Vicinity of Section
21 T16N, R8E
Prepared by Jack P. Frost
July 1, 1994

Well Number	Owner Name	Location	Date	Total Depth	Depth to Water	Yield (GPM)	Water Column	Depth to PWBF	Depth to Base of Low Zone	Estimated Elevation	Water Table (WT)	Principal Water Bearing Formation	Drilling Contractor
56348	Case	SE,NE,NE,28	Nov-92	165	40	20	125	40	165			Red Gravel and Blue Clay	Garcia's
56361	Garcia	NW,NW,NW,27	Feb-93	122	65	15	57	96	115			Snd & Grvl 65-75, Snd & Grvl 85-90, Sand 96-115	Nuanes-Cap
55069	Pacheco	SW,SE,NW,27	Mar-82	200	90	12	110	100	140			Sand and Gravel	Boylan
56653	Newton	NW,NE,NW,27	May-94	80	35	60	45	50	52			Yellow Sand and Gravel	Lujan
57198	Deangelo	SE,SE,NE,28	Apr-93	100	19	13	81	75	80			Snd & Grvl 19-22, Snd & Grvl60-65, Sand 75-80	Nuanes-Cap
58393	Gallegos	SE,SE,NW,22	Oct-93	108	64	20	44	64	95			Sand and Gravel	Nuanes-Cap
58245	Montoya	SE,SE,NW,22	Oct-93	117	69	20	48	69	117			Sand and Gravel	Nuanes-Cap
56881	Guerro	SE,SE,SE,21	Mar-93	170	100	8	70	145	160			Pk Bkn Granite	G&H
21468		SE,SW,SW,22	Aug-72	72	28		44	59	69			Brn, Red Sand	Crocker
56653		NW,NE,NW,27	May-93	80	35	60	45	50	52			Yel. Sand & Gravel	Lujan
56361		NW,NW,NW,27	Feb-93	122	65	15	57					Sand and Gravel	Nuanes-Cap
55069		SW,SE,NW,27	Mar-92	200	90	12	110					Sand and Gravel (poor)	Boylan
56348		SE,NE,NE,28	Nov-92	165	40	20	125					Red Grav., Blue Clay and Gravel	Garcia
57198		SE,SE,NE,28	Apr-93	100	19	13	81					Sand, Sand and Gravel	Nuanes-Cap
58393	Gallegos	SE,SE,NW,22	Oct-93	108	64	20	44	64	95			Sand and Gravel	Nuanes-Cap
58245	Montoya	SE,SE,NW,22	Oct-93	117	69	250	48		44			Sand and Gravel	Nuanes-Cap
58411	Gallegos	SW,SE,22	Oct-93	105	61	20	44					Gravel	Nuanes-Cap
55880	Holmes	NE,NW,SW,27	Sep-92	200	80	20	120	25	75			Layers of Sand and Gravel	Boylan
55355	Romero	NW,NE,SW,27	May-92	200	100	10	100					Red and White Clay and rock	Garcia
55154	Madrid	NW,NE,SE,28	Apr-92	90	33	20	57					Sand and Gravel	Nuanes-Cap
41553	Gallegos	SW,SE,SW,22	Apr-84	100	42	15	58					Sand, Sand and Gravel	Boybal
41775	Cook	SE,SE,SW,22	May-84	373	125	150	248	120	370			Brown Sand and Gravel	Boylan
42782	Pino	NW,SE,NW,28	Nov-84	90	20	20	70	20	80			Gray Silt	Boylan
56898	McNeil	SW,NE,NE,28	Apr-93	160	99	20	61		53			Sand and Gravel	Nuanes-Cap
56178			Sep-92				0						
57760		NE,NE,SE,28	Jul-93	195	75	7	120		120			Wash and Boulders	Thompson
21468	Quintana	SE,SW,SW,22	Aug-72	72	28		44	31	69			Brn/Red Sand	Crocker
Averages:				139	60	35	76	67	108				

___ denotes wells adjoining the study area

TABLE 1

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

'93 APR 28 AM 10
STATE ENGINEER OFF
SANTA FE NEW MEXIC

(A) Owner of well [illegible] Gerardo Guerrero Owner's Well No.
Street or Post Office Address 1817 Mann St
City and State Santa Fe N.M. 87501

Well was drilled under Permit No. RG-56881 and is located in the:

a. SE ¼ SE ¼ SE ¼ ¼ of Section 21 Township 16N Range 8E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in SANTA FE County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor G&H Drilling pretty acc. License No. WD 815

Address 5730 Greer LP Sw Albuq. 87105

Drilling Began 3/5/93 Completed 3/9/93 Type tools Rotary Size of hole 7 7/8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 170 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 100 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
145	160		Pink boken granite	about 8

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5	PVC		1½	170	171½	OPen	150	170

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

93 APR 20 P 1:2
STATE ENGINEER O
DISTRICT I
ALBUQUERQUE, N.
92

From	To	In Feet	
			56881
0	10		Loose Gravel & Boulders
0	20		Boulders
20	30	10	Clay
30	40		[illegible]
xxxx40	95	± 55	Boulders & Clay ? Base Rock ?
95	135		Pink Sand & Granite
135	140	5	Clay
140	160		Sand & Granitic
160	165	5	Clay
165	170		Granite ?

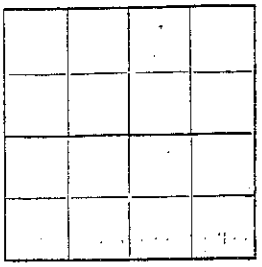
Section 7. REMARKS AND ADDITIONAL INFORMATION

Form WR-23 STATE ENGINEER OFFICE

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1



(Plat of 640 acres)

(A) Owner of well GARY QUINTANA
Street and Number RT 4 BOX 94
City SANTA FE State N.M.
Well was drilled under Permit No. RG 21468 and is located in the SE ¼ SW ¼ SW ¼ of Section 22 Twp. 16-N Rge. 8-E
(B) Drilling Contractor CROCKER, INC License No. WD-214
Street and Number RT 4 BOX 94 B
City SANTA FE State N.M.
Drilling was commenced AUG 29 19 72
Drilling was completed AUG 29 19 72

Elevation at top of casing in feet above sea level ..... Total depth of well 72'
State whether well is shallow or artesian SHALLOW Depth to water upon completion 28'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	31	51	20	BROWN SAND
2	59	~~69~~ 72	~~70~~ 10	BROWN-RED SAND
3				
4				
5				

1972 SEP 22 AM 11 25 STATE ENGINEER OFFICE SANTA FE, N.M.

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
~~6~~ 5⅞	40	—	0	72	72	—	50	68
							28	33

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

1972 SEP 15 AM 11 18 STATE ENGINEER OFFICE SANTA FE, N.M.

Section 5 PLUGGING RECORD

Name of Plugging Contractor ..... License No. .....
Street and Number ..... City ..... State .....
Tons of Clay used ..... Tons of Roughage used ..... Type of roughage .....
Plugging method used ..... Date Plugged ..... 19 .....
Plugging approved by: ..... Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received .....

File No. RG-21468 Use dom Location No. 16.8.22.334

94

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	6	6	BROWN	TOPSOIL
6	23	17	TAN	BOULDERS, GRAVEL, CALICHE
23	31	8	BROWN	SANDY CLAY
31	51	20	"	SAND (WATER)
51	59	8	"	SANDY CLAY / BOULDERS
59	69	10	BROWN/RED	SAND - (WATER)
69	72	3	RED	CLAY

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

Edward Elsocken
Well Driller

95

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Helen P. Newton / Terry Berg Owner's Well No. ______
Street or Post Office Address Rt. 14, Box 200
City and State Santa Fe, NM 87501

'93 JUN 7 AM 10 26
STATE ENGINEER OFFICE
SANTA FE NEW MEXICO

Well was drilled under Permit No. RG-56653 and is located in the:

a. ____ ¼ NW ¼ NE ¼ NW ¼ of Section 27 Township 16N Range 8E N.M.P.M.

b. Tract No. ______ of Map No. ______ of the ______

c. Lot No. ______ of Block No. ______ of the ______
Subdivision, recorded in Santa Fe County.

d. X= ______ feet, Y= ______ feet, N.M. Coordinate System ______ Zone in the ______ Grant.

(B) Drilling Contractor Lujan Drilling License No. WD-547

Address Rt. 3, Box 95-78, Santa Fe, NM 87505

Drilling Began 5-14-93 Completed 5-14-93 Type tools Rotary Size of hole 9 in.

Elevation of land surface or ______ at well is ______ ft. Total depth of well 80 ft.

Completed well is [X] shallow [ ] artesian. Depth to water upon completion of well 35 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
From	To			
50	52	2	Yellow Sand & Gravel	60 ?

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
6 5/8			0	80			60	80

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				

28 PM 1:10 ALBUQUERQUE, N. MEX.

'93 JUN 25 AM 9 STATE ENGINEER OFFICE SANTA FE NEW MEXICO

96.

From	To	Thickness in Feet	Color and Type of Material Encountered 56653
0	25	25	Yellow - Sandy Clay
25	50	25	Gray - Sandy Clay
50	60	10	Yellow Sand & Gravel
60	80	20	Yellow - Sandy Clay pss

Section 7. REMARKS AND ADDITIONAL INFORMATION

WATER RESOURCE STUDY AND WELL DESIGN
POR SU GRACIA SUBDIVISION
SECTIONS 27 AND 28, T16N, R8E
SANTA FE COUNTY, NEW MEXICO

Prepared by: Jack P. Frost
Hydrogeologist
505-466-6435
January, 1994
Revised June, 1994

TABLE OF CONTENTS

PRE-DRILL REVIEW
POR SU GRACIA SUBDIVISION
WATER RESOURCE STUDY AND WELL DESIGN
SECTIONS 27 AND 28, T16N, R8E, SANTA FE COUNTY, N.M.

Prepared by: Jack P. Frost
Hydrogeologist
June, 1994

INTRODUCTION

This report reviews the hydrogeology in the vicinity of two adjoining forty acre tracts near La Cienega, Santa Fe County. Also included is a plan for a typical well design and distribution of shared wells. The owners propose to subdivide the parcels into approximately 2 1/2 acre tracts.

The premise of this study is that a shared well system, coupled with thoughtful well design and construction, will be economical and will minimize the impact on the shallow aquifer. Such a system will ensure a safe water supply for the future.

This study shares several features of the County Code - prescribed Hydrogeologic Report. The owners are not asking for increased lot density. It is their intent to adopt the 2 1/2 acre density allowed by the County Code in this area when dwellings are restricted to 0.25 acre feet per year of water, including water conservation measures.

The study area lies in the County's Extra - Territorial Zone, in the Basin Hydrologic zone. It flanks County Road 54 approximately 1 1/4 miles from the intersection with Racetrack Road. It lies west of the Santa Fe Downs race track in the valley of the confluence of Arroyos Chamiso and Hondo {Figure 1}.

100

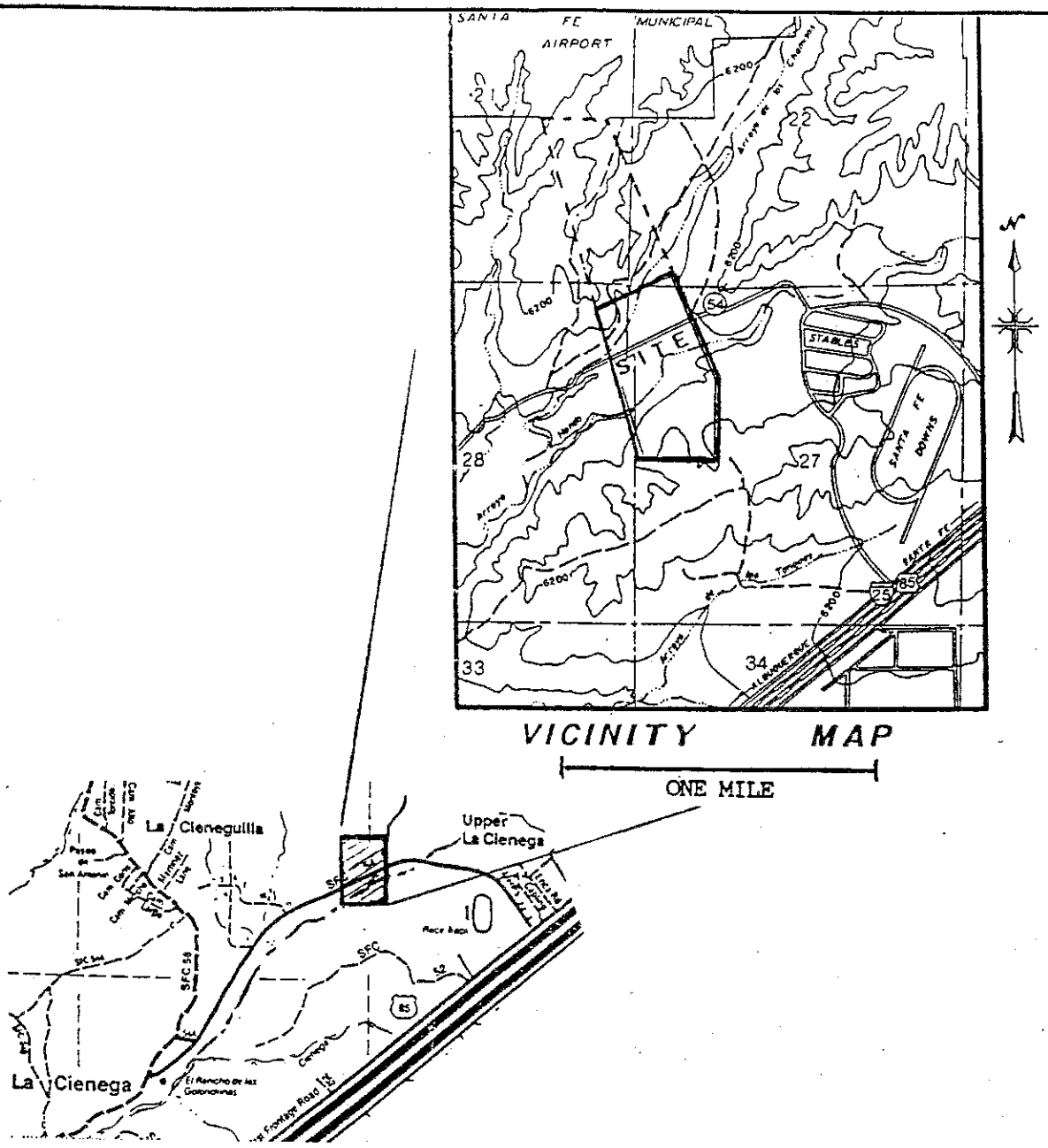


Figure 1

LOCATION OF THE POR SU GRACIA AND BROWN TRACTS, SANTA FE COUNTY

Page 2

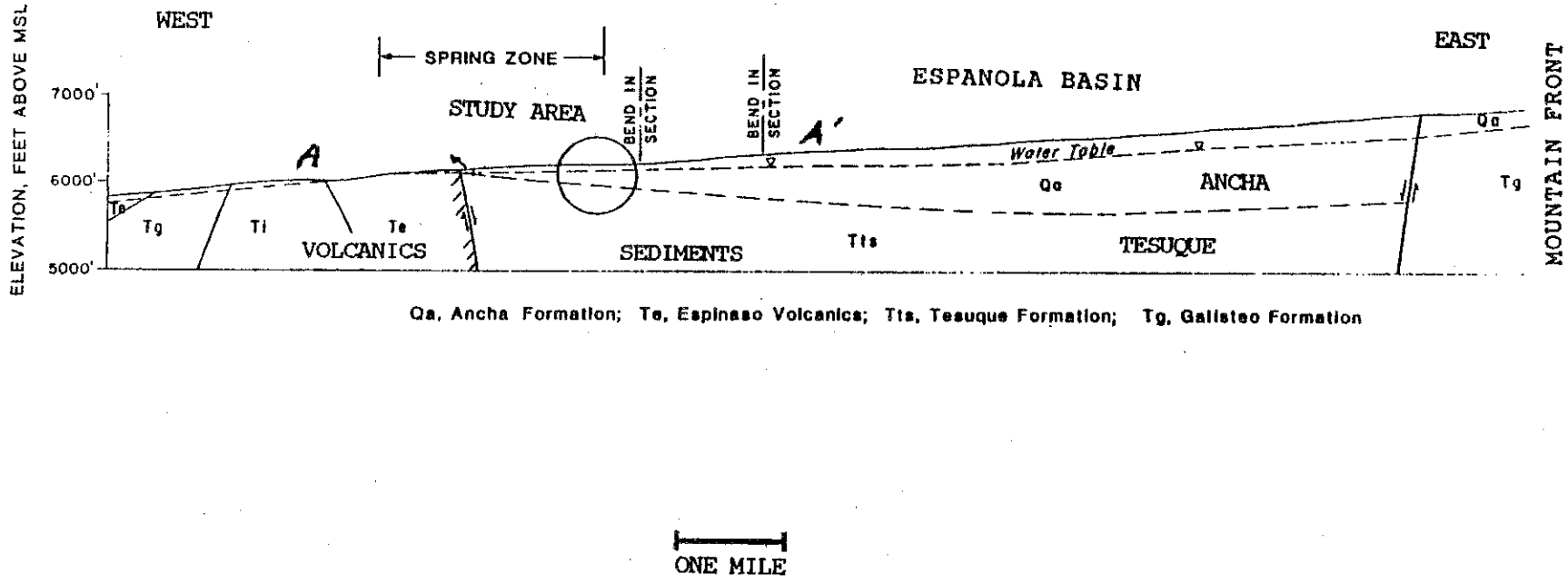
SCOPE

The scope of this project is a departure from common practices in the area. Typically individual landowners have drilled single - dwelling wells with little consideration of impact or contamination potential. From the review of well logs it appears that drillers' completion practices are highly varied.

Approximately 18 wells within a one - half mile radius were reviewed in this study. Over 90 wells and/or permits are on file at the State Engineer's Office within a one mile radius of the subject tract. From the well logs a cross section was constructed (Appendix 2) and the subsurface hydrogeologic conditions were interpreted. The well logs have also been helpful in designing a prototype well whose construction should protect the shallow Ancha Formation aquifer as well as minimize contaminant susceptibility from septic tank and other surface sources.

Several regional studies serve as important references for this report. They include Spiegel and Baldwin, 1963; and Fleming, 1994. Locally, several studies have been prepared to evaluate development at the Racetrack (Spiegel, 1975), and at Sunrise Springs Resort (AGW Consultants, 1976).

In order to optimize the number and distribution of shared wells on the property several computer models have been constructed to simulate drawdown and potential interference in the well field.



Qa, Ancha Formation; Te, Espinaso Volcanics; Tts, Tesuque Formation; Tg, Galisteo Formation

SCHEMATIC HYDROGEOLOGIC CROSS SECTION

AFTER SPEIGEL

Figure 3

HYDROGEOLOGIC SETTING

The hydrogeologic setting of the study area is depicted in Figures 2 and 3. They are modified from the AGW Consultants' study at Sunrise Springs Resort.

The study area lies on the west flank of the Espanola Basin. The older Tesuque and Ancha Formations, and recent basin -fill sediments terminate against a fault about a mile west of the study area (Spiegel, 75). Relatively impermeable volcanic rocks adjoin the fault zone on the west, creating a groundwater flow boundary. Ground water flows westward from the mountains, and the water table "piles up", in effect, against the volcanic rocks and discharges through springs, streambeds and phreatophytes in the vicinity (Figure 3).

The subject tracts occupy the floodplain and flanking hillsides of Arroyos Chamisa and Hondo. The arroyos are underlain by alluvial sand and gravel, silt and clay derived from the mountains to the east. These deposits represent recent and Quaternary age outwash overlying and cut into the Tertiary Tesuque Formation.

The Tesuque Formation is composed of similar sediments which are more consolidated and cemented. Buried channels of coarse sediment probably occur within the section and influence ground water flow. The Ancha Formation, which unconformably overlies the Tesuque outside the Arroyo, is probably thin or may be absent beneath the valley floor (Spiegel 1963, Fleming 1993). Actual boundaries between these units are not distinguishable in most driller's logs.

Ground water occurs as an unconfined aquifer at depths of 30 to 60 feet in most of this area. Springs and stream bed seeps represent areas where the water table approaches ground level, often associated with geologic contacts or faults.

Local domestic wells are above average for Santa Fe County in terms of production rate, depth to water, and water quality. Domestic wells are partially penetrating, and range from 72 to over 370 feet in the area. The saturated thickness of combined Ancha - Tesuque sediments is greater than 1000 feet, as revealed by exploratory drilling (AGW Consultants, 1976).

Springs in the Area

Most of the springs and acequias in the area occur along the valley walls of arroyos that drain towards La Cienega, west-southwest of the study area. Based on Spiegel's and Fleming's regional maps, the study area is not in the flow path of groundwater moving towards these springs (Figure 2). In addition, the water table in the study area lies deeper than the discharge elevation of spring lines in Cienega and Guicu Creeks, one to three miles southwest.

Complicating the distribution of the springs is the faulting and degree of stratification in the sediments of the area. For example, at Sunrise Springs, ample groundwater flow (est. 18 gpm) occurs in sand, gravel and clay horizons from depths of 29 to 50 feet, where 15 feet of clay was encountered. The principal water bearing strata was reported as a 5' zone within 16' of "red clay and gravel". The "Sunrise Springs" could be perched flow horizon on the valley wall, where the water table reaches the surface. Spiegel also implicated igneous intrusions or the regional fault to explain these spring locations.

Aquifer Properties

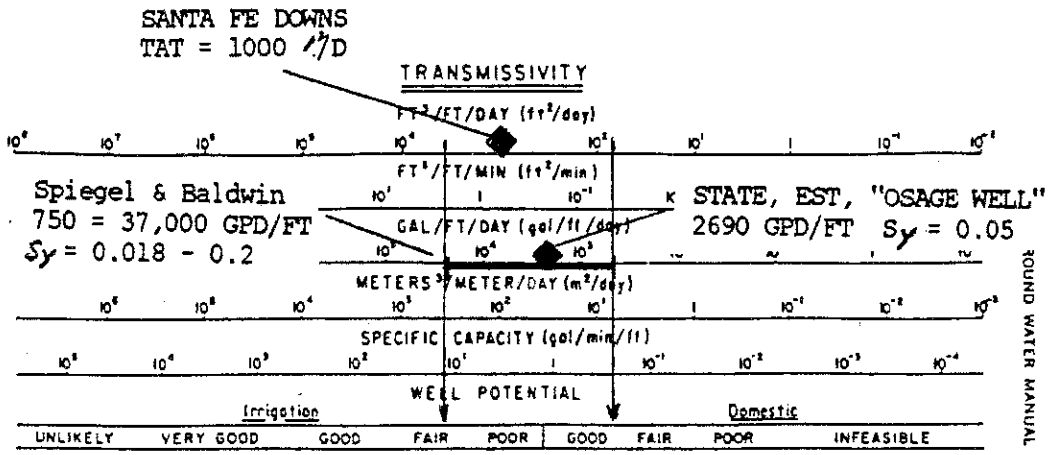
The sedimentary section appears to be moderately stratified, with interbedded sand and gravel, silt and clay (Appendix 1 and 2). Although moderately transmissive, the aquifer is heterogeneous and anisotropic. In such situations the downstream horizontal hydraulic conductivity is typically much higher than the lateral and vertical hydraulic conductivity (Walton, 1987). A ratio of horizontal to vertical hydraulic conductivity of 10 was used in models presented here.

The average reported hydrologic coefficients of the local formations were reviewed in the Sunrise Springs report. Based on a pump test and other data, that study concluded that an average Transmissivity of 10,000 gpd/ft and a Specific Yield of 0.10 is appropriate and conservative for the combined Ancha - Tesuque formations locally. A Specific Capacity of 1 gal per minute per foot of permeable formation is reasonable in this area. Figure 4 puts these values in perspective.

Using an average water table slope of 0.4 percent, average porosity of 5 percent, and an average hydraulic conductivity of 25 ft/d (31 ft/d was measured in the thin section at Sunrise Springs), the average linear velocity of flow is approximately 1.2 feet per day. Neglecting fracturing, vertical flow velocities are expected to be at least one tenth the rate of horizontal flow.

Recharge and Contamination Susceptibility

The arroyos flow within their channels seasonally. In this area the stream banks are incised and well defined. Small, seasonal stream flows represent groundwater discharge. Regional ground water through - flow is much larger than vertical recharge due to precipitation, although streambed recharge could be significant during flood events. The arroyos and buried channels are potentially significant conduits of groundwater flow from the mountains (Fleming, 94).



NOTES: Transmissivity (T): KM where
K: Permeability
M: Saturated thickness of the aquifer
Specific capacity values based on pumping period of approximately 8-hours but are otherwise generalized.

FIGURE 2-4.—Comparison of transmissivity, specific capacity, and well potential. 103-D-1406.

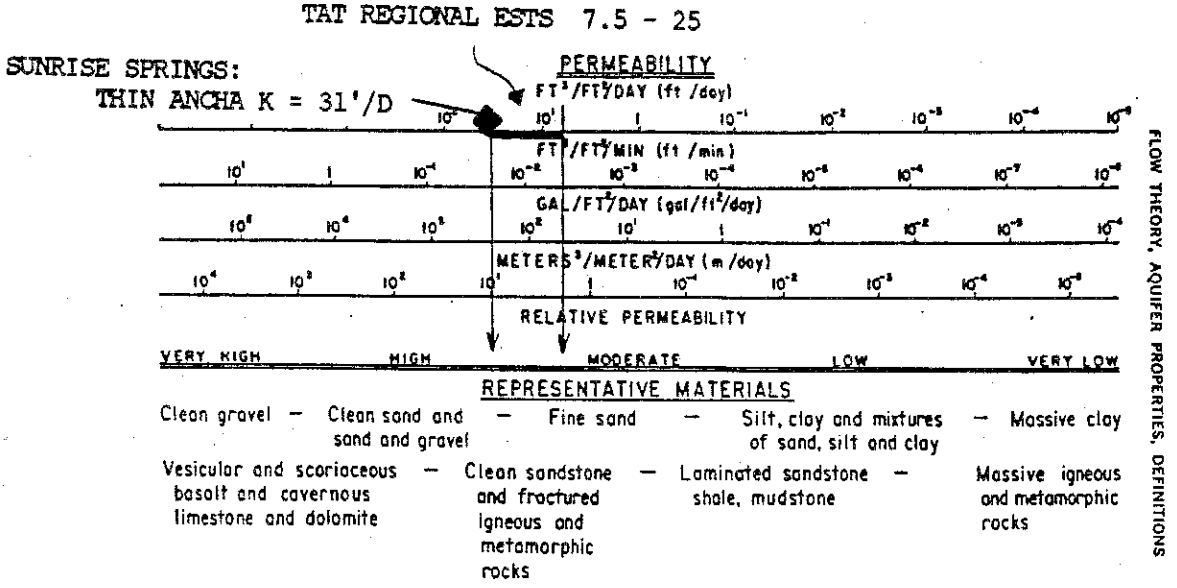


FIGURE 2-5.—Comparison of permeability and representative aquifer materials. 103-D-1407.

ROUND WATER MANUAL

FLOW THEORY, AQUIFER PROPERTIES, DEFINITIONS

Figure 4

REPRESENTATIVE VALUES OF AQUIFER MATERIALS

Ta = ANCHA

Tt = TESUQUE

Tat = COMBINED VALUES

Sy = 0.05 - 0.20

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Because strata of coarse, unconsolidated sediments underlie the valley, the area has been identified as being susceptible to groundwater contamination, particularly from septic tank effluent. In the 1980 Santa Fe County General Plan, the study area lies in a general outline of areas with potential man - made water pollution problems. However, most of the wells examined for this study report a 3 to 25 feet thick soil and clay near the surface, and many reported 10' to 30' of sandy clay above 60' drill depths. This stratification and the proposed well design should minimize the downward migration of any contaminants.

FINDINGS

Prototype Well Design

The objective of the following design is to isolate the Ancha aquifer and produce the underlying Tesuque Formation.

Based on 18 nearby wells the estimated deliverability is 10 to 15 gallons per minute (about half the average driller's estimate). The average well encountered the water table at about 64 feet and was drilled to 144 feet. About 25 feet of well casing was slotted or perforated at various depths. Very little information is reported on pump selection.

Utilizing generalized design considerations as well as conversations with Steve Kuckelman of Kuckelman Pump Services, the following features are estimated (Figure 5). The well should be drilled to 7 7/8" or greater in diameter, approximately 150 to 200 feet deep (i.e. have over a 100 foot water column), utilizing the mud rotary method. Five inch PVC casing should be installed, with more than 25' of slots opposite the most porous and permeable strata at least 50' below the water table.

Presuming the well is capable of pumping at 10 to 20 GPM, a 3/4 to 1 1/2 horse pump rated at 20 gpm, positioned at least 20 feet above total depth, should be sufficient for supplying up to four households.

Top of Casing > 1'
Above FEMA Floodplain

Surface casing if needed.

Total HEAD 100+'

Bentonite pellets above
gravel pack to surface

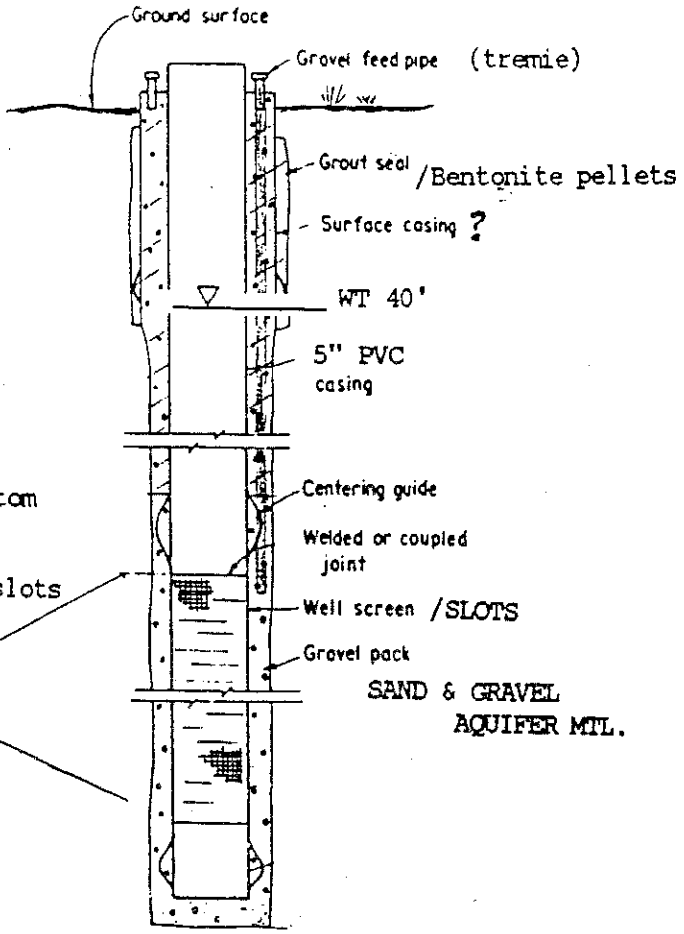
3/4 to 1 1/2 hp pump + 20' off bottom

Gravel pack tremied to 10-20' above slots

Total Screen 25+' in most
porous & perm. form.

TOTAL DEPTH 150-200'

7 7/8+ borehole



SINGLE STRING CONSTRUCTION

FIGURE 11-1.—Gravel packed, rotary drilled well for single string construction. 103-D-1488.

Figure 5

SUGGESTED PROTOTYPE WELL DESIGN

TO PRODUCE FROM THE TESUQUE FORMATION AND ISOLATE THE ANCHA FORMATION

Prepared by: Jack P. Frost
Hydrogeologist
505-466-6435

Modified from the Ground Water Manual

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A shared well system of this design should be able to serve up to 4 residences restricted to the County's 0.25 acre foot per year allowable. Shared wells will result in about 8 wells per 40 acre tract, versus 16 if each owner is responsible for their own well.

Because of the expected vertical stratification, wells should be perforated in the lowest permeable strata encountered to minimize downward induction of septic effluent. The annulus should be stabilized by gravel pack at least 10 feet above the top of perforations. Above the gravel pack pellet bentonite should be added to near ground level. In this way vertical flow in the borehole annulus will be minimized. This design is similar in some regards to precautions taken in the construction of ground water monitoring wells.

Drilling costs for the proposed design are estimated at $16 to $19 per foot (about $2500 to 3800). The pump and surface equipment was estimated by Mr. Kuckleman at about $4500 per well.

Mr. Kuckelman estimates that a four - home shared well system could reduce costs as much as 70 percent over single home well systems.

Well Drawdown Model

For comparison purposes, a well with a pumping rate of 0.60 gallons per minute (864 gpd or 1 acre foot per year), sufficient to serve 4 houses at a 0.25 af/yr allowable, has been modeled in Appendix 3. Actually, such a well typically produces it's average daily output in two to three hours of pumping per day. This translates into an actual, intermittent pumping rate of less than 8 gpm. Intermittent pumping causes a larger transient drawdown with interspersed periods of recovery. Such conditions and results should not be dissimilar to the model scenarios depicted in the Appendix.

The aquifer appears to be more than adequate for domestic use. To test the input assumptions, models were created using both the lower (K=50 gpd/ft, Sy=.05) and higher (K=200gpd/ft, Sy=0.15) estimates of aquifer coefficients. The most conservative drawdown model indicates a maximum drawdown of less than 1 foot in the well bore and less than 0.2 feet at a radius of 100 feet, computed over a 40 year pumping interval.

Pollution Potential

Because the study area occupies the floodplain and is underlain by porous and permeable sediments, there is some concern for pollution potential. In a conversation with Mr. Gene Fulgenzi, Environmentalist at the District 11 office of the State E.D., he was unaware of any specific problems in the general area.

For the purposes of this study, no information was encountered regarding regional or point source contamination near or up gradient of the study area. Such potential sources include leaking buried tanks, agricultural chemical use or other subsurface disposal hazards.

Septic tanks, the means for domestic liquid waste disposal in this area, create an environment for bacteria to degrade domestic wastes. The effluent from the septic leach field is either transpired by plants or slowly makes its way downward to the water table. In this area the soils and bacterial action should remedial the effluent in a short distance, probably less than tens of feet. The horizontal stratification of the aquifer will also slow the downward percolation of the effluent.

The proposed well construction practices, as well as the natural filter function of the aquifer, should secure bacteria - free groundwater for many years. The State Environment Department specifies construction practices and setbacks from wells, and requires approval of individual septic tank systems.

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SUGGESTED WELL LOCATIONS

Figure 6 is an orthographic survey plat of the Por Su Gracia Subdivision, showing suggested shared well sites. Approximately 9 sites are recommended, each to be shared by 2 to 3 lots and houses. These locations are based on topography and interpreted homesites. The average distance of water supply line is less than 250 feet. Final homesite choices might cause some adjustments to these suggestions, and some individual wells on the valley walls are likely because of rugged topography.

Considering the well design and model results described previously, well interference should not be an issue in this subdivision.

The following Table indicates lot locations and predicted drilling depths for shared wells located in Figure 6. The proposed depths should access the Tesuque Formation as the principle water bearing formation.

PROPOSED SHARED WELL SITES, ELEVATION, TOTAL DEPTH

Site	Lots Served B=Block, L=Lot#	Estimated Elevation	Estimated Total Depth (ft,app)
A	B2-L1,L2	6142	150+
B	B1-L1, L2	6136	150+
C	B1-L3,L4	6142	150+
D	B1,L3, L4?	6150	200+/-
E	B2-L5,L6	6154	200+/-
F	B1-L9?, L10,L11,L12	6160	200+/-
G	B1-L6,L7	6200	200

SUGGESTED SHARED-WELL LOCATIONS

POR SU GRACIA SUBDIVISION

Prepared by: Jack P. Frost
Hydrogeologist
505-466-6435

Figure 6

- Computer models depict a modest impact on regional groundwater flow. The cones of depression will not interfere with one another to any significant degree. No impairment of prior ground water appropriators should be expected.

- If State approved practices are employed, the potential for local contamination from domestic septic tank systems appears minimal. The soils and horizontal stratification of the aquifer will remediate and impede downward - migrating contaminants.

- A shared well system, coupled with thoughtful well design and construction, will minimize the impact on the aquifer and ensure a safe water supply for the residents of the subdivision.

BIBLIOGRAPHY

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Spiegel, Z., 1975, Preliminary Report on the Hydrology of the La Cienega Area, Santa Fe County N.M.: Consultant Report to Santa Fe Downs

Walton, W. C., 1987, Groundwater Pumping Tests, Design and Analysis, Lewis Publishers

APPENDICES

TABLE OF WELL RECORD INFORMATION

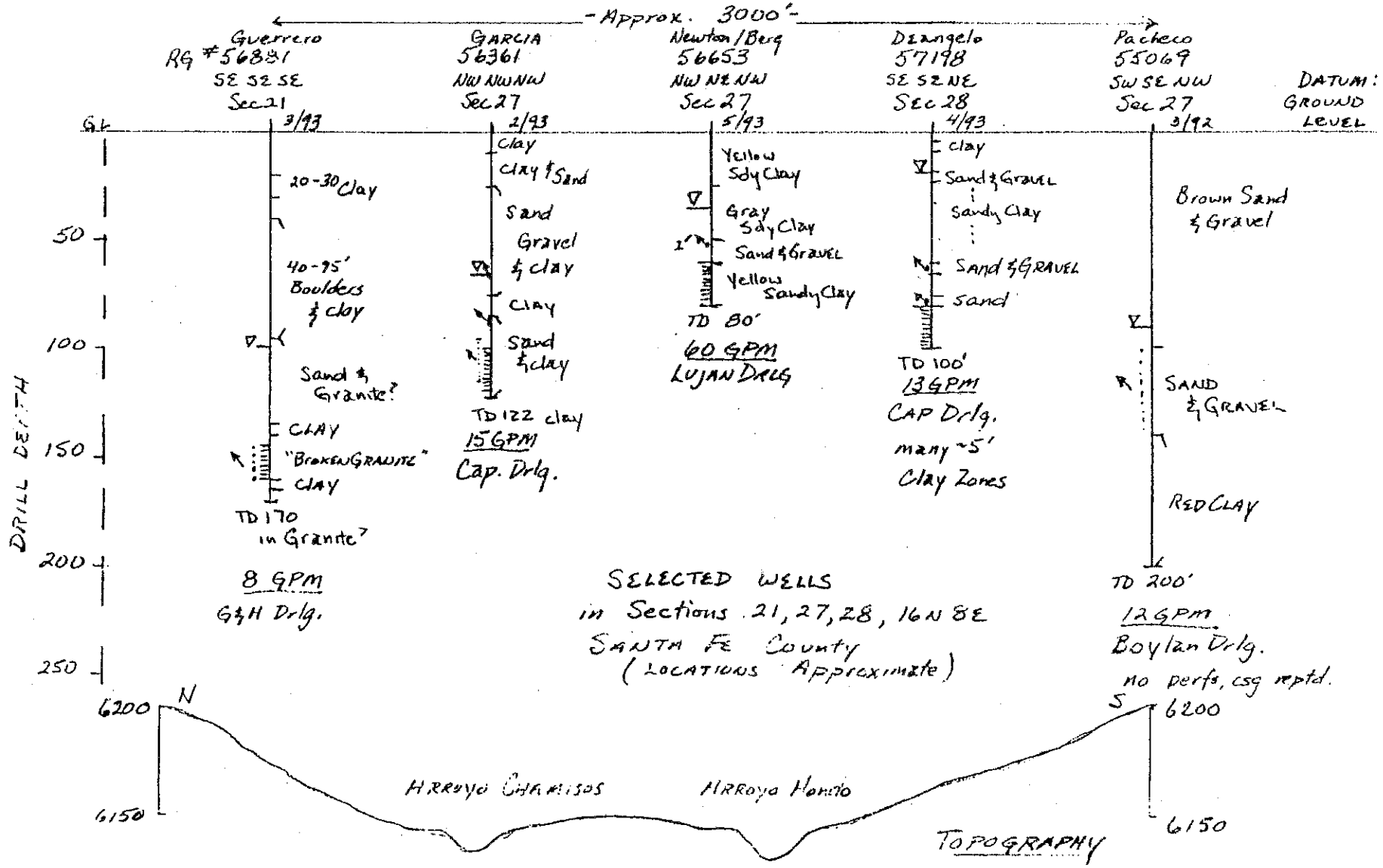
SCHEMATIC WELL LOG CROSS SECTION

PREDICTIVE MODEL USING HIGHER FORMATION COEFFICIENTS

PREDICTIVE MODEL USING MORE CONSERVATIVE COEFFICIENTS

TWO REPRESENTATIVE WELL RECORDS ADJOINING THE STUDY AREA

Well Number RG #	Owner, Location	Total Depth	Depth to Water	Yield (GPM)	Water Column	Depth to Base of Low Zone	Principle Water Bearing Formation	Perfs, Casing	Drilling Contractor
56881	SE,SE,SE,21	170	100	89	70	160	Pink Bkn Granite	20, 5" pvc	G & H
21468	SE,SW,SW,22	72	28	NR	44	69	Brown-Red SD	23, 6.625"	Crocker
56653	NW,NE, NW,27	80	35	60	45	52	Yel. Sand & Gravel	20, 6.625"	Lujan
56361	NW,NW,NW,27	122	65	15	57		Sand & Gravel	20, 5"	Nuanes (Cap)
55069	SW,SE,NW,27	200	90	12	110		Sand & Gravel (poor)	40, 7.875" hole	Boylan
56348	SE,NE,NE,28	165	40	20	125		Red Grav., Blue Clay & Gravel	30, 4.5" pvc	Garcia
57198	SE,SE,NE,28	100	19	13	81		Sand, Sand & Gravel	20	Nuanes (Cap)
58393	SE,SE,NW,22	108	64	20	42	95	Sand & Gravel	20, 5"	Nuanes (Cap)
58245	SE,SE,NW,22	117	69	20	48	44	Sand & Gravel	20, 5"	Nuanes (Cap)
58411	SW,SE,22	105	61	20	44		Gravel	20, 5"	Nuanes (Cap)
55880	SE,NW,SW,27	200	80	20	120	75	Layers of Sand & Gravel	40, 5.5"	Boylan
55355	NW,NE,SW,27	200	100	10	100		Red & White Clay & Rock	30, 4.5"	Garcia
55154	NW,NE,SE,28	90	33	20	57		Sand & Gravel	20, 5"	Nuanes
41553	SW,SE,SW,22	100	42	15	58		Sand, Sand & Gravel	20, 6.625"	Roybal
41775	SE,SE,SW,22	373	125	150	248	370	Brown Sand & Gravel	113, 6.625"	Boylan
42782	NW,SE,NW,28	90	20	20		80	Gray Silt	20, 6.625"	Boylan
56898	SW,NE,NE,28	160	99	20		53	Sand & Gravel	20,5"	Nuanes
56178	PERMIT ONLY								
57760	NE,NE,SE,28	145	75	7		120	"Wash & Boulders	50,4.5"	Thompson
AVERAGES		144.3	63.6	31.2	83.3	111.8			


- Approx. 3000' -
Guerrero
RG #56881
SE SE SE
Sec 21
3/93
20-30 Clay
40-95' Boulders & clay
Sand & Granite?
CLAY
"Broken Granite"
CLAY
TD 170 in Granite?
8 GPM
G&H Drlg.
GARCIA
56361
NW NW NW
Sec 27
2/93
Clay
Clay & Sand
Sand Gravel & clay
CLAY
Sand & clay
TD 122 clay
15 GPM
Cap. Drlg.
Newton/Berg
56653
NW NE NW
Sec 27
5/93
Yellow Sdy Clay
Gray Sdy Clay
Sand & Gravel
Yellow Sandy Clay
TD 80'
60 GPM
LUJAN Drlg
Dzangelo
57198
SE SE NE
Sec 28
4/93
clay
Sand & Gravel
Sandy Clay
Sand & GRAVEL
sand
TD 100'
13 GPM
CAP Drlg.
many ~5' Clay Zones
Pacheco
55069
SW SE NW
Sec 27
3/92
DATUM: GROUND LEVEL
Brown Sand & Gravel
SAND & GRAVEL
RED CLAY
TD 200'
12 GPM
Boylan Drlg.
no perfs, csg rptd.
DRILL DEPTH
GL
50
100
150
200
250
SELECTED WELLS
in Sections 21, 27, 28, 16N 8E
SANTA FE County
(LOCATIONS Approximate)
N
S
6200
6150
ARROYO CHAMISOS
ARROYO HONDO
TOPOGRAPHY

Program: PT1
Version: IBM/PC 2.1
Model : SIMULATION OF 1 OR 2-LAYER AQUIFER SYSTEM, UNIFORM PROPERTIES, WELL STORAGE CAPACITY, DELAYED GRAVITY YIELD, LEAKAGE, DEWATERING, RADIAL FLOW TO PRODUCTION WELL,FINITE-DIFFERENCE APPROXIMATION FOR PUMPING TEST DESIGN

Program based in part on program presented by Rushton,K.R. and S.C.Redshaw.1979.Seepage and groundwater flow-numerical analysis by analog and digital methods.John Wiley & Sons,Ltd. New York; and Rathod,K.S and Rushton,K.R.1984. Numerical method of pumping test analysis using microcomputers.GROUND WATER.Vol.22,No.5.

DATA BASE:

AQUIFER HORIZ. HYDR. COND. (GPD/SQ FT)= 200.00
AQUIFER VERT. HYDR. COND. (GPD/SQ FT)= 20.000
AQUIFER THICKNESS (FT)= 100.00
ARTESIAN AQUIFER STORATIVITY (DIM)= 1.0000D-03
WATER TABLE STORATIVITY (DIM)= 0.1500
PRODUCT. WELL EFFECTIVE RADIUS (FT)= 0.400
TOP OF AQUIFER DEPTH (FT)= 50.00
BASE OF AQUIFER DEPTH (FT)= 150.00
INITIAL WATER LEVEL DEPTH (FT)= 50.00
INFINITE AQUIFER SYSTEM

COMPUTATION RESULTS:

PRODUCTION WELL DISCHARGE RATE (GPM)= 0.60

PRODUCT. WELL EFFECTIVE RADIUS (FT)= 0.400
TIME AFTER PUMPING STARTED(MIN)=%21024000.00

DISTANCE-DRAWDOWN OR WATER LEVEL VALUES AT END OF PUMPING PERIOD

NODE NO	RADIUS(FT)	DRAWDOWN OR WATER LEVEL (FT)
2	0.40	50.08
3	0.63	50.07
4	1.00	50.07
5	1.59	50.07
6	2.52	50.06
7	4.00	50.06
8	6.34	50.06
9	10.05	50.05
10	15.92	50.05
11	25.24	50.05
12	40.00	50.04
13	63.40	50.04
14	100.48	50.04
15	159.24	50.03
16	252.38	50.03
17	400.00	50.03
18	633.96	50.02
19	1004.75	50.02
20	1592.43	50.02
21	2523.83	50.02
22	4000.00	50.01
23	6339.57	50.01
24	10047.55	50.01
25	15924.29	50.00
26	25238.30	50.00

PREDICTIVE MODEL OF DRAWDOWNS
HIGH K, Sy EXAMPLE
40 YEAR INTERVAL

DATA BASE:

AQUIFER HORIZ. HYDR. COND. (GPD/SQ FT)= 50.00
AQUIFER VERT. HYDR. COND. (GPD/SQ FT)= 5.000
AQUIFER THICKNESS (FT)= 100.00
ARTESIAN AQUIFER STORATIVITY (DIM)= 1.0000D-03
WATER TABLE STORATIVITY (DIM)= 0.0500
PRODUCT. WELL EFFECTIVE RADIUS (FT)= 0.400
TOP OF AQUIFER DEPTH (FT)= 50.00
BASE OF AQUIFER DEPTH (FT)= 150.00
INITIAL WATER LEVEL DEPTH (FT)= 50.00
INFINITE AQUIFER SYSTEM

COMPUTATION RESULTS:

PRODUCTION WELL DISCHARGE RATE (GPM)= 0.60

TIME AFTER PUMPING STARTED(MIN)=%21024000.00

DISTANCE-DRAWDOWN OR WATER LEVEL VALUES AT END OF PUMPING PERIO

NODE NO	RADIUS(FT)	DRAWDOWN OR WATER LEVEL (FT)
2	0.40	50.30
3	0.63	50.29
4	1.00	50.27
5	1.59	50.26
6	2.52	50.25
7	4.00	50.23
8	6.34	50.22
9	10.05	50.21
10	15.92	50.20
11	25.24	50.18
12	40.00	50.17
13	63.40	50.16
14	100.48	50.15
15	159.24	50.13
16	252.38	50.12
17	400.00	50.11
18	633.96	50.09
19	1004.75	50.08
20	1592.43	50.07
21	2523.83	50.06
22	4000.00	50.04
23	6339.57	50.03
24	10047.55	50.02
25	15924.29	50.01
26	25238.30	50.00

PREDICTIVE MODEL USING LOW-END VALUES OF K, Sy

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well DONNA DEANGELO Owner's Well No.

Street or Post Office Address 992 Ave. Las Campanas

City and State Santa Fe, NM

Well was drilled under Permit No. RG 57198 and is located in the:

a. ¼ SE ¼ SE ¼ NE ¼ of Section 28 Township 16N Range 8E N.M.P.M.

b. Tract No. of Map No. of the

c. Lot No. of Block No. of the Subdivision, recorded in Santa Fe County.

d. X= feet, Y= feet, N.M. Coordinate System Zone in the Grant.

(B) Drilling Contractor Capitol Drilling License No. WD 1004

Address Rt 8, Box 331N, Santa Fe, NM 87505

Drilling Began 4-27-93 Completed 4-27-93 Type tools Rotary Size of hole 7 7/8 in.

Elevation of land surface or at well is ft. Total depth of well 100 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 19 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
19	22	3	Sand & Gravel	
60	65	5	Sand & Gravel	13 Total
75	80	5	Sand	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5	2.48		0	100	100	NONE	80	100

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

'93 MAY 7 P1:19 ALBUQUERQUE, N. MEX. OFFICE

'93 MAY 12 OIL CONSERVATION DIV. STATE OF NEW MEXICO SANTA FE

om	To	in Feet	Color and Type of Material Encountered 57198
0	3	3	Sandy Clay
3	5	2	Sand & Gravel
5	10	5	Clay
10	11	1	Sand & Gravel
11	18	7	Clay
19	22	3	Sand & Gravel
22	30	8	Clay & Sand
30	39	9	Clay
39	60	21	Sandy Clay
60	65	5	Sand & Gravel
65	66	1	Clay
66	70	4	Sandy Clay
70	71	1	Sand
71	75	4	Clay
75	80	5	Sand
80	85	5	Clay
85	90	5	Sandy Clay
90	93	3	Sand
93	94	1	Sandy Clay
94	99	5	Sand
99	100	1	Clay

Section 7. REMARKS AND ADDITIONAL INFORMATION

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

Owner of well Helen P. Newton / Terry Berg — Owner's Well No. _____

Street or Post Office Address Rt. 14, Box 200

City and State Santa Fe, NM 87501

'93 JUN 7 AM 10 26

STATE ENGINEER OFFICE
SANTA FE NEW MEXICO

was drilled under Permit No. RG-56653 and is located in the:

a. ____ ¼ NW ¼ NE ¼ NW ¼ of Section 27 Township 16N Range 8E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in Santa Fe County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

Drilling Contractor Lujan Drilling License No. WD-547

Address Rt. 3, Box 95-78, Santa Fe, NM 87505

Drilling Began 5-14-93 Completed 5-14-93 Type tools Rotary Size of hole 9 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 80 ft.

Completed well is [X] shallow [ ] artesian. Depth to water upon completion of well 35 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
50	52	2	Yellow Sand & Gravel	60 ?

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
6 5/8			0	80			60	80

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

'93 JUN 25 AM 9 55

STATE ENGINEER OFFICE
SANTA FE, NEW MEXICO

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	To	in Feet	Color and Type of Material Encountered 56653
0	25	25	Yellow - Sandy Clay
25	50	25	Gray - Sandy Clay
50	60	10	Yellow Sand & Gravel
60	80	20	Yellow - Sandy Clay pss

Section 7. REMARKS AND ADDITIONAL INFORMATION

JACK PHILIP FROST
GEOLOGIST, HYDROLOGIST
(505) 466-6435

RT. 3 BOX 95-37
SANTA FE, NM 87505

Transmittal Letter

To: Mr. Charles Heaton
Mr. Joe Catanach
Santa Fe County Land Use

September 28, 1994

Re: Vista de Sandia Subdivision

Enclosed is an addendum to the hydrogeologic study I prepared for the aforementioned subdivision. Please include this in the submittal package for the project. I find sufficient water availability to support 2.5 acre development in the area.

Would you please review the attached addendum and call me if you have any questions? My investigations in this area are ongoing, and I will promptly notify you of any new or revised findings. Feel free to call me if I can be of any assistance.

Sincerely,

Jack P. Frost

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ADDENDUM TO HYDROGEOLOGIC REPORT

Re: Por Su Gracia , Vallecitas de Gracia, and Vista de Sandia Subdivisions

Calculations of Water Availability beneath 2.5 acre tracts in Subject Area.

Prepared by Jack P. Frost, Hydrogeologist

This memo supplements the hydrologic studies I have prepared in sections 21, 22, 27, and 28, T16N, R8E, Santa Fe County. As mentioned in the reports, there are a number of pumping tests in the area, to the east at the Racetrack, to the southeast at La Canada Subdivision, and to the west at Sunrise Springs. The findings of hydraulic coefficients from these tests are characteristic of the Ancha and Tesuque formation aquifers. Sample and geophysical logs for a uranium test hole beneath the subject area are attached, demonstrating the presence of a thick section of saturated Tesuque aquifer. I believe the Ancha-Tesuque contact occurs at about 70 feet in this well. Permeable Tesuque sands occur at 120', 160, and 200' which are suitable for a domestic well completion.

A calculation of the County Code-prescribed Water Availability follows. This calculation is based on the generalized well design proposed, having total depth of 200 feet and a Saturated Thickness of 135'. A 100 year availability of 0.1134 acre foot per acre per year is calculated. This results in an availability beneath a 2.5 acre tract of 0.2835 acre feet per year. The County permits 2.5 acre densities with a restriction on water use of 0.25 acre feet per year in this area. Again, the wells in this area could be drilled deeper to demonstrate greater availability, but this would be unnecessary. The average depth of 18 domestic wells in the immediate vicinity is 144 feet.

Also attached is a revised computer flow model demonstrating the predicted drawdowns pumping 1 acre foot per year for 100 years (allowable for 4 lots sharing the well). Conservative coefficients were used in this calculation, and it demonstrates a modest drawdown of less than 2 feet at radii greater than 160' from the modeled well. According to this model well interference will be negligible. This model does not consider the presence of many hundreds of feet of Tesuque formation not penetrated in the proposed well design.

If you have any questions about these findings please call me at 466-6435.

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WATER AVAILABILITY PER CODE PRESCRIBED CALCULATION
VICINITY OF SECTIONS 21, 22, 27 and 28, T16N, R8E

Prepared by Jack P. Frost

note: In this area the prevailing County Code permits single dwelling lots to 2.5 acres when restricted to a 0.25 acre foot per acre per year water use.

STORAGE CALCULATION

Storage, per acre = Sy x ST x Rl x Rec
Sy = 0.15 Standard Value
ST = 135' of Tesuque formation
Rl = 0.7 per Code
Rec = 0.8 per code

S' = 0.15 x 135' x 0.7 x 0.8 = 11.34 acre feet per acre

note: ST derived from a depth to water of 65' (average in nearby water wells) and TD of 200'. All wells in this area are partially penetrating. The Saturated Thickness of Tesuque formation exceeds 800'. Several wells at Santa Fe Downs and elsewhere produce from commingled Ancha-Tesuque formations to depths of 740 feet.

WATER AVAILABILITY

Per the Code calculation, water availability beneath the subject tract presumes storage depletion and requires the water supply to last 100 years. However, the average published service life of domestic water wells (neglecting pumps) is 35 years.

A, PER ACRE = 11.34 ACFT/AC % 100 YEARS = 0.1134 ACFT/YR

AVAILABILITY PER 2.5 ACRE TRACTS = 0.2835 ACFT/YR

ogram: PT1
rsion: IBM/PC 2.1
del : SIMULATION OF 1 OR 2-LAYER AQUIFER SYSTEM,
UNIFORM PROPERTIES, WELL STORAGE CAPACITY,
DELAYED GRAVITY YIELD, LEAKAGE, DEWATERING,
RADIAL FLOW TO PRODUCTION WELL,FINITE-
DIFFERENCE APPROXIMATION FOR PUMPING TEST
DESIGN

rogram based in part on program presented
Rushton,K.R. and S.C.Redshaw.1979.Seepage
id groundwater flow-numerical analysis by
alog and digital methods.John Wiley & Sons,Ltd.
ew York; and Rathod,K.S and Rushton,K.R.1984.
merical method of pumping test analysis using
icrocomputers.GROUND WATER.Vol.22,No.5.

ress any key to continue

GROUNDWATER FLOW MODEL
LA CIENEGA VICINITY
TESUQUE FORM. COEFFICIENTS
Unconfined Aquifer
Th = 100', Kh =5 gpd/ft2
Kh/Kv = 10

Prep. By JPF,9/94

ATA BASE:

QUIFER HORIZ. HYDR. COND. (GPD/SQ FT)= 5.00
QUIFER VERT. HYDR. COND. (GPD/SQ FT)= 0.500
QUIFER THICKNESS (FT)= 100.00
RTESIAN AQUIFER STORATIVITY (DIM)= 1.0000D-03
ATER TABLE STORATIVITY (DIM)= 0.1000
RODUCT. WELL EFFECTIVE RADIUS (FT)= 0.400
OP OF AQUIFER DEPTH (FT)= 50.00
ASE OF AQUIFER DEPTH (FT)= 100.00
NITIAL WATER LEVEL DEPTH (FT)= 50.00
NFINITE AQUIFER SYSTEM

OMPUTATION RESULTS:

RODUCTION WELL DISCHARGE RATE (GPM)= 0.62 — 1 acft/yr.

IME-DRAWDOWN OR WATER LEVEL VALUES (FT)

	SELECTED DISTANCES (FT)					
TIME(MIN)	0.40	63.40	159.24	400.00	1004.75	2523.83
0.14	50.02	50.00	50.00	50.00	50.00	50.00
0.23	50.04	50.00	50.00	50.00	50.00	50.00
0.36	50.06	50.00	50.00	50.00	50.00	50.00
0.57	50.09	50.00	50.00	50.00	50.00	50.0
0.91	50.14	50.00	50.00	50.00	50.00	50.00
1.44	50.22	50.00	50.00	50.00	50.00	50.00
2.28	50.33	50.00	50.00	50.00	50.00	50.00
3.62	50.49	50.00	50.00	50.00	50.00	50.00
5.73	50.71	50.00	50.00	50.00	50.00	50.00
9.09	51.00	50.00	50.00	50.00	50.00	50.00

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14.40	51.35	50.00	50.00	50.00	50.00	50.00
22.82	51.74	50.01	50.00	50.00	50.00	50.00
36.17	52.12	50.03	50.00	50.00	50.00	50.00
57.33	52.47	50.06	50.00	50.00	50.00	50.00
90.86	52.75	50.12	50.00	50.00	50.00	50.00
144.00	52.98	50.20	50.01	50.00	50.00	50.00
228.22	53.17	50.30	50.04	50.00	50.00	50.00
361.71	53.33	50.41	50.07	50.00	50.00	50.00
573.27	53.47	50.51	50.13	50.00	50.00	50.00
908.58	53.60	50.62	50.19	50.01	50.00	50.00
1440.00	53.72	50.72	50.26	50.02	50.00	50.00
2282.25	53.82	50.81	50.34	50.04	50.00	50.00
3617.12	53.91	50.90	50.41	50.07	50.00	50.00
5732.74	54.00	50.97	50.47	50.10	50.00	50.00
9085.79	54.07	51.04	50.53	50.13	50.00	50.00
14400.00	54.13	51.10	50.58	50.16	50.01	50.00
22822.47	54.19	51.15	50.63	50.19	50.01	50.00
36171.17	54.24	51.19	50.67	50.22	50.01	50.00
57327.44	54.28	51.24	50.72	50.25	50.02	50.00
90857.87	54.33	51.28	50.75	50.28	50.02	50.00
144000.03	54.37	51.32	50.79	50.32	50.03	50.00
228224.66	54.42	51.36	50.83	50.35	50.04	50.00
361711.72	54.47	51.41	50.88	50.39	50.06	50.00
573274.44	54.52	51.46	50.93	50.43	50.08	50.00
908578.77	54.60	51.53	51.00	50.49	50.11	50.00
%1440000.31	54.68	51.61	51.08	50.56	50.15	50.00
%2282246.70	54.78	51.70	51.17	50.65	50.21	50.01
%3617117.27	54.90	51.81	51.27	50.75	50.28	50.03
%5732744.56	55.02	51.92	51.38	50.86	50.37	50.05
%9085787.88	55.15	52.05	51.50	50.97	50.47	50.10
%14400003.42	55.28	52.17	51.63	51.09	50.58	50.16
%22822467.51	55.42	52.30	51.76	51.22	50.70	50.25
%36171173.56	55.57	52.44	51.89	51.35	50.82	50.34
%52560000.00	55.69	52.55	52.00	51.46	50.93	50.43

TIME AFTER PUMPING STARTED(MIN)=%52560000.00 = 100 yrs

DISTANCE-DRAWDOWN OR WATER LEVEL VALUES AT END OF PUMPING PERIOD

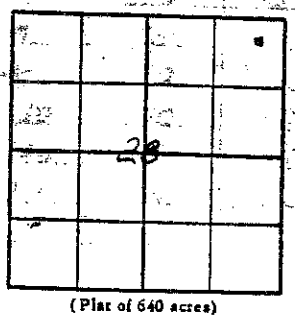
NODE NO	RADIUS(FT)	DRAWDOWN OR WATER LEVEL (FT)
2	0.40	55.69
3	0.63	55.39
4	1.00	55.10
5	1.59	54.81
6	2.52	54.52
7	4.00	54.23
8	6.34	53.95
9	10.05	53.66
10	15.92	53.38
11	25.24	53.10
12	40.00	52.82
13	63.40	52.55
14	100.48	52.27
15	159.24	52.00
16	252.38	51.73
17	400.00	51.46
18	633.96	51.19
19	1004.75	50.93
20	1592.43	50.67
21	2523.83	50.43
22	4000.00	50.23
23	6339.57	50.08
24	10047.55	50.02
25	15924.29	50.00

STATE ENGINEER OFFICE

DRILL HOLE RECORD

INSTRUCTIONS: This form should be executed in duplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections pertaining to the specific drill hole shall be answered as completely and accurately as possible. Any additional remarks or information pertinent to the plugging, construction and operation and maintenance of the drill hole should be included in Section 7.

Section 1



(Plat of 640 acres)

(A) Owner of land or lessee KSTT

Street and Number

City Santa Fe State N.M

Hole is located in the NE ¼ NE ¼ NE ¼ of Section 28

Twp. 16 N Rge. 9 E

(B) Drilling Contractor Reid and Cathy

Street and Number

City Casper State Wyoming

Drilling: Commenced Feb 11 19 71 Completed Feb 12 19 71

Elevation at top of casing in feet above sea level 6160 Total depth of hole 840

Check whether water encountered is ☒ shallow or ☐ artesian. Depth to water upon completion 23

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	23	840	817	Interbedded Sandstone & Mudstone
2				
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor Company Personnel

Street and Number City State

Tons of Clay used Tons of Roughage used Type of roughage

Plugging method used Plastic hole plug @ 30' Filled Date Plugged 3/10 19 71

Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used
			130

FOR USE OF STATE ENGINEER ONLY

Date Received

File No. Use Location No. 16.8.28.222

A 8

LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	155	155	Brn	S.S. + Gravel w/s Mudstone
155	305	150	Brn	Mudstone w/ Sandstone
305	400	95	Brn-grn	Sandy Mudstone
400	465	65	Brn-grn	Mudstone
465	630	165	Brn	Muddy S.S.
630	680	50	Brn	M.S.
680	725	95	Brn	Muddy S.S.
725	840	65	"	Mudstone

Section 7. Remarks and additional information

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

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Driller

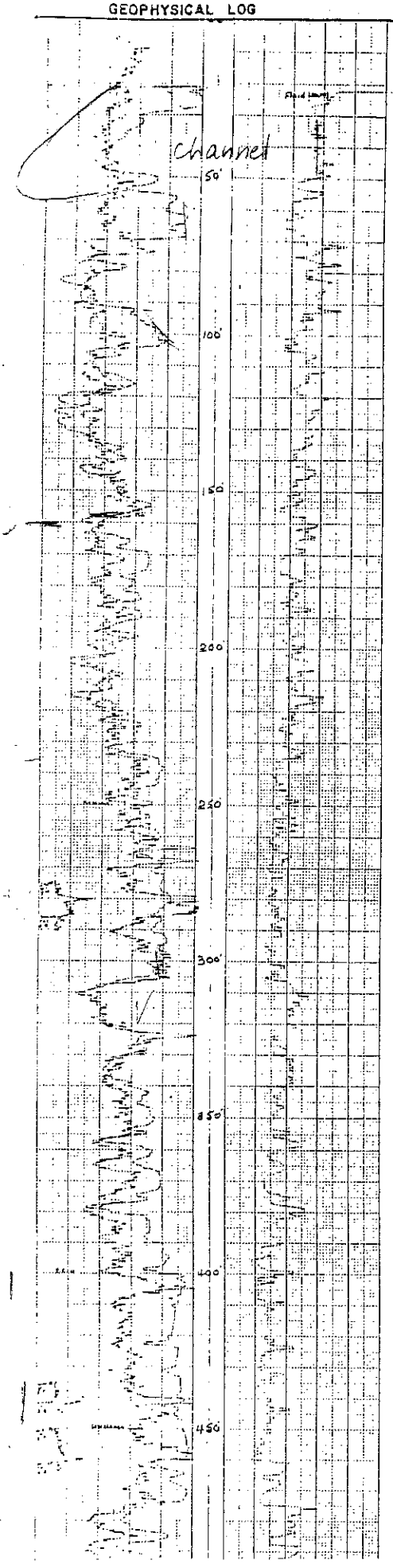
HOLE SIZE ____ ☐ AIR ☐ WATER HOLE NO. ____

1160' NORTH 87 EAST ____ LOGGED BY Morris-Groop DATE 2/13/71

28 TOWNSHIP 16N RANGE 8E T.D. 840' P.B. 836'

NE NE NE

GEOPHYSICAL LOG



DEPTH | P | C | A

LITHOLOGY LOG

Alluvium

brn SS + gvl

Ancha

brn sdy mdst

brn SS, m-c

brn sdy clyst

GRAVEL

TESUQUE

100

brn mddy SS

brn sdy clyst

brn interb SS + mdst

NO

brn mdst

200

brn-dk brn mdst, sm lt grn cly (abd @ 250')

dk brn mdst

grnish-gry clyst + brn mdst

olive-gry clyst

blue-gry clyst

brn mdst + gry clyst

300

brn mdst

brn mdst, with wh clyst

lt grn + wh clyst, with brn mdst

brn mdst

brn mdst, sm grn clyst

400

grnish-gry clyst

brn mdst

grn mdst

brn with sm grn mdst

132

brn mdst, abd dk grn mdst

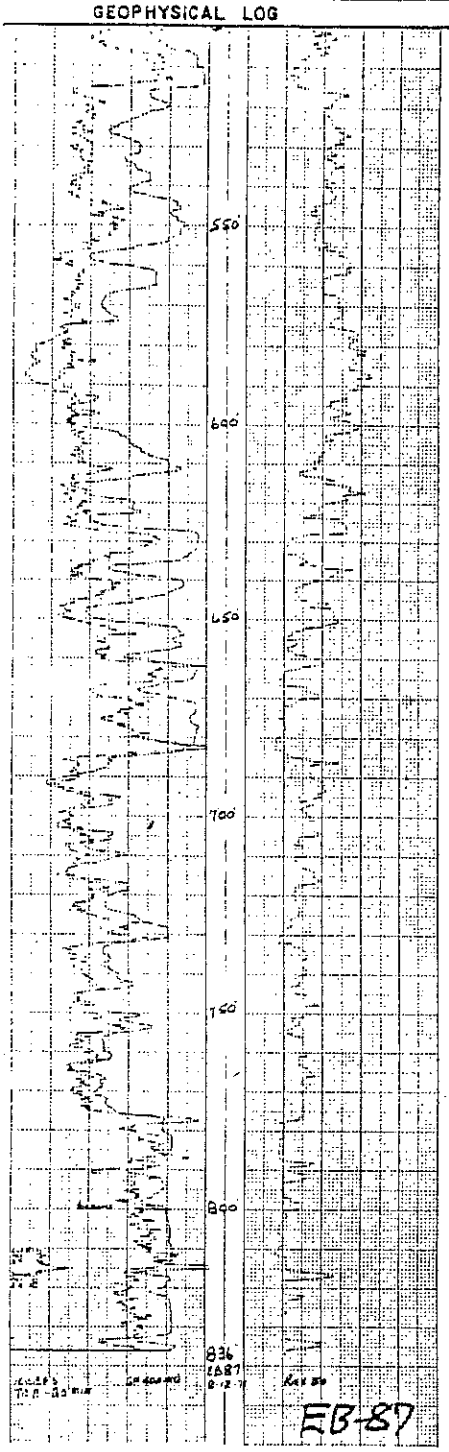
" "

HOLE SIZE ☐ AIR ☐ WATER HOLE NO.

1160' NORTH EAST LOGGED BY Morris-Green DATE 2/18/71

28 TOWNSHIP 16 N RANGE 8 E T.D. 840' P.B. 836'

GEOPHYSICAL LOG



DEPTH | P | C | A

LITHOLOGY LOG

500

brn sdy mdst

brn mddy SS

600

brn sdy mdst

brn mddy SS

700

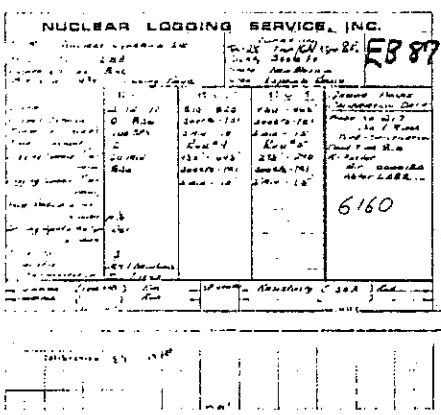
brn sdy mdst

TD 836'

Other tests to 1000' in this area.

800

900



133

Top of Casing > 1'
Above FEMA Floodplain

Surface casing if needed.

Total HEAD 100+'

Bentonite pellets above
gravel pack to surface

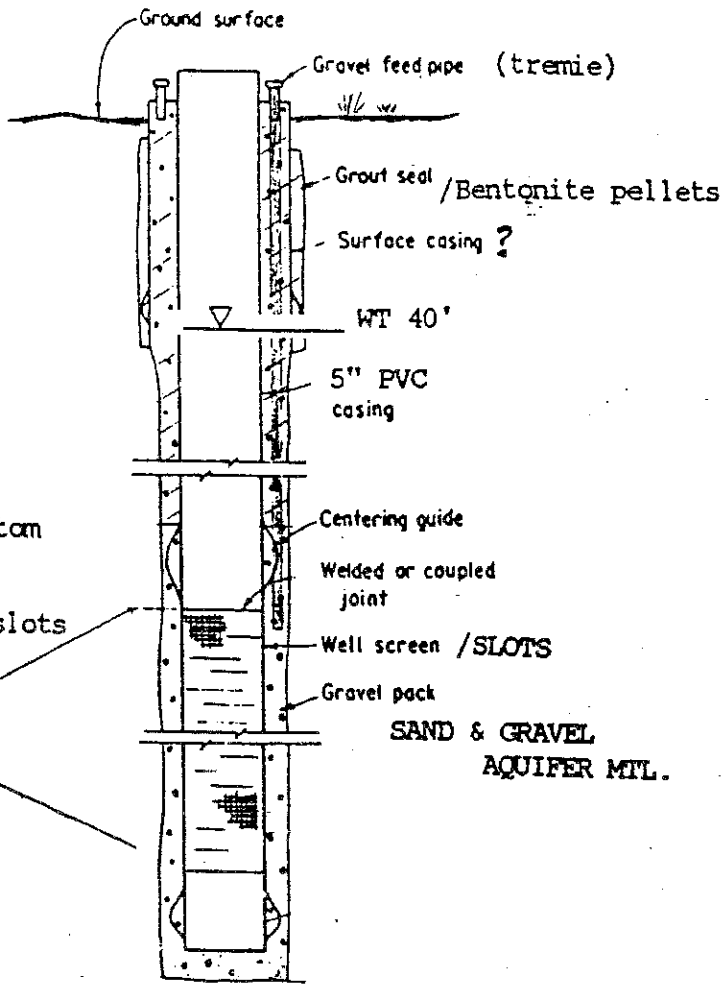
3/4 to 1 1/2 hp pump + 20' off bottom

Gravel pack tremied to 10-20' above slots

Total Screen 25+' in most
porous & perm. form.

TOTAL DEPTH 150-200'

7 7/8+ borehole



SINGLE STRING CONSTRUCTION

FIGURE 11-1.—Gravel packed, rotary drilled well for single string construction. 103-D-1488.

Figure 5

SUGGESTED PROTOTYPE WELL DESIGN

TO PRODUCE FROM THE TESUQUE FORMATION

AND ISOLATE THE ANCHA FORMATION

Prepared by: Jack P. Frost
Hydrogeologist
505-466-6435

Modified from the Ground Water Manual

Page 11

1264911

DECLARATION OF COVENANTS, CONDITIONS, AND RESTRICTIONS

This Declaration of Covenants, Conditions and Restrictions is made on this 29 day of ~~February~~ APRIL 1996, be VISTA DE SANDIA CORPORATION hereinafter called "Declarant".

WHEREAS, Declarant is the owner of the real property located in Sections 21 & and 22, Township 16 North, Range 8 East, N.M.P.M., County of Santa Fe, New Mexico and commonly known as the Vista De Sandia Corporation Subdivision and recorded in the office of the County Clerk, Santa Fe, New Mexico, Plat Book 333 Page 4-5, hereinafter called "the Property": and

WHEREAS, Declarant wishes to impose the provisions of this declaration on the subject Property to the Covenants, Conditions and Restrictions stated in this document, including easements, for the purpose of protecting the value and standards of said property, and to insure that all owners will maintain the Property in a private and prestigious manner; and

WHEREAS, the terms of this declaration shall run with the land and be binding upon and inure to the benefit of all parties having any right, title or interest in or to the Property, or any part thereof, and their successors and assigns,

IT IS, THEREFORE, DECLARED:

ARTICLE 1 - DEFINITIONS

1. "OWNER" shall mean and refer to any contract purchaser of record owners, whether one or more persons or entities, of a fee simple title to any lot which is a part of the Property, but excluding those having such interest merely as security for the performance of an obligation.

2. "Property" shall mean the above described real estate.

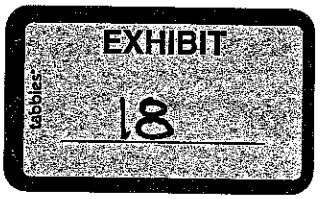
3. "Lot" shall mean and refer to any plot of land shown within the Property whether existing now, or by virtue of any subsequent division of the Property.

4. "Declarant" shall mean and refer to Vista De Sandia Corporation Subdivision.

ARTICLE II - USE OF PROPERTY; STRUCTURES

1. The Property or lots shall be used for residential purposes.

2. It is expressly stated that any space within a residence located on any lot on the Property may be used for a professional or other office in which there is employed not more than two (2) employees or other persons who do not reside on the Property or the Lot, provided that said use of the Property does not generate a greater level of traffic or activity on the Lot than would normally be generated by a single family dwelling.



3. No structure shall be erected, altered, placed or permitted to remain on any Lot or building other than one single-family dwelling.

4. No building shall be erected any closer than twenty-five (25) feet to any boundary line of any lot within the Property.

5. Exterior construction of any type on any Lot shall be completed within eighteen (18) month of commencement of said construction.

6. All barns, stables or corrals for confining horses or animals permitted under this declaration shall not occupy more than six percent (6%) of the total land area of any lot. Such structures shall be of good and sound design and construction.

ARTICLE III - PROHIBITIONS

1. No division of any lot shall be permitted.

2. Vehicles in need of repair, wrecked vehicles, vehicles that are not in operating condition will not be allowed on any lot in this subdivision whatsoever. Modular, manufactured housing or double wide mobile homes (not older than 1990) will be allowed on any lot within the Property.

3. No animals shall be raised or maintained on any lot for commercial use. No commercial breeding will be allowed. No owner shall be allowed to maintain a number of animals on any lot which could cause a health or environmental hazard to other lot owners on the Property.

4. No oil drilling, oil development operations, oil refining, quarrying or mining operations of any kind shall be permitted on any lot on the Property. No oil wells, tanks, tunnels, mineral excavations or mine shafts shall be permitted on the Property. No derrick or other structure designed for use in boring for oil, natural gas, or any other substance, with the exception of water for domestic use, shall be erected, maintained or permitted on any lot.

5. No dumping of solid or liquid waste shall be permitted on any lot.

6. No hunting shall be permitted on the Property and no discharge of firearms shall be permitted on the Property.

7. No storage of building materials other than during construction shall be permitted. No storage of any materials except those commonly and regularly used in connection with a residence shall be permitted. No storage of any explosives or hazardous materials of any kind shall be permitted.

8. Bright, glaring lights on rooftops, poles, patio walls or elsewhere are prohibited. All exterior lights must be located so as not be directed toward surrounding lots, properties or roads.

9. No lot shall be used for the storage or dumping of trash, rubbish, debris or waste of any kind, or for the storage of any Property or thing which causes such lot to appear in unclean or untidy condition, or that will be visually offensive or obnoxious, and no substance, thing or material may be kept upon any lot which will emit foul or obnoxious odors, or that will cause any noise that will disturb the peace, quiet, comfort or serenity of any occupant or owner of any lot within the Property.

10. No guest houses shall be allowed on any lot.