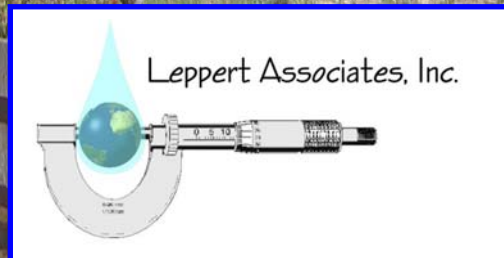


Arapahoe Aquifer Baseline Domestic Water Well Background Investigation Adams County, Colorado

Prepared for :

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1 ARAPAHOE AQUIFER BASELINE DOMESTIC WATER WELL SAMPLING

Leppert Associates (LA) was retained by the Colorado Oil and Gas Conservation Commission (COGCC) to conduct domestic water well sampling of the Arapahoe aquifer. The designated study area was: Townships 1 and 2 South, Ranges 59, 60, 61, 62, 63 and 64 West, in Adams County, Colorado. The purpose of the study was to collect up to 20 samples from individual water wells to provide background geochemical characterization of the Arapahoe aquifer in the area.

2 REGIONAL HYDROGEOLOGY

2.1 ARAPAHOE AQUIFER

The Arapahoe Aquifer is one of four principal Aquifers within the Denver Basin. The aquifers ranging from shallowest to deepest are: the Dawson Aquifer; the Denver Aquifer; the Arapahoe Aquifer; and the Laramie-Fox Hills (as described by Topper, et al., 2003). The Arapahoe Formation underlies an area of approximately 4700 square miles including eight Colorado counties. The Upper-Cretaceous age formation consists of interbedded sequences of conglomerate, sandstone, siltstone, and shale. The saturated thickness of these sediments may range from 0 feet along the margins of the aquifer to as much as 400 feet in the center of the basin. The Arapahoe Aquifer is divided into an upper and lower hydrologic unit along the northern basin where 50 to 100 feet of shale separate the sandstone and siltstone layers.

Groundwater conditions in the Arapahoe Aquifer are typically confined except along the basin margins. Transmissivity values in Adams County may range from 0 feet squared per day (ft^2/day) along the aquifer margins to as high as 1200 ft^2/day through the central and eastern portions. Well yields are high with values exceeding 300 gallons per minute (gpm) not unusual. Increasing demands on water supply have resulted in declining water levels throughout the aquifer including Adams County.

Water from the Arapahoe Aquifer is considered to be of good quality and classified as a sodium bicarbonate type. A typical water quality analysis for the aquifer (as modified from Robson, 1987) is shown below in Table 1. Regional studies demonstrate that dissolved solids concentrations tend to be low in the central portion of the aquifer and may increase to more than 2000 mg/l in the northern and eastern

margins of the aquifer. Isolated locations within the Arapahoe Aquifer have demonstrated reducing conditions which convert sulfate minerals and organic material to hydrogen sulfide and methane gases.

TABLE 1: A TYPICAL WATER QUALITY ANALYSIS FOR THE ARAPAHOE AQUIFER (AS MODIFIED FROM ROBSON, 1987).

Dissolved Constituent	Concentration in milligrams per liter (mg/l).
Calcium	31
Iron	0.17
Magnesium	3
Manganese	0.03
Potassium	4.1
Sodium	140
Bicarbonate	250
Carbonate	0
Chloride	57
Fluoride	1.1
Nitrate as N	0.04
Phosphate	4.1
Silica	9.6
Sulfate	110
Hardness as CaCO ₃	90
Dissolved Solids	479

2.2 PHASE I: WELL SELECTION AND PLANNING.

The State Engineer’s Office (SEO) database was reviewed to provide a list of water well owners for the study area. Database information provided by the SEO included well locations, well owners, and telephone numbers in addition to well completion details. Initial selection included approximately 30 wells from the database designated as wells completed in the Arapahoe Aquifer or alluvial wells in the eastern portion of the study area. No water wells completed in the Arapahoe Aquifer were found in Township 1S, Range 59W and, therefore, LA personnel selected alluvial wells to sample. The decision to sample alluvial wells in the eastern portion of the study area was based on the assumption that the Arapahoe aquifer in the eastern area was shallow and therefore the aquifer was unconfined and recorded as an alluvial aquifer. No wells were selected from Township 2S, Range 59W as none met either criterion. No wells were selected from Township 1S, Range 61W as only four Arapahoe aquifer wells were listed in the database and no information was available on well owners. All selected wells had

pumps and were reported to yield more than five gpm. Each of the 30 selected wells were designated as wells for domestic use.

Well owners chosen during the preliminary selection process were contacted by telephone approximately two weeks prior to field activities. All well owners were informed of proposed sampling and offered the opportunity to have their wells sampled as part of the study. Well owners were interviewed regarding well construction and performance, yields, water usage, and any existing filtration or treatment systems. A finalized list of well owners was prepared consisting of approximately 25 well owners in the area. The relatively large number of wells allowed for flexibility of alternatives during the field sampling process. A second series of telephone calls was conducted to confirm well owners' agreement to participate in the study. Formal records of telephone contacts were maintained and are included in Appendix A.

LA field personnel found it necessary to make substitutions for selected wells based on landowner communication and accessibility limitations. Substituted well locations are noted in telephone contact lists included in Appendix A. The selected well locations are illustrated in Figure 1. Wells 2-64B and 2-64C were determined based upon corrected GPS locations after field sampling to be south of the original study area. A review of the SEO database revealed that 2-64B (Crisman residence) was erroneously designated at Township 2 South. Sample location 2-64C was selected during field activities after communication with landowner and based upon the assumption that 2-64B was within the study area boundaries. Both wells were reported by well owners to be completed within the Arapahoe aquifer.

2.3 PHASE II:

2.3.1 Well Sampling Field Investigation

Field sampling was conducted on June 11th through 14th, 2007. For the purpose of this study, sampling locations were assigned designations based upon township, range, and order of sampling (i.e. 1-50A refers to a sample collected from Township 1 South, Range 50 West, and "A" meaning the first sample from this area). A list of sample locations and the corresponding property owners is included in Appendix A. In an effort to minimize confusion with the laboratory data, sample designations were not changed after corrected GPS locations revealed errors in township and range information.

Upon arrival at the selected locations LA personnel presented the well owners with the introductory letter composed by the COGCC (Appendix A). When well owners were present, LA field personnel conducted

brief interviews regarding well operation and usage. Well owners were consulted regarding preferences in disposal of purge water to avoid ponding around wellheads or taps. Well owners were consulted on the following conditions:

- Typical daily water use.
- Depth of well and location of well screen
- Production and operation of well

All selected wells had dedicated pumps. Samples were collected prior to any home water treatment and/or pressure tanks. Wells were purged to remove stagnant water in the casing and well riser prior to sample collection. Volumetric flow estimations were made by LA personnel using a stopwatch and 3.4 gallon bucket. All sampled wells produced volumes exceeding 3 gallons per minute. Flow rates were typically reduced once volumetric calculations were made to minimize localized flooding. Flow rates and estimated purge volumes were recorded on field sampling forms included in Appendix B. Field observations of produced water were in accordance with standard LA water sampling field protocol and included:

- Water clarity
- Water color
- Odors (if any)
- Effervescence (if any)
- Produced sediment (if any)
- Evidence of bacterial fouling (bioslimes or biofilms)

Field observations were recorded and notes are included in Appendix B. All field equipment was calibrated to manufacturer's instructions prior to use. Measurements of water temperature, pH, and specific conductance were made throughout the purging process. Wells were sampled after field parameters were stable (i.e., three consecutive readings separated by 3 to 5 minutes). Measurements varied no more than the following:

- pH; by less than 0.1 units
- temperature; by less than 0.2 °C
- specific conductance; by less than 5 percent for values less than 100 $\mu\text{S}/\text{cm}$ and less than 3 percent for values greater than 100 $\mu\text{S}/\text{cm}$

A calibrated Q Ray Systems LEL O₂ explosimeter was used to detect the presence of methane in the well and sampling area. Dissolved oxygen was measured using a calibrated WTW O Meter. Explosimeter and dissolved oxygen readings are recorded in Appendix B.

Water levels were not measured in any of the 20 sample locations, since sample collection was conducted at taps and wellheads were not accessible. Depth to water was approximated by some well owners based on well treatments and well installation. Notes regarding well owner volumetric estimates are included in Appendix B.

Digital photographs were taken of sampling locations and details were recorded on the Photo Log Forms included in Appendix B. Photos were not taken at sampling location 2-63A at well owner's request. Photos were not taken at locations 1-60B and 1-63C due to equipment limitations and weather conditions, respectively. GPS locations were recorded using a Trimble GeoXH with accuracy to the nearest one foot. Corrected GPS locations are included in Appendix B.

Flow rates were reduced to between 0.1 and 1 gpm prior to sample collection. Ground water samples were collected using laboratory supplied bottles and vials. Nitrile gloves were worn by sampling personnel. All field equipment was subsequently rinsed with deionized water between sample locations.

Collected samples were labeled in water-proof ink and included: a field sample identification number; date and time of collection; and the initials of sampler. Samples were placed in iced laboratory-supplied containers appropriate for the specific analyses being conducted.

Sample collection times were recorded and Chain of Custody (COC) forms were maintained by LA field personnel and updated after each sample was collected. Completed forms were delivered daily with the samples to Severn Trent Laboratories (STL) of Arvada, Colorado. Each form was verified to match the samples included in the associated cooler including the following information:

- Project name;
- Unique sample identification number;
- Sample collection date and time;
- Preservation method, if applicable;
- Analyses requested;
- Special handling or analysis requirements;
- Number and type of containers submitted;
- Dated signature of the sampler;

- Dated signature(s) of person(s), other than the sampler, involved in the delivery of the samples to the laboratory; and,
- Dated signature of STL acknowledging receipt of the collected samples.

The COC forms were completed and signed in indelible ink. The COC tracking number and the date and time of delivery to the laboratory was noted in the Field Logbook. A copy of the COC forms was delivered to and retained by the LA Project Manager. Prior to sealing the cooler, all sampling containers were verified one final time against that cooler's COC form.

2.3.2 Quality Assurance/Quality Control Sampling

Quality control samples were collected after collecting the ground water samples following the same techniques. These samples included duplicate samples and trip blank samples.

Duplicate samples were used to compare the results from two separate samples taken from the same location. The duplicate sample was a second set of bottles filled exactly the same way as the non-QC sample. These samples were preserved, packaged, and sealed in the same manner as non-QC samples. Duplicate samples were given unique sample identification numbers and were submitted blind to the laboratory. The duplicate bottles were filled after the non-QC sample bottles. Samples designated as 1-50A were duplicates of samples 1-59C.

2.3.3 Laboratory Analyses

Ground water samples were submitted and analyzed for the following parameters by the methods listed below. Samples were extracted and processed within the recommended holding times listed below with the exception of Sample 2-63C analyzed in the laboratory for pH. Laboratory reports indicate a pH value of 8.7. Field logs show pH values ranging from 8.85 to 8.91 during well stabilization. All recorded values are within acceptable limits according to EPA secondary drinking water standards.

TABLE 2: ANALYTES OF INTEREST AND THE CORRESPONDING HOLDING TIMES.

Analytes and Method Numbers	Holding Times
Chloride, sulfate by E300.0	28 days
Nitrate + Nitrite by E353.2	28 days
Major cations (sodium, calcium, magnesium, potassium, iron) by E200.7	6 months
Dissolved Metals (arsenic, barium, cadmium, chromium, lead, selenium, manganese) by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) by SW6020	6 months
Alkalinity (carbonate, bicarbonate) E310.1	14 days
Halides (fluoride, bromide) by E300.0	28 days
Dissolved methane by RSK 175	14days
TDS by E160.1	7 days
pH by E150.1	48 hours
BTEX by SW8021B	14days
Specific conductance by E120.1	28 days

3 SUMMARY OF DATA

Laboratory results are tabulated in Table 3. Duplicate samples and blanks are not included but complete laboratory reports are included in Appendix C. A preliminary data review illustrates consistencies between regional studies conducted by Robson (1987) and the 20 samples collected from the study area.

Figures 2 and 3 are Stiff diagrams designed to graphically represent analyte concentrations. The Stiff diagrams allow for the identification of patterns of spatial change over a geographical area within the Arapahoe Aquifer. Figure 2 illustrates distinct visual similarities using RCRA metals throughout the sample area with the exception of the wells in the eastern portion of the study area. Minor concentrations of selenium and arsenic were present in these wells creating a pattern different from those to the west. The eastern wells were relatively shallow (20 feet below ground surface) and represent unconfined conditions in the Arapahoe Aquifer whereas the wells to the west exceed 100 feet in depth.

Absolute concentrations (meq/L) of major ions were plotted and are illustrated in Figure 3. The results of this representation provide less of a distinct pattern than those of the metals plotted in Figure 2. Similarities appear the greatest between samples in the same north-south region (for example samples 1-60B and 2-60C) and tend to differ distinctly from east to west. The relative size of the individual Stiff diagrams also corresponds to the relatively high ionic concentrations as reflected in samples 1-59A and 1-59C.

Figure 4 graphically depicts ranges of metal concentrations in ground water samples using box and whisker plots. In addition to concentration ranges, the boxplots also include median concentrations and outliers. The plots allow for a simple characterization of the water types and may be useful for baseline comparison in future Arapahoe aquifer studies. The outliers depicted by Figure 4 represent predominantly low metal concentrations and are typically a function of low detection limits in analytical methods.

The Durov plot (see Figure 5) allows for direct comparison of the 20 samples and identification of any outliers and identification of any visually discernable trends. Major ions composition is reflected on a percentage basis. The sample results from the study reflect a predominance of sodium and sulfate/bicarbonate ions with pH values 7 to 9 and variable specific conductivity.

Sulfate was detected in 18 of the 20 samples. EPA secondary drinking water standards for sulfate of 250 mg/l was exceeded in wells 2-60C, 1-60B, 1-59A (and duplicate sample 1-50A), 1-59C, 1-63C, 1-63D, 1-63A and 1-64A.

Methane was detected in 11 of the 20 sample locations. Figure 6 illustrates the location of methane-bearing wells and the respective concentrations. Methane was not detected in wells located in the eastern sections of the study area (Townships 1 and 2 S, Ranges 59 and 60 W). Samples 2-61B, 2-63A, and 1-62A had higher methane concentrations relative to other samples; however, the source and distribution of elevated methane concentrations can not be discerned from these data alone.

Total dissolved solids (TDS) concentrations ranged from a low of 300 mg/l (1-63E) to 6200 mg/l (1-59A or 6300mg/l in duplicate 1-50A). Field notes indicate that sample location 1-59A was a hand-dug well which produced visible sedimentation during sample collection. EPA secondary drinking water standards for TDS are 500 mg/l, which was exceeded in samples 2-60C, 1-60B, 1-59A (and duplicate 1-50A), 1-63C, 2-61B, 1-62A, 1-63D, 1-63A, and 1-64A. Robson (1987) provides an average TDS value of 479mg/l for the Arapahoe Aquifer (see Table 1) and notes that TDS values typically increase to the east.

Nitrates-nitrites were detected in seven samples. Concentrations ranged from below detection limits to 8.5mg/l. Method E353.2 combines the concentration of nitrites and nitrates for a total of the two analytes. EPA guidelines for the combined analytes do not exist though drinking water standards for nitrate is 10 mg/l and nitrite is 1 mg/l. None of the twenty sample locations exhibited concentrations exceeding 10mg/l.

Selenium was identified in samples 1-59A (and duplicate 1-50A) and 1-59C in concentrations of 0.054 (0.055 for duplicate) and 0.22 respectively. The EPA drinking water standard for selenium is 0.05 mg/l.

Benzene was detected in sample 2-63A at a concentration of 0.74µg/l. This concentration is below EPA drinking water standard of 5µg/l. The source of the benzene is not obvious though it may be a result of nearby mechanical operations or possible laboratory contamination.

Toluene was identified in samples 1-59C and 2-64A. Concentrations from samples were 4.8 and 2.4µg/l, respectively. The EPA drinking water standard for toluene is 1mg/l. Relatively low concentrations of toluene in groundwater samples may be indicative of laboratory contamination.

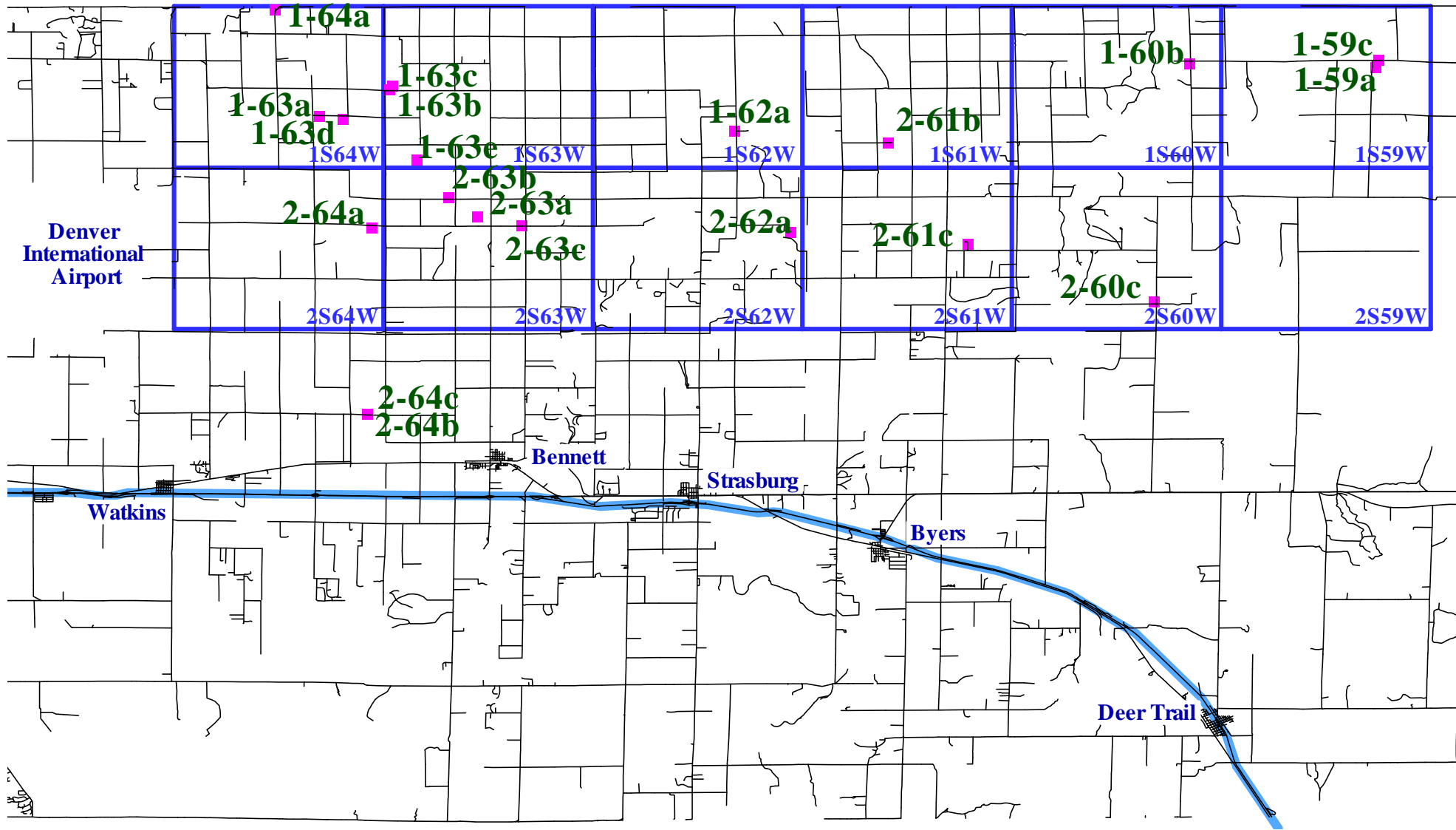
4 RECOMMENDATIONS FOR ADDITIONAL STUDIES




It is LA's recommendation that further ground water sampling be conducted for sample locations 2-61B, 2-63A, and 1-62A based upon methane concentrations from collected samples. Isotopic sampling should provide diagnostics as to the source of methane, whether the origins are biogenic or thermogenic. Sample location 2-63A exhibited benzene in addition to methane and, therefore, the additional analyses may provide additional insight into the occurrence of benzene at the location.

5 REFERENCES

Robson, S.G., 1987, *Bedrock Aquifers in the Denver Basin, Colorado: A Quantitative Water-Resources Appraisal: U.S. Geological Survey Professional Paper, 1257*, 73p.


Topper, R., K.L. Spray, W.H. Bellis, J.L. Hamilton, and P.E. Barkman, 2003, *Ground Water Atlas of Colorado: Special Publication 53*, Colorado Geological Survey, Division of Minerals and Geology, Department of Natural Resources 210p.



- Legend**
-  Interstate I-70
 -  Sampled Well Location
 -  Township Borders



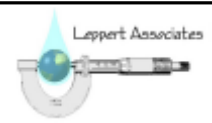
COGCC

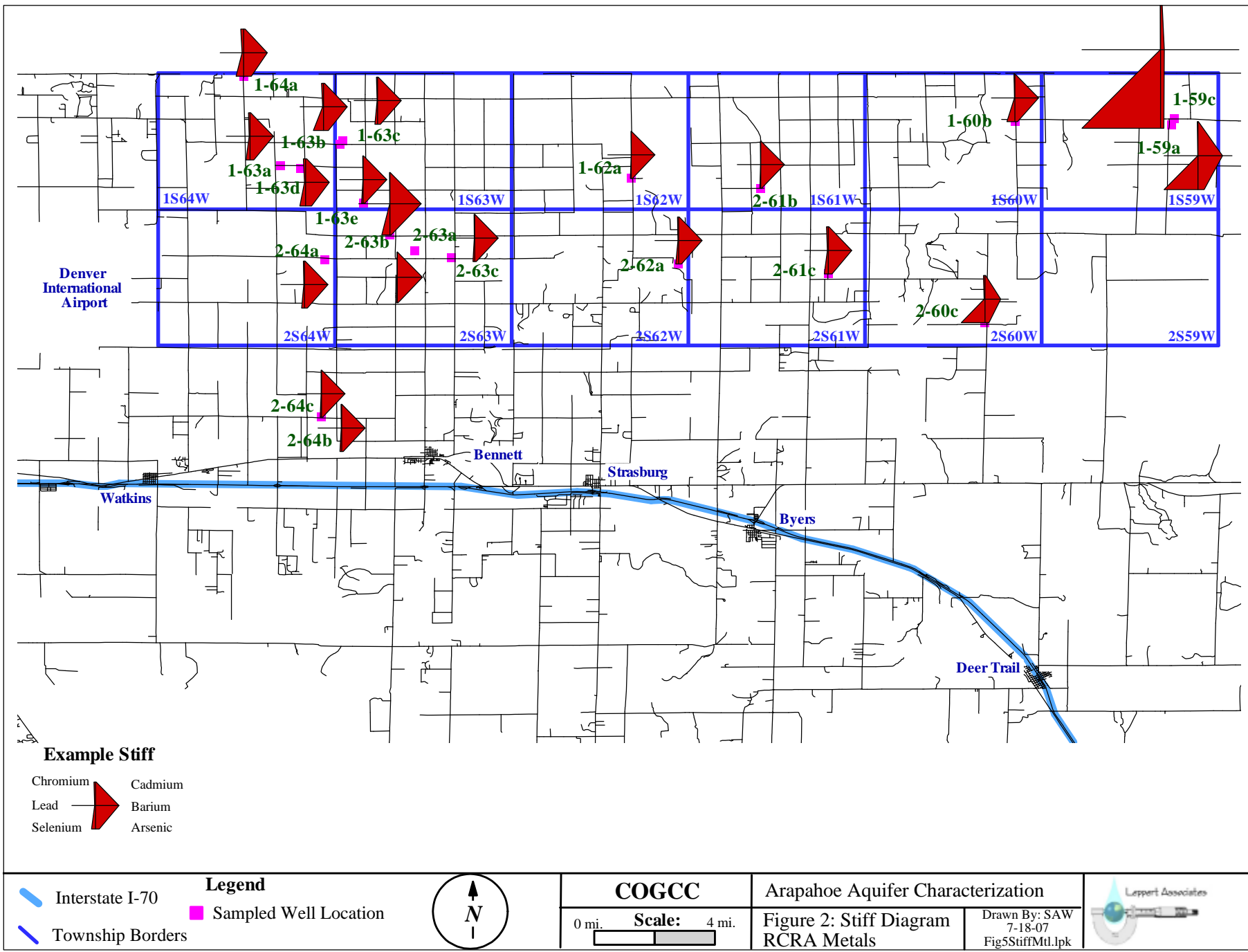
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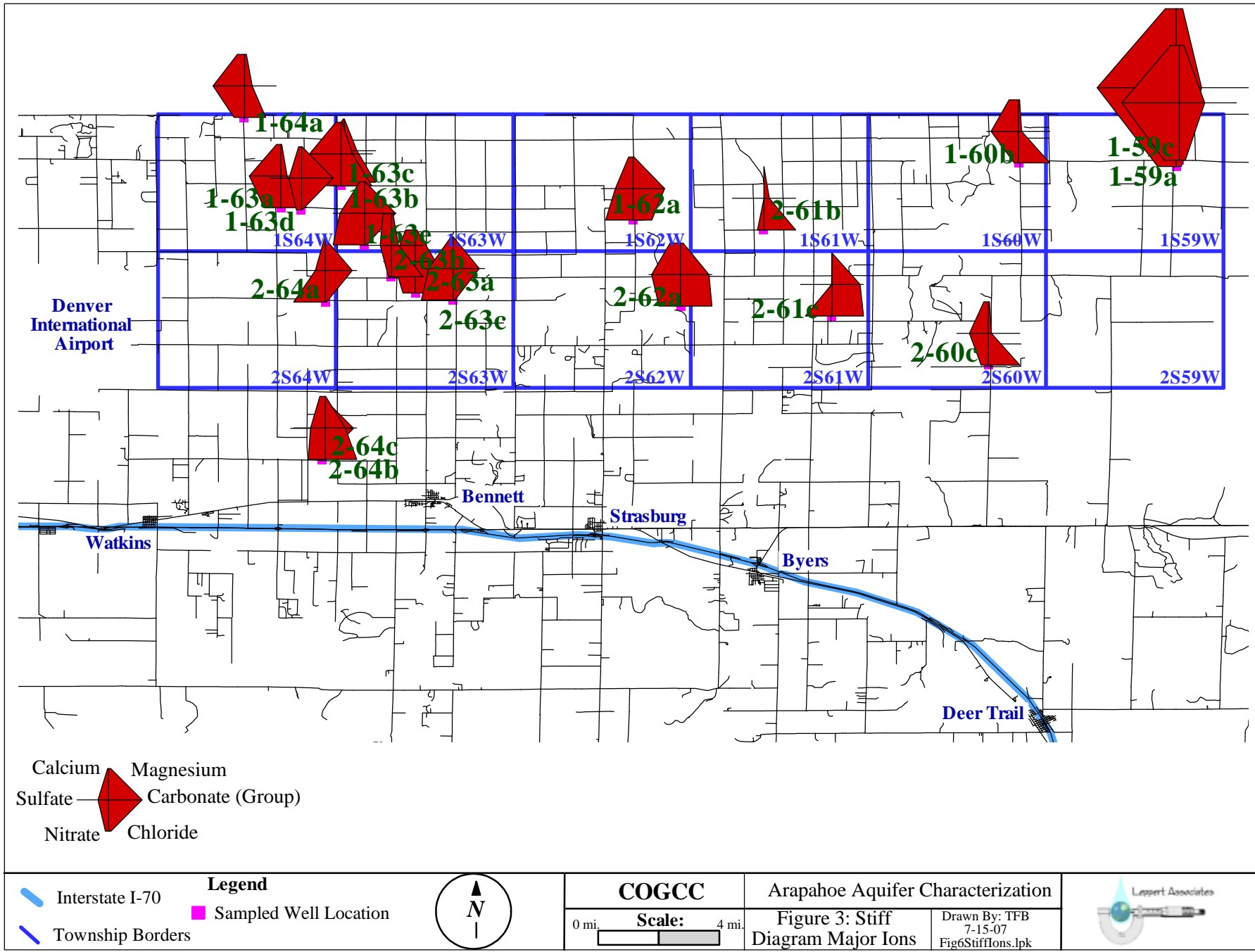
Arapahoe Aquifer Characterization

Figure 1:
Base Map

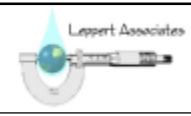
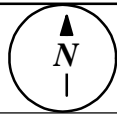
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ABBBaseMap.lnk

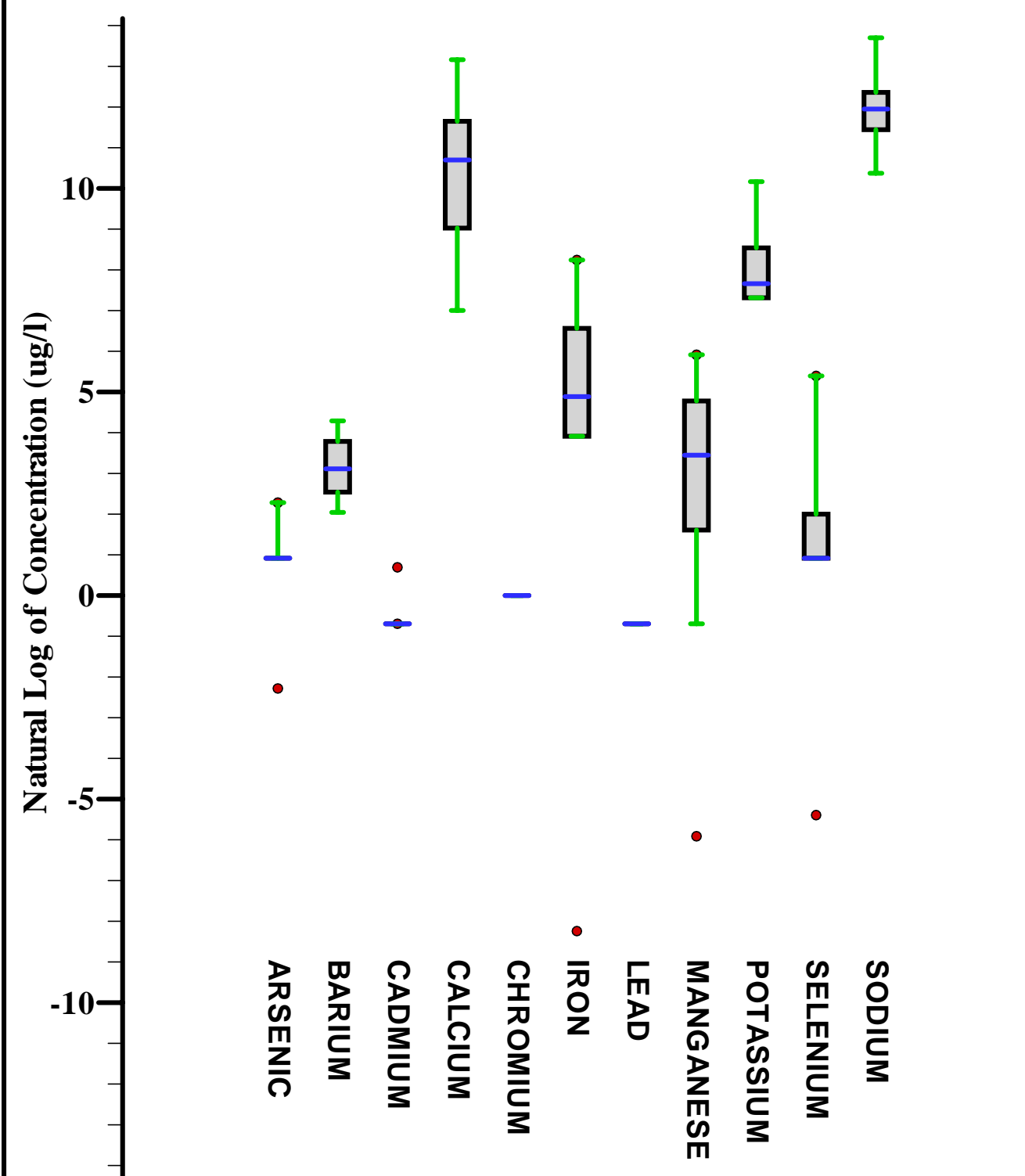






Calcium Magnesium
 Sulfate Carbonate (Group)
 Nitrate Chloride



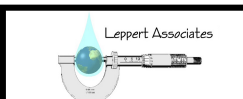


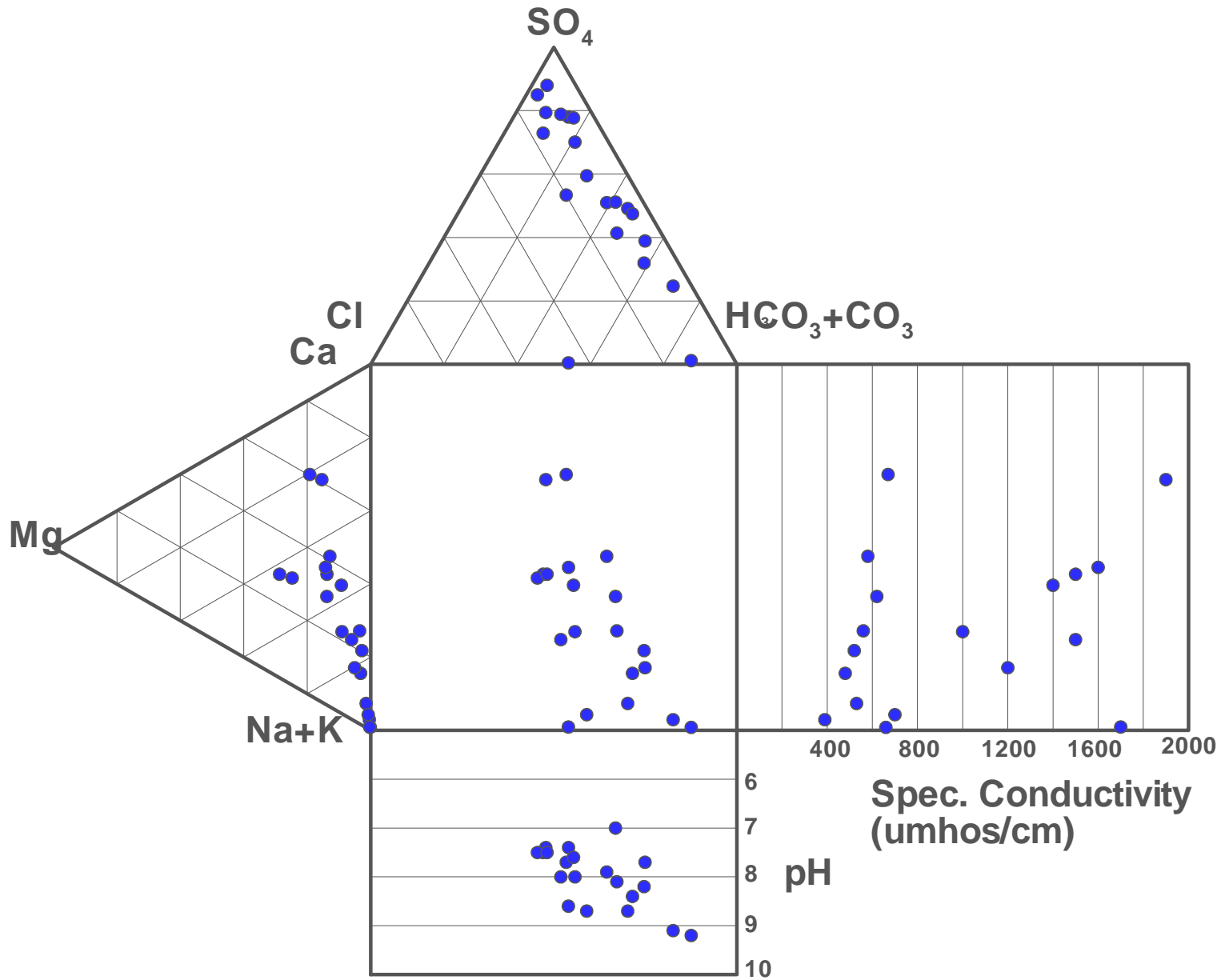
Legend	
	Whisker - Range Extent for Outliers
	Median
	Box - 25 Percentile to 75 Percentile
	Outlier

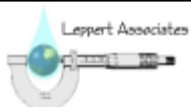
**Adams County
Arapahoe Aquifer
Characterization**

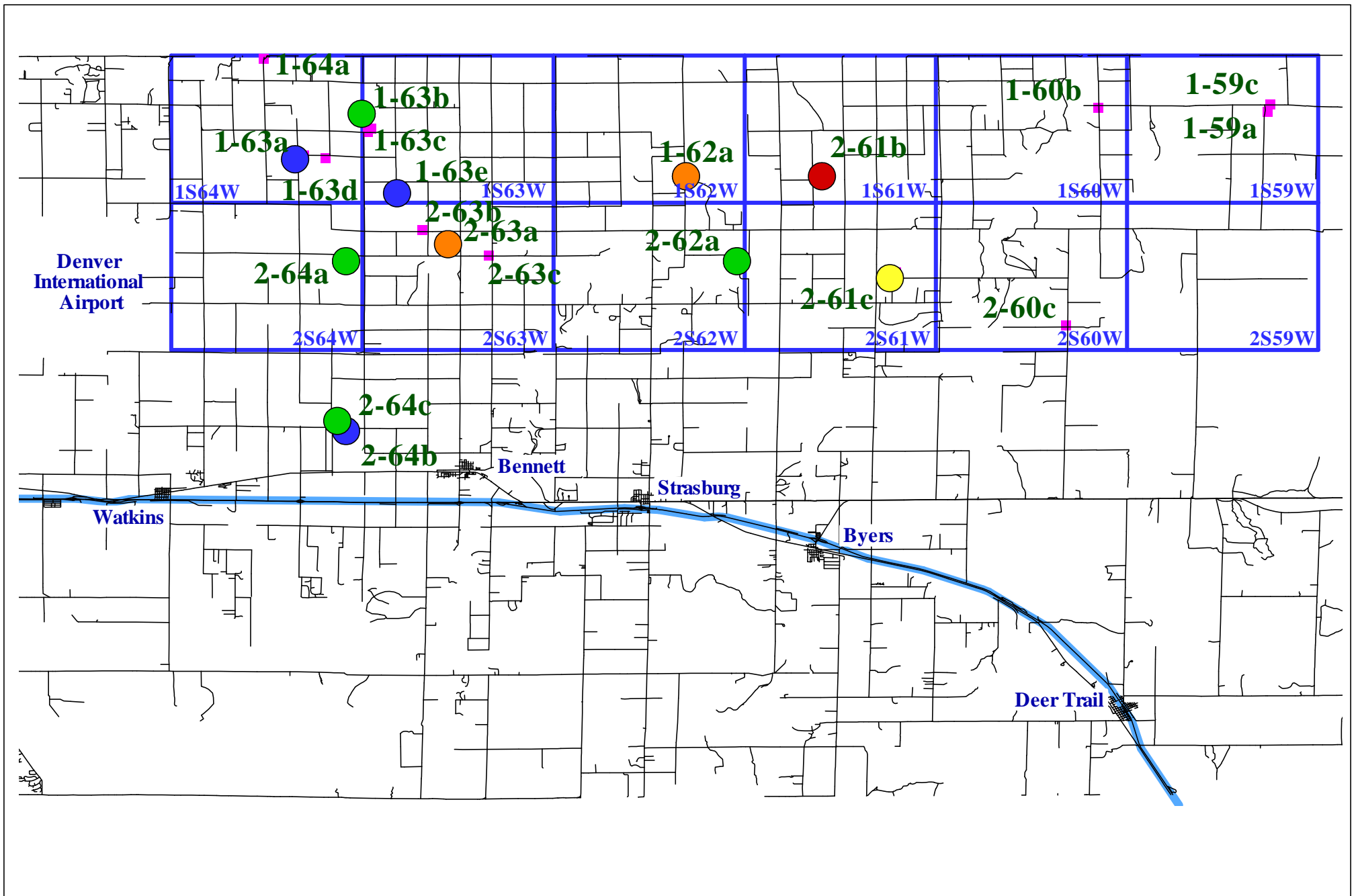
**Figure 4:
Box & Whisker
Plots for Metals**

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MAW
7/11/06
Fig4B&W14.lpk



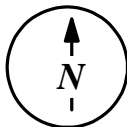


Legend	
Adams County Arapahoe Aquifer Characterization	
Figure 5: Durov Plot / Ion Signature	
Drawn By: SAW 7/19/07 WildHorse.lpk	 Leppert Associates



Legend

- 10000-15000 ug/l
- 1000-10000 ug/l
- 100-1000 ug/l
- 10-100 ug/l
- 5-10 ug/l
- < 5 ug/l



- Interstate I-70
- Township Borders

COGCC

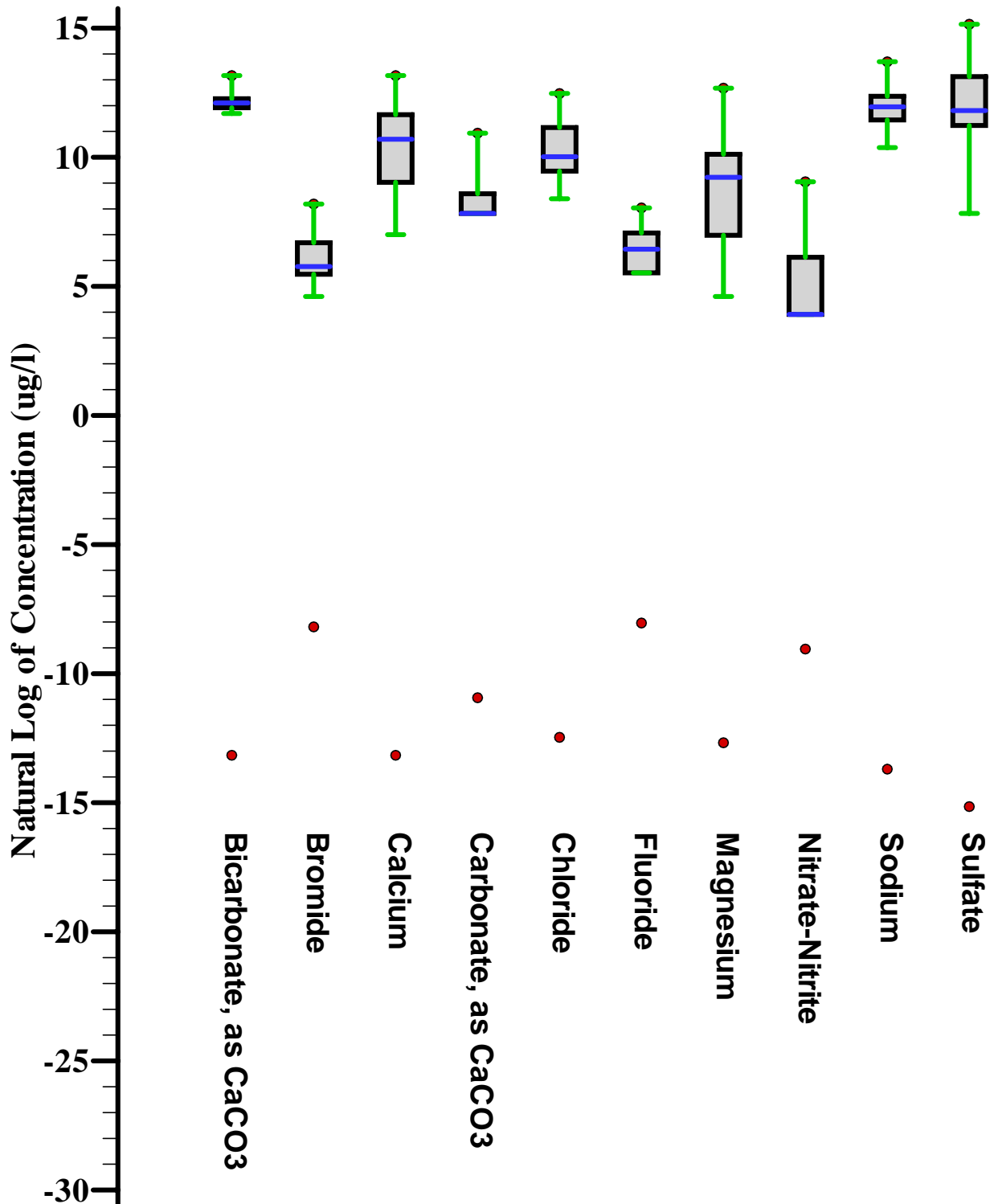
Arapahoe Aquifer Characterization



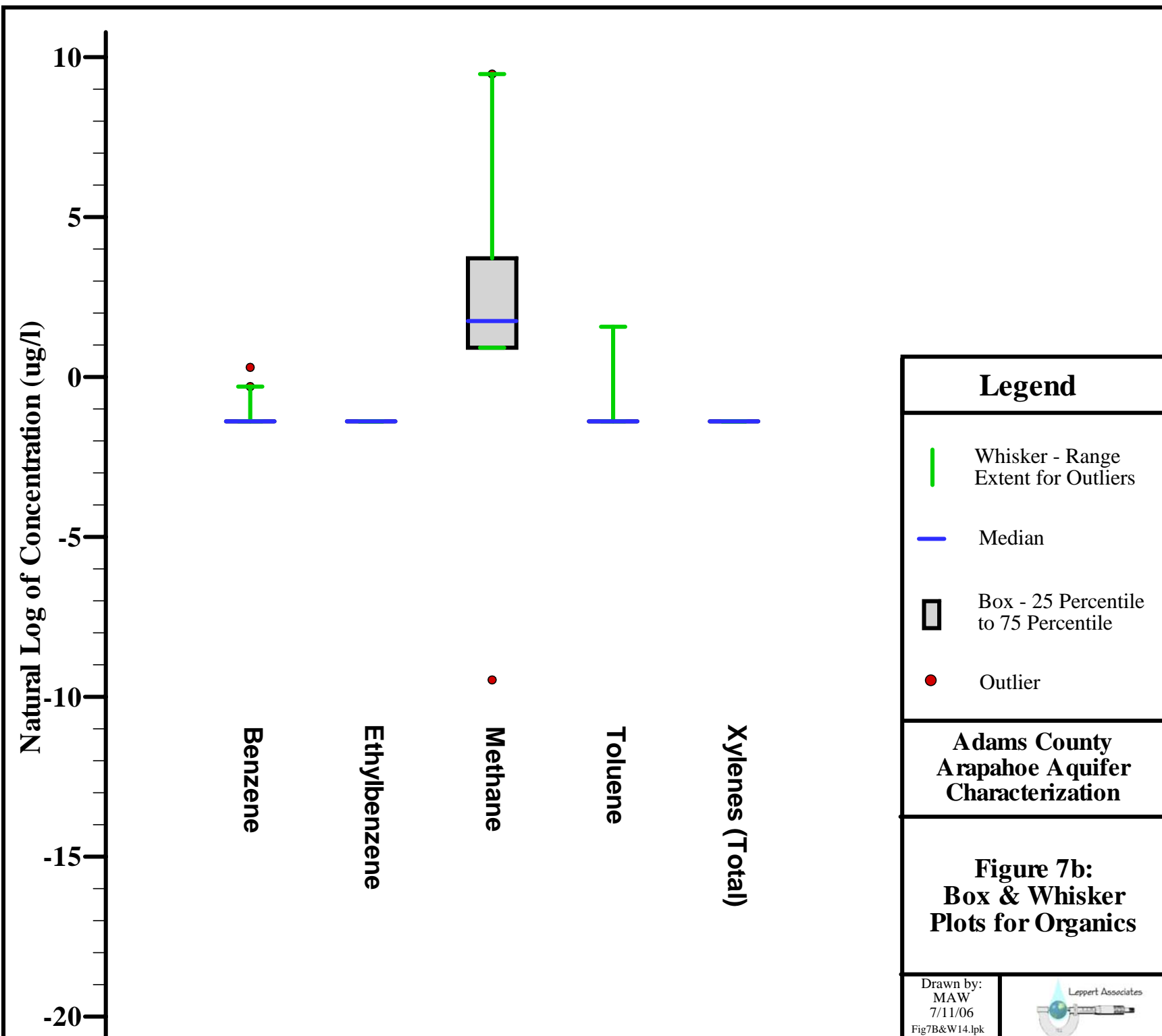
Figure 6: Dot Plot Methane

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Fig6MethaneDot.lpk





Legend	
	Whisker - Range Extent for Outliers
	Median
	Box - 25 Percentile to 75 Percentile
	Outlier
Adams County Arapahoe Aquifer Characterization	
Figure 7a: Box & Whisker Plots for Ions	
Drawn by: MAW 7/11/06 Fig7B&W14.lpk	



Legend	
	Whisker - Range Extent for Outliers
	Median
	Box - 25 Percentile to 75 Percentile
	Outlier

**Adams County
Arapahoe Aquifer
Characterization**

**Figure 7b:
Box & Whisker
Plots for Organics**

Drawn by:
MAW
7/11/06
Fig7B&W14.lpk



ARAPAHOE AQUIFER BASELINE DOMESTIC WATER WELL SAMPLING

TABLE: 3a



Sample Number	ARSENIC (DISSOLVED) Method 6020 Detection Limit 0.005mg/l	BARIUM (DISSOLVED) Method 6020 Detection Limit 0.001mg/l	BENZENE Method 8021B Detection Limit 0.5 ug/l	Bicarbonate as CaCO3 Method 310.1 Detection Limit 5mg/l	BROMIDE Method 300.0A Detection Limit 0.2 mg/l	CADMIUM (DISSOLVED) Method 6020 Detection Limit 0.001mg/l	CALCIUM (DISSOLVED) Method 200.7 Detection Limit 0.2mg/l
1-59A	0.0098	0.039	BDL	370	3.6	BDL	520
1-59C	0.0096	0.011	BDL	180	1.9	BDL	370
1-60B	BDL	0.024	BDL	170	1.2	BDL	280
1-62A	BDL	0.063	BDL	470	0.29	BDL	40
1-63A	BDL	0.015	BDL	150	0.43	BDL	66
1-63B	BDL	0.021	BDL	140	0.31	BDL	5.4
1-63C	BDL	0.012	BDL	180	0.4	BDL	49
1-63D	BDL	0.01	BDL	190	0.33	BDL	100
1-63E	BDL	0.035	BDL	150	BDL	BDL	14
1-64A	BDL	0.0077	BDL	220	0.44	BDL	130
2-60C	BDL	0.01	BDL	150	0.96	BDL	120
2-61B	BDL	0.058	BDL	520	2	BDL	2.8
2-61C	BDL	0.015	BDL	280	0.27	BDL	1.1
2-62A	BDL	0.021	BDL	180	0.23	BDL	39
2-63A	BDL	0.071	0.74	170	0.28	BDL	49
2-63B	BDL	0.073	BDL	120	0.47	BDL	88
2-63C	BDL	0.036	BDL	150	BDL	BDL	7
2-64A	BDL	0.021	BDL	130	BDL	BDL	2.3
2-64B	BDL	0.046	BDL	190	0.21	BDL	22
2-64C	BDL	0.039	BDL	180	0.26	BDL	29

BDL = Below Detection Limits

Detection Limits Provided Above Are Only Representative of Undiluted Samples (lower concentrations).

For Specific Detection Limits See Appendix B for Laboratory Reports.

ARAPAHOE AQUIFER BASELINE DOMESTIC WATER WELL SAMPLING

TABLE: 3b



Sample Number	Carbonate, as CaCO3 Method 310.1 Detection Limit 5mg/l	CHLORIDE Method 300.0A Detection Limit 3 mg/l	CHROMIUM (DISSOLVED) Method 6020 Detection Limit 0.002mg/l	ETHYLBENZENE Method 8021B Detection Limit 0.5 ug/l	FLUORIDE Method 300.0A Detection Limit 0.5 mg/l	IRON (DISSOLVED) Method 200.7 Detection Limit 0.1 mg/l	LEAD (DISSOLVED) Method 6020 Detection Limit 0.002mg/l
1-59A	BDL	250	BDL	BDL	BDL	3.8	BDL
1-59C	BDL	260	BDL	BDL	BDL	3	BDL
1-60B	BDL	95	BDL	BDL	BDL	BDL	BDL
1-62A	BDL	17	BDL	BDL	1.4	0.77	BDL
1-63A	BDL	38	BDL	BDL	BDL	2.1	BDL
1-63B	6.9	21	BDL	BDL	0.84	0.29	BDL
1-63C	BDL	29	BDL	BDL	BDL	0.49	BDL
1-63D	BDL	24	BDL	BDL	BDL	0.55	BDL
1-63E	BDL	5.5	BDL	BDL	0.78	0.16	BDL
1-64A	BDL	37	BDL	BDL	0.62	1.4	BDL
2-60C	BDL	85	BDL	BDL	1.2	BDL	BDL
2-61B	55	190	BDL	BDL	3.1	BDL	BDL
2-61C	56	19	BDL	BDL	0.85	BDL	BDL
2-62A	BDL	12	BDL	BDL	0.61	2.4	BDL
2-63A	BDL	16	BDL	BDL	0.58	BDL	BDL
2-63B	BDL	33	BDL	BDL	BDL	0.2	BDL
2-63C	7.3	6.7	BDL	BDL	1.1	BDL	BDL
2-64A	21	4.4	BDL	BDL	1.8	BDL	BDL
2-64B	BDL	11	BDL	BDL	0.63	BDL	BDL
2-64C	BDL	17	BDL	BDL	0.57	0.11	BDL

BDL = Below Detection Limits

Detection Limits Provided Above Are Only Representative of Undiluted Samples (lower concentrations).

For Specific Detection Limits See Appendix B for Laboratory Reports.

ARAPAHOE AQUIFER BASELINE DOMESTIC WATER WELL SAMPLING

TABLE: 3c



Sample Number	MAGNESIUM (DISSOLVED) Method 200.7 Detection Limit 0.2mg/l	MANGANESE (DISSOLVED) Method 6020 Detection Limit 0.001mg/l	METHANE Method SOP-175 Detection Limit 5ug/l	NITRATE-NITRITE Method 353.2 Detection Limit .1mg/l	pH Method 150.1 Detection Limit 0.1 (No Units)	POTASSIUM (DISSOLVED) Method 200.7 Detection Limit 3mg/l	SELENIUM (DISSOLVED) Method 6020 Detection Limit 0.005mg/l
1-59A	320	0.27	BDL	7.4	7.5	26	0.054
1-59C	190	BDL	BDL	BDL	7.5	12	0.22
1-60B	43	0.006	BDL	2.6	7.4	10	0.0083
1-62A	8.4	0.14	7200	BDL	7.7	4	BDL
1-63A	11	0.13	5.6	BDL	8	BDL	BDL
1-63B	0.66	0.017	17	BDL	8.7	BDL	BDL
1-63C	12	0.064	BDL	0.68	8	3	0.0052
1-63D	16	0.13	BDL	0.11	7.6	3.9	BDL
1-63E	1.9	0.044	5.9	BDL	8.4	BDL	BDL
1-64A	30	0.19	BDL	BDL	7.4	4.6	BDL
2-60C	28	BDL	BDL	4.2	7.5	6.8	0.015
2-61B	0.66	0.0031	13000	BDL	8.6	BDL	BDL
2-61C	BDL	0.0056	850	BDL	9.2	BDL	BDL
2-62A	11	0.085	51	BDL	7	5.3	BDL
2-63A	9.3	0.029	1500	0.14	7.9	BDL	BDL
2-63B	17	0.002	BDL	8.5	7.7	4	0.019
2-63C	0.9	0.013	BDL	BDL	8.7	BDL	BDL
2-64A	0.22	0.0081	21	BDL	9.1	BDL	BDL
2-64B	1.8	0.034	14	BDL	8.2	BDL	BDL
2-64C	2.4	0.038	8.3	BDL	8.1	BDL	BDL

BDL = Below Detection Limits

Detection Limits Provided Above Are Only Representative of Undiluted Samples (lower concentrations).

For Specific Detection Limits See Appendix B for Laboratory Reports.

ARAPAHOE AQUIFER BASELINE DOMESTIC WATER WELL SAMPLING

TABLE: 3d



Sample Number	SODIUM (DISSOLVED) Method 200.7 Detection Limit 5mg/l	SPECIFIC CONDUCTANCE Method 120.1 Detection Limit 2umhos/cm	SULFATE Method 300.0A Detection Limit 5 mg/l	TOLUENE Method 8021B Detection Limit 0.5 ug/l	TOTAL ALKALINITY Method 310.1 Detection Limit 5 mg/l	TOTAL DISSOLVED SOLIDS Method 160.1 Detection Limit 10mg/l	XYLENES (TOTAL) Method 8021B Detection Limit 0.5 ug/l
1-59A	890	6500	3800	BDL	370	6200	BDL
1-59C	660	5000	2500	BDL	180	4300	BDL
1-60B	120	1900	820	BDL	170	1500	BDL
1-62A	250	1200	160	BDL	470	770	BDL
1-63A	250	1500	470	BDL	150	1000	BDL
1-63B	150	700	150	BDL	150	430	BDL
1-63C	170	1000	300	4.8	180	650	BDL
1-63D	180	1400	440	BDL	190	940	BDL
1-63E	94	480	74	BDL	150	300	BDL
1-64A	190	1600	560	BDL	220	1100	BDL
2-60C	190	1500	510	BDL	150	1100	BDL
2-61B	400	1700	BDL	BDL	580	950	BDL
2-61C	160	660	BDL	BDL	340	390	BDL
2-62A	82	620	110	BDL	180	390	BDL
2-63A	62	580	110	BDL	170	370	BDL
2-63B	32	670	120	BDL	120	440	BDL
2-63C	110	530	85	BDL	160	340	BDL
2-64A	93	390	29	2.4	160	240	BDL
2-64B	94	520	51	BDL	190	310	BDL
2-64C	92	560	79	BDL	180	340	BDL

BDL = Below Detection Limits

Detection Limits Provided Above Are Only Representative of Undiluted Samples (lower concentrations).

For Specific Detection Limits See Appendix B for Laboratory Reports.