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ENGINEERING GEOLOGY · HYDROLOGY · GEOENVIRONMENTAL SERVICES

September 22, 2006

Board of Supervisors
County of Santa Barbara
105 East Anapamu Street
Santa Barbara, California 93101

Subject: Recent Sample Analyses of Nunez Wells
Nunez Appeal of Rancho Danza del Sol CUP
for Horse Boarding Facility (99-CP-059)
1140 Via Regina, Santa Barbara, California

Dear Supervisors:

INTRODUCTION

On July 18, 2006, you convened a hearing on Oscar and Sharon Nunez's appeal of the approved CUP for a horse-boarding facility at Rancho Danza del Sol, owned by Joseph and Tina Handerhan and located at 1140 Via Regina, Santa Barbara. Mr. Nunez has stated that he believes the horse boarding activities on Rancho Danza del Sol ("the Ranch") will affect water quality in one of his two water wells: the downstream Nunez Well #1. At the July hearing, counsel for Mr. Nunez presented a laboratory report on water samples taken in 2006 from the Nunez wells. Your Board continued this matter so that staff could review the newly-received data and provide additional information to you.

Mr. Handerhan has asked me to provide some additional information on water contamination that may help to clarify the data. In addition, I would like to report on recent additional testing, which was completed and analyzed under conditions acceptable to both Mr. Nunez and Mr. Handerhan.

HORSE-RELATED CONTAMINATION

Horses produce wastes in the form of urine and feces. Horse urine contains nitrogen compounds, but is devoid of bacteria.[1] In other words, it is considered a sterile fluid. It percolates into and through soil, where it is utilized by microbial soil organisms and taken up

[1] Personal communication with Raquel Harvey, FGL Environmental.

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by plants, as wells as being adsorbed to soil particles. A large percentage is also lost to evaporation and dispersion.

Horse fecal material contains nitrogen and bacteria. Bacteria and other micro-organisms that originate in fecal waste do not generally migrate with groundwater over great distances in the subsurface as these organisms either become caught up in the matrix of soil particles or do not survive due to exposure to sunlight or other environmental changes that differ greatly from the conditions inside a warm-blooded animal (such as a horse) where these micro-organisms originate. Surface water or creek flow can transport bacteria over significant distances, as evidenced by the presence of fecal coliform in upstream creek samples that appear to be related to horse boarding activity farther up the canyon from the Ranch.

Total coliform is a broad measure of bacteria that may originate from a number of organic sources such as rotting leaves, soil, etc. Fecal coliform is a subset of total coliform and is known to originate from the feces of animals. The animals are obviously not limited to horses or to any other domesticated animal. Creek samples have been known to exhibit fecal coliform in completely undeveloped, wild watersheds where the only source is native animals.[2]

RECENT SAMPLE COLLECTION

In order to further address issues raised by Mr. Nunez at the July 18, 2006 Board of Supervisors' hearing, personnel from an independent, state-licensed analytical laboratory collected additional water samples on August 1, 2006. Representative samples were collected from the surface water locations, upstream, and downstream of Rancho Danza del Sol, as previously sampled and identified in the Maria Ygnacio Creek surface water monitoring program.

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2 Personal communication with Cathleen Garnand, County of Santa Barbara Public Works, Project Clean Water.

Samples were also collected from three groundwater production wells adjacent to the creek, including Nunez Well #1 (downstream) and Nunez Well #2 (upstream). Please see Plate 2 – Site Map, attached. Mr. Nunez agreed to the sampling by the laboratory and witnessed the procedures. The sampling was also witnessed by Mr. Nunez's consultant, Mark Kram, and by Campbell·Geo, Inc., representing Mr. Handerhan. Duplicate samples were collected on August 1 at each location for the analysis of bacteria and nitrites/nitrates, so that a total of ten analyses were conducted for the five creek and well sample locations. For the two Nunez wells, analyses were conducted of additional chemicals required by county ordinance for drinking water supplies.

WELL SAMPLE RESULTS

The groundwater (well) sample results are presented on Table II attached to this letter. The August 1 data indicates the absence of both total and fecal coliform in the Nuñez wells. The analysis of the additional constituents in the Nunez wells indicates high dissolved, inorganic mineral content unrelated to constituents originating from any animal waste contamination. The Total Dissolved Solids (TDS) value for Well #1 is 1,360 mg/l, compared to the drinking water maximum of 1,000 mg/l established by current county ordinance. The electrical conductivity in Well #1 is 1,950 µmhos/cm, which is also higher than the county ordinance standard of 1,600 µmhos/cm. Manganese in Well #1 is at 0.050 mg/l, which is equal to the State of California maximum contaminant level for drinking water. We have also included on Table II results from historical samples. March, May and July data provided by Mr. Nunez for his two wells indicate the presence of total coliform in the downstream well (Nunez #1). Fecal coliform (originating from animal waste) is not present in any sample except for Mr. Nunez's July sample, where it is quantified to be equal to the low detection limit of 1.1 MPN/100 ml. That result is considered to be insignificantly low, especially given the absence of any coliform (total or fecal) in both of the duplicate samples collected from Nunez #1 in August.

CREEK SAMPLE RESULTS

The creek sample results are presented on Table I attached to this letter and are consistent with data collected by this office in May 2006 from the same locations, upstream and downstream of the ranch. As is typical of most coastal streams on the south coast, total coliform is present in the creek. Again, total coliform is a broad measure of bacteria that may originate from a number of organic sources such as rotting leaves, soil, etc. Fecal coliform is a subset of total coliform and is known to originate from the feces of animals.

Fecal coliform was also found in the creek samples in May and August. The average fecal coliform results in duplicate upstream creek samples were higher than the average downstream fecal coliform results for both May and August.

DISCUSSION

The presence of dissolved minerals in both of the Nunez wells, unrelated to any bacterial levels or purported livestock contamination, requires treatment to make the water produced compliant with drinking water standards, as required by current Santa Barbara County Code (Chapter 34B). Mr. David Brummond, Supervising Specialist at Santa Barbara County Environmental Health Services, has reviewed the complete laboratory analyses and concurs that treatment of the well water is required by ordinance.[3]

The typical treatment method to reduce or remove those minerals, known as reverse osmosis, will also remove nitrates and nitrites. SBCEHS file data indicates that one or both of the Nunez wells may serve the two new residences under construction on the Nunez property, although a final permit has not been approved by SBCEHS. Both wells are located more than 100 feet from the Handerhans' proposed horse barns and corral, as required by county and state standards (Chapter 34A of the County Code and State Department of Water Resources Bulletin 74-90).

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[3] Pursuant to the meeting with Mr. Brummond on August 28, 2006.

CONCLUSIONS

In summary, none of the existing data indicates the presence of contamination in Nunez Well #1 attributable to horses on Rancho Danza del Sol, either in the past or at present. There is no indication that future horse operations on Rancho Danza del Sol will degrade groundwater water at either of the Nunez wells, especially in light of the separation of horses from the wells, the extensive wastewater engineering controls, the approved animal waste management program, and the approved surface water monitoring program. If unexpected nitrate contamination should affect groundwater at Nunez #1 in the future, the treatment system required to remove dissolved minerals will already by in place and operating to address that. Bacterial contamination, should it appear, can be removed by chlorination or by treatment equipment similar to what the Ranch previously offered to purchase for Mr. Nunez.[4]

In our opinion, if the data presented above does not alleviate Mr. Nunez's concern, there are at least three options he may pursue in addition to or instead of water treatment at Well #1:

1) Dedicate the upstream well (Nunez #2) for drinking water supplies and utilize the downstream well (Nunez #1) for irrigation, fire protection, and other non-potable uses.
2) Obtain municipal service for domestic usage in the three residences on the Nunez property, which the Goleta Water District (GWD) has confirmed is in its service area.[5] The distance between the Nunez property and existing or proposed GWD facilities on Rancho Danza del Sol is a few hundred feet.

[4] September 11, 2006 letter from Price, Postel and Parma to Allen and Kimbell.
[5] Memo from GWD, dated July, 2006.

(3) Re-drill or otherwise reconstruct Well #1 with a deeper sanitary seal and deeper casing perforations to gain more separation between the creek channel and the utilized sections of the shallow alluvial groundwater aquifer.

I will make a short presentation, if time is allowed, and will be available for questions at the September 26, 2006 Board of Supervisors hearing.

Sincerely,
Campbell·Geo, Inc.

Steven H. Campbell
Professional Geologist
State of California, #5576
Certified Engineering Geologist
State of California, #1729
Certified Hydrogeologist
State of California, #82

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Enclosures: Table (2)
Plates (3)

cc: Mr. Joe Handerhan

Price, Postel and Parma
Attn: Ms. Susan Basham

TABLE I
Summary of Laboratory and Field Analyses of Surface Water Samples
Rancho Danza Del Sol
Santa Barbara, California

Sample ID	Sample Date	Nitrite as N (mg/*l*)	Nitrate as N (mg/*l*)	Total Coliform (MPN/100 m*l*)	Fecal Coliform (MPN/100 m*l*)	Tempera-ture (°C)	Dissolved Oxygen (mg/*l*)	Conductivity (µs/cm)	pH
Upstream A	5/31/06	0.1[2]	NA	700	500	16.6	1.35	1008	8.40
Upstream B (duplicate)	5/31/06	NA	NA	1300	130	16.6	1.35	1008	8.40
Downstream A	5/31/06	<0.1[2]	NA	500	80	16.4	1.02	1059	8.34
Downstream B (duplicate)	5/31/06	NA	NA	1700	50	16.4	1.02	1059	8.34
Downstream[4]	7/7/06	NA	NA	>23[3]	>23[3]	NA	NA	NA	NA
Upstream[4]	7/12/06	NA	NA	1600	110	NA	NA	NA	NA
Upstream A	8/1/06	<0.1	<0.1	1700	230	20.6	7.58	884	8.50
Upstream B (duplicate)	8/1/06	<0.1	<0.1	800	300	20.6	7.58	884	8.50
Downstream A	8/1/06	<0.1	<0.1	1300	130	20.2	7.97	940	8.48
Downstream B (duplicate)	8/1/06	<0.1	<0.1	2300	80	20.2	7.97	940	8.48
State of CA Standards for Body Contact		---		10,000[1]	400[1]				

See notes on page 2.

TABLE I
Summary of Laboratory and Field Analyses of Surface Water Samples
Rancho Danza Del Sol
Santa Barbara, California

Notes:
MPN/100 = Most Probable Number per 100 ml
NA = Not Analyzed

(1) Section 5.1, State of California DOHS, Draft Guidance for Freshwater Beaches (updated May 8, 2006), Single sample values.
(2) Indicated results are for "nitrite as N plus nitrate as N."
(3) Indicates coliform analyzed by method SM 9223B. All other coliform results obtained by method SM 9221B.
(4) Indicates July 2006 creek samples collected by Nunez/FGL at locations verbally reported by FGL courier.

TABLE II
Summary of Laboratory and Field Analyses of Groundwater Samples
Rancho Danza Del Sol
Santa Barbara, California

Sample ID	Sample Date	Nitrite as N (mg/*l*)	Nitrate as N (mg/*l*)	Nitrate as NO_3 (mg/*l*)	Total Coliform (MPN/100 m*l*)	Fecal Coliform (MPN/100 m*l*)	Tempera-ture (°C)	Total Dissolved Solids (mg/*l*)	Conduct-ivity (µs/cm)	pH
Nunez Well #1 (Cushman)	1/10/79	NA	NA	Trace	NA	NA	NA	1,318	1570	7.4
Nunez Well #1	8/20/96	ND	NA	0.8	NA	NA	NA	1,200	1700	7.1
Nunez Well #1	5/13/99	0.6	NA	0.8	NA	NA	NA	1,000	1100	7.0
Nunez Well #1	3/22/06	NA	NA	NA	23.0[4]	<1.1[4]	NA	NA	NA	NA
Nunez Well #1	5/15/06	NA	NA	NA	9.2[4]	<1.1[4]	NA	NA	NA	NA
Nunez Well #1	7/7/06	NA	NA	NA	16.1[4]	1.1[4]	NA	NA	NA	NA
Nunez Well #1	8/1/06	<0.1	0.3	1.5	<1	ND[1]	20.2	1,360	1,950	7.1
Nunez Well #1 (duplicate)	8/1/06	<0.1	0.4	NA	<1	ND[1]	---	NA	NA	NA
Nunez Well #2	3/22/06	NA	NA	NA	<1.1	ND[1]	NA	NA	NA	NA
Nunez Well #2	5/15/06	NA	NA	NA	<1.1	<1.1	NA	NA	NA	NA
Nunez Well #2	7/7/06	NA	NA	NA	<1.1	ND[1]	NA	NA	NA	NA
Nunez Well #2	8/1/06	1.47	1.0	4.3	<1	ND[1]	23.8	7,600	9,200	7.0
Nunez Well #2 (duplicate)	8/1/06	1.31	1.0	NA	<1	ND[1]	---	NA	NA	NA
Giordano Well #1	1/31/97	<0.1	NA	9.7	NA	NA	NA	1,400	1,900	7.1
Giordano Well #1A	5/31/06	NA	2.4[2]	NA	<2	ND[1]	26.08	NA	2,535	7.2
Giordano Well #1B (duplicate)	5/31/06	NA	NA	NA	<2	ND[1]	---	NA	---	7.2
Giordano Well #1	8/1/06	<0.1	---	NA	1	<1	19.8	NA	2,169	7.3
Giordano "Well #2" (duplicate of Well #1)	8/1/06	<0.1	---	NA	1	<1	---	NA	---	---
State of California Drinking Water Standards CCR Title 22		1	10[3]	45	any detection	any detection	---	1,000	1,600	---

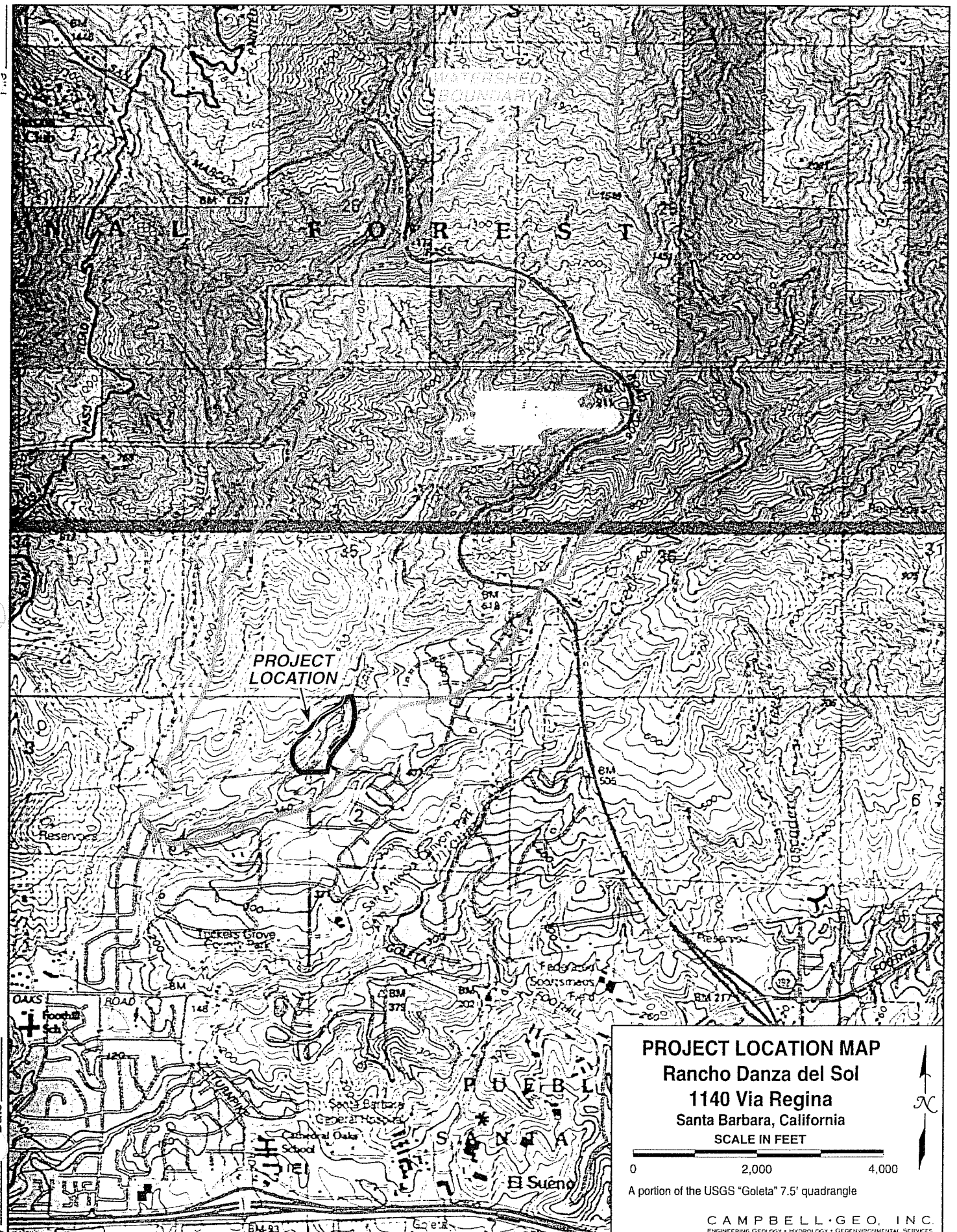
See notes on page 2

TABLE II
Summary of Laboratory and Field Analyses of Groundwater Samples
Rancho Danza Del Sol
Santa Barbara, California

NOTES:

MPN/100 = Most Probable Number per 100 m*l*
NA = Not Analyzed
ND = Not Detected

(1) Fecal coliform, which is a subset to total coliform, was not analyzed (but is undetectable) in indicated sample because total coliform was undetectable.
(2) Indicated result is for "nitrate + nitrite as N."
(3) Drinking water standard is for sum of "nitrite as N plus nitrate as N."
(4) Indicates coliform analyzed by method SM 9223B, which is specific to *e-coli* bacteria for fecal coliform results. All other coliform results obtained by method SM 9221B.



PROJECT LOCATION MAP
Rancho Danza del Sol
1140 Via Regina
Santa Barbara, California

SCALE IN FEET

0 2,000 4,000

A portion of the USGS "Goleta" 7.5' quadrangle

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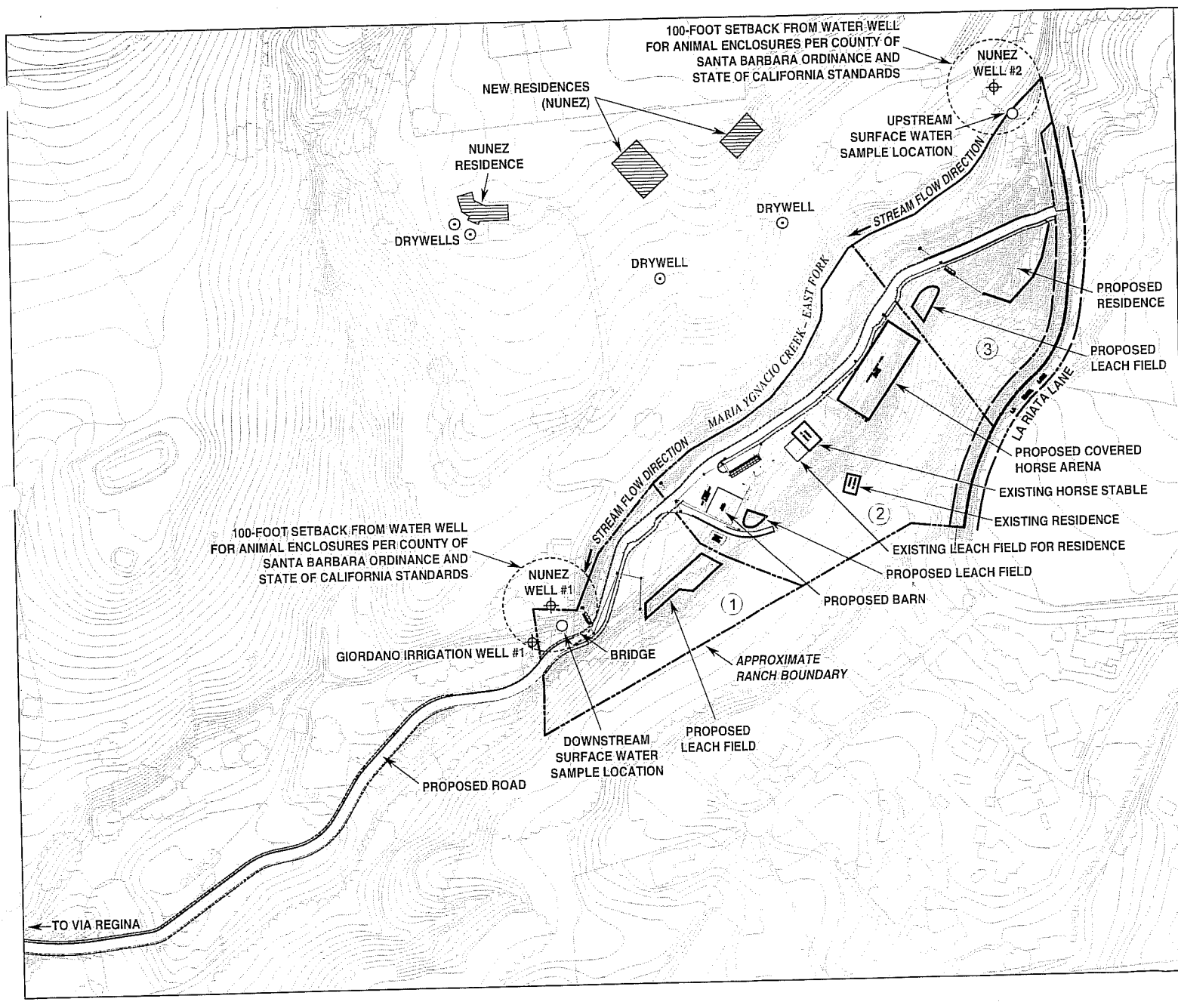
By DAS Date 5-18-06

Plate 1



SITE MAP

Rancho Danza del Sol
1140 Via Regina
Santa Barbara, California

SYMBOLS

- Creek Water Sampling Location
- Existing Water Well
- (1) Proposed Ranch Parcels
- Existing Dry Well (Nunez) for Septic Effluent Disposal

N

SCALE IN FEET

0 200 400

NOTES Basemap from Flowers and Associates (5/12/06).

Nunez property improvements are shown in their approximate location based on a site plan by Pacific Engineering Associates.

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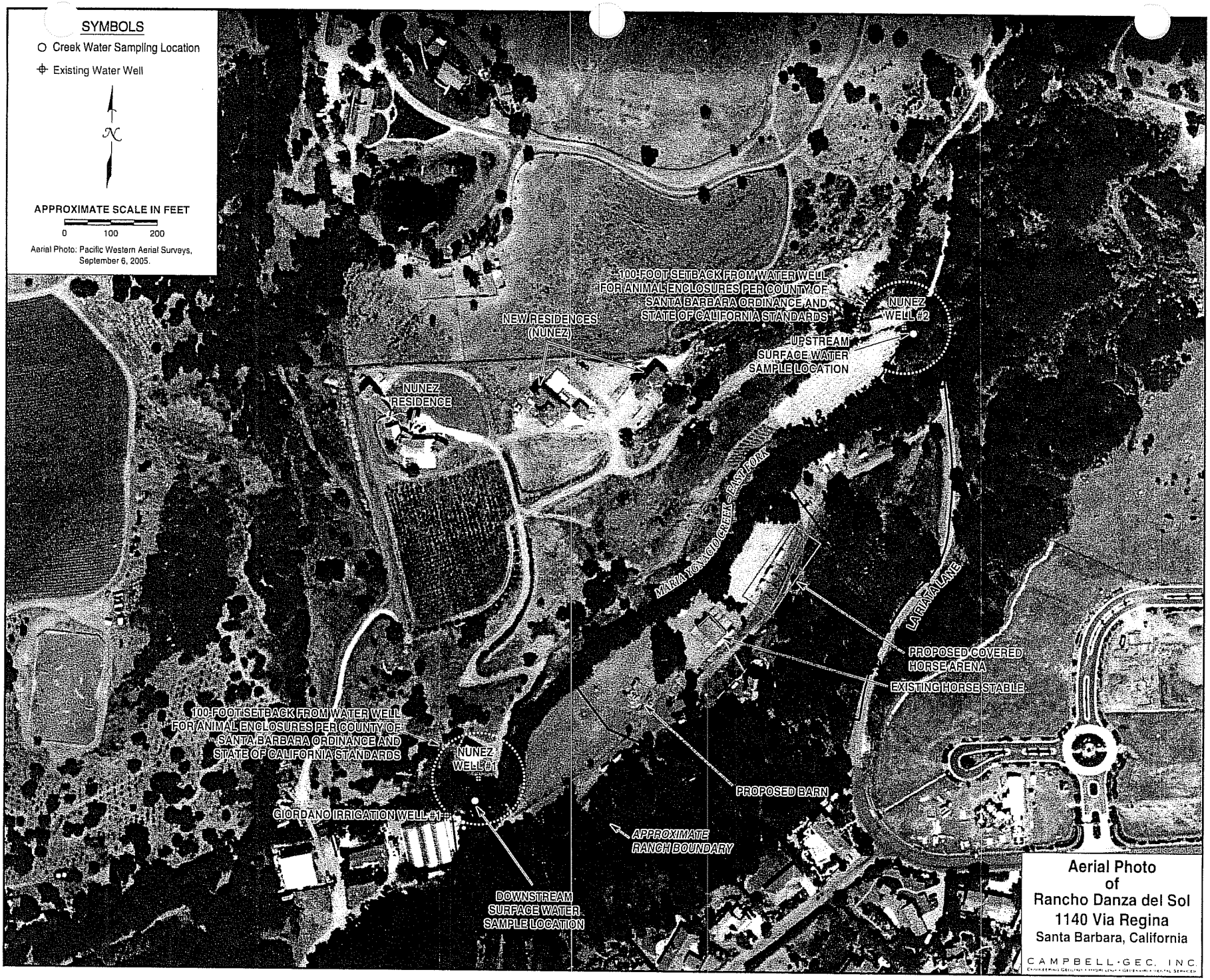
Plate 2



Aerial Photo
of
Rancho Danza del Sol
1140 Via Regina
Santa Barbara, California

CAMPBELL·GEC, INC.

Plate 3