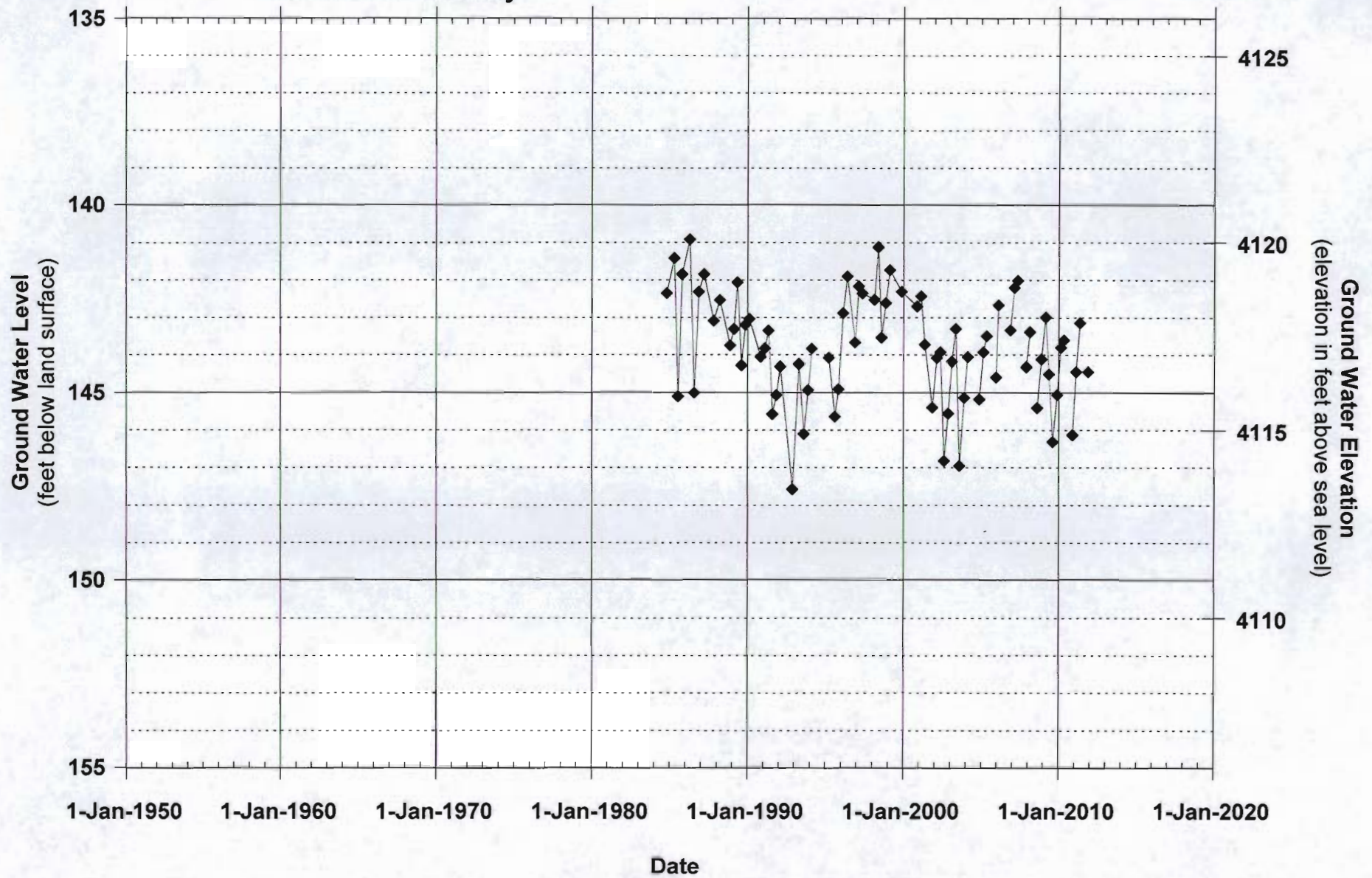
Well Depth = 46 ft  
Casing Depth = 19 ft  
Seal Depth = 19 ft  
Aquifer = Brown and Black Lava (25 to 46 ft)





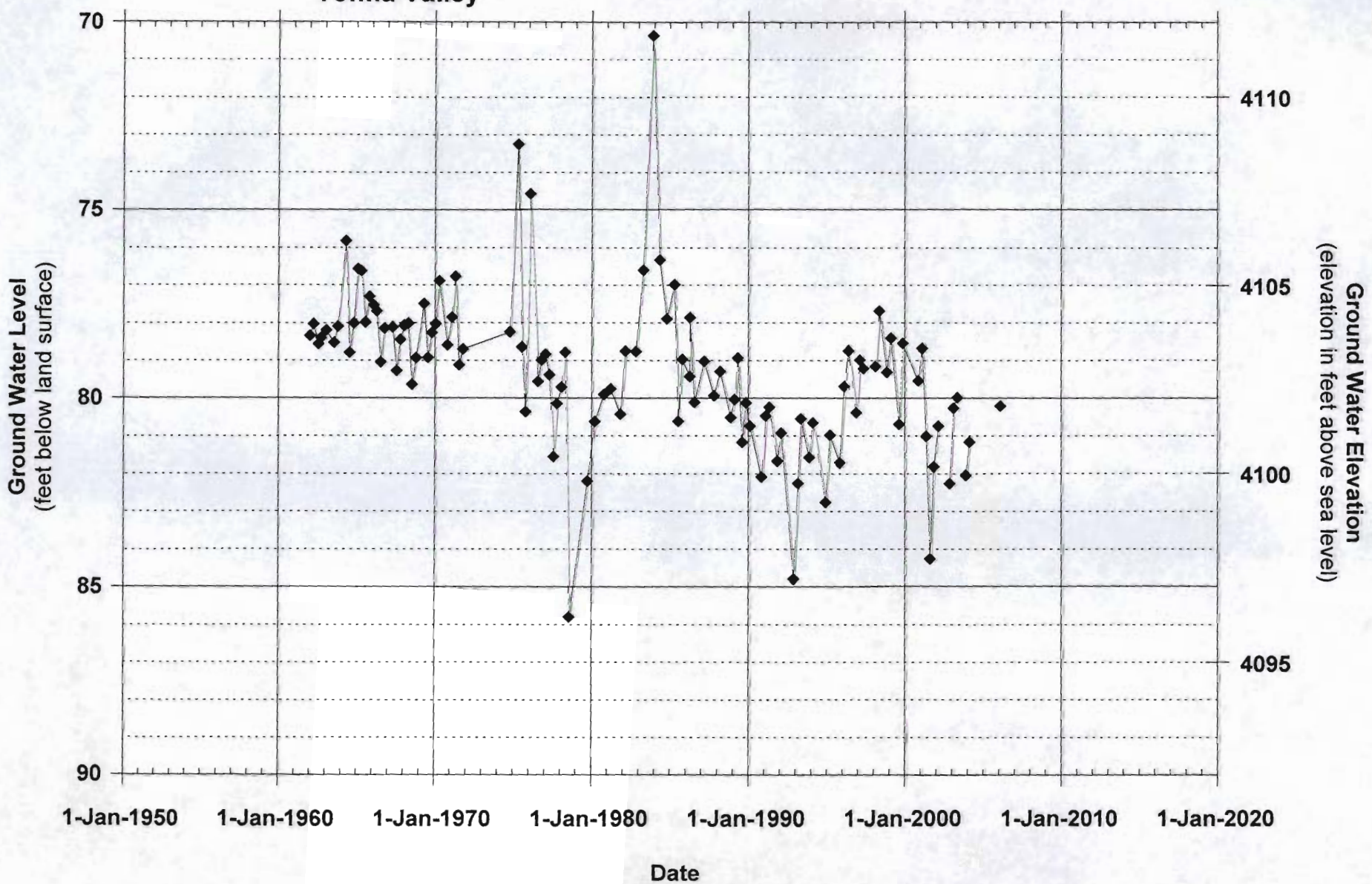
**KLAM 2374**  
**State Observation Well 282**  
**T37S/R11.5E-sec 25 ddd**  
**North Yonna Valley**

Well Depth = 582 ft  
Casing Depth = 240 ft  
Seal Depth = 240 ft  
Aquifer = Sandstone and Lava (195 to 380 ft & 435 to 470 ft)



**KLAM 12404**  
**State Observation Well 286**  
**T38S/R11.5E-sec 15 dda**  
**Yonna Valley**

Well Depth = 495 ft  
Casing Depth = ? ft  
Seal Depth = ? ft  
Aquifer = Lava & Cinders (362 to 495 ft)



**KLAM 13427**  
**State Observation Well 288**  
**T39S/R11E-sec 20 aad**  
**Yonna Valley**

Well Depth = 567 ft  
Casing Depth = 20 ft  
Seal Depth = ? ft  
Aquifer = Basalt (>380? ft)

