Interim Year 1 Environmental Conditions Colorado River Corridor

Public Meeting

November 21, 2013

COUNTY OF TRAVIS
STATE OF TEXAS
1839

LCRA
ENERGY • WATER • COMMUNITY SERVICES

CITY OF AUSTIN
FOUNDED 1839

Study Team

Travis County

City of Austin

Lower Colorado River Authority

Dr. Jack Sharp

URS Corporation

Introduction

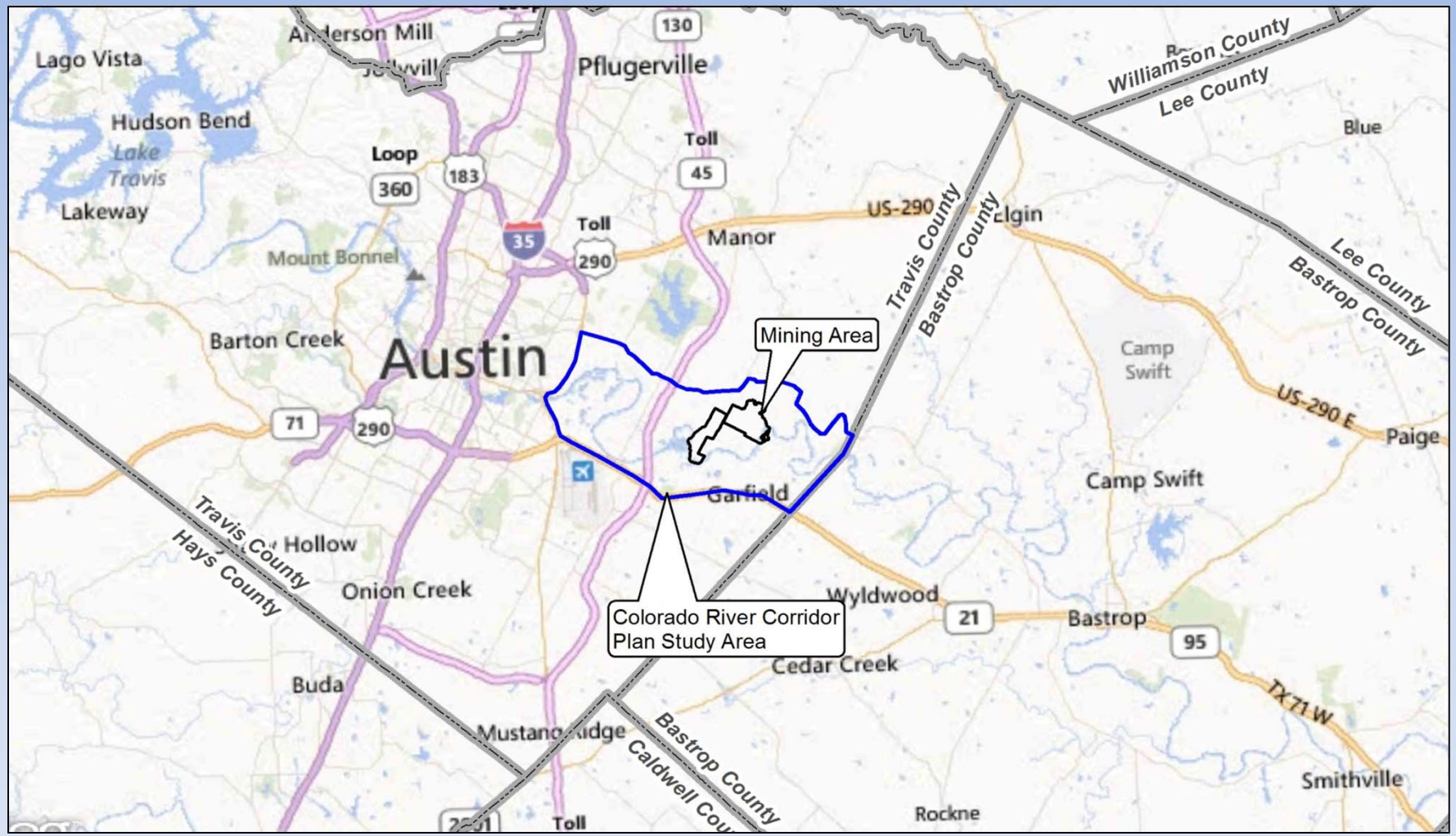
- URS was contracted by Travis County to perform groundwater, air, and noise environmental monitoring at planned TXI Hornsby Bend East and West mining site
- URS is an unbiased and impartial party
- Dr. Sharp (UT Jackson School of Geology) performed third party independent technical oversight
- Stake Holders Include
  - Local residents
  - TXI (mining)
  - Local farmers, ranchers, and nurseries
  - Travis County, LCRA, and City of Austin

Ranch Land West of Planned Mining Area and Planned Mining Area in Background

Objectives

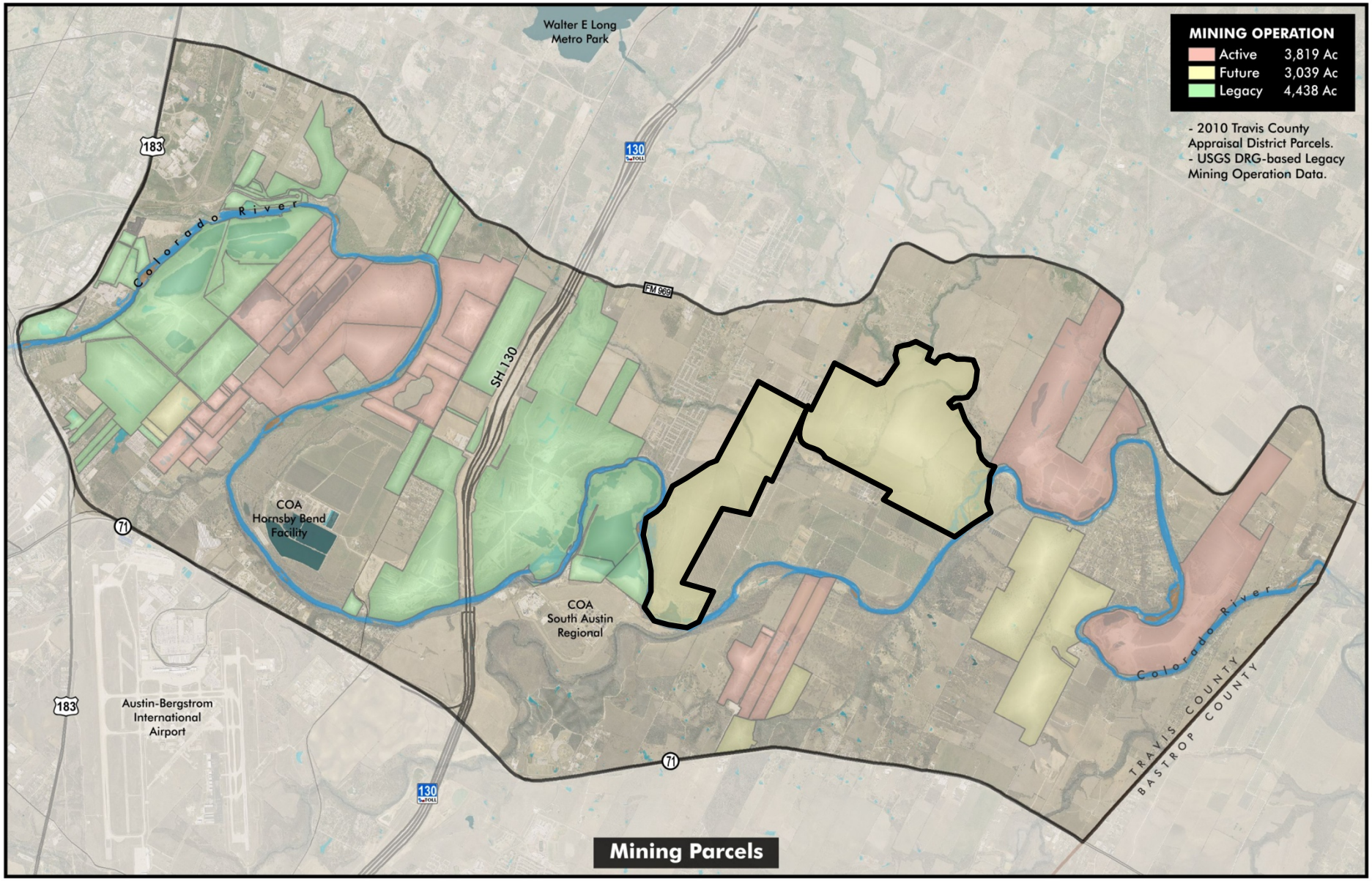
- Establish baseline environmental conditions prior to active mining operations beginning at Hornsby Bend mine site to determine if operations have an impact
  - Groundwater (Availability and Quality)
  - Air Quality
  - Noise
- Update groundwater baseline with interim data, i.e after the baseline year and prior to mining
- Continue monitoring after mining commences and compare results to the pre-mining conditions

Regional Site Map

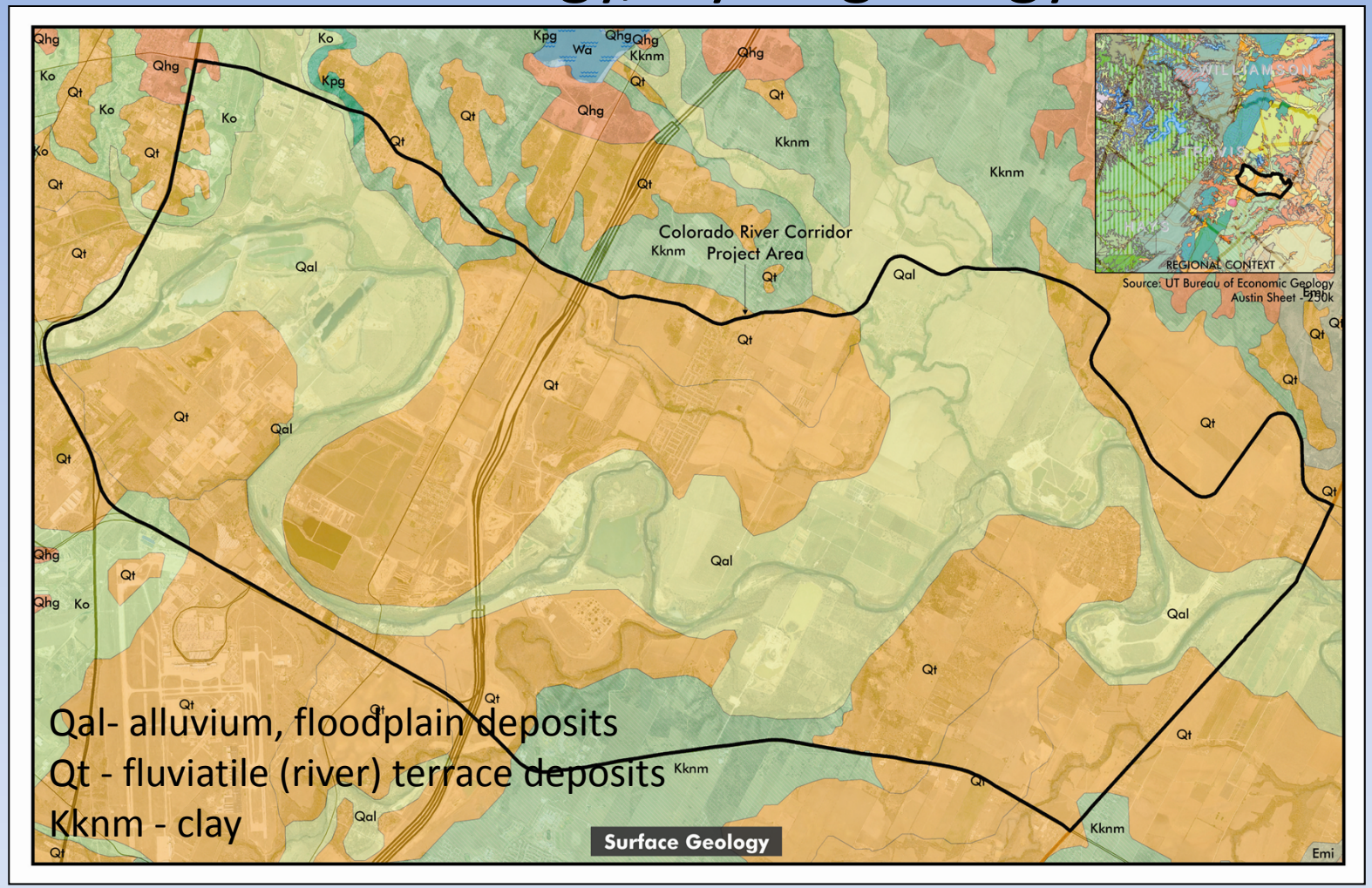


Study area located in southeast Travis County

TXI's Hornsby Bend East and Hornsby Bend West Mining Sites



Site Geology, Hydrogeology



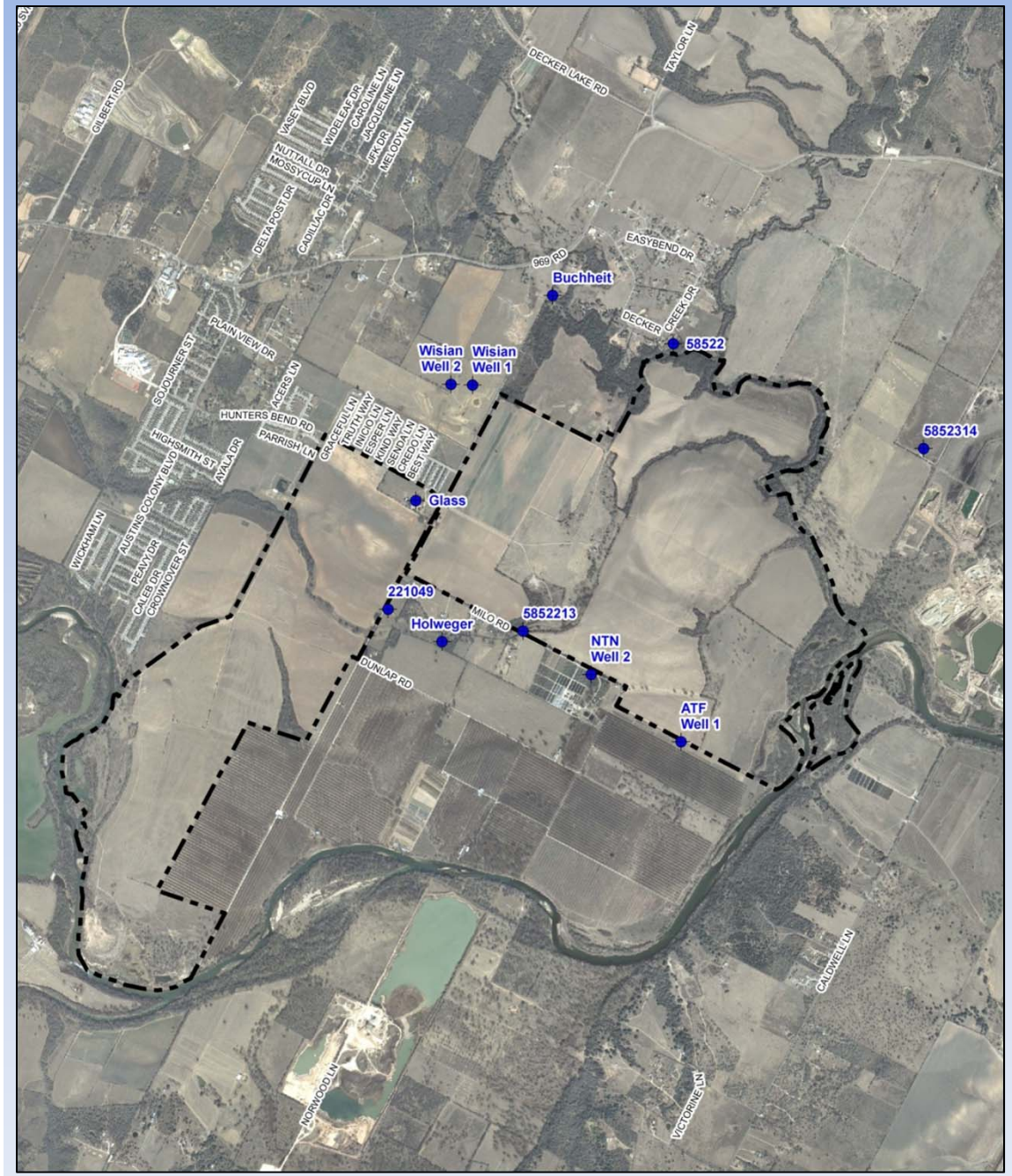
Geology - Shallow alluvial sand and gravel deposits ~10 to 60 feet thick overlying the Navarro and Taylor clay and shale

Hydrogeology - Colorado River Alluvial Aquifer; shallow unconfined aquifer with recharge from precipitation

Task 1 - Groundwater

- Baseline Year (October 2011 to May 2012)
  - Well Inventory – reviewed TWDB well database and met with property owners to identify 10 wells for monitoring
  - Well top of casing elevation and location (X,Y) surveyed
  - Groundwater levels and basic water quality samples collected during six baseline year events
- Interim Year 1 (May 2012 to June 2013)
  - Quarterly groundwater levels
  - Annual basic water quality sample collected and included additional analysis for organics (TPH, PAHs, and VOCs)

Selected Groundwater Monitoring Wells

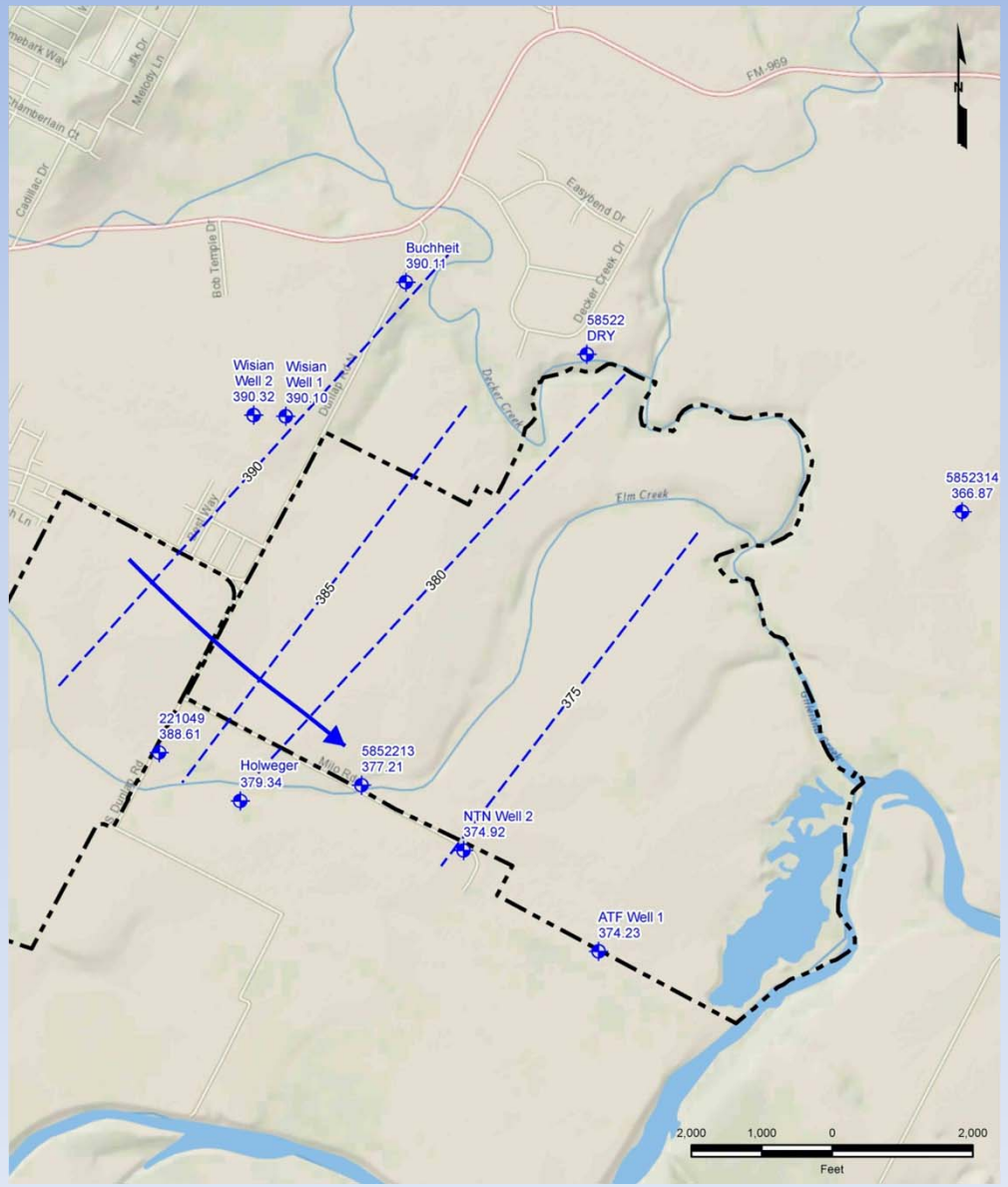


- Selected 10 wells
- Each screened in the Colorado River Alluvial Aquifer
- Located around the periphery of planned mining area to measure baseline water level and water quality levels
- Obtained permission for access

Survey Well Location and Top of Well Casing Elevation

Measuring Depth to Water with Water Level Indicator

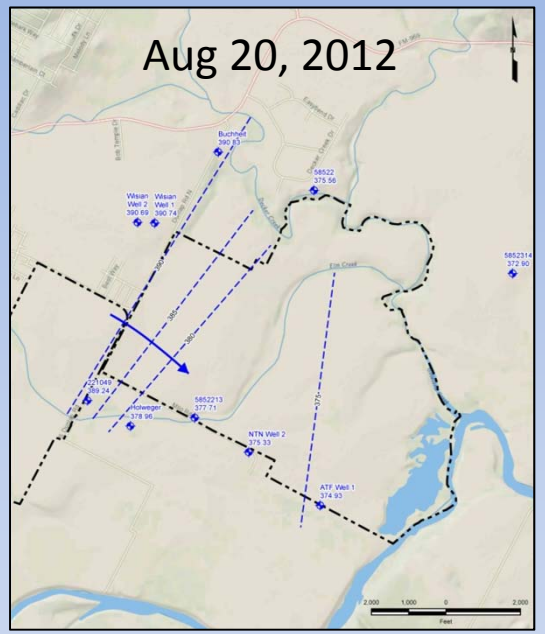
Groundwater Potentiometric Surface

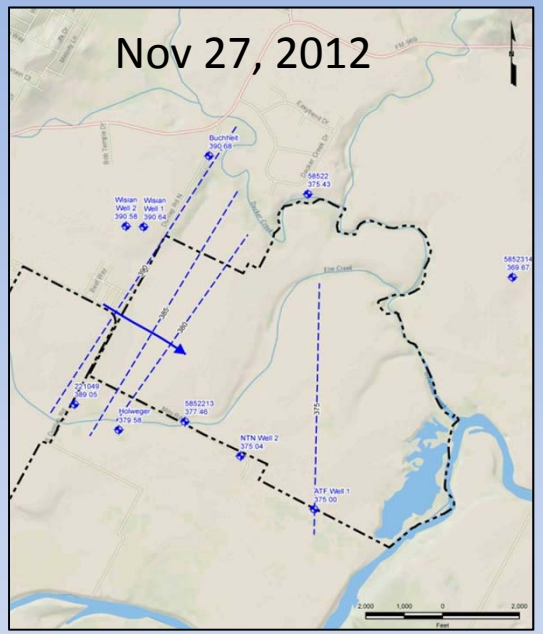


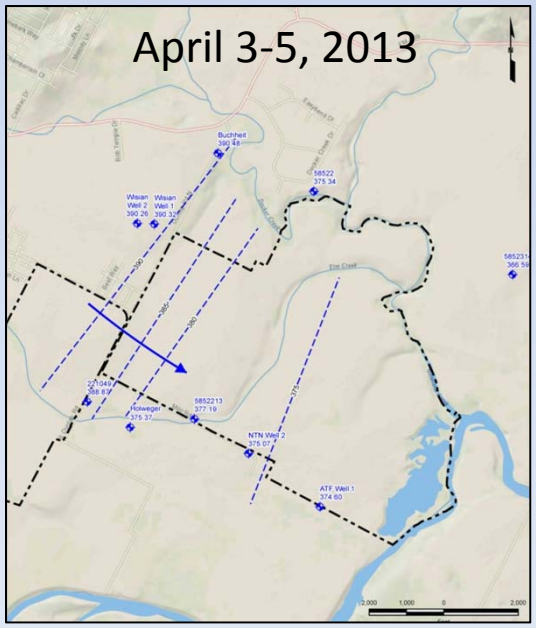
June 11-12, 2013

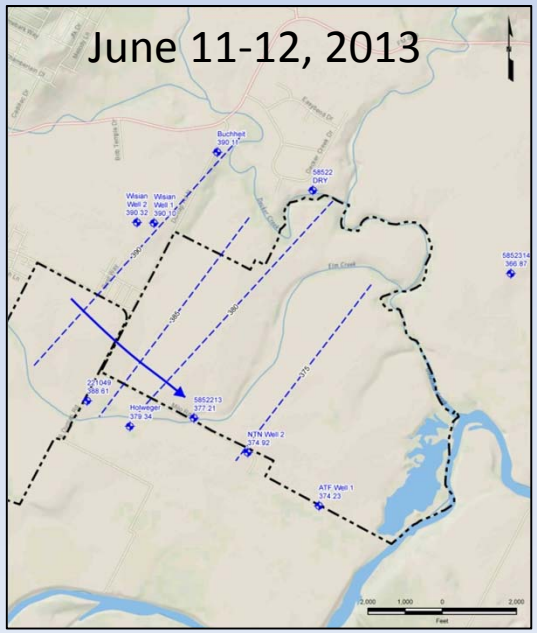
Potentiometric Surface Contour (Dashed Where Inferred)

Groundwater Potentiometric Surfaces, August 2012 to June 2013









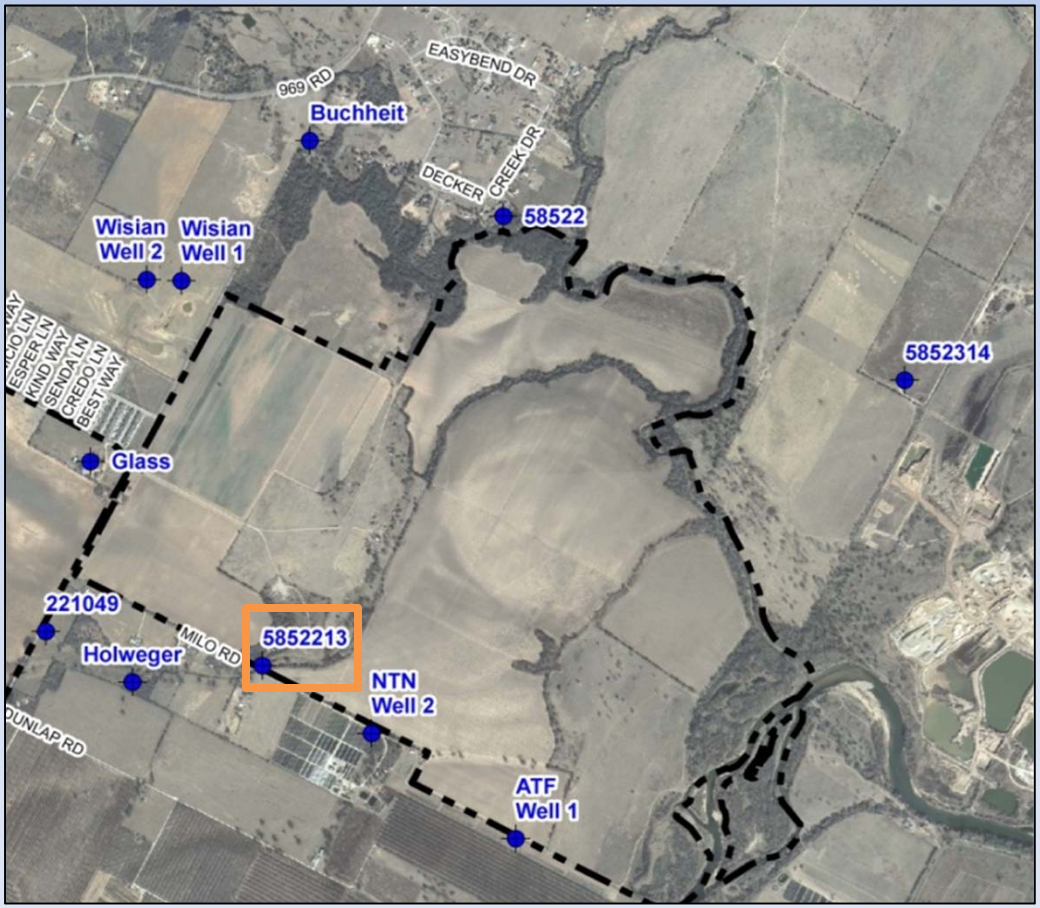
Potentiometric Surface Contour (Dashed Where Inferred)

Groundwater Elevation Change

Well ID	Baseline Year, October 2011 to May 2012	Interim Year 1, May 2012 to June 2013	Baseline and Interim Year 1, October 2011 to June 2013
58522	+ 0.17	NM	NM
221049	+ 1.42	- 0.98	+ 0.44
5852213	+ 1.88	- 1.14	+ 0.74
5852314	+ 4.85	- 6.10	- 1.25
ATF Well 1	+ 1.75	- 1.62	+ 0.13
Buchheit	+ 0.82	- 0.87	- 0.05
Holweger	+ 1.44	- 0.81	+ 0.63
NTN Well 2	+ 3.49	- 1.32	+ 2.17
Wisian Well 1	+ 0.85	- 0.60	+ 0.25
Wisian Well 2	+ 0.67	- 0.37	+ 0.30

Task 1 – Groundwater (continued)

- Groundwater elevation measured every hour continually with pressure transducer in one well (5852213)



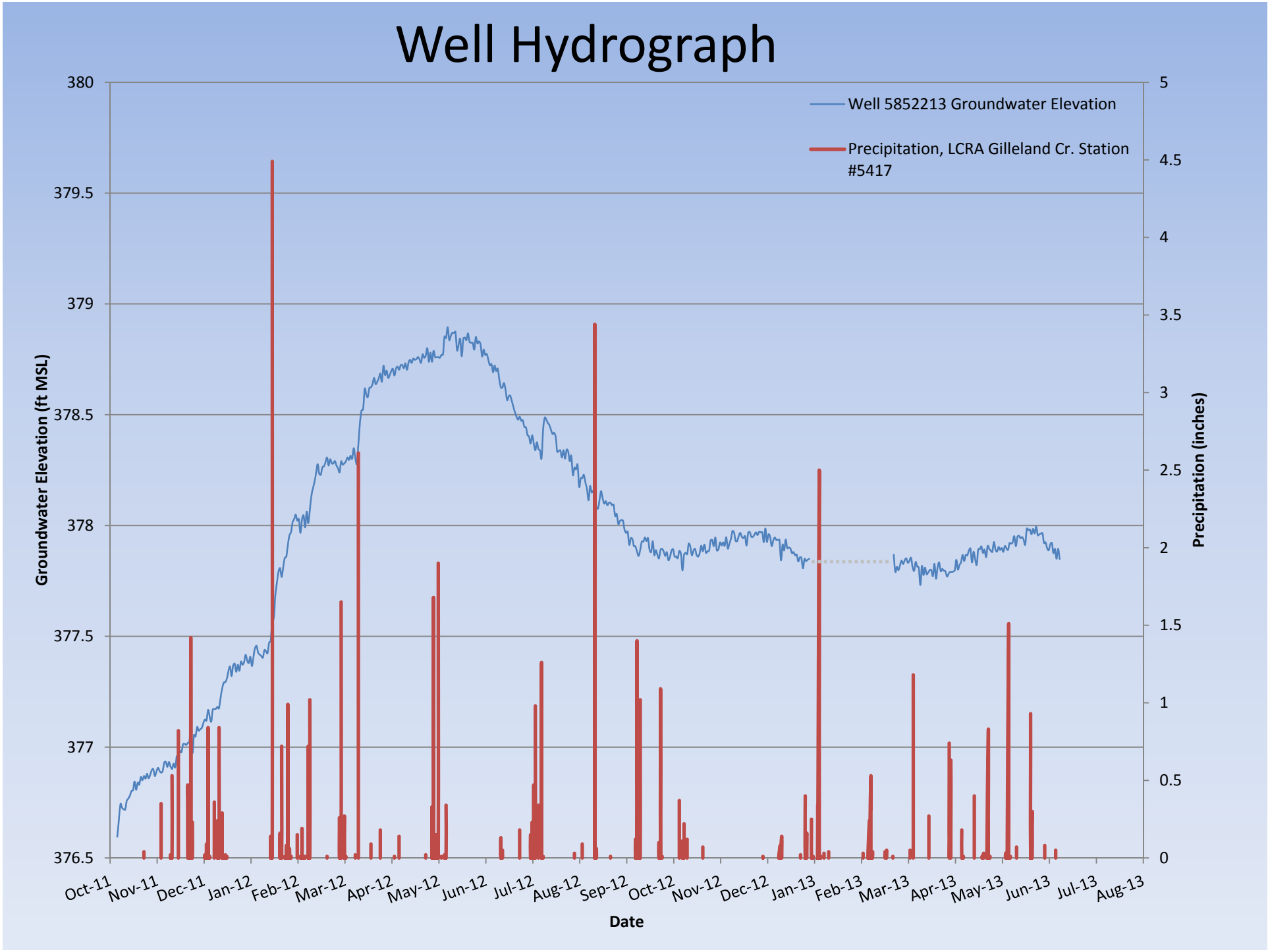
Continuous Water Level Monitoring Equipment

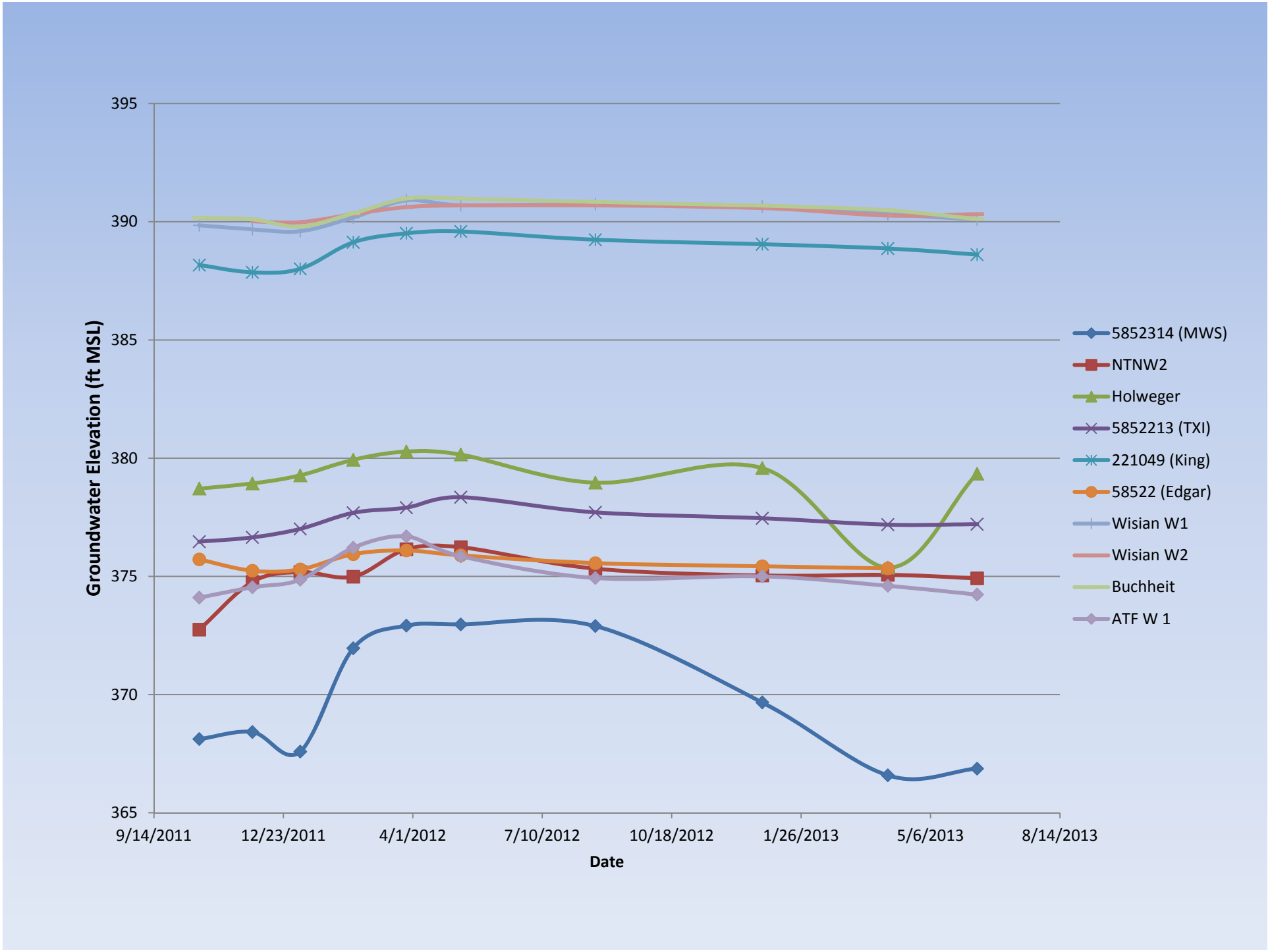
Well 5852213

Water Level Pressure Transducer

Downloading Water Level Data from Transducer in Well 585223

Well Hydrograph




395
390
385
380
375
370
365
Groundwater Elevation (ft MSL)
9/14/2011
12/23/2011
4/1/2012
7/10/2012
10/18/2012
1/26/2013
5/6/2013
8/14/2013
Date
5852314 (MWS)
NTNW2
Holweger
5852213 (TXI)
221049 (King)
58522 (Edgar)
Wisian W1
Wisian W2
Buchheit
ATF W 1

Baseline Groundwater Availability

- Potentiometric surface ranged from approximately 390 ft to 366 ft above msl
- An overall average groundwater rise of 0.37 ft observed from Oct 2011 to June 2013
- Late 2011 and early 2012 precipitation recharged the aquifer after extreme dry conditions that persisted from Feb to Oct 2011
- June 2012 to June 2013 had relatively flat to slightly declining water levels

Task 1 – Groundwater (continued)

- LCRA Environmental Laboratory Services analyzed water quality for PAHs, TPH, VOCs and basic water quality parameters including;
  - Calcium
  - Magnesium
  - Potassium
  - Sodium
  - Ammonia
  - Total Suspended Solids
  - Chloride
  - Fluoride
  - Sulfate
  - Nitrate
  - Carbonate
  - Bicarbonate

Groundwater Sampling, Field Parameters

Groundwater Sampling, for Lab Analysis

Portable Submersible Pump for Groundwater Sampling at Wells without Dedicated Pumps

Groundwater Sampling with Dedicated Pump

Groundwater Analytical Data Set, Well 5852213

Date	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Ammonia (mg/L)	TSS (mg/L)
10/18/2011	130	24.8	4.68	31.9	27.8	0.293	0.07	7.11	460	< 2	6.35	60
11/29/2011	133	21.2	4.70	28.9	19.8	0.360	<0.050	9.84	420	< 2	3.57	18.2
1/4/2012	128	20.2	4.35	30.0	16.5	0.39	<0.050	28.4	404	< 2	1.90	25.4
2/15/2012	129	20.1	6.01	25.5	15.6	0.239	<0.010	34.1	527	< 2	1.52	73.7
3/26/2012	150	23.2	4.41	25.5	15.2	0.230	<0.100	37.4	425	< 2	0.909	5.9
5/7/2012	150	23.6	4.62	22.6	18.5	0.332	0.025	14.6	455	< 2	1.22	7.0
6/11/2013	154	22.9	4.86	23.5	12.6	0.365	<0.100	21.1	409	<10	1.38	274

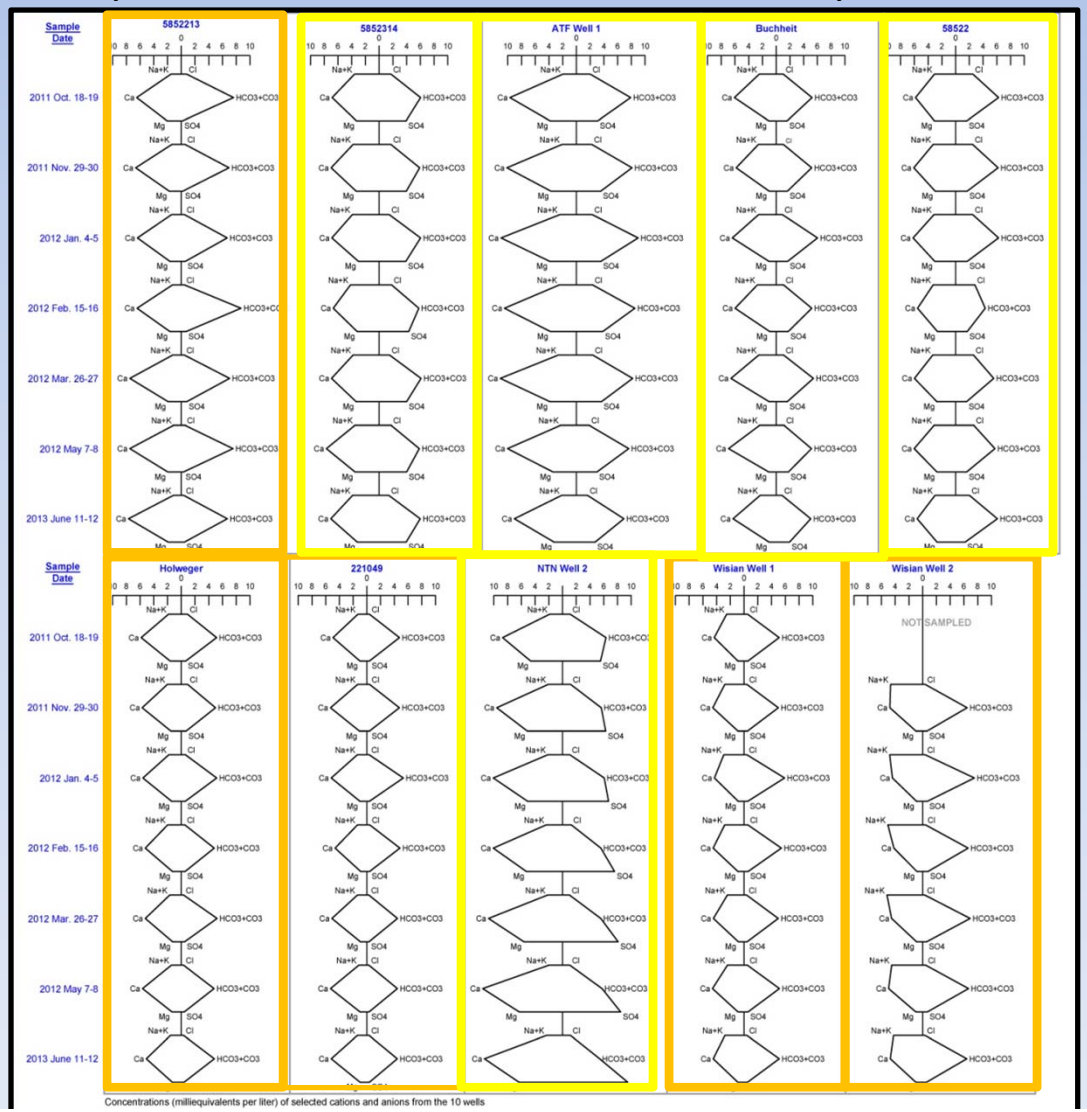
- Example water quality data set from well 5852213
- In total 70 data sets collected from 10 wells

Overall Water Quality Statistics

- PAHs, TPH, and VOC results were all less than detection limits
- Water chemistry from each sampling event is consistent for each well with small variation between most wells
- Calcium bicarbonate water type is dominate
- Wells 58522, Buchheit, 5852314, ATF 1 and NTN 2 have relatively more sulfate
- Wisian Well 2 has relatively more sodium

Stiff Diagrams

Stiff diagrams a graphical representation of the major ion composition of the water. A polygonal shape is created by plotting cations and anions in milliequivalents per liter on either side of a vertical zero axis. Stiff patterns are useful in making a rapid visual comparison between different water samples.

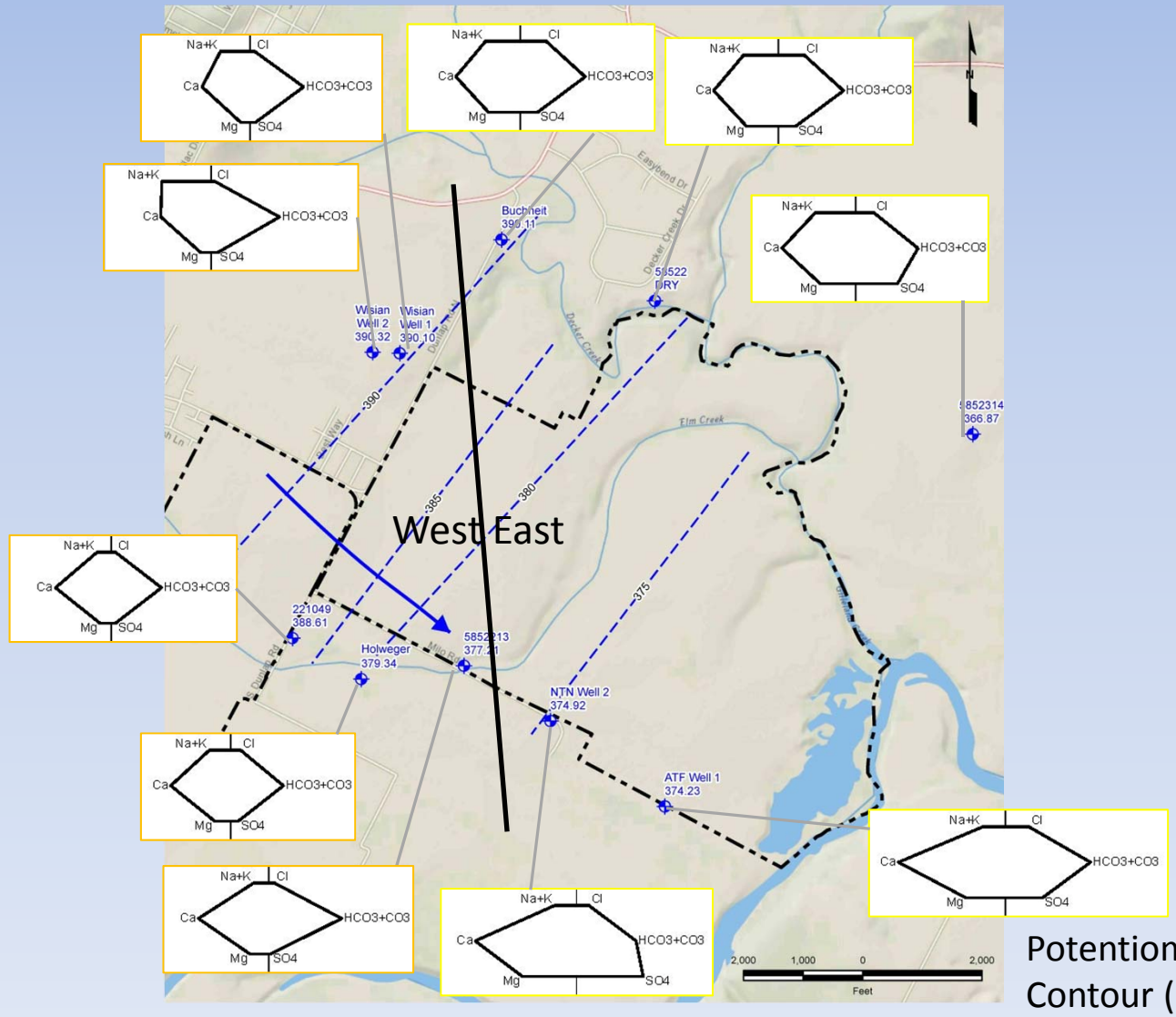


Concentrations (milliequivalents per liter) of selected cations and anions from the 10 wells

- Diamond shape Stiff pattern indicate calcium bicarbonate water type is dominate
- Wells 5852314, ATF 1, Buchheit, 58522 and NTN 2 have relatively more sulfate
- Identify East and West well populations based on geochemstry

East Wells	West Wells
Buchheit	Wisian W2
58522	Wisian W1
5852314	Holweger
ATF 1	221049
NTN W2	5852213

April 3-5, 2013 – Potentiometric Surface & Stiff Diagrams



Potentiometric Surface Contour (Dashed Where Inferred)

Baseline Groundwater Quality

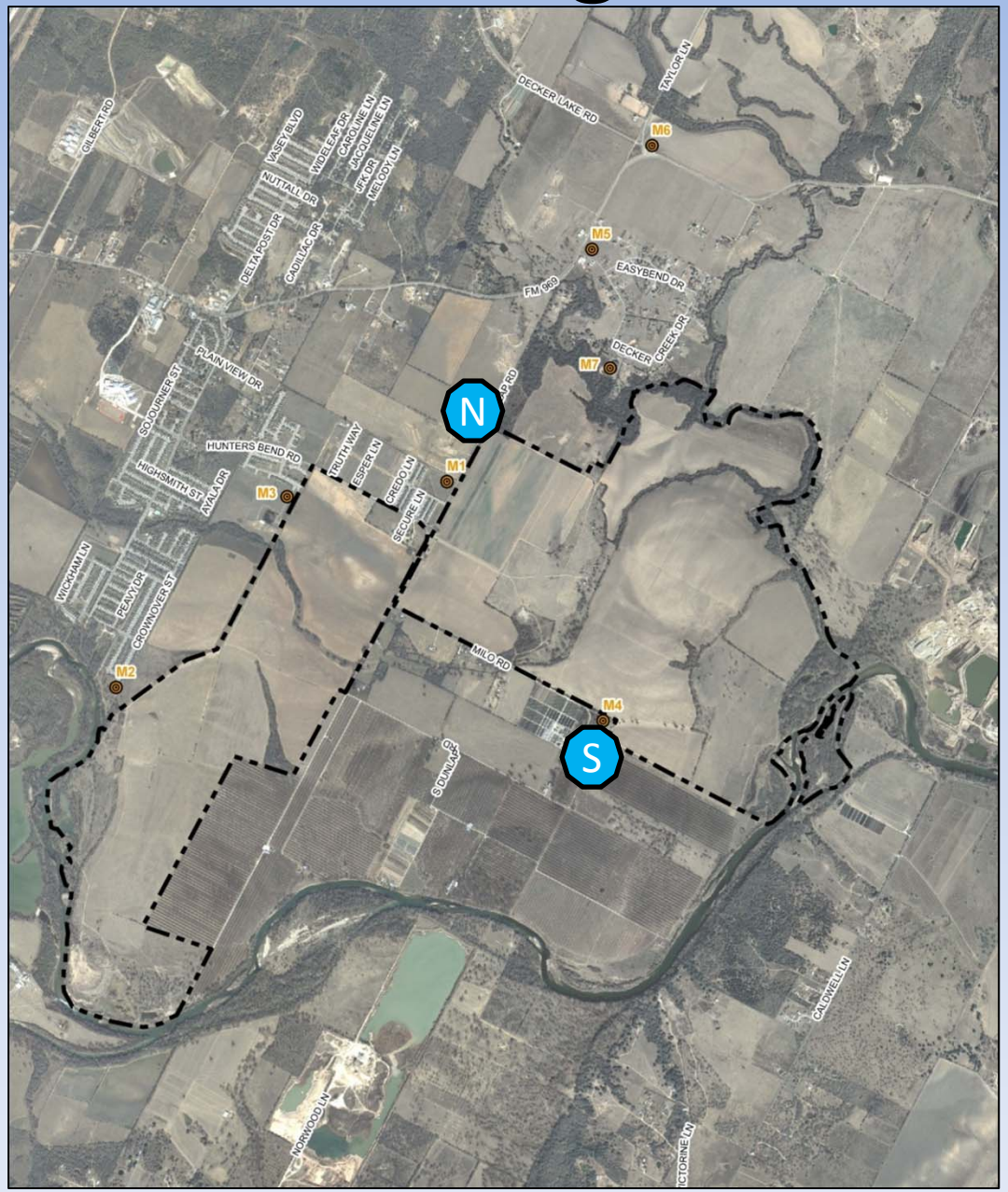
- The range of water quality values is representative of overall baseline conditions
- Future water quality values incongruent with baseline conditions can be identified as concentrations greater than the maximum baseline value + two standard deviations

Wells Statistic (normal samples)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Ammonia (mg/L)	TSS (mg/L)	TDS (mg/L)
West Wells (Calcium-bicarbonate water type)													
# of Samples	34	34	34	34	34	34	34	34	34	34	34	34	34
Median (50th Percentile)	103	12.2	2.44	38.9	14.2	0.29	12.7	24.8	317	< 2	0.02	1.80	546
Minimum	83.9	10.1	1.49	22.6	10.2	0.11	0.03	7.11	266	< 2	0.02	1.00	440
Maximum	154	24.8	6.01	118	32.6	0.43	21.6	37.4	527	< 2	6.35	274	759
Standard Deviation	19.3	4.64	1.14	29.6	5.62	0.10	6.42	7.46	69.2	< 2	1.28	48.4	92.0
Median + 2 Standard Deviations	142	21.5	4.72	98.0	25.4	0.48	25.5	39.7	455	< 2	2.59	98.5	730
Maximum + 2 Standard Deviations	193	34.1	8.29	177	43.8	0.62	34.4	52.3	665	< 2	8.92	371	943
East Wells (calcium-bicarbonate/calcium-sulfate mixed water type)													
# of Samples	35	35	35	35	35	35	35	35	35	35	35	35	35
Median (50th Percentile)	139	39.3	2.31	57.4	57.5	0.27	6.76	170	361	< 2	0.02	1.10	878
Minimum	111	11.4	1.75	41.7	29.9	0.14	2.42	65.9	259	< 2	0.02	1.00	618
Maximum	233	76.9	4.49	94.5	99.6	0.42	34.7	456	544	< 2	0.07	26.0	1185
Standard Deviation	40.8	18.1	0.72	15.2	21.5	0.07	9.95	108	65.1	< 2	0.01	4.28	175
Median + 2 Standard Deviations	221	75.4	3.75	87.9	101	0.41	26.7	385	491	< 2	0.04	9.66	1228
Maximum + 2 Standard Deviations	315	113	5.93	125	143	0.56	54.6	671	674	< 2	0.09	34.6	1535

Task 2 – Air, Baseline Year Review

- Air sampling for $PM_{2.5}$ and PM_{10} performed with Airmetrics, Inc MiniVol air samplers
- Samples collected at two locations - upwind and downwind of planned mining area
- Four air sampling events of six 24-hour samples collected in Baseline Year
  - Event 1: October 20 to November 4, 2011
  - Event 2: January 5 to 20, 2012
  - Event 3: March 15 to 30, 2012
  - Event 4: May 3 to 18, 2012
- No air samples collected during Interim Year 1

Air Monitoring Locations



S Air Monitoring Location

Air Quality Sample Location, North Site

Air Quality Sample Location, South Site

Air Quality $PM_{2.5}$ and PM_{10} Size Fraction Results

Sampling Event	Date	North Site		South Site	
		PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
1	10/20/2011	28.1	7.6	15.8	7.5
1	10/23/2011	24.9	10.7	19.9	10.7
1	10/26/2011	11.9	8.1	15.0	8.2
1	10/29/2011	27.5	9.0	22.1	10.3
1	11/1/2011	22.6	11.7	28.6	13.6
1	11/4/2011	15.4	6.7	NV-L	7.4
2	1/5/2012	21.9	4.0	24.6	10.8
2	1/8/2012	31.7	10.3	31.9	19.3
2	1/11/2012	11.8	NS	12.5	6.5
2	1/14/2012	33.2	NS	17.5	8.9
2	1/17/2012	13.6	NS	13.9	NS[1]
2	1/20/2012	21.5	NS	60.1	16.0
3	3/15/2012	14.7	10.0	NS	9.0
3	3/18/2012	12.9	7.8	NS	10.3
3	3/21/2012	13.8	5.7	NS	5.8
3	3/24/2012	16.5	12.5	NS	11.7
3	3/27/2012	18.1	10.6	NS	NV-C
3	3/30/2012	19.6	13.3	NS	12.2
4	5/3/2012	16.5	NV-L	22.4	NS
4	5/6/2012	14.7	NV-L	22.8	NS
4	5/9/2012	19.7	12.5	32.9	NS
4	5/12/2012	11.3	9.2	16.7	NS
4	5/15/2012	17.2	8.5	27.9	NS
4	5/18/2012	18.1	NV-L	22.2	NS
	Average	**19.1**	**9.3**	**23.9**	**10.5**

Baseline Air Quality

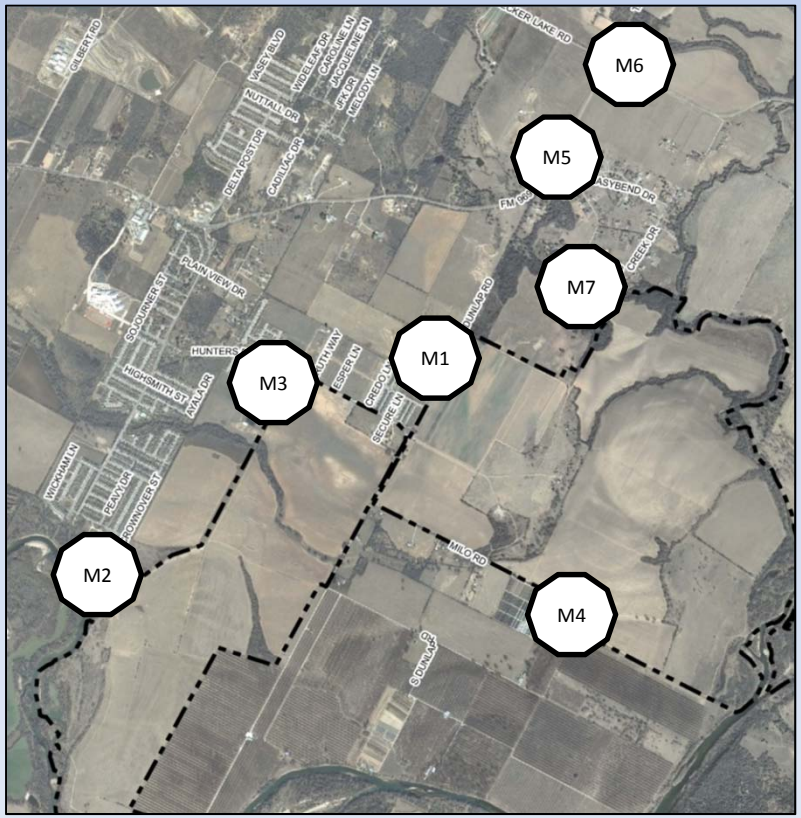
- Average $PM_{2.5}$ and PM_{10} levels from north and south sites averaged 9.8 *u*g/m^3 and 21.1 *u*g/m^3 respectively, and are representative of baseline levels
- 24-hr average National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$ and PM_{10} are 35.0 *u*g/m^3 and 150 *u*g/m^3 and are greater than baseline levels

Task 3 – Noise, Baseline Year Review

- Noise Monitoring was performed with a Quest SoundPro DL-1 Type 1 precision sound level meter
- Noise monitoring at 7 representative noise receptor sites
- Two rounds of short-term (15 min) noise monitoring performed
  - Oct 26, 27, 28, 31 and Nov 2, 3, 2011
  - March 22, 23, 28, 29, and 30, 2012
- One long-term (4 hour) noise monitoring performed near Chaparral Crossing on March 20, 2012
- Noise Monitoring not performed during Interim Year 1

Noise Monitoring Locations

- M1 - NW corner of Dunlap Rd and Chaparral Crossing Blvd. Representative of residences located closest to the proposed mining area. Long-term noise measurement also performed.



- M2 - south end of Crownover Street in Austin's Colony near the west side of mining area boundary.
- M3 - south end of Yabers Ct and south of Hunters Bend Rd, near NW mining area boundary.
- M4 - at Native Texas Nursery, near SW mining area boundary.
- M5 - NW corner of FM 969 and Decker Creek Dr, representative of residences within Twin Creek Meadows.
- M6 - NW corner of FM 969 and Taylor Lane, representative of residences on potential truck haul route along FM 969.
- M7 - south end of Decker Creek Dr representative of residences closest to north side of mining area.

Ambient Noise Measurements

Site Location	Monitored Noise Level (dBA Leq)										
	Round 1						Round 2				
	10/26	10/27	10/28	10/31	11/2	11/3	3/22	3/23	3/28	3/29	3/30
M1	47.0	53.6	51.0	50.4	53.1	55.5	45.5	42.7	52.6	44.4	44.0
M2	43.8	48.2	51.0	41.2	44.8	53.5	49.4	49.7	44.2	45.8	44.5
M3	42.1	46.9	46.6	43.7	47.5	47.6	51.3	44.4	44.3	47.1	41.6
M4	48.3	48.6	50.5	43.6	48.8	49.3	50.4	44.3	48.2	43.3	42.5
M5	59.6	59.9	59.1	58.2	61.6	60.8	57.6	58.9	58.5	56.7	56.8
M6	66.1	62.7	65.2	65.8	65.8	62.3	67.1	64.1	67.2	68.3	63.8
M7	39.7	47.2	52.4	46.0	48.7	43.3	44.7	41.6	53.5	45.7	45.2

Federal Transit Administration Construction Noise Criteria Guidelines

Land Use	Eight-hour Leq (dBA)	
	Day	Night
Residential	80	70
Commercial	85	85
Industrial	90	90

Baseline Noise Levels

- M1 long-term (4-hour) noise level was 46.8 dBA
- M1 to M4 and M7 located away from FM 969, had noise levels of 40 dBA to 55 dBA
- M5 and M6 located next to FM 969, had noise levels of 57 dBA to 68 dBA
- Baseline noise levels are less than Federal Transit Administration (FTA) Construction Noise Criteria Guidelines for residential, commercial, and industrial day and night noise levels

Conclusions

- Groundwater
  - Groundwater elevation is at 390 to 366 ft and tends to rise with rain fall and decline with lack of precipitation
  - The range of observed water quality values is representative of baseline conditions within the east and west well populations
  - Maximum baseline value + two standard deviation can be used as water quality threshold levels to identify future water quality values greater than baseline conditions on the periphery of mined areas

Conclusions (continued)

- Air
  - Average baseline $PM_{2.5}$ and PM_{10} levels are 9.8 *u*g/m^3 and 21.1 *u*g/m^3 and are representative of baseline levels
  - $PM_{2.5}$ and PM_{10} NAAQS are 35.0 *u*g/m^3 and 150 *u*g/m^3 and are greater than baseline levels
  - NAAQS can be used as air quality threshold levels

Conclusions (continued)

- Noise
  - Baseline noise levels ranged from of 40 dBA to 68 dBA
  - Baseline noise levels are less than residential, commercial, and industrial FTA Construction Noise Criteria Guidelines
  - FTA Construction Noise Criteria Guidelines can be used as noise threshold levels

Recommendations

- Groundwater
  - Collect quarterly water level, TPH and PAH data, continuous water levels with transducer, annual basic water quality data until mining starts, and update baseline values as appropriate
  - Collect quarterly water level data and water quality data, and continuous water levels with transducer during first two years of active mining
- Air - Collect quarterly air quality samples during first two years of active mining
- Noise - Perform semi-annual noise monitoring during the first year of active mining
- Compare groundwater, air, and noise environmental conditions during active mining to pre-mining baseline levels and to NAAQS for air and FTA guidelines for noise

Thank You to all Land Owners for Allowing Access

- Austin Tree Farm
- Barbra Buchheit
- Dale Holweger
- Douglas Edgar
- James Glass
- Mary Wisian
- Native Texas Nursery
- Mansville Water Supply
- Sara King
- TXI

Tree Nursery Located South of Planned Mining Area, Planned Mining Area in Left Background

Questions?