

New Mexico Bureau of Geology/Office of State Engineer Hydrogeologic Studies in the Española Basin – Status Report

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**Jemez y Sangre Water Planning
Council
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2003-2004 Hydrogeologic Studies

- Basic data collection
 - Well and aquifer data compilation
 - Santa Fe County hydrogeologic reports, MWB, City of Santa Fe, USGS GWSI, NMED UST/SWB/DWB, private consultants, well drillers
 - Location, well, water level, and hydraulic data
 - ~300 new measurements 2003-2004 – sites with historic data
 - Good location control (GPS or map-derived coordinates), GIS ready
 - Access 2003 database – >400 data entries but still incomplete

NM Bureau of Geology WaterWell Database

WDB_ID: 3 T.: 15 / N Quad: Turquoise Hill MP_Alt: 6071
 Point ID: EB-002 R.: 8 / E Fm: 112ANCH/120IRSV Screen1 Elev: 5360
 OSEWellID: RG-61825 Sec: 4.111 Altitude: 6070.00 Screen2 Elev: 5720
 Location_ID: 15N.8E.4.111 Screen3 Elev:

Find PointID
 Filter by QuadName
 Save Data
 Show All Records

Sorting
 Sort by Location
 Sort by PointID
 Sort By Location and Quad

Location Well Data Water Level data Hydraulics Data Stratigraphy

Location Data

Well Database ID	DateCreated	Latitude	Longitude	Datum	Method	Accuracy	Altitude	Alt_Datum	Alt_Method	Alt_Accy
3	8/29/2002	353339.20	1060647.20	NAD27	G	5	6070.00	NGVD29	M	10.00

USGSSite ID	SiteType	T.	R.	Section	UTM E	UTM N	SPX	SPY
	GW	15N	8E	4.111	399070	3935822		

Point ID: EB-002 Data Type: 2,4,10
 CoordinateNotes: Altitude from 10-m DEM

SiteNames: LCJV#1 DateInventoried: 2/27/2004 DataReliability: C
 QuadName: Turquoise Hill County: SANTA FE

Owner: Proprietary data; contact Peggy Johnson at NMBG- email peggy@gis.nmt.edu

LocationNotes: Proprietary data; contact Peggy Johnson at NMBG- email peggy@gis.nmt.edu

Lat_Deg:	Long_Deg:	Lat_DD	Long_DD
35	106	35.56089	106.11311
Lat_Min: 33	Long_Min: 06		
Lat_Sec: 39.2	Long_Sec: 47.2		

Save Record

Record: 1 of 1

Record: 2 of 412

NM Bureau of Geology WaterWell Database

WDB_ID: 2 T.: 15 / N Quad: Turquoise Hill MP_Alt: 6063.5
 Point ID: EB-001 R.: 8 / E Fm: 112ANCH/123GLST Screen1 Elev: 5929
 OSEWellID: RG-39419 Sec: 5.323 Altitude: 6063.00 Screen2 Elev:
 Screen3 Elev:
 Location_ID: 15N.8E.5.323

Find PointID

Save Data

Sorting

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Filter by QuadName

Show All Records

Location Well Data Water Level data Hydraulics Data Stratigraphy

Well Database ID									
2									
Point ID	OSEWellID	HoleDepth	WellDepth	DepthSource	CompletionDate	CompletionSource			
EB-001	RG-39419	223	221	D	3/15/1983	D			
MeasuringPoint									
TOC									
MPHeight	CasingDiam	CasingDepth	ScrTop1	ScrBtm1	ScrTop2	ScrBtm2	ScrTop3	ScrBtm3	
0.50	0.55	221	47	221					
MP_Alt	Screen1 Elev		Screen2 Elev		Screen3 Elev				
6063.5	5929								
Driller	ConstructionMethod	StaticWL	SwElev	AqType					
Rodgers & Co.		32.00	6031.5	U					
Fm	112ANCH/123GLST								
Construction									
WaterNotes									
WBZ: 41-223' (red gravel w/ clay, "granite" aka red sand w/ clay layers; 80 gpm)									
Status	CurrentUse	Status/Use Notes							
I	X								
DataSource									
Cooper, D. R., 1995, Geohydrology Report for Cottonwood Ranch Subdn, Santa Fe Cty, NM, April 1995									
Notes									

NM Bureau of Geology WaterWell Database

WDB_ID: <input type="text" value="2"/>	T.: <input type="text" value="15"/> / <input type="text" value="N"/>	Quad: <input type="text" value="Turquoise Hill"/>	MP_Alt: <input type="text" value="6063.5"/>	Find PointID	<input type="button" value="Save Data"/>	Sorting <input type="checkbox"/> Sort by Location <input type="checkbox"/> Sort by PointID <input type="checkbox"/> Sort By Location and Quad
Point ID: <input type="text" value="EB-001"/>	R.: <input type="text" value="8"/> / <input type="text" value="E"/>	Fm: <input type="text" value="112ANCH/123GLST"/>	Screen1 Elev: <input type="text" value="5929"/>	<input type="text"/>	<input type="button" value="Show All Records"/>	
OSEWellID: <input type="text" value="RG-39419"/>	Sec: <input type="text" value="5.323"/>	Altitude: <input type="text" value="6063.00"/>	Screen2 Elev: <input type="text"/>	Filter by QuadName	<input type="text"/>	
Location_ID: <input type="text" value="15N.8E.5.323"/>			Screen3 Elev: <input type="text"/>	<input type="text"/>		

Location Well Data Water Level data Hydraulics Data Stratigraphy

Point Id	Date	DTWater	WLElev	Status	Method	Meas'dBy	DataSource	SiteNotes
▶ EB-001	1/31/1995	47.20	6016.30		R	Cooper	G	
EB-001	1/9/2004	48.91	6014.59		S	Johnson		
* EB-001								

Record: 1 of 2

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Location Well Data Water Level data Hydraulics Data Stratigraphy

Point_ID: EB-002 HydraulicUnit: 112ANCH TestTop: 60 TTopElev: 6010 TestBtm: 120 TBtmElev: 5950 UnitType: X
 Remarks: 96-Hr drawdown, single well; averaged 2 late time data lines 55 and 93 ft2/d; upper screen Ancha 90-130', lower screen in volcanics 330-370' UnitThick: 60
 T (ft2/d): 7.40E+01 S (-): Ss (ft-1): Ss Calc: Sy (dec fract): 0.00 KH (ft/d): KH Calc: 1.2E+00 KV (ft/d):
 HL (day-1): HD (ft2/d): Cs (gal/d/ft): Data Source: Dennis R.Cooper, 1995
 P (decimal fraction): k (darcy):

Record: 1 of 3

2003-2004 Hydrogeologic Studies

- Basic data collection
 - Improved geologic data descriptions/compilation
 - 1:24,000-scale lithosome and facies mapping in Tesuque and Ancha Fms – grain size, cementation, faults
 - 1:50,000 geologic map compilation incorporating 8 quadrangles
 - Monitor well installation – Archery Range, Buckman, Santa Fe River, Rodeo Grounds
 - ArcGIS digital products

2003-2004 Hydrogeologic Studies

- Hydrogeologic Interpretations
 - Measured stratigraphic section through Tesuque Fm, mountain front to Yates-La Mesa #2 – correlates surface outcrop to subsurface intervals in YLM #2
 - Fault characterization at San Isidro
 - Permeability and grain size characteristics
 - Hydrostratigraphic base of Ancha Formation and saturated thickness
 - Channels in Ancha Fm
 - Ancestral Santa Fe River
 - Mountain front to basin grain size trends – “trending anisotropy”
 - Compartmentalization – San Isidro fault, mountain front faults, dipping beds

2003-2004 Hydrogeologic Studies

- Water Levels and Recent Hydrologic Conditions
 - Monitoring Network
 - 40 new and replacement well locations
 - Capitalize on historic data
 - Expansion in Cieneguilla, I-25/South 14 corridor, La Tierra, Los Campanos, South Santa Fe, Southern Embayment, Tano Road, West Santa Fe
 - Objective to monitor regional conditions, effects of well fields and regional development, changes in discharge areas
 - Potentiometric Surface
 - Well field drawdowns – “zone of influence”
 - Effects of compartmentalization
 - Water Level Changes
 - Vertical Gradients

Region	Total	5-Year	Annual	Recorder/ Monthly	Multilevel Piezometer	Deleted	Added
Agua Fria	5	-	5	-	-	4	-
Arroyo Hondo	3	-	3	-	-	-	-
Buckman	7	-	2	5	4	-	1
Cieneguilla	3	3	-	-	-	-	2
East Santa Fe	6	5	1	-	-	-	-
El Dorado	2	2	-	-	-	-	*
I-25/S-14 Corridor	8	5	2	1	-	-	4
La Bajada	1	1	-	-	-	-	-
La Cienega	2	2	-	-	-	1	1
La Tierra	6	4	2	-	-	-	4
Los Campanos	1	-	1	-	-	-	1
MtnFront/E SFe	0	-	-	-	-	7	-
Picture Rock	1	1	-	-	-	-	-
MtnFront/South	3	3	-	-	-	-	-
South Santa Fe	6	4	2	-	-	-	2
Santa Fe	8	-	7	1	1	3	-
SF Opera	2	2	-	-	-	1	1
Southern Embay	13	10	3	-	-	2	5
SW Santa Fe	5	-	5	-	-	4	2
Tano Rd	7	2	4	1	1	-	7
Tesuque Pueblo	2	2	-	-	-	-	-
Tesuque	8	7	1	0	0	7	6
Tesuque South	2	0	2	0	0	0	2
W Santa Fe	5	4	-	1	1	-	4
TOTALS	106	58	39	9	7	28	40

* = additional monitor wells needed

Hydrogeologic Issues

- Influence of faults and dipping structures on regional groundwater flow, well field drawdowns?
- Where is aquifer compartmentalization occurring and what is the geologic control?
- Improvements on three-dimensional architecture and permeability of Tesuque/Ancha Fms?
- Status of water levels – Santa Fe & Buckman well fields?

Water Level Declines

- Rates vary significantly; NO coalescing drawdown between Santa Fe and Buckman fields
- Santa Fe River field: elliptical drawdown cone elongate N-S, highest decline north of City (6.4 ft/yr for past 6 years)
- Buckman field: 9-10 ft/yr over last 15 yrs, extends as far as El Prado at 2 ft/yr (9-yr record)

General Observations

- Quality & distribution of well data variable
 - Data gaps on federal, pueblo, and ranch lands
 - Partially penetrating wells with minimal deep aquifer data
 - Piezometer installation critical
- Aquifer compartmentalization, heterogeneity, and anisotropy all control regional flow and resource development
- Lithosome mapping can improve permeability distribution and modeling
 - “Observed” permeability differences between lithosomes – more analysis to be done