



## Dennis Jackson - Hydrologist

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October 19, 2008

Tom Lippe  
329 Bryant Street, Suite 3D  
San Francisco, CA 94107

Re: DEIR for Rodgers/Upper Range Vineyard Project Conversion #02454-ECPA

Dear Mr. Lippe:

You have asked me to comment on Supplemental Draft Environmental Impact Report of the proposed Upper Range Vineyard Project (Rodgers) conversion from oak woodland and grassland to vineyard. The original Draft Environmental Impact Report (DEIR) was dated December 2006. The Supplemental DEIR is dated August 2008. The DEIR describes the project as follows.

This EIR analyzes the potential environmental impacts of implementing an Erosion Control Plan (#02-454-ECPA) for earthmoving activities associated with a new vineyard in Napa County, California. The Upper Range Vineyard Project – Rodgers Property would involve installing erosion control features and measures and the subsequent operations for a new approximately 161-acre vineyard on privately owned properties. (APNs 030-200-002, 030-130-008, 030-220-009, and 030-220-027/028/029/030 (formerly 030-220-001). The new vineyard would be situated on seven contiguous parcels totaling approximately 678 acres.

The project site is located in the hills between the Silverado Trail and Lake Hennessey, about 2 miles northeast of Rutherford and 13 miles north of the City of Napa. The erosion control measures would be implemented in the proposed vineyard area, which would cover 161 acres (approximately 24 percent of the total 678 acres), while the existing site conditions would remain as is on 517 acres (approximately 76 percent of the total 678 acres). The vineyard layout was designed by the property owners to minimize the need for grading and tree removal.

A new 10,000-gallon water tank and irrigation line would be installed for the vineyard. Ground water would be pumped from an existing well and be stored in the water tank. The existing well would also be shared and provide water to the Rutherford Volunteer Fire Department facility on Silverado Trail. The Rutherford Volunteer Fire facility would have their own separate 10,000-gallon water tank that would be screened from view by existing trees.

The comments in my January 21, 2007 letter still apply and I incorporate those comments by reference.

### **WIN TR-55 Model**

Mathematical models to estimate storm peak discharge are powerful tools but they need to be carefully calibrated before their results can be trusted. The Draft Hydrologic Evaluation Rodgers Upper Range Vineyard Conversion prepared by HIS, October 2005 page 2-6 concurs.

Due to the potential for flooding of Silverado Trail, if there is any increase in runoff from the project, it is recommended that a hydraulic model of the project site be developed. **The model should be calibrated to measured data collected at the project site.** The runoff characteristics for the post-project condition should be collected from runoff measured from an adjacent vineyard with similar geology, soils, and topography. (Emphasis Added)

The WIN TR-55 model (Trso, November 2006) does not appear to have been calibrated to local pre-project conditions. The peak flood flows predicted by the WIN TR-55 model for pre-project conditions do not appear to agree with USGS data collected in a nearly adjacent Lake Hennessey Tributary watershed between 1959 and 1973. See Figure 1 for a map showing the location of the USGS Lake Hennessey Tributary gage watershed. Figure 2 shows the soil map from the Upper Range DEIR showing the stream that the USGS measured the flood peaks on. The Lake Hennessey Tributary stream gage (USGS Station Number 11456400) was operated to collect data on the flood response of small watersheds. The watershed area of the Lake Hennessey Tributary stream gage is 1.04 square miles (665 acres). The soils, land use, vegetation, and topography of the watershed of the Lake Hennessey Tributary stream gage are similar to those of Rodgers Upper Range, especially the Lake Hennessey Gulch sub-basin.

Figure 6 shows the soil map (Figure 3-8 of HIS' Draft Hydrologic Evaluation) with the location of the USGS Lake Hennessey Tributary stream gage. The soil types mapping symbol is a three-digit number.

Table 1 shows the predicted peak flood discharges for pre-project conditions from Table 2, page 12, of Trso's November 2006 report. Table 1 also shows the peak flood discharges for the USGS flood peak data for the same return period storms Trso estimated. Note that the predicted discharges for Lake Hennessey Gulch on the Upper Range project are much higher than the discharges estimated for the USGS Lake Hennessey Tributary data, even though the watershed area of the Lake Hennessey Gulch is 34.7% of the USGS watershed.

The peak storm discharges predicted by the WIN TR-55 model do not appear to agree with regional peak discharge data from other USGS stations in the Napa River watershed. Table 2 shows data about the location and length of record for the USGS gaging stations used to construct the regional peak discharge graphs shown in Figures 3 and 4. Table 3 shows watershed area and peak storm discharges for the same return period storms used by Trso (November 2006). Figure 3 shows the 2-year peak storm discharge for the Rodgers Upper Range watersheds and for the USGS stream gages versus the watershed area. Figure 4 shows the similar data for the 10-year storm.

In both Figure 3 and 4 the peak flood discharges predicted by the WIN TR-55 model plot higher than the data for the USGS stream gages indicating that the WIN TR-55 model predicts a greater storm peak discharge for a given watershed area than the storm discharges measured by the USGS. It is important to note that the Lake Hennessey Tributary gaging station discharges plot below the regression line for the USGS stations in the Napa River, indicating that the storm runoff from that station is lower than would be expected based on the other USGS Napa River stations.

The pre-project WIN TR-55 storm discharge model does not appear to have been adequately calibrated since it greatly overestimates the storm discharge relative to the regional USGS data, for all flood frequencies. Table 1 compares the Lake Hennessey Tributary storm discharges to the storm discharges for the Upper Range sub-basins. The predicted storm discharges for both the Rodgers Southeast Gulch and the Lake Hennessey Gulch are greater than the storm discharges measured by the USGS even though the watershed upstream of the USGS stream gage (665.6 acres) is much larger than either the Rodgers Southeast Gulch (107.8 acres) or the Lake Hennessey Gulch (231.2 acres)

Since the WIN TR-55 model does not appear to have been calibrated against locally available measured data that represent the pre-project condition its results for the post-project condition are highly suspect. In my opinion, all conclusions based on the WIN TR-55 model should be discarded.

**Table 1.** Estimated peak discharge for selected return period storms modeled by the WIN TR-55 model. Data from Martin Trso, November 2006, Table 2, page 12 for existing conditions. The Lake Hennessey Tributary stream gage peak discharges for the give return period events were calculated from measure runoff events between 1959 and 1973. Note that the predicted discharges for Lake Hennessey Gulch on the Upper Range project are much higher than the discharges estimated for the USGS Lake Hennessey Tributary data, even though the watershed area of the Lake Hennessey Gulch is 34.7% of the USGS watershed.

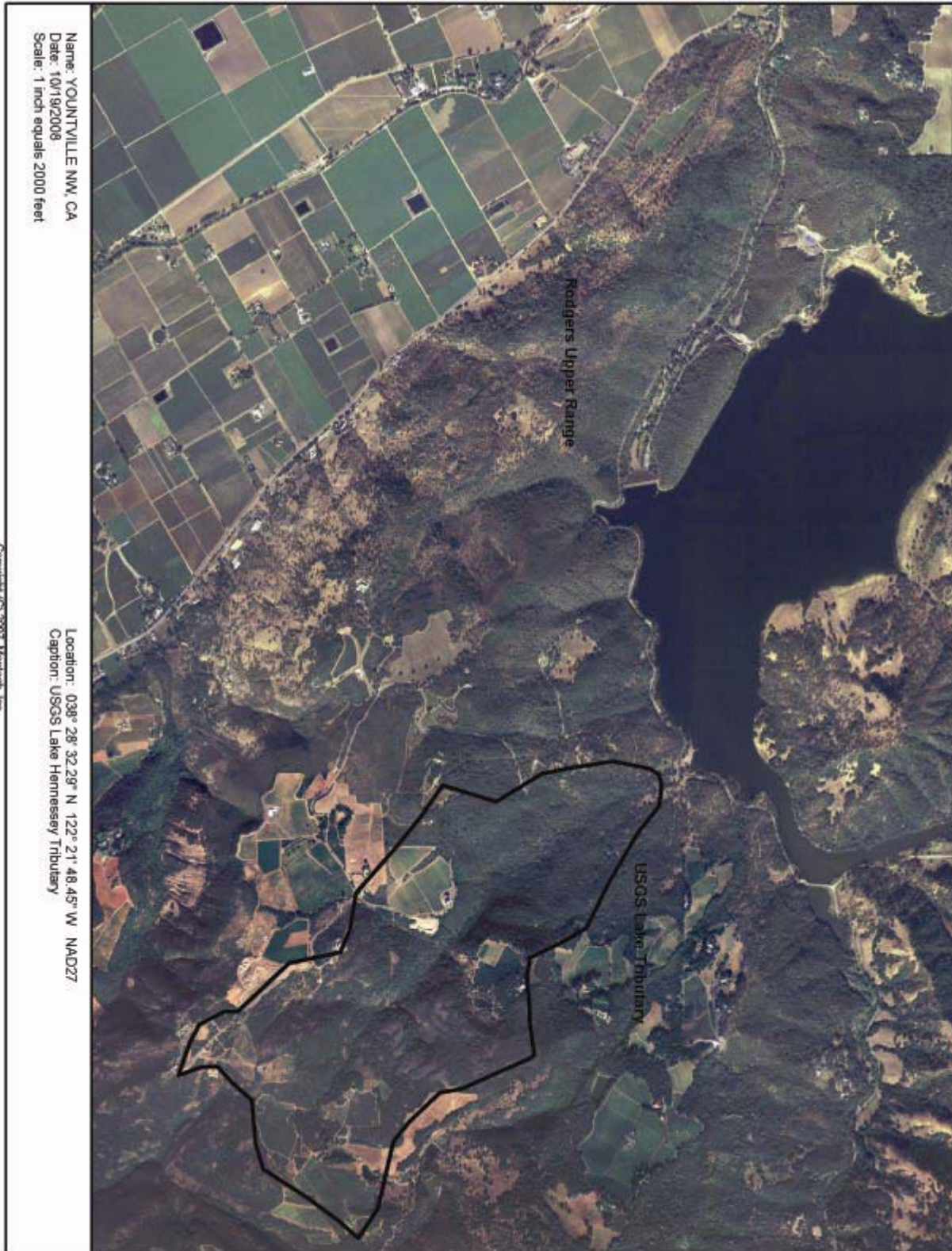
	<b>Area acres</b>	<b>Area sq-mi</b>	<b>2-yr</b>	<b>5-yr</b>	<b>10-yr</b>	<b>25-yr</b>	<b>50-yr</b>	<b>100-yr</b>
Rodgers Southwest Gulch	24.4	0.038	14.7	20.7	26.7	38.8	44.9	51
Rodgers South Gulch	52.5	0.082	29.5	42.2	55.3	81.8	95.1	108.4
Rodgers Southeast Gulch	107.8	0.168	63.1	88.5	114.4	166.7	192.8	219.1
Lake Hennessey Gulch	231.2	0.361	134.4	188.6	243.8	355.5	411.3	467
Sage Canyon Gulch	20.4	0.032	11	15.8	20.9	31.2	36.4	41.5
USGS Lake Hennessey Trib	665.6	1.04	56	103	134	173	203	231

**Table 2.** Location and length of record for USGS gaging stations in the Napa River watershed with peak discharge records.

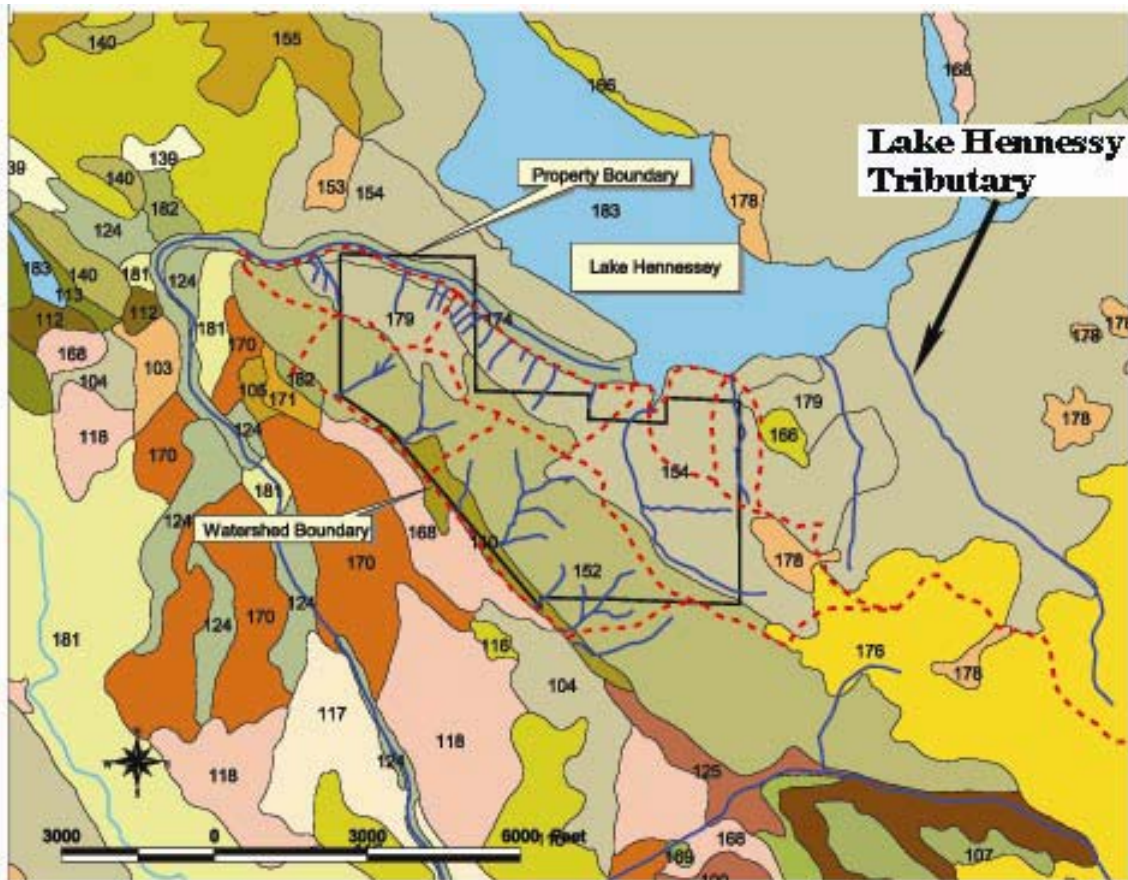
<b>Napa River Streams</b>	<b>Station #</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Start of Record</b>	<b>End of Record</b>	<b>Years of Record</b>
Lake Hennessy Tributary	11456400	382900	1222115	1959	1973	14
Sulphur Creek Nr St Helena	11455950	382916	1222850	1956	1973	18
Redwood near Napa	14458200	381904	1222035	1959	1973	15
Tulucay Creek near Napa	11458350	381709	1221629	1972	1983	12
Napa Creek at Napa	11458300	381807	1221810	1971	1983	13
Milliken Creek near Napa	11458100	382019	1221606	1971	1983	13
Dry Creek near Napa	11457000	382123	1222150	1952	1966	15
Napa River near St. Helena	11456000	382952	1222537	1929	1996	58

**Table 3.** Peak storm discharge for selected return period events for USGS stream gages in the Napa River watershed listed in Table 2.

<b>Napa River Streams</b>	<b>Watershed Area (sq-miles)</b>	<b>2-Year</b>	<b>5-Year</b>	<b>10-Year</b>	<b>25-Year</b>	<b>50-Year</b>	<b>100-Year</b>
Lake Hennessy Tributary	1.04	56	103	134	173	203	231
Sulphur Creek Near St Helena	4.5	528	724	854	1,018	1,140	1,261
Redwood near Napa	9.79	1,007	1,341	1,563	1,843	2,051	2,257
Tulucay Creek near Napa	12.6	898	1,682	2,201	2,857	3,343	3,826
Napa Creek at Napa	14.9	1,472	2,441	3,083	3,893	4,494	5,091
Milliken Creek near Napa	17.3	1,649	2,778	3,525	4,470	5,171	5,867
Dry Creek near Napa	17.4	1,456	2,308	2,872	3,585	4,114	4,639
Napa River near St. Helena	81.4	5,879	9,276	11,526	14,368	16,477	18,570



**Figure 1.** The USGS Lake Hennessey Tributary stream gage is almost adjacent to the Rodgers Upper Range project. The watershed area of the Lake Hennessey Tributary stream gage is 1.04 square miles.



**Figure 2.** Soil map of the Rodgers Upper Range project showing the location of the stream that the USGS measured flood peaks on from 1959-1973. The stream gage name is Lake Hennessey Tributary and its station number is 11456400. The soil types in the watershed draining to the USGS gage are given below.

**Napa County, California (CA055)**

**Map Unit Symbol Map Unit Name Acres**

154 Henneke gravelly loam, 30 to 75 percent slopes.

176 Rock outcrop-Hambright complex, 50 to 75 percent slopes.

178 Sobrante loam, 5 to 30 percent slopes

179 Sobrante loam, 30 to 50 percent slopes

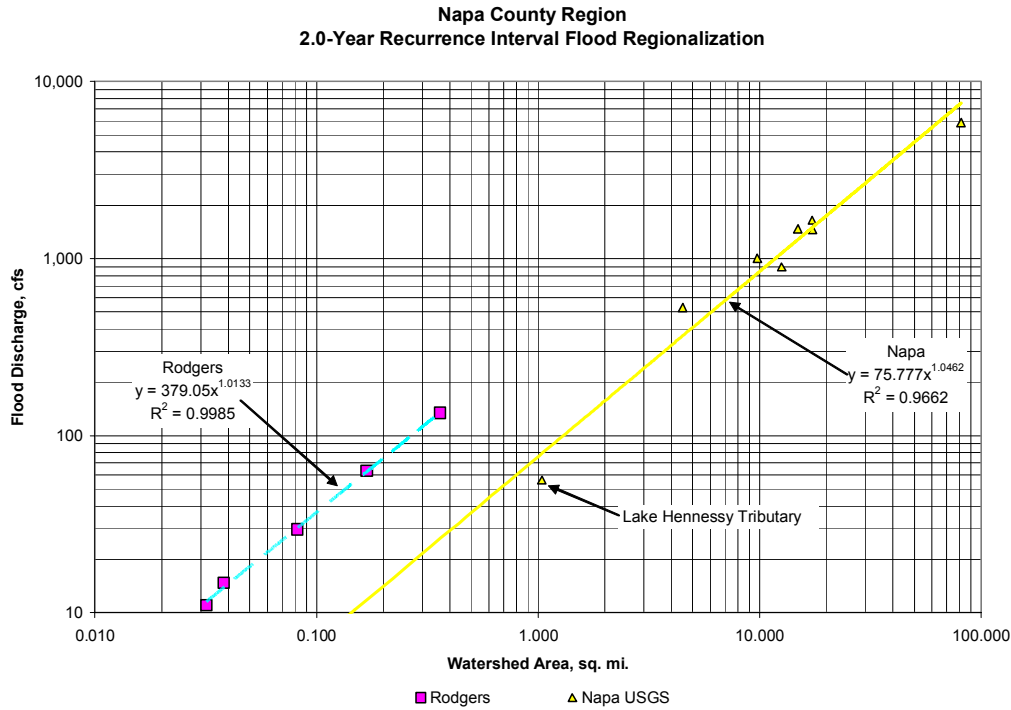


Figure 3. The estimated 2-year peak storm discharge for the Rodgers Upper Range watersheds do not agree with the 2-year storm discharge measured at USGS stream gages in the Napa River watershed.

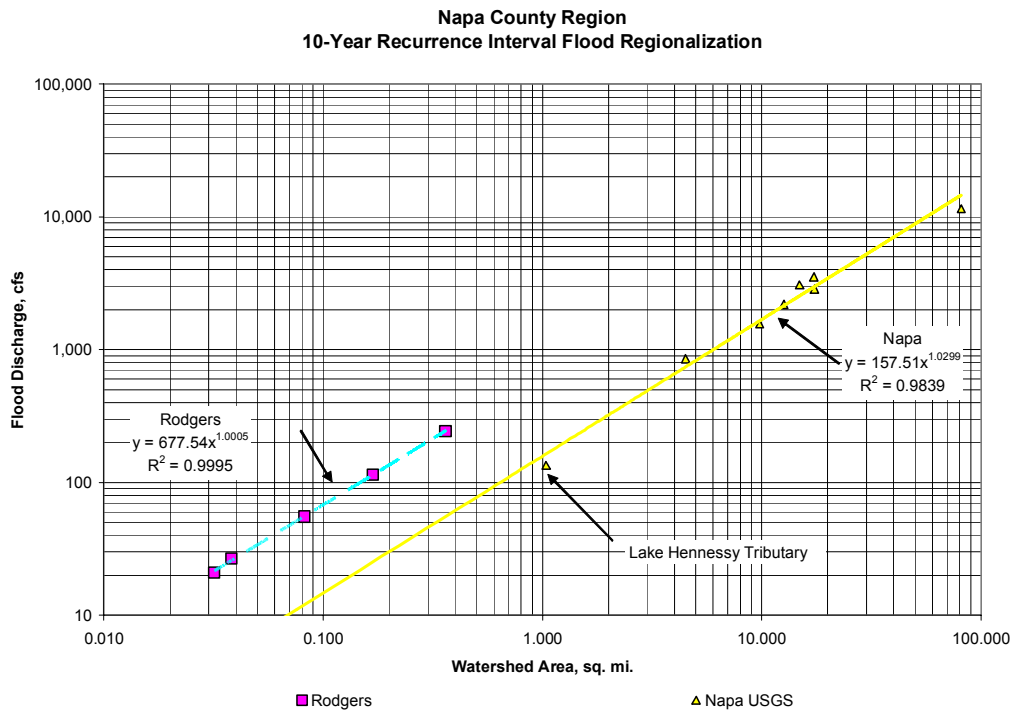


Figure 4. The estimated 10-year peak storm discharge for the Rodgers Upper Range watersheds do not agree with the 10-year storm discharge measured at USGS stream gages in the Napa River watershed.

## Estimates of Mean Annual Rainfall

The December 2006 DEIR has three different estimates for the mean annual rainfall at the project site. Each of the mean annual rainfall values given in the DEIR are listed below. The mean annual rainfall is an important value since the groundwater recharge is estimated from it by subtraction estimates of evapotranspiration and annual runoff. The conclusions in the DEIR regarding groundwater recharge are suspect until a firm well-documented estimate of the mean annual rainfall is presented.

Author	Page	Mean Annual Precipitation	Reference
DEIR	4.4-4	24.28	City of Napa
HIS	2-4	26.40	Napa Hospital E30 607400
HIS	3-4	24.28	Table 3-1
HIS	3-6	27.08	ratio to Atlas Road Gage E20 0368

## Groundwater Recharge Rates

The Supplemental DEIR does not include any discussion of groundwater recharge rates or water availability. The December 2007 DEIR discussion of Impact 4.4-3 on page 4.4-18 states:

For CEQA purposes, the long term average natural rainfall recharge of the **groundwater body in question** should be greater than or equal to the estimated consumptive water use rate. (Emphasis Added)

The “groundwater body in question” is the groundwater body that the project production well is drawing water from. Figure 5 shows DEIR Figure 4.3-1, Soils, Fault Lines and Catchments. I have added the location of the project well from the Draft Hydrologic Evaluation (HSI, 2005) Figure 5-1. Figure 5 shows that the project well is in the Rodgers Southeast Gulch which drains an area of 107.8 acres. Only precipitation that falls on the Rodgers Southeast Gulch sub-basin is expected to recharge the well. The DEIR has not presented any information that demonstrates otherwise.

The December 2006 DEIR (page 4.4-4) gives the mean annual rainfall is 26.4 inches. As noted above, two other estimates of the mean annual rainfall are given in the DEIR. The true mean annual rainfall for the project area still needs to be determined and clearly presented.

Recognizing that the value of the mean annual rainfall in the following calculation may change, I proceed to go through the process used to estimate the groundwater recharge to show that it is flawed. The DEIR estimates that runoff is 7 inches per year and that evapotranspiration rate is 14 inches per year. The DEIR estimates the groundwater recharge by the following equation:

$$\text{Groundwater Recharge} = \text{Rainfall} - \text{Evapotranspiration} - \text{Runoff}$$

Putting in the numerical values gives:

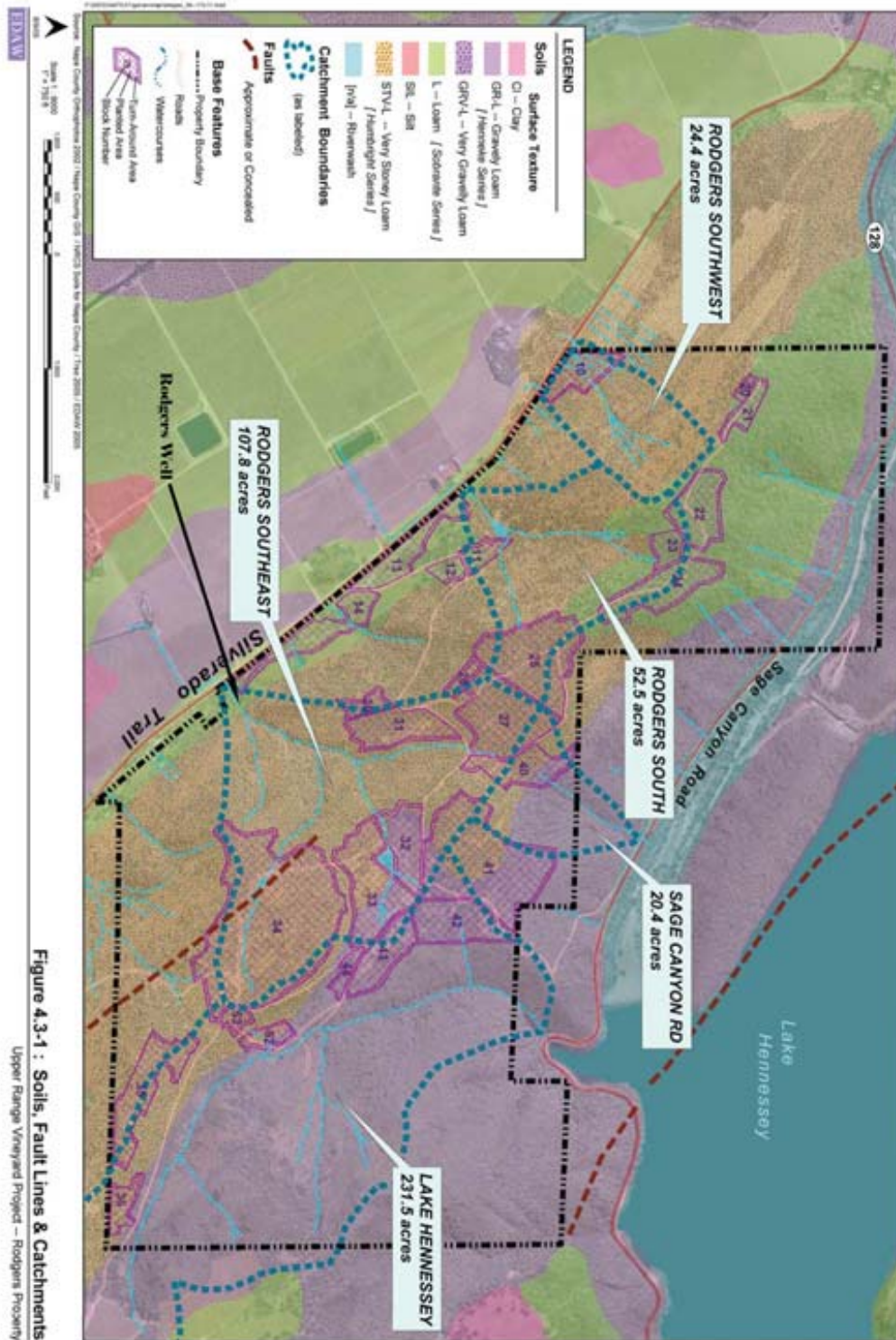
$$\text{Recharge} = 26.4 \text{ inches rainfall} - 14 \text{ inches evapotranspiration} - 7 \text{ inches} = 5.4 \text{ inches.}$$

The estimated groundwater recharge is 20.45% of the mean annual precipitation. Groundwater recharge on the hillslopes in the Rodgers Upper Range project area is expected to only a fraction of the estimated 5.4 inches. Figure 5 shows that the runoff from both the Rodgers South Gulch and Rodgers Southeast Gulch soak into the valley floor to the west of Silverado Trail which is off the project property and upslope of the project well. The groundwater recharge estimated by the DEIR does not represent the level

of recharge on the Rodgers Upper Range property. The estimated groundwater recharge may represent the recharge to the area that includes the area where the streams from Rodgers South Gulch and Rodgers Southeast Gulch soak into the valley floor west of Silverado Trail.

The Draft Hydrologic Evaluation (HIS, 2005) and the DEIR have not adequately defined the groundwater recharge to the project well. A significant portion of the Rodgers Upper Range property drains towards Lake Hennessey (HSI's Zone 1) and Conn Creek just downstream of Conn Dam (HSI's Zone 2). It is highly unlikely that any precipitation that falls on Zone 1 or Zone 2 would be able to provide recharge to the project well. Solid geologic evidence needs to be presented that definitively shows where the recharge to the project well comes from. Until such evidence is presented it is reasonable to assume that the groundwater recharge that supplies the project well comes from the Rodgers Southeast Gulch sub-basin with an area of 107.8 acres. Assuming that the groundwater recharge to the Rodgers Southeast Gulch watershed is 10% of the mean annual rainfall and assuming that the actual mean annual rainfall for the project area is 26.4 inches we get a recharge of 2.64 inches (= 10% x 26.4") or 0.22 feet. Thus the total recharge from the Rodgers Southeast Gulch sub-basin is 0.22 feet x 107.8 acres = 23.7 acre-feet per year. This is far less than the estimated project water demand of 131 acre-feet per year (page 2-5 of HIS, 2005).

This indicates that the water production rate from the well (131 acre-feet) is over five times the estimated recharge rate from the Rodgers Southeast Gulch sub-basin.



**Figure 5.** The Rodger Upper Range property boundaries, sub-basin boundaries and well location. Map is DEIR Figure 4.3-1. The location of the project well was taken from Figure 5-1 on page 5-2 of HSI’s Draft Hydrologic Evaluation from the DEIR. The project well is in the Rodgers Southeast sub-basin and is east of Silverado Trail.

## Well Test

The Rodgers/Upper Range Vineyard groundwater pumping test was a mix of a step-drawdown test and a constant-rate discharge test. However, instead of progressively *increasing* discharge, as in a standard step-drawdown test, the step-drawdown portion of the Rodgers/Upper Range pumping test was done by successively *decreasing* the discharge.

Standard texts such as Driscoll (1986) or Walton (1987) recommend that the pumping should have stopped after the step-drawdown test to allow the water surface to recover to the pre-test level prior to conducting the constant-rate discharge test. Driscoll (1986) notes that:

Beginning a pumping test when the static water level is below normal may eliminate early data that show discharge or recharge boundaries. Without the early drawdown data, it may be impossible to obtain the correct transmissivity and storage parameters for the aquifer.

The phrase, “when the static water level is below normal” means when the water level in the well has not recovered to the pre-pumping level. In addition to conducting the well test in a way that clouds the value of the data collected. The first 6.5 hours of the actual pump test data for the Rodgers well (from 9:30 am on November 15, 2004 until 4 pm on November 15, 2004) are not reported in Appendix C of the Draft Hydrologic Evaluation (HIS, 2005). This prevents independent analysis of the well test data.

The observed drawdown in one of the neighboring wells (Riboli) was about 1.5 feet at the end of the pump test, approximately 31 hours and 20 minutes after the end of pumping. The drawdown began in the Riboli well sometime between 28 and 48 hours after the start of pumping. The report compares the 1.5 foot drawdown in the neighboring well to the 260 foot drawdown in the production well and concludes that there is no problem. The comparing the drawdown in a monitoring well (the Riboli well) to the drawdown in the production well is an absurd way to determine if the production well has the potential to adversely impact the neighbor’s well. The production well will always have a much larger drawdown than any nearby monitoring well. The other aspect of this comparison is that it looks at the drawdown in the neighbor’s well at the end of the 72-hour pump test. The real question is will the neighbor’s well be adversely impacted from the pumping of the project well at the end of the irrigation season. That is, what is the predicted drawdown in the Riboli well that can be attributed to the project pumping at the end of the irrigation season? The DEIR and the Draft Hydrologic Evaluation have not answered this question.

A new 72-hour constant-discharge test needs to be performed at a discharge rate of about 205 gpm which appears to be the sustainable pumping rate of the project well. The neighboring wells need to be monitored for at least 96 hours (24 hours after pumping ends) using recording water level equipment. The drawdown in the production well also needs to be record electronically. The resulting data should be analyzed by standard methods such as though presented in Driscoll (1986) to estimate the size of the zone of influence and the groundwater levels at the end of the pumping.

Given the fact that the realistic estimate of groundwater recharge to the Rodgers well is only a fraction of the project water demand, it is imperative that a new properly conducted 72-hour constant-discharge aquifer test be done to demonstrate that the aquifer supplying the well can adequately supply the project water demand and the water demand of the Rutherford Volunteer Fire facility and that the project will not progressively lower local groundwater levels over time in the and that pumping the project well does not adversely impact the neighboring wells.

The well test as conducted and analyzed does not support the conclusion that there will be no adverse impact to static groundwater levels or to the neighboring wells from pumping the project well.

## Cumulative Impacts

Page 2-2 of the DEIR states that:

A new 10,000-gallon water tank and irrigation line would be installed for the vineyard. Ground water would be pumped from an existing well and be stored in the water tank. The existing well would also be shared and provide water to the Rutherford Volunteer Fire Department facility on Silverado Trail. The Rutherford Volunteer Fire facility would have their own separate 10,000-gallon water tank that would be screened from view by existing trees.

Sharing the water pumped from the project well is a cumulative impact. The estimated annual water demand to supply the Rutherford Volunteer Fire facility needs to be estimated and included when determining if the project will adversely impact groundwater levels or neighboring wells.

## Conclusion

The pre-project storm runoff peak discharges predicted by the WIN TR-55 model do not agree with USGS flood peak data collect just to the east of the Rodgers Upper Range project area. The predicted pre-project storm peaks also do not agree with regional USGS flood data. The WIN TR-55 model needs to be calibrated to the actual data collected by the USGS at the Lake Hennessey Tributary stream gauge. All conclusions about storm runoff and sediment loads in the project streams that use the uncalibrated WIN TR-55 model should be discarded.

The estimates of the mean annual rainfall are conflicting. The confusion regarding the true value makes it difficult to evaluate the merits of the Hydrologic Evaluation (HIS, 2005).

The groundwater recharge rates presented in the DEIR do not represent conditions on the Rodgers Upper Range project site. The groundwater recharge rates reflect the off-site recharge to the valley floor west of Silverado Trail.

I estimate that the groundwater recharge from the Rodgers Southeast Gulch sub-basin to the project well is on the order of 23.7 acre-feet per year. The DEIR does not present any solid geologic evidence that demonstrates that the project well would receive recharge from any other source other than the Rodgers Southeast Gulch sub-basin.

The well test was not performed or analyzed in a way that supports the conclusion that groundwater levels and the neighboring wells would not be adversely impacted at the end of the irrigation season from pumping the Rodgers well. A new 72-hour constant discharge test should be conducted at 205 gpm and the neighboring wells should be monitored for at least 96 hours. The drawdown data from the Rodgers well and all of the pertinent neighboring wells should be collected electronically with manual spot checking. The data should be analyzed by standard methods presented in Driscoll (1986).

Sharing water from the Rodgers well with the Rutherford Volunteer Fire facility is an unidentified cumulative impact of the project and should be analyzed. The water demand of the Rutherford Volunteer Fire facility should be included in the pumping demand and the impact of the combined pumping volume should be ascertained.

Sincerely,

A handwritten signature in black ink that reads "Dennis Jackson". The signature is written in a cursive style with a large, sweeping initial "D".

Dennis Jackson  
Hydrologist

## References

Driscoll, Fletcher G., 1986, *Groundwater and Wells*, Johnson Irrigation Systems, St. Paul, MN

EDAW/AECOM, December 2006, Draft EIR, Upper Range Vineyard Project, Rodgers Property, SCH # 2006022132.

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Napa County "Baseline Data Report,

<http://www.co.napa.ca.us/gov/departments/29000/bdr/index.html>

Napa County Department of Public Works, August 2003, *Water Availability Analysis: Policy Report*.

The pathogen TMDL can be found at

[http://www.swrcb.ca.gov/rwqcb2/agenda\\_nov\\_06.htm](http://www.swrcb.ca.gov/rwqcb2/agenda_nov_06.htm)

Trso, Martin, November, 2006, *Erosion and Sedimentation Assessment, Upper Range Vineyard Project, Rodgers Property, #02454-ECPA, Napa County, California*.

Walton, William C., 1987, *Groundwater Pumping Tests: Design and Analysis*, Lewis Publishers, Chelsea, MI.