CHARACTERIZING A GROUNDWATER SYSTEM DOWNGRADIENT OF A COAL MINE WASTE ROCK DUMP, ELK VALLEY, BRITISH COLUMBIA, CANADA

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By

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ABSTRACT

Seepage from steelmaking coal mine waste rock dumps in the Elk Valley, British Columbia, Canada can contain selenium (Se), cadmium (Cd), and sulfate (SO_4^{2-}) from the oxidation of sulfide minerals, and nitrate (NO_3^-) from blasting. The impact of these constituents of interest (CIs) on receiving groundwater systems and the potential for their natural attenuation is investigated. A 10.7 km^2 mine-impacted research catchment (West Line Creek) was instrumented with 13 monitoring wells and 8 drivepoint wells to characterize the hydraulics and hydrochemistry of the aquifer system downgradient of the waste rock dump. Drill core samples from valley-bottom sediments defined subsurface lithologies, geotechnical properties, and geochemical characteristics. The groundwater monitoring program also facilitated the development of a conceptual model of hydrogeology in a small montane valley.

An unconfined aquifer at the overburden/fractured bedrock interface, i.e. the basal alluvial aquifer was identified as the primary groundwater conduit for the migration of water and solutes from the waste rock dump toward Line Creek. Vertical and horizontal dispersion of CIs in the overburden aquifer system was established by porewater analysis of core samples, with Se concentrations exceeded the BC water quality guideline for aquatic life (2.0 µg/L) in 98% of samples (n = 223). Residence time in the basal alluvial aquifer across the 650 m study site was determined using $^3H/^3He$ age dating (n = 3) and estimates of groundwater velocity to be less than three years. The chemical composition of surface and groundwater samples were compared to evaluate CIs from their source through to identified discharge locations. Geochemical modelling and measured *in situ* geochemical parameters established that SO_4^{2-} was a conservative ion in solution. Linear correlation of CI concentrations with SO_4^{2-} concentrations in water samples indicated that Se and NO_3^- were also conservative, whereas Cd was non-conservative and may be undergoing mineral precipitation or adsorption reactions in the subsurface. The distribution of CIs in groundwater was seasonally variable, and dilution was determined to be the dominant mechanism controlling the concentrations of Se, SO_4^{2-}, and NO_3^- away from the toe of the waste rock dump and during the spring freshet. The basal alluvial aquifer downgradient of the waste rock dump was estimated to annually discharge 16% of the water and 7% of the SO_4^{2-} load from the catchment.

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
AWTF	Active Water Treatment Facility
AGL	Aqueous Geochemistry Laboratory
BP	Barometric Pressure
BC	British Columbia
CI	Constituent of Interest
CBE	Charge Balance Error
DI	Deionized Water
DIC	Dissolved Inorganic Carbon
ERT	Electrical Resistivity Tomography
FS	Full Scale
GVI	Gas Vapor Implant
HDPE	High-Density Polyethylene
HPLC	High Perfomance Liquid Chromatograph
ICS	Ion Chromatograph System
ICP-MS	Inductively-Coupled Plasma Mass Spectrometry
ICP-OES	Inductively-Coupled Plasma Optical Emission Spectrometry
K	Hydraulic Conductivity
LDM	Laser-Diffraction Method
LDO	Liquid Dissolved Oxygen
LDPE	Low-Density Polyethylene
Masl	Meters Above Sea Level
Mbgs	Meters Below Ground Surface
MDL	Method Detection Limit
MU	Measured Uncertainty
n_T	Total Porosity
n_E	Effective Porosity
θg	Gravimetric Water Content
ORP	Oxidative-Reductive Potential
ρ_d	Dry Bulk Density
ρ_w	Wet Bulk Density
Q	Discharge Velocity
q	Specific Discharge
QCP	Quality Control Program
S_g	Particle Density
S_y	Specific Yield
SpC	Specific Conductance
TDS	Total Dissolved Solids
USDA	United States Department of Agriculture
USCS	United Soil Classification System
VSMOW	Vienna Standard Mean Ocean Water
v	Flow Velocity
WQG	Water Quality Guideline
WLC	West Line Creek

CHAPTER 1
INTRODUCTION

The Elk Valley coalfield of British Columbia (BC) is one of the major steel-making coal producing areas of Canada. In the Valley, Teck Resources Ltd. operates five open-pit mines using large-scale removal of overburden waste rock to access shallow coal seams. This waste rock is then pushed into mined-out pits or adjacent valleys using end-dumping methods that form waste rock dumps up to several kilometers long and often bury existing streams (Palmer et al., 2010). In the Elk Valley, mining of the coal-bearing Mist Mountain formation produced 25 million metric tons of coal in 2013 (Teck Resources Limited Annual Report, 2014) and over 140 million metric tons of waste rock annually (Lussier et al., 2003). As of 2010, the cumulative volume of all the waste rock dumps in the valley was estimated to be 4.7 billion bench cubic meters (Golder Associates, 2013). Drainages from the waste rock dumps enter the Elk River downstream of mining operations, subsequently flowing into the United States about 110 km downstream of the town of Sparwood, BC.

Drainages from the base of waste rock dumps contain constituents of interest (CIs) including selenium (Se) that can be toxic or damaging to biota in downstream environments (Palmer et al., 2010). In the mid-1980s, Se concentrations at surface water quality monitoring sites on the Elk River were below the current BC water quality guideline (WQG) for aquatic life of 2.0 μg/L (MacDonald and Strosher, 1998). Se concentrations at these sites began to increase in the mid-1980s and average concentrations exceeded the provincial guidelines by the late-1990s. Since 2008, Se concentrations have exceeded 2.0 μg/L near Sparwood, BC (Dessouki and Ryan, 2010). SAPSE (2010) notes that the increasing Se concentrations in the Elk River are directly proportional to the total volume of waste rock mined.

Teck Resources Ltd. Elk Valley Water Quality Plan (2014) identifies strategies and solutions to address increasing concentrations of CIs mobilized from waste rock materials including selenium (Se), sulfate (SO_4^{2-}) and cadmium (Cd) derived from the oxidation of sulfide minerals, and nitrate (NO_3^-) from blasting residue. However, the contribution of groundwater that is recharged through the waste rock dumps to the increasing concentrations of CIs in the Elk River is not known. The Elk Valley Water Quality Plan (2014) only addresses groundwater quality in the floodplains of Elk River Valley, where several private and municipal wells have recently exceeded BC WQG for Se. The primary source of Se in wells found in populated areas is believed to be surface water recharge, particularly downgradient of river meanders (Elk Valley Water Quality Plan, 2014). The extent of upland recharge of mine-impacted waters was not addressed.

Beginning in 2012, as part of a multi-disciplinary research program, an investigation was initiated to examine the impact of CIs on a groundwater system downgradient of a waste rock dump. The objectives of this study were threefold: (1) to characterize the hydrogeology and hydrochemistry in the West Line Creek (WLC) valley downgradient of the WLC waste rock dump, (2) to estimate the rates of annual groundwater flow and mass fluxes of CIs in the dominant aquifer, and (3) to evaluate the potential for natural or enhanced attenuation of CIs in the groundwater system. These objectives were attained by drilling several borehole nests to access water bearing formations and by analyzing core and drill cuttings to determine geotechnical parameters, hydraulic properties, porewater chemistry, solid digest chemistry and leached water chemistry. Field testing of monitoring wells and groundwater sampling was conducted extensively over a two-year study period.

The results of this research provide tools to evaluate groundwater systems in small mine-impacted mountain catchments as well as for the implementation of subsurface monitoring programs in these settings. Generally, studies of alpine hydrology rely mostly on surface observations and surface water hydrometric data rather than wells to determine groundwater output at the catchment scale (Roy and Hayashi, 2009). This study presents an evaluation of alpine/sub-alpine aquifers using a network of monitoring wells and the internal geologic structure of the subsurface provided by drilling. The development of a conceptual model of flow and CI transport provides a framework to evaluate impact of coal mining on groundwater, the contribution of groundwater to surface water quality, and preliminary site characterization that could guide future remedial work in the Elk Valley, BC.

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CHAPTER 2
LITERATURE REVIEW

2.1 Montane Hydrogeology

Characterizing groundwater flow in mountainous terrain poses significant challenges and studies have been limited (Manning and Solomon, 2005; Gleeson and Manning, 2008). In part, this can be attributed to the difficulty of drilling boreholes and installing groundwater monitoring wells in alpine environments, a result of physical constraints and regulations regarding the protection of pristine environments (Roy and Hayashi, 2009). Studies of alpine/sub-alpine hydrology have often used flow and water properties of springs to elucidate sources or characteristics of groundwater flow paths (e.g. Clow et al., 2003). Thus, conceptual models of groundwater flow in these environments often involve a fair bit of speculation, often relying on surface hydrometric measurements (i.e. springs, lakes, and ponds) rather than wells and surface observations rather than internal data from drilling for the structure of the overburden sediment and bedrock topography (Roy and Hayashi, 2009). Since complex interrelationships between topography, climate and geology control groundwater flow paths and the distribution of discharge, these environments are highly dynamic systems (Gleeson and Manning, 2008). The simulation of these systems, particularly under climate change scenarios, often requires the use of complex transient models to reproduce field observations.

Recently, studies at the hillslope scale in alpine catchments also discard the suitability of the steady-state assumptions in flow models and identify several transient water table dynamics (e.g. Seibert et al., 2003; Penna et al., 2015). For example, differences in the hydrological regime of the near-stream riparian zone and the more distant upslope area have been recognized. These studies used networks of shallow piezometers (<2 mbgs) and identified surface and bedrock topography, soil depth, soil properties (e.g. antecedent moisture) and distance upslope from the stream course as the most important physical characteristics affecting the spatio-temporal variability of shallow groundwater response to precipitation events. However, the processes governing the temporal dynamics of shallow aquifers and the factors affecting the spatial variability in piezometric responses at the catchment scale are still not fully understood (Rinderer et al., 2014).

In many mountain catchment studies, the flow of groundwater is assumed to occur in the shallow unconsolidated overburden material of the basin (Tiedeman et al., 1998). These overburden materials form valley-bottom aquifers in that are important groundwater resources in the western US and Canada (Smerdon et al., 2008). Furthermore, these overburden deposits are often geologically complex (i.e. the type and extent of surface materials), which is a key controlling factor in groundwater contribution to stream flow (Hood et al., 2006; Clow et al., 2003). Structurally complex bedrock aquifers have only recently been shown to contribute largely to lowland rivers and aquifer. Thus, in analyzing groundwater flow through mountain catchments it is often useful to divide flow paths into two categories: bedrock and glacial deposit flow (Tiedeman et al., 1998). This distinction can be important because bedrock aquifers can flow across topographic divides, signifying that the groundwater drainage basin may be markedly larger than the surface water drainage basin (e.g. Manning and Caine, 2007). Tiedeman et al. also showed that in formerly glaciated terrain the groundwater recharge into a kettle lake was up to 60% along flowpaths that involve movement in bedrock. Factors controlling groundwater flow systems in alpine terrains identified in catchment scale and bedrock aquifer studies include:

- Surface topography such as relief, slope profile and three-dimensional form
- Geological controls on variability in porosity and permeablility
- Climate influencing infiltration, surface temperatures and extent of glaciers
- Vegetation effects on infiltration (Forster and Smith, 1988)

2.2 Tools for Analyzing Groundwater Flow and Aquifer Characteristics

Environmental isotopes and subsurface temperatures provide useful tracers of groundwater movement. Analyses of these tracers provides tools to evaluate groundwater flow paths including the relative importance of various recharge sources, the evolution of geochemistry within a flow system, and to determine residence times of groundwater. Geophysical methods are useful non-invasive techniques to define aquifer geometry. Several of these methods are described.

2.2.1 Carbon-13 Isotope Signature in Dissolved Inorganic Carbon

Measuring the relative abundance of the stable isotope of carbon, ^{13}C, in ground water provides a means of tracing carbonate evolution in a groundwater system and can be used to evaluate potential geochemical reactions. This is possible because large differences exist in ^{13}C among various carbon reservoirs in regional groundwater flow systems (Hutchings and Petrich, 2002). The evolution of dissolved inorganic carbon (DIC) and its associated $\delta^{13}C$ values begins with atmospheric CO_2 that has a $\delta^{13}C$ value of roughly -7‰ Vienna Pee-Dee Belemnite (VPDB). Isotopic fractionation of $\delta^{13}C$ during (C3) plant uptake of CO_2 results in an overall depletion of about 22‰, giving a $\delta^{13}C$ value of between -24 to -30‰. Subsequent fractionation of about 4‰ during plant decomposition results in soil CO_2 with $\delta^{13}C$ values of roughly -23‰. Dissolution of soil CO_2 into infiltrating water allows it to become hydrated and dissociates into HCO_3^- and CO_3^{2-}, resulting in further fractionation of $\delta^{13}C$ to values of around -15‰, at circum-neutral pH (Clark and Fritz, 1997). Weathering of calcite and other carbonate minerals in the soil profile causes DIC concentrations to increase and $\delta^{13}C$ to evolve to higher values until calcite saturation is reached (Hutchings and Petrich, 2002). For groundwaters in media containing carbonate minerals, dissolution of carbonate results in the evolution of $\delta^{13}C_{DIC}$ to more enriched values, depending on whether dissolution is occurring in an open or closed system with respect to CO_2. Under open conditions in the unsaturated zone, the $\delta^{13}C_{DIC}$ is more strongly influenced by the biomass carbon pool (around -25‰) compared to the carbonate pool (around 0‰) (Clark and Fritz, 1997).

2.2.2 Tritium-Helium (3) Groundwater Age Dating

Numerous methods exist for age dating groundwater (e.g. carbon-14 and chlorofluorocarbon analyses); however, the simplest and most frequently used involves analyzing water for isotopes of hydrogen and helium. Tritium (^{3}H) is a radioactive isotope of hydrogen with a half-life of 12.4 years and is formed naturally by cosmic-ray bombardment of nitrogen and ^{2}H in the upper atmosphere. Minor amounts of ^{3}H are also formed by neutron radiation of lithium in bedrock. Since the 1960s, ^{3}H levels have been artificially elevated in the atmosphere by thermonuclear testing and nuclear reactor operations, as summarized in Kazemi et al. (2006) and Solomon and Cook (2002). Pre-bomb (natural) ^{3}H levels in precipitation ranged from 0.5 to 20 TU, while ^{3}H levels in precipitation in the northern hemisphere following nuclear testing in the Arctic were in excess of 5,000 TU (Solomon and Cook, 2002). Concentrations of ^{3}H in groundwater signify atmospheric levels of ^{3}H when the water was last in contact with the atmosphere, and can be used to estimate the date of groundwater recharge (Motzer, 2007).

However, the initial recharge concentration of ^{3}H, particularly in modern groundwaters, is not always known with certainty. A more accurate method to determine the age of groundwater recharge is to measure the relative abundance of ^{3}H and helium (3) in a groundwater sample. Tritium decays to ^{3}He (tritiogenic helium) by particle emission following a known decay rate that allows for a more accurate groundwater age to be estimated (Solomon and Cook, 2002). In young shallow groundwaters other sources of ^{3}He (e.g. mantle derived ^{3}He) are considered negligible but atmospheric ^{3}He must be separated from ^{3}He produced by tritium decay in the saturated zone. This is done by measuring the ^{4}He content in the groundwater sample and calculating the ^{3}He/^{4}He ratio of the sample (Kazemi et al., 2006). ^{3}H/^{3}He ratios are useful for determining groundwater ages ranging from several months to about 50 years.

2.2.3 Groundwater Temperatures

Groundwater temperature varies with depth and is a function of two main factors: the background geothermal gradient and ambient temperature at the land surface (Stuart et al., 2010). In shallow groundwater systems, annual periodic temperatures variations can identify flow processes including surface water infiltration, identify recharge and discharge areas, and flow patterns in groundwater basins (Anderson, 2005). Time-series records of temperatures in a stream and stream bed are also helpful in qualitatively identifying the locations of inflows and outflows in the stream and can also be used to estimate fluxes in groundwater-stream systems. The benefits of using heat as a groundwater tracer include the ease of measurement and the high degree of sensitivity, which may be obtained in the field with inexpensive measuring devices.

2.2.4 Geophysical Methods in Hydrogeology

Combined geophysical and hydrological studies allow for more detailed descriptions of subsurface structure geometries and their corresponding hydrogeological parameters. Borehole based subsurface investigation methods are only able to provide a limited picture of the subsurface dependent on the number wells that are installed. Hydrogeological parameters determined in wells are subsequently regionalized for the whole aquifer by interpolation, approximation methods or geostatistical realizations, with each approach having its own inherent assumptions (Koch et al., 2009). Often a more robust conceptual model of groundwater flow may be developed with the additional information provided by geophysical surveys. Two methods that are of note in montane settings include electrical resistivity tomography (ERT) and ground penetrating radar (GPR) (McClymont et al., 2011).

ERT measures how resistive a volume of material is to the flow of electrical current (Worley Parsons Ltd., 2013). The process involves introducing an alternating electrical current into the ground through a pair of electrodes and measuring the voltage drop or potential difference between two separate electrodes. Surface measurements, based on electrical flow being dispersed through the ground, provide information on the electrical character of materials below the earth's surface (Baines et al., 2002). The resistivity of the subsurface is based on changes in pore water and pore space geometry in rock which produces a range of resistivity values over many orders of magnitude for common earth materials. Electrode contact with the ground is achieved by connecting each electrode to a stainless steel stake drive ~20 cm into the ground at a spacing based on desired resolution. Resolution and depth of the ERT survey show an inverse relationship dependent on the electrode spacing and the total number of electrodes (Worley Parsons Ltd., 2013). By using an array of electrodes and by measuring voltages from various combinations of electrode pairs, multiple subsurface current paths can be sampled. ERT profiles are produced by modelling the data through an inversion technique that fits all the measurements made from all the different electrode combinations along a survey line. Preliminary interpretation of profiles in natural settings can be based on known relationships between grain size and resistivity. However, qualitative comparison of ERT profiles with other subsurface information should be performed where available since resistivity values are altered by the quantity and chemistry of pore space moisture (Baines et al., 2002)

Ground penetrating radar (GPR) surveys use electromagnetic (EM) pulses that are transmitted into the ground where they are reflected off boundaries of contrasting electromagnetic and electrical properties. In geomorphological research sediment thickness and depth to bedrock are common parameters determined by GPR (Sass, 2006). Although its depth penetration within standard geological materials is often limited to a few metres, the high-resolution imaging capabilities of GPR have been used to delineate subsurface structures in multiple disciplines. In a GPR survey, electromagnetic pulses are transmitted into the ground, where they are reflected off boundaries of contrasting electrical and electromagnetic properties (Worley Parsons Ltd., 2013).

2.3 Properties of Coal Waste Rock

Waste rock dumps can be several kilometers long, up to a kilometer wide and hundreds of meters tall (Lussier et al., 2003). These large unconsolidated landforms are problematic because they produce changes in water chemistry as precipitation infiltrates and migrates through the large unsaturated portions (Everett, 1985). The problematic chemistry of effluent released from coal spoil is due to the newly fractured and unconsolidated material being exposed to aerobic conditions and water, accelerating reaction rates and the release of solutes (Swanson et al., 2010). Each rock emplaced within a waste rock pile has characteristic mineral constituents, permeability and solubility that produce a complex mix of geochemical processes. Thus, a need exists to understand the geology, internal structure, geometry, and construction methods of these landforms and how these govern the subsequent outflow of effluent (Amos et al., 2014). Zones of interest within the dump are also linked to dates of construction, as time sensitive behavior like flushing and weathering may occur.

Within coal waste rock dumps, unconfined water table conditions may exist because of the heterogeneity and lack of internal stratification. Water level changes occur due to precipitation at the mine site and saturated portions at the base of the waste rock dump can produce markedly different water chemistry. This phenomenon is common in backfill waste rock dumps where the dump is built inside the excavation created from the mining of coal. In situations of backfilling, the hydrogeological regime surrounding the pit is still intact. Once waste material is replaced into the excavation a groundwater regime returns that may produce a large saturated zone with markedly different chemistry than seen by placing waste rock on top of an undisturbed location (Everett, 1985).

Where a waste rock dump impedes natural stream drainage, either the stream must be diverted around the dump or allowed to flow in the thalweg of the valley through the boulder layer at its base (BGC Engineering Inc., 2013). Constructing a boulder layer, or rock drain, is a preferred option for multiple reasons including cost and ease of construction. Generally, the end-dumping method of construction is the most economical for creating a rock drain and uses natural segregation (during dumping) to place coarse debris on the valley floor. Outstanding issues with rock drains are vast and their effect on the chemistry of effluent has yet to be fully determined (BGC Engineering Inc., 2013).

2.4 Mobilization of Constituents of Interest From Coal Waste Rock

Previous research studying mobilization of constituents of interest from coal mining spoil has shown these systems are primarily controlled by mineral solubility, redox conditions, sorption and pH (Brown, 1992). Another strong control on these processes is the ingress of oxygen and water within the dump which is often exacerbated by dump failures such as cracking and rock slides. In western North America, waste rock drainage waters have been shown to be influence by seven primary geochemical reactions including: oxidation of pyrite, dissolution of gypsum, precipitation of gypsum, production of carbon dioxide by oxidation of organic matter, cation exchange and sulfate reduction. All of these geochemical reactions operate primarily above the water table and occur during recharge regardless of the age of water and distance travelled (Everett, 1985). Conditions and geochemical processes within the coal spoil that further affect the mobility potential in the vadose zone include:

- Geotechnical properties of coal waste rock (listed above)
- Geochemical gradients including hydraulic, capillary, thermal, salinity
- Ion-exchange and adsorption
- Evaporation of water
- Precipitation of minerals (Everett, 1985)

At the base of the coal waste rock dumps saturated conditions may occur. Seasonal variations likely produce water table fluctuations, leaching the dissolved load present from weathering processes operating in the vadose zone. This phenomenon may produce strong periodicity to the release of weathering products.

Water quality management at the Elk Valley mines was historically focused on total dissolved solids and nitrogen forms (nitrate, nitrite, ammonia) (Kennedy et al., 2012). The elevation of total dissolved solids (TDS) in downgradient aquatic systems is due to geochemical reactions releasing appreciable calcium (Ca^{2+}), magnesium (Mg^{2+}), alkalinity and SO_4^{2-} while nitrogen release is from residues of explosives used in the mining process. Below valley fills in the central Appalachians, streams are characterized by increases TDS accompanied by increased electrical conductivity and pH. High sulfate concentrations were found to be particularly abundant and are important measures of downstream biological health due to the strong linear relationship it forms with concentrations of multiple metals (Palmer et al., 2010).

The concern over CIs such as NO_3^-, Se and Cd being liberated from coal waste rock has recently become a major environmental concern in the coal mining industry. Of primary concern is Se, a semi-metallic element analogous to sulfur that is found in varying quantities in coal and coal associated interburden. Se is an essential trace metal for organisms but has a very narrow range between essentiality and toxicity (Kumar and Riyazuddin, 2011). In excess, Se may cause reproductive failure and teratogenic deformities in fish and birds (Lussier et al., 2003).

2.5 Geochemical Controls on Selenium

Due to similar ionic radii, Se can readily substitute for sulfur and therefore has both organic and inorganic associations in coal and coal interburden (Lussier et al., 2003). Dreher and Finkelman (1992) broadly attributed the following modes of occurrence of selenium in rocks as follows: in water soluble salts, absorbed to clay surface, association with sulfides, in fine grained selenides, in organic association, bound to hydrous ferrous and manganese oxides (HFMO). In Wyoming, oxidation of organic matter was found as a possible source contributing Se in surface waters (Naftz and Rice, 1989). However, based on mineralogy and leachate correlations, the origin of Se leaching from the waste rock in the Elk Valley is likely oxidative dissolution of pyrite (Kennedy et al., 2012).

$$(FeSe_2) \text{ or } FeS_2 + 15/4O_2 + 7/2H_2O \rightarrow Fe(OH)_3 + 2SO_4^{2-} + 4H^+ \qquad (2.1)$$

In many mining districts around the world the oxidation of sulfides such as pyrite produces large amounts of acidity and subsequently acid rock drainage (Day et al., 2013). In the presence of carbonate minerals the acidity produced is neutralized and often results in a mildly basic solution. In the United Kingdom studies of coal samples from mines also found strong positive correlation between pyrite content and Se concentrations in effluent (Lussier et al., 2003).

Selenium can exist in the 2^-, 0, 4^+, and 6^+ oxidation states. The concentration, speciation, and association of Se depend on pH, oxidation-reduction potential (ORP), chemical and mineralogical composition, biological interactions, dissociation constants and reaction kinetics

(Lussier et al., 2003). Selenide (Se^{2-}) and elemental Se (Se^{0}) are generally favored in reducing environments, selenite (SeO_3^{2-}) in mildly oxidizing environments, and selenate (SeO_4^{2-}) in well-oxidized environments (Roy, 2005). Oxidizing conditions exist in coal waste rock after deposition, oxidizing the reduced and less mobile oxidation states of selenium. Research into speciation of Se at Teck mine sites has shown that the dominant species seen in surface waters is SeO_4^{2-} (Day et al., 2012). In mildly basic conditions, SeO_4^{2-} is not readily adsorbed to surfaces indicating selenium will likely persist as SeO_4^{2-} and remain highly mobile. Selenate absorption is also markedly reduced in high ionic strength solutions, which is common of effluent released from coal waste rock dumps (Naftz and Rice, 1989). Therefore, possible mechanisms of SeO_4^{2-} removal from solution may include co-precipitation of selenium with gypsum and carbonate minerals as reported in the literature although this may be unlikely under the observed geochemical conditions within the Elk Valley (Day et al., 2012).

Pyrite oxidation by NO_3^- is another problem currently being examined in the Elk Valley as a mechanism supporting Se release (MEND Report 10.3, 2015). This phenomenon has been confirmed by correlation between NO_3^- and Se in waste rock effluent (Kennedy et al., 2012). In a study by Wright (1999), where dissolved oxygen had been removed from groundwater, nitrate concentration maintained oxidizing conditions sufficient to oxidize selenium. The presence of dissolved NO_3^- can also inhibit the reduction of Se hindering possible remediation strategies (Weres et al. 1990).

2.6 Previous Work on Coal Mine Affected Groundwater

Dreher and Finkedlman (1992) addressed the issues of contamination in groundwater within the Powder River coal district in Wyoming using various extractions of inorganic species from core, physical water sampling from monitoring wells, analyses for major and trace elements as well as determination of Se speciation. In Wyoming it was found that the concentration of aqueous selenium was dropping due to microbially assisted reduction of SeO_4^{2-} followed by sorption on clays and other sorbents. This study involved backfill and overburden materials and indicated that organic solutes were also important to Se chemistry because of the accompanying redox effects (Naftz and Rice, 1989; Dreher and Finkelman, 1992). However, these results apply to groundwater found in a small area of backfill and further research is required on the watershed scale.

As water interacts with coal waste rock it is transported through various depositional environments at surface coal mining operations. The degree of water saturation, existing groundwater quality and overall geochemical nature of the depositional environment affects the chemistry of the effluent (Everett, 1985). In terms of soil interaction with trace metals, numerous factors control pollutant mobility:

- Soil texture and particle size
- Pore space distribution
- Content/distribution of iron, aluminum and manganese oxides and hydroxides
- pH of soil and percolating waters
- ORP
- Organic matter content of soils and percolating waters
- Concentration of trace elements (Everett, 1985)

Everett (1985) discussed that pollutants moving through the saturated zone at coal mine sites may be removed from solution. Contact with certain types of rock surfaces, intermixing with other waters and filtration through certain earth materials are all possible mechanisms decreasing the concentration of pollutants. Interaction with mineral surfaces may change dissolved concentration through adsorption or ion exchange, precipitation, biological processes and changes in redox. Intermixing of different water sources may encourage interaction with mineral surfaces.

In terms of studying mine affected groundwaters, important considerations producing apparent decreases in dissolved concentrations of contaminants are leakage into underlying aquifers and hydrodynamic dispersion. It has also been shown in studies that CIs can migrate to the bottom of an aquifer prior to extensive lateral migration (Everett, 1985). Nevertheless, specific examples of coal mine affected aquifers and determination of contributing geochemical processes is lacking. Therefore, any attempt to limit the mobilization and transport of pollutants at a coal mine will firstly require a robust evaluation of existing groundwater quality and the altered hydrological regime.

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CHAPTER 3
SITE DESCRIPTION

3.1 Teck Coal’s Line Creek Operation

Teck Coal’s Line Creek Operation (LCO) is located 25 km north of Sparwood in southeastern BC, Canada (Figure 1). The mine site drains several small catchments adjacent to Line Creek, a tributary of the Elk River (Fitch et al., 1998). Mean annual temperature is approximately 5°C (9 to 15°C in summer and -2 to -7°C in winter). Annual average precipitation is between 600–800 mm, with roughly 55% as snow (Shatilla, 2013).

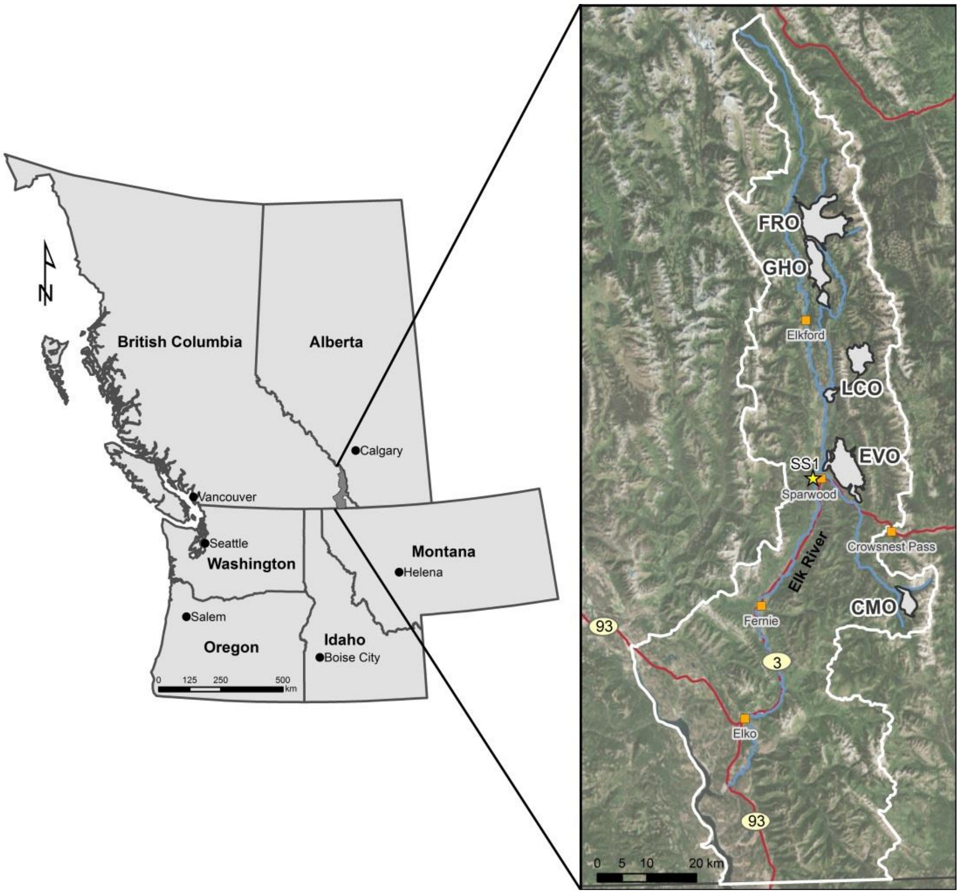

Figure 1. Location of Line Creek (LCO) mine.

3.2 West Line Creek Catchment Physiography

The study site is located in the small (10.7 km^2) West Line Creek (WLC) catchment. The elevation in the catchment ranges from 1450 meters above sea level (masl) at the outlet to approximately 2650 masl at the peaks of the Wisukitsak range at the western edge (Shatilla, 2013). The western portion of the catchment consists of a series of five alpine cirques formed between high limestone and sandstone peaks (Figure 2). This high relief reflects the erosion resistant Upper Devonian and Carboniferous rocks that were thrust atop younger strata during the Cordilleran orogeny (Lee, 2011). Thus, the dominant exposed strata in the catchment are steep and eastward dipping units that were deposited prior to the Mesozoic aged coal-bearing formation, i.e. the Mist Mountain (Butrenchuk, 1989). The azimuth of WLC is approximately 160 degrees and roughly parallel to the crest of the eastern edge of the catchment, formerly known as Line Creek ridge. The WLC valley is a U-shaped valley, incised by glacial processes, and the slopes of the valley walls progressively increase with increasing elevation above the creek (Golder Associates, 1979). The eastern portion of the valley below Line Creek ridge had a thin mantle of overburden (<0.3 m) composed of weathered and unweathered sandstones, limestones and shales above 1600 masl.

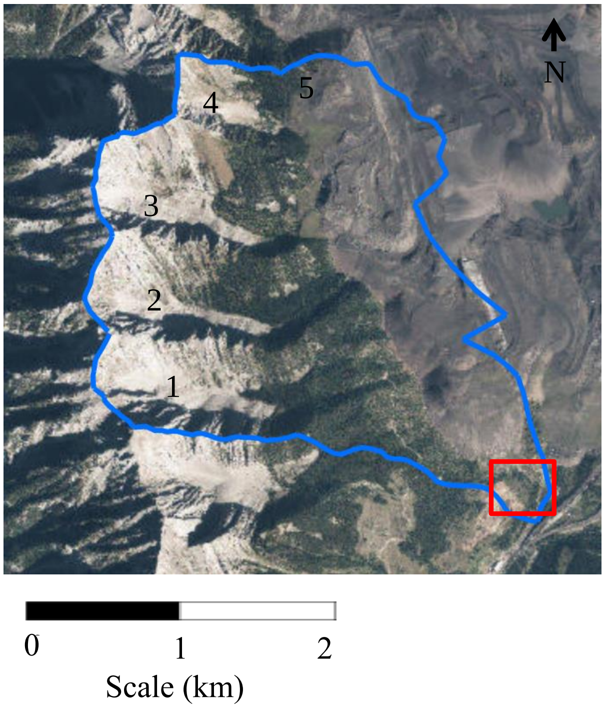

Figure 2. Current extent of WLC watershed showing the five west-valley cirques, evidence of coal mining and the study site (delineated by the red box).

Beneath the cirques, geomorphological processes have produced large-scale downslope movements of colluvium. A series of ephemeral streams originating in the cirques have also cut deep channels into the colluvial deposits. The fifth cirque (Figure 2) had observable surface water flow for most of the summer months before being covered by coal waste rock in the 1980s (T. Birkham, personal communication; Figure 3). The historic surface flow at the base of the WLC valley was an intermittent stream (AMEC Environmental & Infrastructure, 2013). At approximately 1650 masl along the valley bottom West Line Creek flowed through a 300 m ravine cut into the Fernie Formation shale (Golder Associates, 1979).

Figure 3. Most northerly cirque in the WLC catchment that had surface water flow for majority of summer months before being covered by coal waste rock.

The bottom of the WLC valley is a nearly flat lying terrace that slopes gently toward the southeast. At the southeastern edge of the catchment a steep slope marks the confluence of the WLC catchment with Line Creek drainage basin. The steep slope is believed to have been produced by glacial erosion during the last glacial period when the WLC valley was a tributary glacier to the main stem Line Creek glacier. An incised channel formed by surface water is evident within this area although its origin, either as a historic channel or a post-mining diversion is unknown. Several post-mining features are evident, including a 2- to 3-m tall earthen 'toe' dam constructed on the terrace to prevent entry of waste rock debris from slope failures into Line Creek (Golder Associates, 1979). Additionally, an underground corrugated pipe drainage culvert was installed within the terrace sediments to collect drainage from the waste rock dump. A 1979-geotechnical proposal suggests the culvert was built on top of coarse debris placed within the existing WLC creek channel to accommodate larger flow volumes and to protect the integrity of the toe dam (Golder Associates, 1979). Worley Parsons Ltd. (2013) conducted a magnetic survey that defined the location of the buried culvert to the WLC outlet structure (Figure 4). The underground drainage culvert currently collects waste rock effluent from the toe of the dump and directs it toward the WLC active water treatment facility (AWTF).

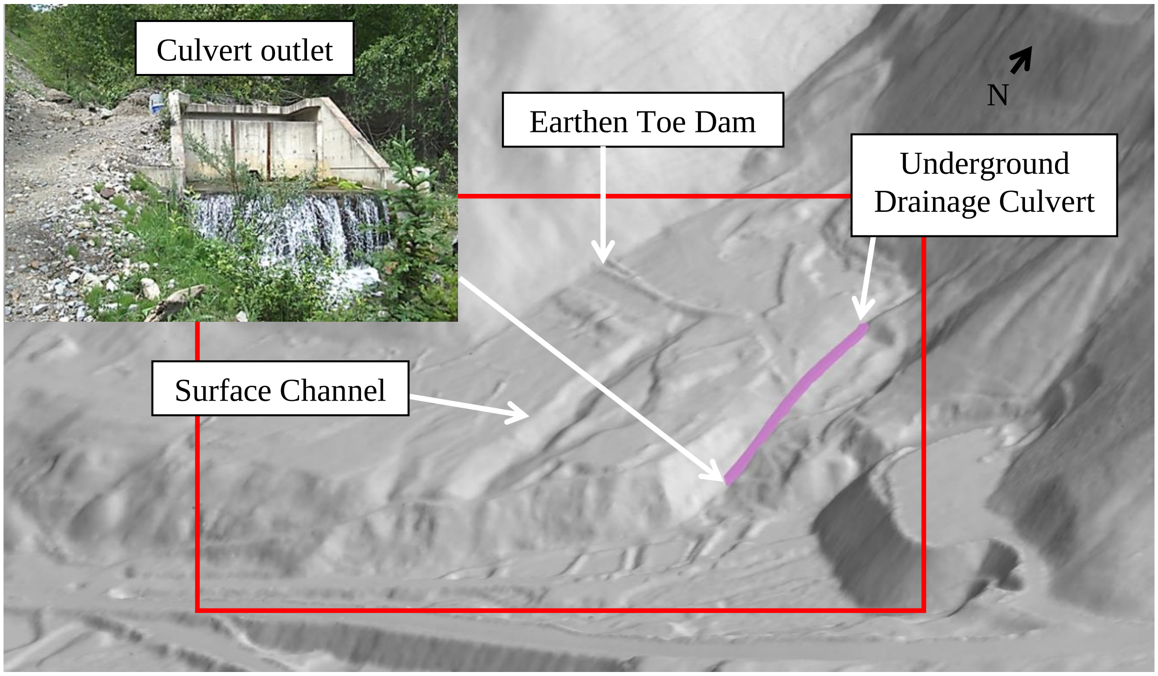

Figure 4. LiDAR data showing the study site in red as well as the surface channel, earthen toe dam, culvert outlet and the underground drainage culvert defined by Worley Parsons Ltd. (2012).

3.2.1 Bedrock Geology

Golder Associates (1979) interpreted the bedrock in the catchment as marine deposited shales, siltstones and sandstones of the Fernie Formation. Previous research states that this dominantly shale formation was deposited during the Jurassic period in the Western Interior Seaway (Poulton et al., 1990) and that its thickness across the western Cordillera is highly variable (Riddell, 2012). MacKay (1931) reports that the Fernie Formation, owing to its soft nature, occupies areas of low relief in southeastern B.C. and is largely concealed by alluvial sediments. In the WLC catchment, Golder Associates (1979) report that the Fernie Formation shale is exposed at higher elevations along the western boundary of the catchment and beneath the unconsolidated overburden sediments at the base of the catchment. This suggested that the majority of the bedrock in the catchment was deposited prior to the Jurassic aged coal bearing

Mist Mountain Formation (Butrenchuk, 1989). AMEC Environmental and Infrastructure (2013) state that groundwater flow in the catchment occurs primarily in the fractured and weathered bedrock, as well as through two westward dipping thrust faults located beneath the waste rock dump. However, the dominant bedrock stratigraphy of the western portion of the catchment

3.2.2 Waste Rock Dump Characteristics

The WLC waste rock dump was constructed using end-dump methods from 1981 to 2012 and covers about approximately 30% of the 10.7 km^2 catchment (Figure 5). The end-dump method from the side-valley slopes allowed coarser material to preferentially segregate on the valley floor and form a rock drain. The waste rock dump is approximately 3.5 km in length, up to 1 km wide, 200 m tall and with a total volume of 2.10 × 10^8 m^3 (Shatilla, 2013).

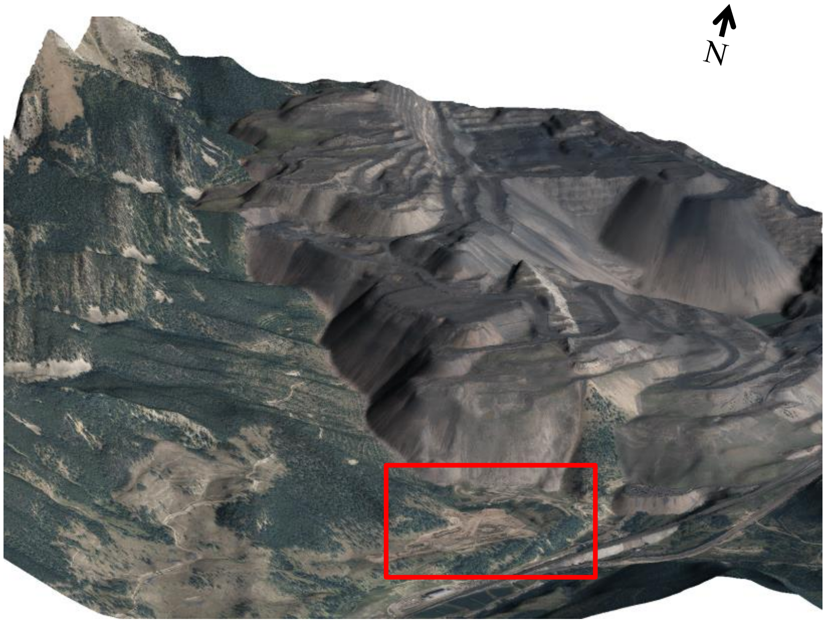

Figure 5. A 3-D view of the present day WLC catchment showing the extent of the waste rock dump and the extent of the study site (red box).

3.3 Active Water Treatment Facility Residuals Landfill Area

In October 2012, a proposed landfill site located on the WLC terrace was investigated to determine material strength properties, general foundation conditions, and potential borrow materials (SRK Consulting (Canada) Inc., 2013b). Five boreholes were drilled to the southwest of the waste rock dump at the AWTF residuals landfill area. The concentrations of CIs and major ions (SO_4^{2-}, Ca^{2+} and Mg^{2+}) in groundwater samples collected from the AWTF boreholes were low and were determined to have been minimally or not impacted by mining activities (SRK Consulting (Canada) Inc., 2013c).

CHAPTER 4
MATERIALS AND METHODS

In 2012, Teck Resources Ltd. initiated several multi-disciplinary studies of the WLC catchment with university researchers and private consultants. In support of this program the University of Saskatchewan (U of S) directed borehole drilling, while core logging was completed by SRK Consulting (Canada) Inc. (2013a) and core samples collected by U of S field personnel. Moreover, a geophysical study to define subsurface features and optimize drillhole sites was completed by Worley Parsons Ltd. (2013) using downhole and survey geophysical methods.

Following the installation and development of monitoring wells, this study undertook field testing and sampling of monitoring wells, sampling of groundwater springs, and analysis of drillcore data collected in 2012. Reports procured as part the R&D program were used in support of this work to refine and develop the groundwater conceptual model. Additional reports by SRK Consulting (Canada) Inc. (2013b, 2013c), completed as part of a separate program to investigate the AWTF landfill at the southern extent of the catchment, were also used in support of this study.

4.1 Drilling and Core Sample Collection

Thirteen vertical boreholes were drilled at six sites between July-August 2012 at the southern extent of the WLC catchment (Figure 6) and to the northeast of the AWTF landfill area. Boreholes were drilled using either sonic or air rotary drill rigs (Table 1). Boreholes were typically drilled in nests of two- to three-hole to target different subsurface aquifers at particular sites. Sonic drilling was performed using a Boart Longyear (Sonic Rig 1524) truck-mounted sonic drill rig with 15.24 to 17.78-cm casing. These boreholes were drilled and continuously cored to depths ranging from 12.8–56.4 m below ground surface (mbgs).

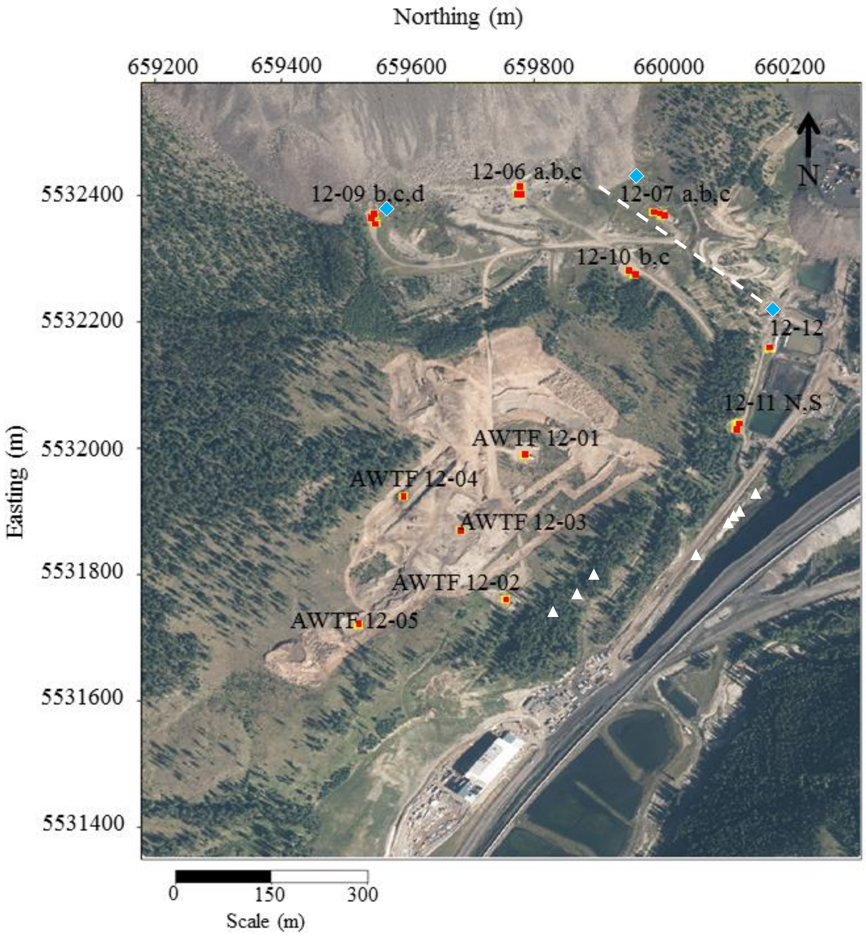

Figure 6. Boreholes drilled at WLC study site (shown in red), drivepoint wells (shown with white triangles), the underground drainage culvert (white dashed line), and the rock drain sampling locations (blue diamond). Map coordinates displayed as NAD 1983 UTM Zone 11N.

Table 1. Details of drilling program.

Borehole ID	Easting (m)	Northing (m)	Depth (m)	Date Started	Date Finished
Sonic Boreholes					
LC-WLC-12-06a	659676	5532418	44.2	July 4, 2012	July 7, 2012
LC-WLC-12-06b	659672	5532409	25.9	July 7, 2012	July 8, 2012
LC-WLC-12-07a	659851	5532377	12.8	July 25, 2012	July 26, 2012
LC-WLC-12-09b	659481	5532366	46	July 18, 2012	July 21, 2012
LC-WLC-12-10b	659818	5532283	56.4	July 21, 2012	July 25, 2012
LC-WLC-12-11	659961	5532031	28	July 14, 2012	July 16, 2012
LC-WLC-12-12	660004	5532159	32	July 16, 2012	July 18, 2012
Air Rotary Boreholes					
LC-WLC-12-06c	659676	5532405	76.2	August 3, 2012	August 4, 2012
LC-WLC-12-07b	659863	5532375	16.8	July 7, 2012	July 7, 2012
LC-WLC-12-07c	659861	5532372	9.3	July 8, 2012	July 8, 2012
LC-WLC-12-09c	659484	5532373	47.4	July 4, 2012	July 6, 2012
LC-WLC-12-09d	659486	5532359	11	July 6, 2012	July 6, 2012
LC-WLC-12-10c	659825	5532277	65.8	July 9, 2012	July 10, 2012

Sonic coring was conducted using a 0.10-m ID (and occasionally 0.15-m ID) × 3.05-m long core barrel. Overall core recovery was approximately 90% (SRK Consulting (Canada) Inc., 2013a). At ground surface, each sonic core was transferred from the core barrel into a plastic sleeve. The ends of the sleeves were immediately knotted, placed in a 101.6-mm diameter PVC half pipe, and transferred to the on-site core shed. In the core shed, the sleeves were cut lengthwise, the internal temperature of the core was measured by inserting a steel-tipped Taylor 9840 Classic Instant Read Pocket Thermometer 10 to 20 mm into the core. The core was logged for physical and lithological characteristics and photographed. Solid samples were collected at 1-m intervals (n = 223). Prior to collecting samples, the outer 1–5 mm layer of core was removed to minimize sample contamination. Approximately 2 kg of each core was collected, homogenized in a steel bowl, and split into five subsamples. Subsamples were processed and analyzed for: geotechnical and particle size analyses (see Section 4.6.1), squeezed porewater (see Section 4.6.2), solid digestion (see Section 4.6.4), and isotopes of water analysis (see Section 4.7.7). These subsamples were placed inside individual medium sized Ziplock® bags (17.7 cm × 19.5 cm) that were sealed after expelling all the air and subsequently packed again inside a second large Ziplock® bags (26.8 cm × 27.3 cm) in the same manner. The following day the samples were placed in coolers and shipped to the University of Saskatchewan (U of S) satellite laboratory at Hillcrest Mines, AB where they were transferred from the Ziplock® bags into Food Saver® bags (20 cm × 22.5 cm) and vacuum sealed. A second Food Saver® bag (20 cm × 27 cm) was vacuum-sealed again to ensure an airtight seal. The Food Saver bags were weighed and stored at room temperature and shipped to the Aqueous and Environmental Geochemistry Laboratories (AGL) at the U of S for processing and analysis.

To quantify the effects of drill fluid on the chemistry of sonic drill core samples, drill water was spiked with deuterium (δ^2H) and sodium chloride at selected drillholes following the methods described by Hendry et al. (2013). Results (beyond the scope of the current study) indicated that the core samples rarely exhibited contamination by the drilling fluid.

Air rotary boreholes were drilled using JR Drilling's (Foremost DR 24 drill) truck-mounted air rotary rig with 15.24 to 20.32-cm casing. These boreholes were drilled to depths ranging from 9.3 to 76.3 mbgs. Solid samples obtained by air rotary drilling were in the form of drill cuttings, collected at surface. Drill cuttings were collected at 3 m intervals (n = 74). Subsamples were taken for analysis by: 1) aqueous leach (see Section 4.6.3) and solid digestion (see Section 4.6.4). A general log of lithological characteristics was produced based on the appearance of drill cuttings.

4.2 Monitoring Well Installation

Monitoring wells were installed in the boreholes to target water-bearing units. Each borehole was constructed using either 5.08-cm or 10.16-cm Schedule 40 PVC and a screened PVC interval for accessing formation water. Typically 3.05-m intake screens were installed in the monitoring wells except in three instances. Two shallow wells (12-07a and 12-07c; 12.8 and 9.3 mbgs) were constructed using a 1.52-m intake screen, and one well (12-09c; 47.5 mbgs) with a 6.10-m intake screen. A sand pack was placed around the screened interval extending 0.61–

1.52 m above the top of the screen. A bentonite seal (1.52–3.04 m) typically placed above the top of the sand pack before the drill rods were pulled. Subsequently, the remainder of the annular space was filled with bentonite chips and pellets. Select boreholes also had an additional segment of PVC placed below the screened interval to act as a sump for fine-grained sediments entering the screens.

The monitoring wells were developed after construction by purging three or more well volumes from those boreholes that exhibited rapid recharge and a minimum of one well volume for lower permeability units (SRK Consulting (Canada) Inc., 2013a). The purging was done using a small electrical Grundfos Redi Flow 2 pump equipped with a single discharge tube.

4.2.1 Drivepoint Monitoring Wells in Discharge Area

Three drivepoint wells were installed approximately 1 m upgradient of major groundwater springs identified in 2013 along the steep slope that characterizes the southeastern extent of the catchment (Figure 6). The drivepoints were J208-2 model produced by Parts2O® and were 1-1/4 inches in width by 36 inches in length. A sledgehammer was used to install the drivepoint well to allow monitoring of hydraulic head at the groundwater spring location. The drivepoints where driven to depth until the water level was higher than the screened interval.

In June 2014, five AMS® Gas Vapor Implants (GVIs) (Figure 7) were installed in the bank of Line Creek at a known groundwater discharge location (Figure 6). GVIs are soil gas sampling systems, which were adapted to sample shallow groundwater as drivepoint wells. The install location was an area of defined groundwater seepage into Line Creek determined by Birkham et al. (2014). The GVIs were connected to a Cole Palmer® 1/4 inch high-density polyethylene (HDPE) tube prior to installation. A shovel, a pry bar and an AMS® Gas Vapor Probe Drive Kit (http://www.ams-samplers.com/itemgroup.cfm?CNum=86&catCNum=3) were used to place the GVIs at depths of 0.3–0.8 m into the rocky shoreline of Line Creek. The GVIs were 152 mm long and had an OD 12.7 mm (http://www.ams-samplers.com/itemgroup.cfm?CNum=220&catCNum=3).

Figure 7. AMS® Gas Vapor Implants used for sampling groundwater.

4.3 Hydraulic Testing

In-situ falling head (slug) tests were conducted to estimate the hydraulic conductivity (*K*) of the sediments at the depth of the monitoring well screened interval. The slug test method involved changing the hydraulic head in a well and measuring the water level response similar to the ASTM D4044-96 method (2008). Drawdown in the well was induced using a Geotech® SS Geosub electric pump. Water level recovery was measured using 1 to 60-s measurement intervals on a Solinst 3001 Levelogger® Edge.

Slug tests in wells screened in very permeable units were conducted pneumatically because of the extremely rapid water level recovery times (Butler et al., 2003). A well cap was modified to provide an airtight seal and compressed air was delivered into the well at <70 kPa to induce drawdown of the water level. To determine whether test responses were: 1) independent of the magnitude of the initial displacement, 2) not affected by non-Darcian flow losses and 3) not being altered by repetitive testing, normalized plots of absolute head versus log time (since test initiation) were juxtaposed (Butler et al., 1996).

Interpretation of piezometer water recovery data from slug tests was conducted according to Bouwer and Rice (1976) using spreadsheets available through the United States Geological Survey (USGS; Halford and Kuniansky, 2002). Three or more slug test results were used to determine the average *K* of each monitoring well using two or more initial displacements (H_0) of the water column. The Bouwer-Rice method estimates *K* based on the Thiem equation of steady state flow and is applicable to completely or partially penetrating wells in unconfined aquifers (Bouwer and Rice, 1976).

4.4 Groundwater and Rock Drain Monitoring – Data Logging and Flow Measurement

4.4.1 Monitoring Wells

A Solinst® 3001 Levelogger Edge was installed at the base of the screened intervals in each monitoring well to continuously record total pressure and temperature. The pressure sensor accuracy was ± 0.05% full scale (FS) and the temperature sensor accuracy was ± 0.05ºC with a resolution of 0.003ºC.

Solinst® 3001 Barologger Edges were installed in the standpipe of one well at each well nest to record barometric pressure (BP). The pressure sensor accuracy was ± 0.05 kPa and the temperature sensor accuracy was ± 0.05ºC with a resolution of 0.003ºC. The barologgers were placed at ~1 m below top of the PVC standpipe. BP measurements were used to calculate hydraulic head by compensating for atmospheric pressure fluctuations in the continual total pressure data from the submerged leveloggers.

Solinst® 3001 LTC Levelogger Juniors were installed in selected wells, based on the results of chemical analyses of Year 1 groundwater samples, to measure electrical conductivity from January–September 2014. The accuracy was ± 0.05% FS for the level sensor and ± 0.1ºC with a resolution of 0.1ºC for the temperature sensor. Data loggers recorded measurements every 15 min from September 2012 to September 2014. Manual measurements of water levels were conducted on all groundwater instrumentation monthly using a Solinst® Model 101 P7 water level meter.

4.4.2 Drivepoint Wells at Discharge Areas

Drivepoint wells installed at major groundwater springs (see Section 4.2.1) were outfitted with Solinst® 3001 Levelogger Edges and Solinst® 3001 Barologger Edges. Groundwater discharge rates from major springs were estimated using a bucket and stopwatch method either at the spring or when the water traversed underneath a road through a drainage culvert.

4.4.3 Underground Drainage Culvert Outlet

Data logging at the underground drainage culvert outlet (Figure 6), which receives water from the the rock drain, was monitored by McMaster University and Teck Resources Ltd. personnel. A Solinst® 3001 Levelogger Edge pressure transducer and a HOBO® U24-001 data logger were installed at the rock drain outlet structure. The instruments were secured to an aluminum rod that was driven into the creek. Each logger was enclosed in a PVC or ABS pipe with holes drilled into the plastic to allow water to flow across the sensor. These instruments provided measurements of total pressure, temperature and electrical conductivity at 15-minute intervals. A Solinst® 3001 Barologger Edge was installed in the nearby Teck datalogger enclosure (approximately 2 m away) to calculate the water level in the stream by compensating for atmospheric pressure fluctuations in the continual total pressure data from the submerged levelogger.

Teck Coal Ltd personnel collected flow measurements using a site specific stage-discharge curve determined prior to the current study. Flow rates where subsequently calculated using the stage-discharge curve and water level measurements obtained from corrected level logger data.

4.4.4 Darcy's Law

The rate of discharge of groundwater per unit area of porous medium was determined using Darcy's Law:

$$q = \frac{Q}{A} = -K_{\text{mean}} \times \frac{dh}{dl} \tag{4.1}$$

where q is the specific discharge, Q is the discharge velocity of groundwater, A is the cross sectional area, K_{mean} is the geometric mean of K from all the monitoring wells, and $\frac{dh}{dl}$ is the horizontal hydraulic gradient. However, because water only flows in the pore space, the actual flow velocity (v) is greater than q, and is defined as the volumetric flow rate per unit interconnected pore space (Schwartz and Zhang, 2004) according to:

$$v = \frac{q}{n_e} \tag{4.2}$$

where v is the flow or pore velocity, q is the specific discharge and n_e is the effective porosity.

4.5 Groundwater and Rock Drain Sample Collection

Water samples were collected from groundwater monitoring wells (n = 153), groundwater springs and drivepoint wells (n = 189), and the rock drain (n = 160) from September 2012 to September 2014 (Table 2). Prior to sampling the monitoring wells, three well volumes were removed from the standpipe using a Geotech® SS Geosub electric pump to ensure that representative formation water was being sampled. Flow rates of the pump were adjusted to minimize the migration of fine-grained geologic materials into the well. Water samples were collected in clean 1-L Nalgene® bottles. Following sampling, the pump was decontaminated using deionized water (DI) before use in subsequent wells. In instances of a lower permeability unit occurring within the screened well interval, a pre-cleaned and sterilized low flow bladder pump (Geotech Bladder pump SS PBP 1.66" CE W/Hanger and Geocontrol 2 Logic Unit) or PVC bailer was used for sampling. After groundwater samples were collected, the temperature, pH, Eh (oxygen reduction potential, ORP), specific conductance (SpC) and liquid dissolved oxygen (LDO) *in-situ* were measured in the piezometer intake zones using an HYDROLAB® MS5 Microsonde. Accuracy of the measurements were ±0.1°C, ±0.2 pH units, ±20 mV, ±0.02 mg/L O_2 and ±0.001 mS/cm for temperature, pH, ORP, LDO and specific conductance, respectively. Field alkalinity was determined in an unfiltered groundwater sample using an end point titration method with a handheld Oakton® 110 Series pH/mV/°C/°F Meter and a HACH alkalinity test kit (Model AL-DT). Calibration of the Microsonde sensors was performed approximately every ten deployments and the handheld pH meter was calibrated daily.

Table 2. Groundwater and Rock Drain sample collection intervals.

Sampling Location	**Sampling Interval**
Groundwater Monitoring Wells	May 2013–Sept. 2014
Groundwater Springs and Drivepoint Wells	June 2013–Sept. 2014
Rock Drain	Sept. 2012–Sept. 2014

Water samples from the rock drain and groundwater springs at the study site were also collected in clean 1-L Nalgene® bottles. Sample collection from groundwater springs using GVIs was done by drawing water from the ¼” tubing using a 120-mL polypropylene syringe and transferred to clean 1-L Nalgene® bottles. Measurements of pH and temperature were performed as soon as possible after sample collection using the handheld Oakton® 110 Series pH/mV/°C/°F Meter. Accuracy of the measurements was ±0.5°C and ±0.01 pH units. Field alkalinity was determined as described above.

Subsamples of all water samples were taken from the 1-L Nalgene® bottles within 24 h of sample collection for different analyses and preservation procedures (see Section 4.7). Depending on the type of analysis to be conducted, polypropylene syringes and disposable Acrodisc® PES 25 mm in diameter and 0.45-µm pore size syringe filters were used for filtering subsamples. Syringes were washed with DI water immediately prior to and following sampling. To minimize contamination of the subsample, a 60-mL volume of sample water was flushed through the filter prior to subsample collection.

Additionally, daily groundwater samples were collected at a spring using an ISCO 6712™ auto sampler. The purpose of the autosampler was to determine minute differences in the breakthrough of a plume containing CIs that was identified in 2013. Samples were collected using the autosampler from May 6, 2014 to September 22, 2014 and were transferred into appropriate bottles for analysis every three days. Processing samples was performed as described above.

4.6 Processing and Analysis of Solid Samples

Solid subsamples from sonic and air rotary drilling were processed before subsequent analyses at the AGL. Sonic drill core subsamples were processed by squeezing porewater and acid digestion of solid samples. Subsamples of drill cuttings from air rotary drilling were processed by aqueous leaching and acid digestion. Analytical methods and preservation procedures for aqueous-phase samples obtained from processing solid core samples are described in Section 3.6.

4.6.1 Geotechnical and Particle Size Analyses

Subsamples of sonic drill core were analyzed for gravimetric water contents (Θg), dry bulk density (ρ_w) and wet bulk density (ρ_d). Water loss during storage of core samples was measured by weighing each sample when initially vacuum sealed and before the Food Saver bags were opened.

Gravimetric water contents of the core samples (n = 123) were determined by the method described in ASTM D2216-10. Aluminum foil-ware disposable trays (7.8 cm × 2.3 cm) were used to weigh 40–80 g of sample prior to being placed in an oven set to 80°C for 24 h. After 24 h the sample and tray were removed from the oven, allowed to cool, and weighed again to determine the water loss. Gravimetric water content was calculated using:

$$\Theta g = \frac{Ww}{Ws} * 100\% \tag{4.3}$$

where Ww is the weight of water in the sample in grams and Ws is the weight of the dry soil sample in grams.

Bulk density analysis of core samples was conducted using the method described in ASTM D7263-09 (Method A). Bulk density measurements were performed on samples that were cohesive enough to form a >20-g clump. The sample was dipped in liquid paraffin wax with a density = 0.85 g/cm^3 until a minimum of three layers of wax covered the samples. The waxed sample was suspended in water by an undercarriage hook and weighed. The wax was subsequently removed, and the sample and tray were weighed. The sample and tray were then placed in an oven set at 80°C to dry for 24 h and gravimetric water content was calculated again according to Equation 4.3. Wet bulk densities (ρ_{w}) in kg/cm^3 were calculated using:

$$\rho_w = \left(\frac{Wws2}{(Wws1 - Wwc) - \left(\frac{Wwax}{0.85}\right)}\right) * 1000 \tag{4.4}$$

where *Wws1* is the weight in g of the wet sample before waxing, *Wws2* is the weight in g of the wet sample after the wax was removed, *Wwc* is the weight in g of the waxed core suspended and *Wwax* is the weight in g of the wax on the sample in g. Dry bulk densities (ρ_d) in kg/cm^3 were calculated using:

$$\rho_d = \left(\frac{1}{1 + \left(\frac{\Theta g}{100}\right)}\right) * \rho_w \tag{4.5}$$

Total porosity (n_T) was calculated using ρ_b of drill core samples and the particle density (S_g) of the drill core samples, estimated to be 2.700 kg/cm^3 using:

$$n_T = \left(1 - \left(\frac{\rho_b}{Sg}\right)\right) \tag{4.6}$$

Particle size analysis of select sonic drill core samples (n = 126) was performed by sieve-hydrometer method ASTM D422-63 (2007) and Laser-Diffraction Method (LDM). Studies have shown that sand and silt fractions determined by either method are comparable, however the clay fraction of the LDM method is typically underestimated (Stefano et al 2011; Zobek 2004). Calibration of the LDM method to the results of sieve-hydrometer method was performed on five samples of core from a single borehole (data not presented) to correct clay size fraction determinations. LDM analysis was the preferred method as it allowed the automation of the particle size analysis. LDM analysis was performed using a Mastersizer® 2000 and samples were run at a laser obscuration of 10–15%, dispersion pump speed of 2200 rpm and ultrasonic tip displacement of 3 μm for 60 s prior to data collection. Each sample was measured three times for 20 s. Grain-size analyses are reported as the average of three successive laser diffraction runs

(Sperazza et al., 2004). Core samples were first sieved to determine gravel-sized fractions, and then were analyzed by LDM to determine the sand, silt and clay fractions. Results were presented following United States Department of Agriculture (USDA) classification for soil particles (<2 µm clay, 2–50 µm silt, 50–2000 µm sand and >2000 µm gravel).

4.6.2 Squeezed Porewater Samples

Sonic drill core subsamples (n = 223; Table 3) were squeezed in a high-pressure mechanical squeezer to obtain pore water samples using a method similar to Patterson et al. (1978) and Bangsund et al. (2013). Core subsamples with <5% θg were not squeezed because of poor porewater yield (data not presented). Where core sample sizes permitted, the squeeze cylinder (316-L stainless steel; 50-mm diam. × 80-mm long) were re-packed with additional core up to 3×, to collect a sufficient amount of porewater for analyses (10 mL). A piston was inserted into the cylinder, placed in a hydraulic press, and the pressure increased to <50 MPa and maintained for 1 d. The squeezed porewater passed through a stainless steel filter (0.45-µm) before exiting the squeezer through a port located at the base of the cylinder and collected in a clean 60-mL syringe. The pH and alkalinity of the porewater was determined according to Section 4.5 prior to being split into subsamples. If a total of 10 mL of porewater was not recovered, analyses were performed in the following order according to Section 4.7: total elemental analysis (1 mL), analysis of common inorganic anions (4 mL), analysis of common cations and select trace elements (4 mL), and δ^2H and δ^{18}O water isotope analysis (1 mL). Porewaters were filtered through a nylon 0.45-µm pore size syringe filter into separate 15-mL Fisher Scientific® polypropylene centrifuge vials.

4.6.3 Aqueous Leach Samples

Selected drill cutting subsamples collected via air rotary drilling were subjected to aqueous leaching (n = 74; Table 3). The aqueous leach method used is described in MEND Report 1.20.1. (2009). Approximately 100 g of drill cuttings (excluding large rocks) were oven dried at 70°C for 48 h, and then placed in a ceramic mortar and ground to natural grain sizes using a pestel. Next, the sample was placed in a clean 950-mL HDPE bottle and Milli-Q® DI water was added to a ratio of 3:1 DI water: sample. The DI water: sample mixture was gently agitated on a shaker table for 48 h and subsequently left to stand for 1 h to allow suspended materials to settle. The solution was poured into 50-mL HDPE centrifuge vials and centrifuged at 3000 rpm until suspended soil particles are separated. The supernatant from all centrifuge vials were combined into one beaker. Thirty mL of supernatant were used for laboratory alkalinity titration and pH. The remaining supernatant was filtered through 0.45-µm pore size syringe filters (see Section 4.5).

The porewater concentrations were back-calculated from the results of the aqueous leach analyses and Θg determined from adjacent sonic borehole using:

$$C_{pw} = Ce * \left(\frac{\Theta e}{\Theta s}\right) \tag{4.7}$$

where C_{pw} is the concentration of the porewater, C_e is the concentration of the extract, Θe is the gravimetric water content of the extracted sample and Θs is the gravimetric water content of the equivalent depth of an adjacent sonic drill hole. When the depths of the air rotary boreholes exceeded the sonic borehole depths, the Θg from the entire sonic borehole were averaged and used to calculate a C_{pw} using the mean Θg for all samples within the air rotary borehole. Additional details on aqueous leaching procedure of core samples can be found in the AGL Quality Control Manual (Nelson, 2014).

4.6.4 Solid Digestion

The dissolvable concentrations of elements in the solid samples from sonic drilling were determined using acid digestion methods (n = 167; Table 3). These data were augmented with samples from air rotary drilling at well 12-06c (n = 7; Table 3). Samples were dried, crushed in a Sturtevant® Jaw Crusher, and then pulverized in a Siebtechnik® tungsten carbide grinder. Approximately 100 mg of pulverized samples were digested in a screw-top Savillex® Teflon container at 200°C for 48 h, with 2-ml of 8M HNO_3 and 1 ml of 48% HF, using a method modified from Jenner et al. (1990). The HF-HNO_3 mixture was evaporated to dryness, and the residue taken into solution in concentrated HNO_3. A second evaporation to dryness was performed to ensure conversion of fluorides to nitrates. The residue was taken up in 2-ml 8M HNO_3, transferred to a 125-ml HDPE bottle, and diluted with DI water to approximately 100 g. Critical steps in sample preparation were conducted gravimetrically under clean-lab conditions, and all reagents were doubly distilled. Duplicates of acid digest samples (10%) were submitted to ALS laboratories in Saskatoon, SK. Additional details on the solid digest procedure are presented in the AGL Quality Control Manual (Nelson, 2014).

4.7 Sample Analysis and Handling: Internal Water Samples

A summary of all aqueous-phase samples and analytical procedures, conducted at the AGL, are presented in Table 3. Aqueous-phase samples included physical water samples, porewater samples, and processed solid samples (i.e. leachate and acid digested samples).

Table 3. Summary of aqueous samples and analytical procedures.

Sample	**Number of Samples Collected**	**Total Element Analysis (ICP-MS)**	**Common Inorganic Anions (ICS)**	**Inorganic Cations and Select Trace Elements (ICP-OES)**	**Isotopes of Water (δ^2H and δ^{18}O)**	**Alkalinity and pH**
Surface and Groundwater						
Monitoring Wells	153	152	153	125	113	153
Groundwater Springs	189	187	189	150	84	161
Rock Drain	160	160	159	140	85	130
Porewater *Sonic Boreholes*						
LC-WLC-12-06a	39	28	25	8	39	28
LC-WLC-12-06b	22	18	9	6	22	18
LC-WLC-12-07a	8	4	3	2	8	4
LC-WLC-12-09b	47	20	17	8	47	20
LC-WLC-12-10b	50	25	17	9	50	25
LC-WLC-12-11	26	26	19	7	26	26
LC-WLC-12-12	31	2	20	11	31	2
Leachate Water *Air Rotary Boreholes*						
LC-WLC-12-06c	23	5	9	23	–	–
LC-WLC-12-07b	5	5	5	5	–	–
LC-WLC-12-07c	4	3	4	4	–	–
LC-WLC-12-09c	17	17	17	17	–	–

LC-WLC-12-09d	4	4	4	4	−	−
LC-WLC-12-10c	21	21	15	21	−	−
Solid Digests *Sonic Boreholes*						
LC-WLC-12-06a	39	39	−	−	−	−
LC-WLC-12-07a	8	8	−	−	−	−
LC-WLC-12-09b	47	46	−	−	−	−
LC-WLC-12-10b	50	18	−	−	−	−
LC-WLC-12-11	26	26	−	−	−	−
LC-WLC-12-12	31	30	−	−	−	−
Air Rotary Boreholes						
LC-WLC-12-06c	23	7	−	−	−	−

Sample handling of all aqueous phase samples followed the Quality Control Program (QCP) of Nelson (2014). All aqueous samples were refrigerated (<4^{o}C) during storage. The 2013–2014 field season samples were transported in coolers from the study site to the AGL for analysis. The sample handling strategy outlined in the QCP ensured that sources of error associated with analyte losses and contamination were determined and addressed prior to the commencement of this study. Table 4 details the bottle types, preservation procedures and minimum volumes required for each sample collected during the 2013–2014 field seasons. Subsamples for analysis of common inorganic cations and select trace elements as well as for total element analysis were acidified immediately after filtering to inhibit bacterial growth and adsorption of metals to the walls of the vessel. Subsamples were acidified to pH ~2 using ultrapure nitric acid (HNO_3). Field blanks were collected and analyzed approximately every 30 samples to monitor for possible contamination, particularly from cleaning procedures (data not presented) of reused 1-L Nalgene® bottles. Risk control protocols were followed for all samples and sample preparations, as outlined in Nelson (2014).

Table 4. Bottle types, preservation methods and volumes of water required for analyses of samples collected during 2013–2014 field seasons.

Analysis	Bottle Type	Preservation	Minimum Volume
Total elemental analysis	30-mL LDPE	Filtered, 2% v/v HNO_3	1 mL
Common inorganic anions	20-mL HDPE scintillation vials with polyethylene cone liner urea cap	Filtered	4 mL
Common inorganic cations and select trace elements	30-mL LDPE	Filtered, 2% v/v HNO_3	4 mL
Isotopes of water (δ^2H and δ^{18}O)	20-mL HDPE scintillation vials with polyethylene cone liner urea cap	Filtered	1 mL
Lab alkalinity / pH	60-mL HDPE	n/a	30 mL

4.7.1 Total Elemental Analysis

Total elemental analysis for 57 elements was performed using a Perkin Elmer® NexION300D inductively-coupled plasma mass spectrometry (ICP-MS) coupled to a Perkin Elmer® S10 autosampler. The system was optimized for maximum sensitivity as well as minimum oxide and doubly-charged ion formation. A background correction technique was required to compensate for variable background contribution to the determination of the analytes. This correction was achieved by the use of an internal standard and Perkin Elmer software. Internal standard addition and external standardization was used for calibration and quantification. Calculation was completed either online using NexIon software or offline using an Excel spreadsheet. This analysis was performed similarly to the EPA Method 6020A (Test Methods for Evaluating Solid Waste, 2007) and to the methods described by Longerich et al. (1990) and Stefanova et al. (2003). The measured uncertainty (MU) for this method was <5% at the 95% confidence interval for all analytes of interest above ~10× the MDL. Full ICP-MS operating conditions, calibration procedures and method detection limits of individual analytes are presented in Nelson (2014). Trace element concentrations are presented hereafter using the results of ICP-MS analyses.

4.7.2 Analysis of Common Inorganic Anions

Analysis of common inorganic anions in aqueous samples (F^-, Cl^-, NO_2^-, Br^-, NO_3^-, PO_4^{3-}, SO_4^{2-}) was performed using a Dionex 2100 ion chromatograph system (ICS) coupled to a Dionex AS-AP autosampler. A Dionex IonPac AS9-HC 2 × 250 mm anion exchange column was used with a 9.00 mM K_2CO_3 eluent at 0.25 mL/min flow rate. A conductivity detector (Detection Stabilizer, model DS3-1) was used after suppression of the eluent conductance (Thermo Scientific ASRS 300 2-mm regenerating suppressor). Conductivity was recorded using Chromeleon 7.2 software. The MU for this method was <0.3% at the 95% confidence interval for all analytes of interest above ~10× the method detection limits. Full IC operating conditions, calibration procedures and method detection limits of individual analytes are listed in Nelson (2014).

4.7.3 Analysis of Inorganic Cations and Select Trace Elements

Analysis of common inorganic cations and select trace elements was done by inductively-coupled plasma optical emission spectrometry (ICP-OES) and performed similarly to methods described in the EPA Method 200.7 and 300.1. A SpectroBLUE® ICP-OES coupled with a CETAC ASX-520 autosampler was used. The common inorganic cations included sodium (Na^+), potassium (K^+), calcium (Ca^{2+}), magnesium (Mg^{2+}), phosphorus (P^{5+}) and sulfur (S^{4+}) and select trace elements included selenium (Se), and cadmium (Cd). Conductivity was recorded using Spectro® Smart Studio software. A background correction technique was required to compensate for variable background contribution to the determination of the analytes and was done using an internal standard and the Spectro® software. The MU for this method was <6.83% at the 95 % confidence interval for all analytes of interest above ~10× the method detection limits. Full ICP-OES operating conditions, calibration procedures and method detection limits of individual analytes are described in Nelson (2014). Major cation concentrations are presented hereafter using the results of ICP-OES analyses.

4.7.4 Laboratory Determination of Alkalinity and pH

The alkalinity of rock drain and groundwater samples were determined by titration in the AGL laboratory. The analytical procedure was based on the EPA method 310.1. The measurements were performed with a Radiometric ABU901 Autoburrette coupled to a TIM800 TitraLab Titration Manager, TimTalk 8 software, and a titrant concentration of ~ 0.1 M HCl. Alkalinity in mg/L $CaCO_3$ was calculated using the Gran method of equivalence volume. Alkalinity in porewaters was estimated using Hach® Aquacheck test strips for total alkalinity and is reported mg/L $CaCO_3$.

The pH was measured using an Oakton® 110 Series pH/mV/°C/°F Meter. Accuracy of the measurements was ±0.01 pH units.

4.7.5 Ion Balance

Ion balances were calculated and examined for the rock drain, groundwater and squeezed core samples as a quality assurance check of the chemical analyses. Surface and groundwater should be electrically neutral, and therefore the anion and cation sums expressed as milliequivalents per liter (meq/L) should be equal. This relationship can be obtained using the charge-balance equation and deviations from equality expressed as:

$$|CBE| = \left|\frac{\sum zm_c - \sum zm_a}{\sum zm_c + \sum zm_a}\right| \times 100\% \tag{4.6}$$

where CBE is the charge balance error expressed in percent, z is the ionic valence, m_c is the molality of cation species, and m_a the molality of anion species (Freeze and Cherry, 1979). The CBE for a single chemical analysis is not a reliable gauge of the accuracy of that analysis, but the CBE for a group of analyses becomes more credible. Thus, the absolute value of the error is used when calculating the overall error in a population of analyses (Fritz, 1994).

4.7.6 Mineral Phases

PHREEQC geochemical modelling was conducted using determined concentrations of elements in solution to define mineral saturation indices (SI) of groundwater and rock drain samples (Parkhurst and Appelo, 1999). Calculation of mineral SI is a convenient method of representing the equilibrium condition of a solution with respect to a mineral (Deutsch, 1997). If a reactive mineral is predicted then its control on the concentrations of elements in solution can be discussed.

4.7.7 Analysis of Stable Isotopes of Water (δ^2H and δ^{18}O)

Rock drain, groundwater and porewater were analyzed for δ^2H and δ^{18}O water isotopes using high-precision off-axis integrated cavity output spectroscopy. A Picarro® L2130-i High-Precision Isotopic Water Analyzer and Picarro A0325 autosampler was used for simultaneous ^{2}H/^{1}H and ^{18}O/^{16}O ratio measurements of H_2O. Data collection was controlled using ChemCorrect® software. Measurement accuracies, by using systematic samples analysis and data normalization procedures presented in Lis et al. (2008), were ±0.8‰ for δ^2H and ±0.1‰ for δ^{18}O relative to Vienna Standard Mean Ocean Water (VSMOW).

Analysis of δ^2H and δ^{18}O water isotopes was also performed on sonic core samples by measuring the stable isotopic composition of headspace H_2O vapor using $H_2O_{(liquid)}$ – $H_2O_{(vapor)}$ Equilibration Laser Spectroscopy at the AGL in Saskatoon, SK. First core samples were allowed to equilibrate isothermally to 100% relative humidity conditions in medium sized Ziplock® bags filled with H_2O-free dry air. A second large Ziploc® bag was evacuated around the inflated medium sized Ziplock® bag to prevent leakage and atmospheric moisture contamination. The samples were left to equilibrate for approximately 3 days to reach liquid-vapor and isotopic equilibrium with the surrounding enclosed headspace (Wassenaar et al., 2008). Two water standards with δ^2H and δ^{18}O values that bracketed that of the pore waters in the core samples were prepared and run after every four samples to correct for instrument drift and to normalize the results to the VSMOW scale. Samples were analyzed on the Picarro® Cavity Ringdown Spectrometer L1102-I. The accuracy of this method, based on laboratory standard waters and the analysis of replicate core samples, was better than ± 0.8 ‰ and ± 0.3 ‰ for δ^2H and δ^{18}O relative to VSMOW (Hendry et al., 2013).

4.7.8 Inorganic Selenium Speciation Sampling and Analysis

Inorganic selenium speciation (n = 10) samples were collected intermittently during monitoring well sampling (see Section 4.5). Water samples were filtered into 10-mL amber propylene bottles and frozen within 12 h of collection. Prior to analysis water samples were thawed to room temperature. Analysis was performed on a Perkin Elmer® Flexar High Perfomance Liquid Chromatograph (HPLC) coupled to an ICP-MS (see Section 4.7.1). The HPLC used a Hamilton® PRP-X100 5 µm 4.6 mm × 150 mm PEEK column; the solvent was 5 mmol ammonium citrate, 2% (v/v) methanol, and the pH was 5.2 with an isocratic elution at a flow rate of 1 mL/minute. Full information on HPLC-ICP-MS analysis can be found in the AGL Quality Control Manual (Nelson, 2014).

4.8 Groundwater Isotope Samples – External Laboratories

Groundwater samples were taken for analyses of 1) $^{3}H/^{3}He$ and 2) $\delta^{13}C_{DIC}$. These water samples were collected using a Geotech® SS Geosub electric pump (see Section 4.5).

4.8.1 Tritium-Helium (3) Groundwater Sampling and Analysis

Tritium-Helium (3) samples (n = 3) were collected at three monitoring wells in August 2013. Tritium sampling (^{3}H) followed the method described by the Dissolved Gas Service Center Laboratory at the University of Utah (http://www.noblegaslab.utah.edu/pdfs/tritium_collection.pdf). Two 500-mL low-density polyethylene (LDPE) bottles were used to collect the sample. The bottles were filled until no headspace remained and were stored in a dark cool location until shipment. Total dissolved gas pressure (mmHg), barometric pressure (mmHg), dissolved oxygen (mmHg) and water temperature (°C) measurements were performed using a PT4 Tracker Lumi4® probe after each tritium sample was collected. The probe took measurements every five minutes until three measurements were equivalent, showing equilibration had been reached. Helium gas (^{3}He) concentrations were determined by *in-situ* passive diffusion sampling. A 3/16" in diameter and 2" in length refrigeration grade copper tube attached to a semi-permeable membrane was placed in the screened section of the monitoring well for 48 h (http://www.noblegaslab.utah.edu/pdfs/standard_diffusion_sampler.pdf). After the gasses within the sampler equilibrated with the gases dissolved in the well water, the copper tube was brought to the surface and immediately cold welded to prevent atmospheric contamination. The $^{3}H/^{3}He$ samples and PT4 Tracker Lumi4® probe measurements were sent to the Dissolved Gas Service Center Laboratory at the University of Utah for analysis.

4.8.2 Carbon-13 Isotope Signature in Dissolved Inorganic Carbon

$\delta^{13}C_{DIC}$ (n = 17) samples were collected during monitoring well sampling in August 2013 (see Section 4.5). Samples were filtered into 60-mL HDPE bottles and kept refrigerated until shipment to the Isotope Science Lab (ISL) at the University of Calgary. The method involved extracting water samples on a glass extraction line using anhydrous phosphoric acid. The evolved CO_2 gas was cryogenically purified and distilled to a 6-mm Pyrex break seal for transfer to the Dual Inlet of an isotope ratio mass spectrometer (VG-903) for $^{13}C/^{12}C$ ratio measurement. Precision and reproducibility using this technique is <±0.2‰ (n = 10 internal lab standards) for $\delta^{13}C_{DIC}$ (http://www.ucalgary.ca/uofcisl/techniques).

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CHAPTER 5
RESULTS AND DISCUSSION

5.1 Geology

5.1.1 Bedrock

The bedrock geology was observed at existing outcrops along the north edge of the AWTF area at 1507-1514 masl (inside excavations) and along the eastern valley edge at 1490 masl (Figure 6). Descriptions of the bedrock geology were similar to drill core logs from SRK Consulting (Canada) Inc. (2013a). The bedrock outcrops were described as massive black, brown and grey siltstone with brittle fractured zones, and occasional sandstone intervals that appeared brown and oxidized (Figure 8). SRK Consulting (Canada) Inc. (2013a) described drillcore from bedrock as medium to high density, varying from brown to black, and weathered and fractured. Lithological logs also stated that the shale bedrock was weathered up to 18 m below the bedrock-overburden contact. The occurrence of thin-bedded sandstone in outcrops may reflect the transitional period from the estuarine conditions at the close of the Jurassic to the freshwater sedimentation of the coal bearing Lower Cretaceous formation (Riddell, 2012). Furthermore, observations of outcrops and drillcore were consistent with a Golder Associates (1979) report that describes the Fernie shale as highly erodible, with exposed sections that break-down rapidly into small platey fragments.

Figure 8. Bedrock outcrops (north edge of AWTF area) with highly fractured and brittle zones amongst massive grey siltstone, as well as brown and oxidized sandy intervals.

The elevation of the bedrock surface was defined using 13 boreholes that intersected the bedrock along with several bedrock outcrops. The bedrock was encountered in drill holes between 1491 masl (12-09c; Table 1; Figure 6) in the NW to 1416 masl (12-11; Table 1; Figure 6) in the SE. The bedrock contact beneath the overburden sediments appeared to be shallower on the sides, deepening toward the middle of the valley, and with a general dip towards the southeast. The electrical resistivity tomography (ERT) surveys conducted by Worley Parsons Ltd. (2013) were also used to identify the bedrock contact Worley Parsons Ltd. (2013) defined the bedrock in ERT surveys by a sudden change in resistivity with depth; from high resistivity sands and gravels (>200 ohm-m) to relatively low resistivity siltstone (<100 ohm-m). The three ERT surveys, used to outline the bedrock location at the study site, are presented in Figure 9.

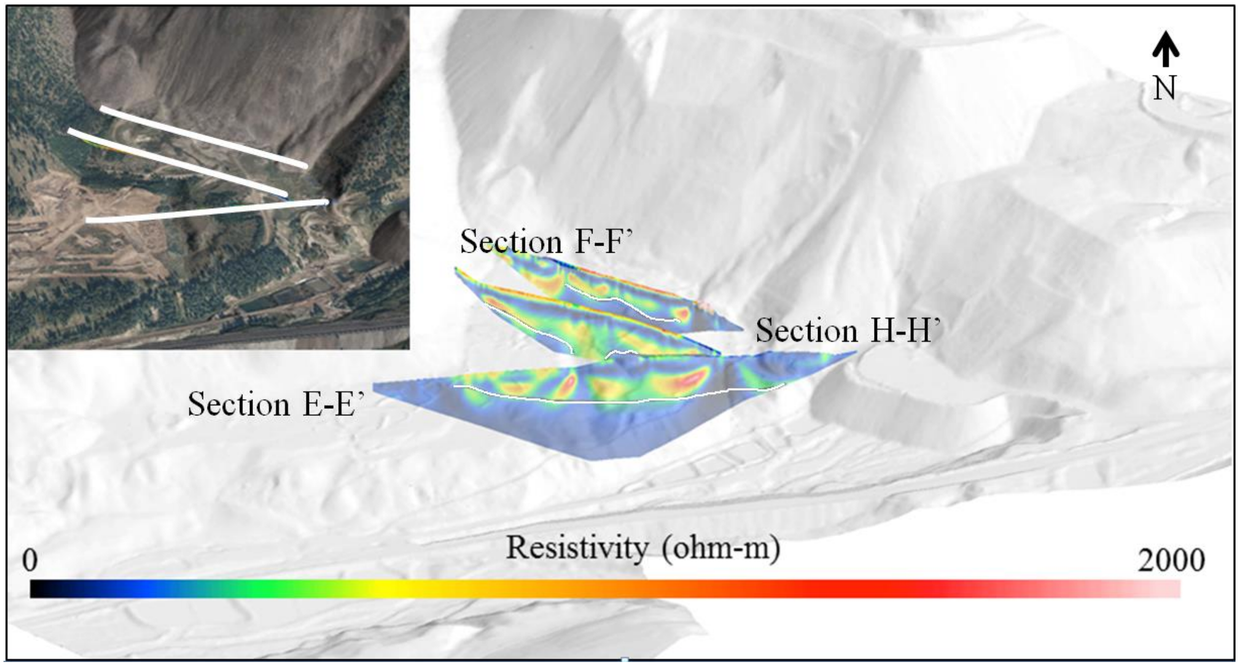


Figure 9. Three electrical resistivity tomography cross sections generated by Worley Parsons Ltd. (2013) presented on a transparent grey image of the study site. The white lines on ERT cross sections indicate the interpreted bedrock contact.

The ERT surveys were used in conjunction with lithological logs and bedrock outcrops to create a 3-D map of the bedrock-overburden contact using Mira GOCAD® software (Figure 10). The bedrock surface beneath the overburden sediments has a U-shaped morphology characteristic of montane valleys in the Western Cordillera similar to that described by Heusser (1956).

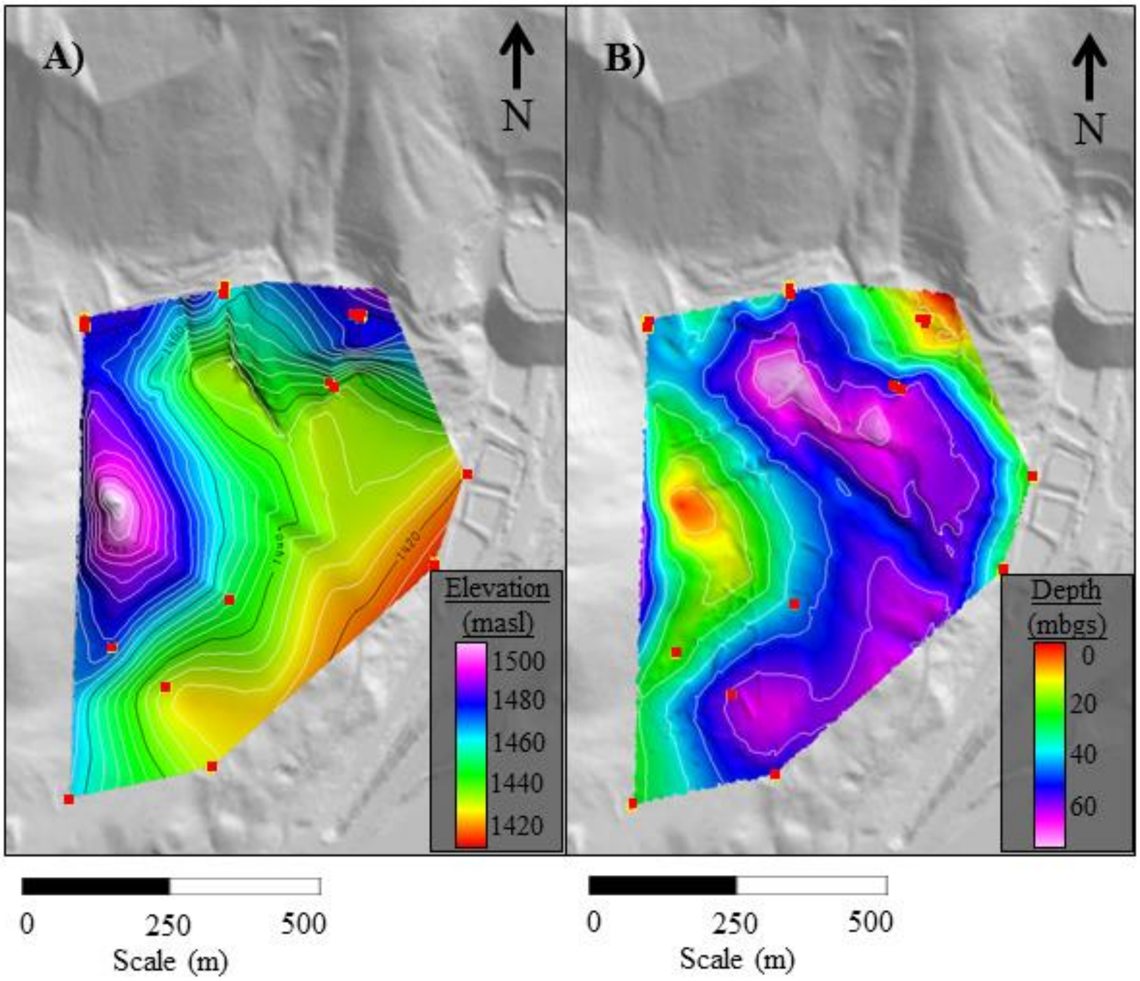


Figure 10. (a) Map of bedrock surface (masl) and (b) map of depth (mbgs) to bedrock beneath overburden sediments; boreholes are shown with red squares and outcrops with red crosses.

5.1.2 Unconsolidated Overburden Sediments

The maximum thickness of the unconsolidated overburden sediments as identified by borehole drilling was 64 m (Figure 10b). Characterization of the overburden using lithological logs and the results of particle size analyses demonstrated that these sediments were glacial till, glacio-lacustine and glacio-fluvial in origin. A comparison between lithological logs and the results of particle size analyses at well nest 12-06 (Table 1; Figure 6) are presented in Figure 11 as an example. This borehole log was illustrative of the three primary depositional environments; with glacial till often occurring at greater depths and glacio-lacustrine found mostly at shallower depths. Lithological logs were simplified into four categories, based on the United Soil Classification System (USCS), and a fifth bedrock siltstone category was added. Full lithological descriptions following USCS methods are available in SRK Consulting (Canada) Inc. (2013a), while the complete results of particle size analyses are presented in Appendix A.

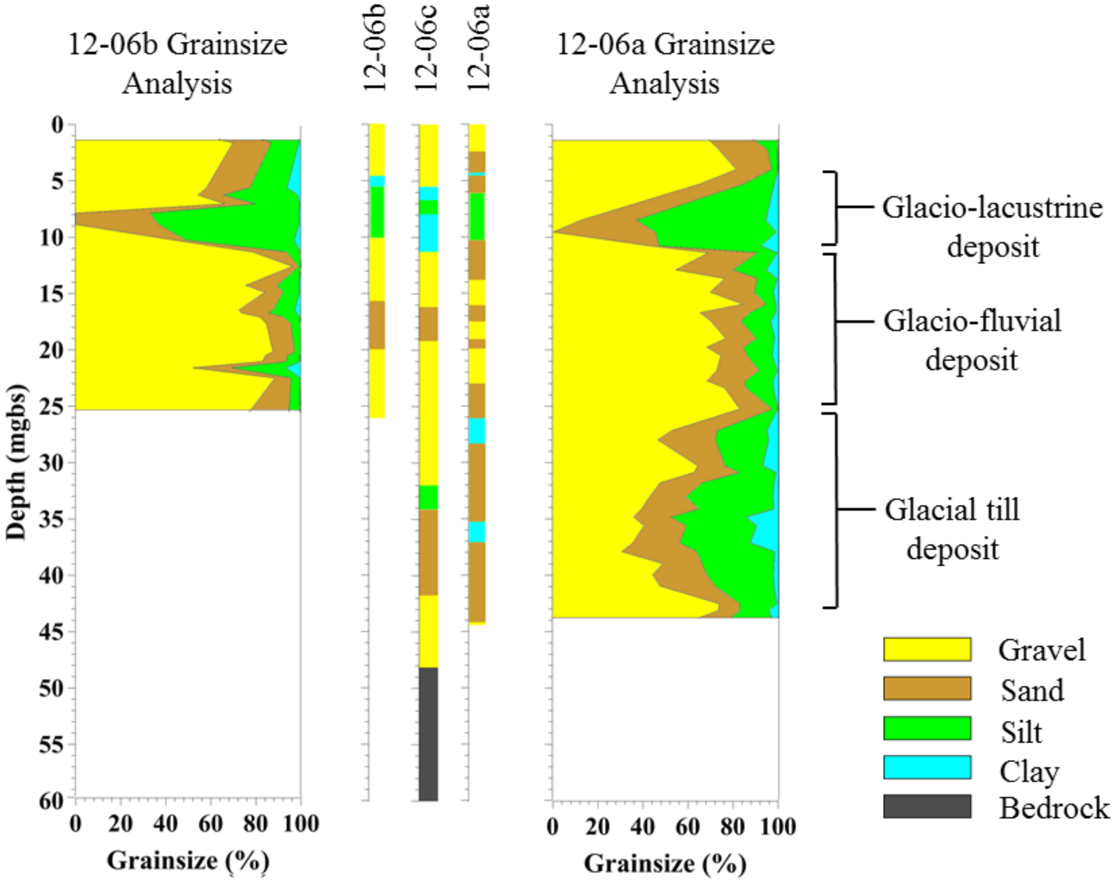


Figure 11. Comparison of lithological logs and particle size analyses from individual boreholes at well nest 12-06.

Although the boreholes at well nest 12-06 were drilled <5 m apart, small-scale variability in geology was evident. This is important because the complex valley-fill successions can result in truncated lithofacies associations and enhances vertical connectivity for groundwater flow (Russell et al., 2004). This occurrence is common in valleys formed by glacial action that are frequently composed of a series of cut and fill structures, which are often narrower than the overall valley (Jorgensen et al., 2006). Several changes in the geology of the valley-fill sediments were noted at well nest 12-06 including:

- 12-06b had a thin layer of increased silt and clay at ~21 m depth not evident in other boreholes;
- below ~25 m depth the lithological logs of 12-06c and 12-06a were not consistent; and
- the fine-grained units between 4 to 15-m depth were observed at a shallower depth in well 12-06a than 12-06b.

The glacial till observed near the base of 12-06a (Table 1; Figure 6) was composed of heterogeneous sized particles (Figure 11). The identification of glacial till from particle size analyses was supported by SRK Consulting (Canada) Inc. (2013a), who report that the relative density of core samples increased with proximity to the bedrock contact, which they identify as a basal till.

The presence of fine-grained sediments at higher elevations in a number of boreholes (i.e. 12-06, 12-07, 12-09 and 12-10 borehole nests; Table 1; Figure 6) was confirmed by particle size analyses. These were interpreted in lithological logs as glacio-lacustrine deposits (Figure 11). These intervals had a high silt (0.01–0.005mm) content (up to 89%) and were described by SRK Consulting (Canada) Inc. (2013a) as a medium to high-plastic clay to silty-clay unit. Laminations were observed within this layer in both drill core and field reconnaissance of access road-cuts (SRK Consulting (Canada) Inc., 2013a). Varved layers are strong evidence of lacustrine deposition (De Geer, 1912). This might have occurred during a period in which water was ponded within the valley due to damming of the valley by glaciers or moraines.

Based on lithological logs and particle size analyses, the overburden sediments appeared to be primarily deposited by glacio-fluvial processes. Gravel sized particles (>2 mm) comprised as much as 84% of the core samples at some depths (12-11; Table 1; Figure 6). Additionally, glacial till and glacio-lacustrine deposits were not encountered in each borehole. The dominance of glacio-fluvial deposits was in agreement with the interpreted ERT surveys (Worley Parsons Ltd. 2013) that identified subsurface paleochannels in the overburden sediment. They described numerous high resistivity anomalies (>200 ohm-m) as packages of relatively coarse sand or gravel found in the paleochannels (Figure 9), further illustrating the dominance of glacio-fluvial deposition and the spatial heterogeneity of the overburden sediments.

SRK Consulting (Canada) Inc. (2013a) also describes coarse-grained sediments in drill core as local ice-contact deposits consisting of gravels with cobbles and boulders. This depositional environment may be reflected by the large percentage of gravel-sized particles (>2 mm) in particle size analyses. The existence of boulders and cobbles may have suggested recent glacial re-advances during deposition of the overburden sediments. Based on the dominance of gravel-sized particles, a braided stream deposition model for the overburden sediments was proposed. Other requirements of the braided river deposition model are abundant sediment and sporadic water discharge (Boggs, 2001), which were inferred by thickness of the overburden deposits and the recent deglaciation of the Western Cordillera (Heusser, 1956).

5.2 Hydraulic Properties of Geologic Media

Following the definition of the geologic units using lithology, the hydraulic properties of these units were determined. These methods included performing instantaneous change in hydraulic head (slug) tests, geotechnical testing of core samples and monitoring hydraulic head in wells.

5.2.1 Hydraulic Conductivity

Hydraulic testing of monitoring wells in the overburden sediments with wells screens completely submerged beneath the water table (n = 8) indicated that the K ranged over two orders of magnitude from 1.1×10^{-4} to 4.3×10^{-6} m/s (Table 5). The geometric mean of K from these tests was 3.4×10^{-5} m/s. However, two of these estimated K values may have been less accurate due to a partially ‘silted in’ well screen (12-12; Table 1; Figure 6) and a broken well screen (12-09c; Table 1; Figure 6; Figure 12). These monitoring well K-tests may have underestimated the K of the bulk formation. The ‘silted in’ wells likely resulted from well development, where overpumping of the wells at high rates can pull fine-grained sediments preferentially from the top of a screened interval (Driscol, 1984). Fine-grained sediments that occurred in the formation above the screened interval may have also slumped into the screen during well development.

The values of *K* reported by SRK Consulting (Canada) Inc. (2013c) for the AWTF monitoring wells were from 2×10^{-5} to 4×10^{-7} m/s (n = 4), suggesting the range of *K* in the overburden sediments across the catchment may be greater than three orders of magnitude. The variability of *K* in the overburden sediments reflected the geological heterogeneity of these deposits, although most wells were screened in the gravel dominated glacio-fluvial sediments. However, two monitoring wells that were hydraulically tested appeared to be partially screened in glacial till deposits as well (12-10b and 12-12; Table 1; Figure 6). The range in *K* was consistent with reported values for glacio-fluvial deposits by Freeze and Cherry (1979), who state that the bedded character of fluvial deposits imparts a strong textural variability and in turn causes a strong heterogeneity in the distribution of hydraulic properties. Conversely, limited *K* values measured in monitoring wells within the shale bedrock (n = 2) were within one order of magnitude. The *K* obtained from these two tests ranged from 1.4×10^{-8} to 7.6×10^{-8} m/s (Table 4), with a geometric mean of 3.3×10^{-8} m/s. However, one of these estimated *K* values may have been less accurate due to a completely 'silted in' well screen (12-10c; Figure 12; Table 1; Figure 6).

Table 5. Summary of hydraulic conductivities (K) measured in monitoring wells with completely submerged screened intervals.

Borehole	K_{min} (m/s)	K_{max} (m/s)	K_{mean} (m/s)	Geology	Comments
LCO-WLC-12-06a	1.0×10^{-4}	1.2×10^{-4}	1.1×10^{-4}	Overburden	
LCO-WLC-12-09b	1.1×10^{-6}	1.4×10^{-6}	1.2×10^{-6}	Overburden	
LCO-WLC-12-09c	5.9×10^{-5}	9.2×10^{-5}	7.5×10^{-5}	Overburden	broken well screen
LCO-WLC-12-10b	2.7×10^{-4}	2.8×10^{-4}	2.8×10^{-4}	Overburden	
LCO-WLC-12-11N	1.2×10^{-4}	1.6×10^{-4}	1.3×10^{-4}	Overburden	
LCO-WLC-12-12	3.7×10^{-6}	4.7×10^{-6}	4.3×10^{-6}	Overburden	1.5 m of screened interval 'silted in'
LCO-WLC-12-10c	6.9×10^{-8}	8.2×10^{-8}	7.6×10^{-8}	Bedrock	3 m of screened interval 'silted in'
LCO-WLC-12-06c	1.1×10^{-8}	1.6×10^{-8}	1.4×10^{-8}	Bedrock	

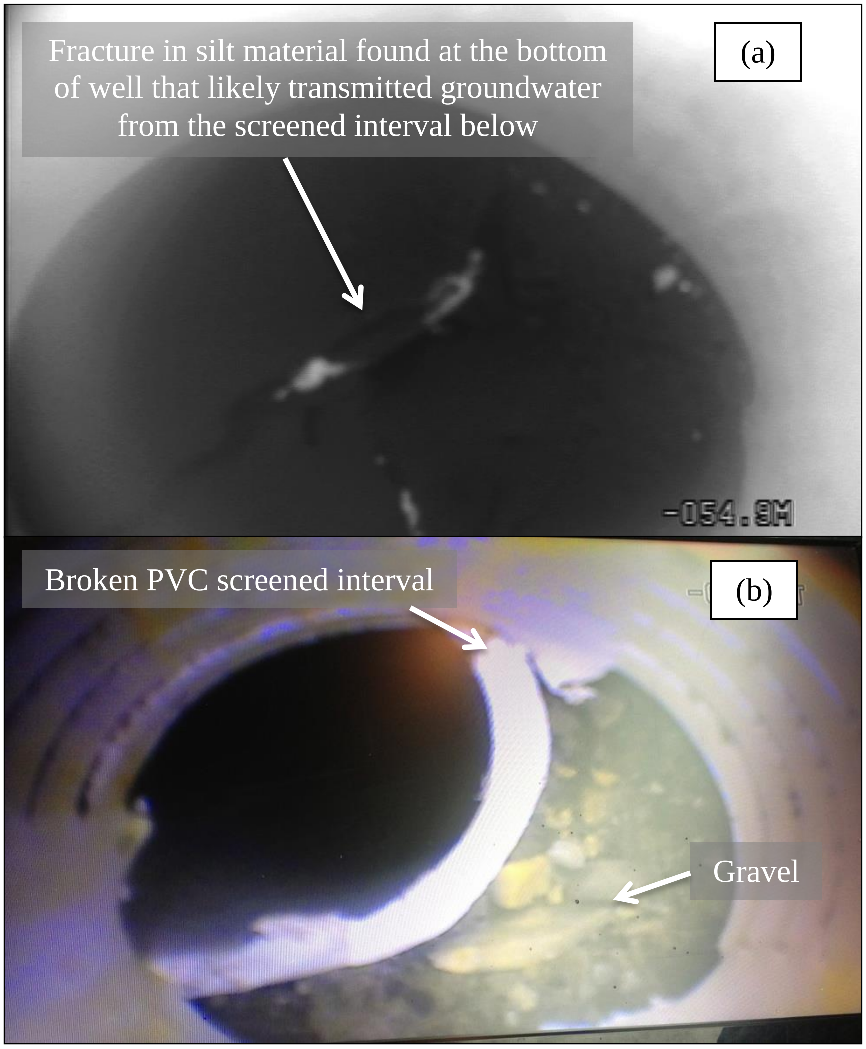


Figure 12: Downhole images taken near the bottom of (a) well 12-10c where no screened PVC interval was observed because the well was fully ‘silted in’ and (b) well 12-09c with a broken PVC screened interval.

5.2.2 Porosity

The porosity (n_T) of core samples from the overburden deposits varied from 0.16 to 0.49 (n = 123) with an arithmetic mean of 0.30. The results of particle size analysis and n_T for monitoring well 12-10b (Table 1; Figure 6) are presented as an example in Figure 13. This data displayed the increased n_T of the glacio-lacustrine compared to the glacio-fluvial deposits and also illustrates the loss of competent core in glacio-fluvial deposits on which geotechnical analyses could be performed. Evaluating core samples from all boreholes showed n_T was changed between the three dominant depositional environments (see Section 5.1.2). The average n_T values of glacio-fluvial, glacio-lacustrine and glacial till sediments were 0.26 ± 0.06, 0.38 ± 0.05, 0.33 ± 0.06, respectively (Table 6). The heterogeneous particle sizes in glacial till units was shown to produce an intermediate n_T when compared to the other two depositional environments. However, apparent loss of competent core from coarse-grained sediment intervals may have biased results for n_T determination, with fine grained units favorably represented. The n_T of the shale bedrock was determined to be lowest measured geologic unit at 0.20 ± 0.04 (n = 4). Complete results for porosity with depth in boreholes are displayed graphically in Appendix A alongside the results of particle size analyses.

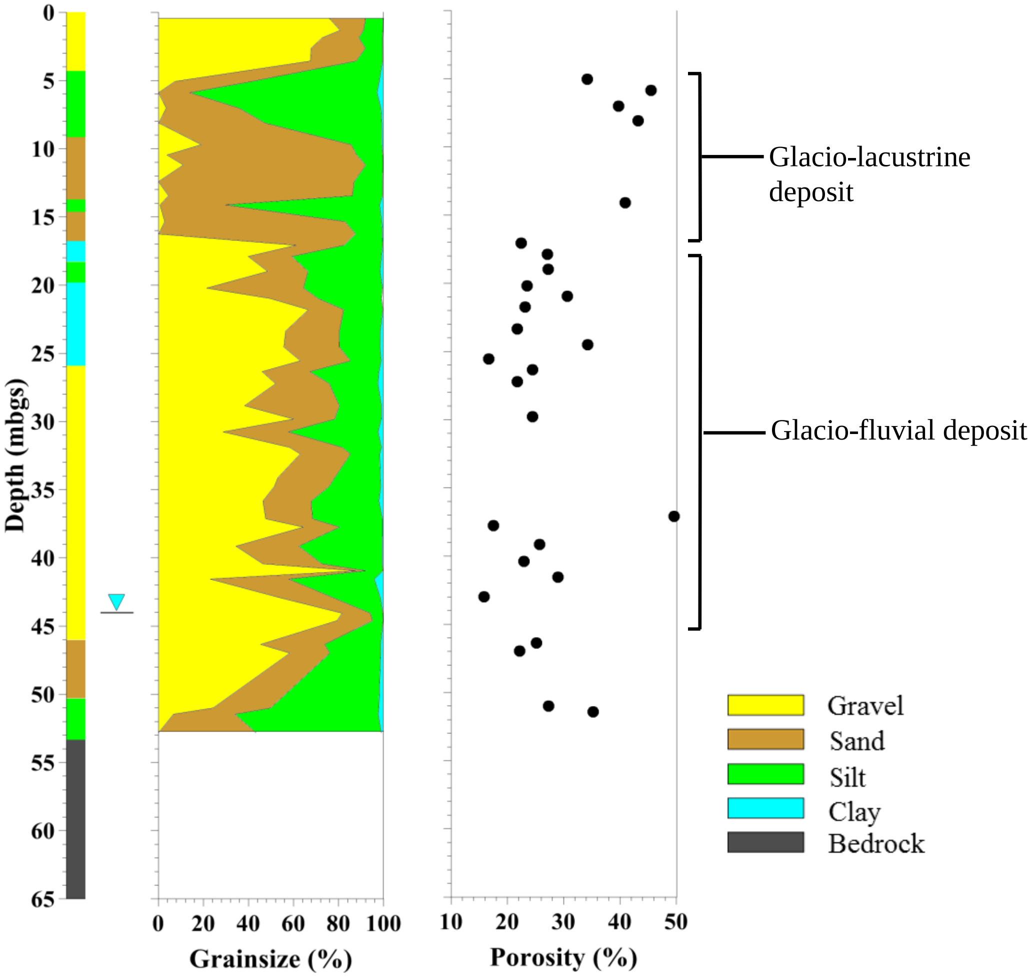


Figure 13. Porosity values of core samples collected from monitoring well 12-10b shown with the results of particle size analysis. Also shown is the approximate average water level (inverted triangle) for the study period.

Table 6. Maximum, minimum and average porosity of core samples grouped by depositional environment of unconsolidated overburden sediments.

Geology	Number of Samples	Max. Porosity	Min. Porosity	Mean Porosity
Glacio-fluvial	68	0.49	0.16	0.26 ± 0.06
Glacio-lacustrine	15	0.45	0.26	0.38 ± 0.05
Glacial Till	37	0.45	0.22	0.33 ± 0.06
Bedrock	4	0.25	0.16	0.20 ± 0.04

5.2.3 Hydraulic Head Monitoring

The maximum, minimum and average hydraulic head values recorded using downhole data loggers over a two-year period (September 2012–September 2014) is presented in Table 7. Average hydraulic head values were only calculated for periods when there was water within the well. A review of lithological logs and hydraulic head data indicated that unconfined aquifers formed in the bedrock, above the shale bedrock (8–64 mbgs) in the overburden deposits and above the shallow glacio-lacustrine deposits (5–15 mbgs). Thick unsaturated zones (from approximately 7 to 45 mgbs) existed above these aquifers. Portions of the overburden aquifers may be semi-confined as demonstrated at well 12-09b (Table 1: Figure 6) where a thin layer of clay and silt was encountered above the well screen interval locally separating this aquifer into two parts.

Table 7. Maximum, minimum and average hydraulic head values at each well.

Monitoring Well	Geology	Max. Hydraulic Head (masl)	Min. Hydraulic Head (masl)	Mean Hydraulic Head (masl)	Range in Hydraulic Head (m)	Depth to Middle of Screened Interval (mbgs)
12-06a	Overburden	1506.2	1496.8	1500.8	9.4	12.1
12-06b	Overburden	-	-	-	-	21.2
12-06c	Bedrock	1470.8	1464.0	1467.3	6.8	74.1
12-07a	Bedrock	1478.2	1477.8*	1478.0	0.4	11.1
12-07b	Bedrock	1477.6	1475.6	1476.2	2.0	13.0
12-07c	Overburden	1482.3	1480.7*	1481.5	1.5	7.2
12-09b	Overburden	1494.6	1488.8	1490.6	5.8	42.2
12-09c	Overburden	1499.5	1490.5	1491.5	9.0	37.2
12-09d	Overburden	1518.0	1514.5*	1515.0	3.5	7.7
12-10b	Overburden	1462.9	1452.9	1454.8	10.1	45.6
12-10c	Bedrock	1459.2	1451.9	1454.5	7.2	62.8
12-11N	Overburden	1441.7	1439.2	1440.1	2.4	5.0
12-12	Overburden	1443.8	1441.9	1442.4	1.9	22.2

* Denotes bottom of screened interval in the monitoring well.

5.2.3.1 Hydraulic Head Fluctuations

The hydraulic head across the study site fluctuated rapidly in response to spring freshet and precipitation events. Generally, greater yearly fluctuations were observed in monitoring wells screened at greater depths in the overburden sediments (Table 7). Hydrographs representative of annual trends in hydraulic head from selected monitoring wells located in the overburden sediments and bedrock formation are presented in Figure 14. Maximum hydraulic head values were generally observed at the beginning of June, suggesting the hydraulic head response of the groundwater system was dominated by snow-melt. However, shallow monitoring wells and those in proximity to the toe of the waste rock dump had increased hydraulic head values sooner in the spring than the remaining wells (i.e. 12-06a and 12-07c; Table 1; Figure 6). Also shown are representative hydrographs from the AWTF area, which displayed a more muted hydraulic response to spring freshet than the remaining monitoring wells. The hydraulic head data from all monitoring wells with time are shown in Appendix A.

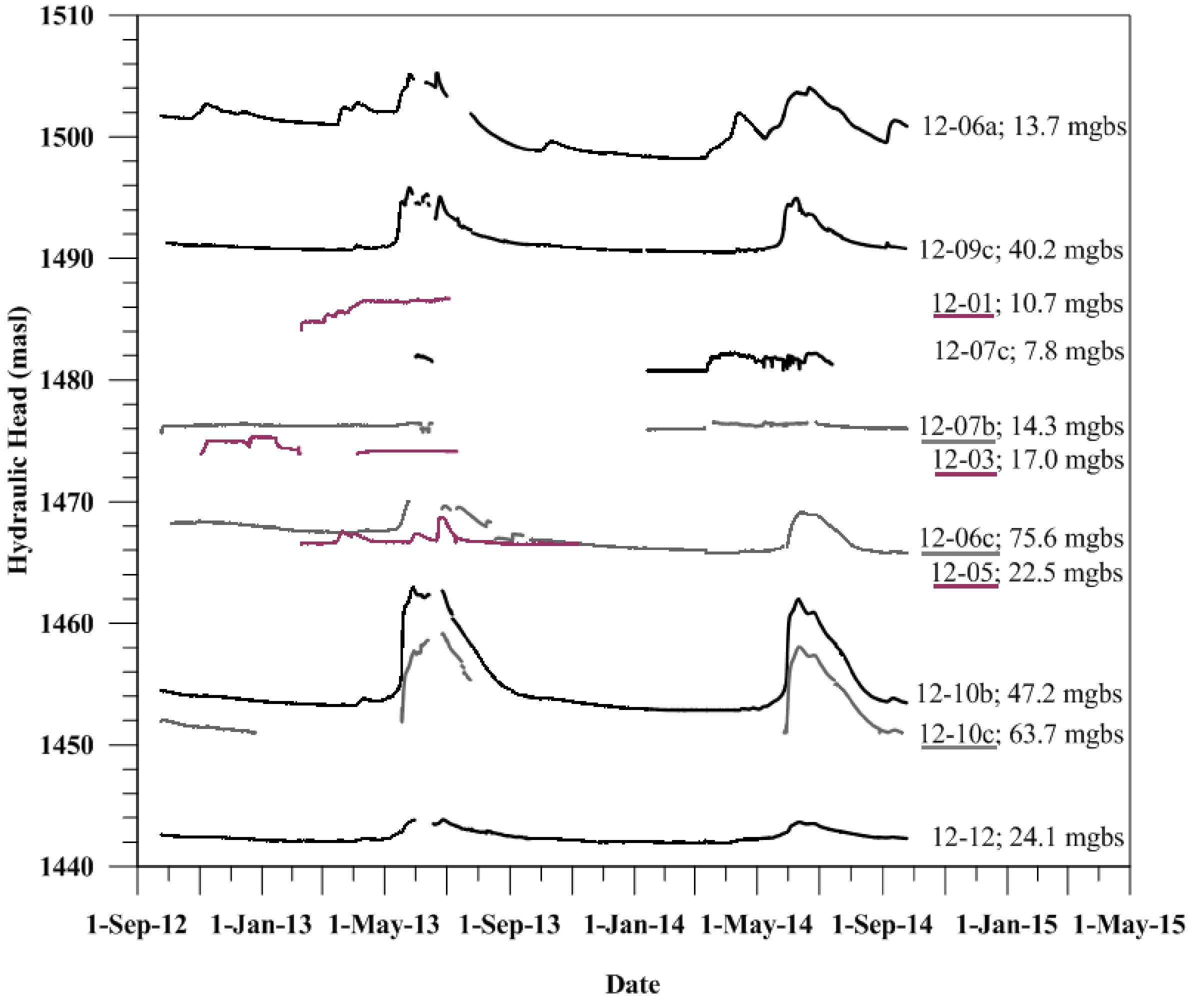


Figure 14. Hydraulic head hydrographs from monitoring wells in the overburden sediments (black), the bedrock formation (grey), and AWTF area (red). Next to the monitoring well label is the depth of the bottom of the screen intake zone.

An evaluation of hydraulic head hydrographs, stream elevation, and stream discharge may have also demonstrated there was low connectivity between the majority of aquifer monitoring locations and the stream, i.e. the rock drain. The approximate elevation of the intake of the underground drainage culvert was 1500 masl at the toe of the waste rock dump (Worley Parsons Ltd., 2013), suggesting shallow monitoring wells 12-06a and 12-09d (Table 1; Figure 6) that formed on top of the shallow glacio-lacustrine sediments were the only wells sufficiently elevated to interact with the rock drain. Additionally, the annual hydraulic head pattern in all monitoring wells did not appear to reflect the changes in discharge at the culvert outlet (see Figure 28). Following spring-freshet the aquifers and rock drain responded simultaneously, with a sharp increase in hydraulic head and discharge, but during the recession period streamflow diminishes quickly and groundwater levels decline gradually. During this recession period, the apparent poor correlation between streamflow and groundwater levels may have demonstrated the dominant influence of natural recharge sources (i.e. not the rock drain) on the aquifers.

Mean hydraulic head recorded in monitoring wells were up to 1.7 m higher in Year 1 (Sept. 2012–Sept. 2013) than in Year 2 (Sept. 2013–Sept. 2014) of the study (Table 7). The difference in hydraulic head between Year 1 and Year 2, particularly at the shallow monitoring well 12-06a may have reflected a difference in precipitation received at the study site. The nearby Sparwood, BC weather station (Environment Canada, 2015) received 412 mm total precipitation in Year 1 and only 289 mm precipitation in Year 2.

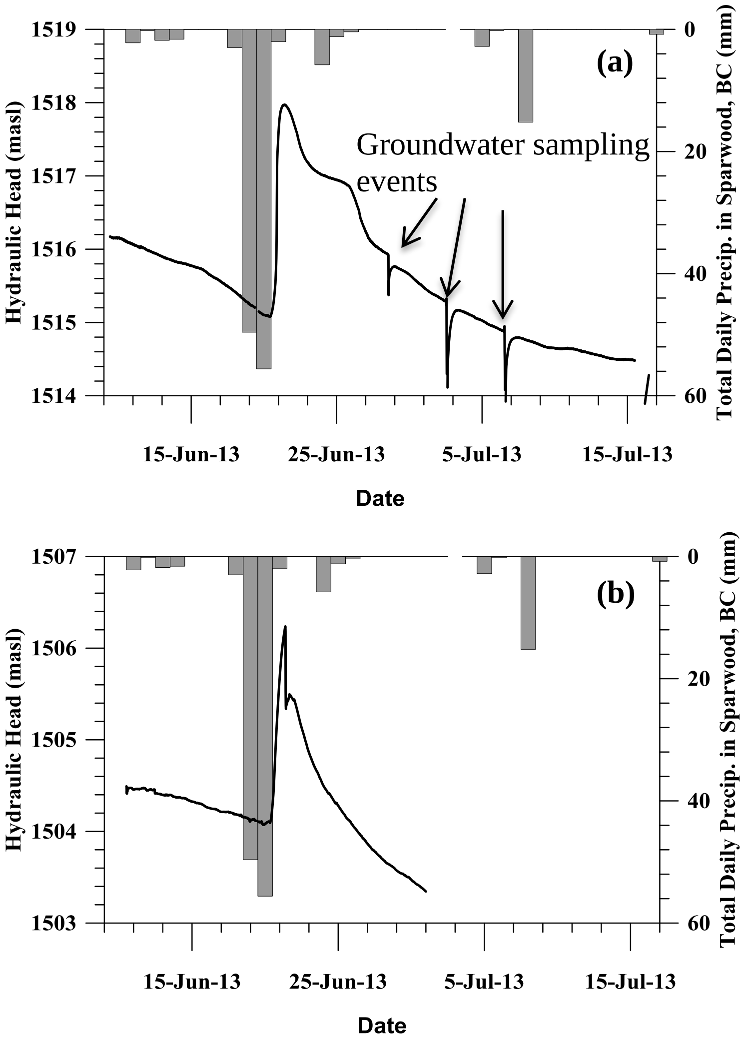
Table 8. Monitoring wells that displayed differences in hydraulic head between Year 1 (Sept. 2012–Sept. 2013) and Year 2 (Sept. 2013–Sept. 2014) of the study.

Well	**Geology**	**2013 Mean Hydraulic Head (masl)**	**2014 Mean Hydraulic Head (masl)**	**Difference in Annual Hydraulic Head (m)**
12-06a	Overburden	1501.7	1500.0	+1.7
12-09c	Overburden	1491.5	1491.2	+0.3
12-09b	Overburden	1491.0	1490.3	+0.7
12-10b	Overburden	1455.1	1454.4	+0.6
12-12	Overburden	1442.5	1442.4	+0.1

Fluctuations in hydraulic head were also attributed to individual rainfall events. A large precipitation event from June 18 to 20, 2013 (100+ mm fell over a 48 h period) had a marked impact on hydraulic head values (Figure 15). Wells 12-09d (screened 6.2–9.2 mbgs), 12-06a (screened 10.5–13.5 mgbs) and 12-09c (screened 34.2–40.2 mgbs) yielded an apparent rise in hydraulic head of 3, 2.2 and 1.9 m, respectively. Shallow groundwater wells responded more rapidly than deeper wells to the precipitation event, displaying the greatest magnitude and most defined peak for hydraulic head. With increasing depth the rise in hydraulic head in monitoring wells was delayed, had a lower amplitude and a less defined peak. The hydraulic head response in wells screened in bedrock (data not presented) had the lowest amplitude and least defined peak, and was attributed to differences in the hydrologic properties (e.g. porosity) of this geologic unit. Additionally, the different hydraulic responses between monitoring wells could also be caused by changes in subsurface soil characteristics and antecedent moisture conditions (Hannel, 2011). Antecedent moisture conditions in the subsurface at the time of the large precipitation event were likely elevated due to recent snow-melt, and hydraulic head values were receding following maximum levels during due to spring freshet.

The large increase in hydraulic head following the June 2013 precipitation event demonstrated that other causes of the water table rise may have occurred for this particular event. For instance, infiltrating rainfall may have trapped air in the unsaturated zone between the wetting front and the water table producing the Lisse effect. Crosbie et al. (2004) discusses that the Lisse effect occurs when the water table rises disproportionally to the amount of precipitation and subsequently dissipates quickly over approximately two days. This occurrence was evident in Figure 14a and Figure 14b, where shallow monitoring wells displayed a steep recession limb on their hydrographs. After two days the recession limb of shallow monitoring wells became more gradual and represented the actual change in hydraulic head due to rainfall, i.e. recharge. Removal of the steep recession limbs on the hydrographs displayed in Figure 15 demonstrated that the amount of recharge was more consistent across varying depths than the previous estimate, with wells 12-09d (screened 6.2–9.2 mbgs), 12-06a (screened 10.5–13.5 mgbs) and 12-09c (screened 34.2–40.2 mgbs) yielding a rise in hydraulic head of 2.0, 1.5 and 1.9 m, respectively.

Estimates of recharge from the June 2013 precipitation event were calculated using the water table fluctuation method, where the change in hydraulic head can be multiplied by an estimate of specific yield (S_y) (Crosbie et al., 2005). Johnson (1967) reports that the minimum S_y possible for unconsolidated deposits of sand to coarse gravel, of which the bulk deposit in this study is composed, is approximately 0.10 to 0.12. Based on these estimates of S_y, the amount of recharge to the aquifers was greater than the volume of rainfall by at least 50 mm and therefore the amount of recharge could not be accounted for by precipitation alone. This demonstrated that an additional cause of water table fluctuation was present in the overburden sediments and may have occurred from upgradient or lateral groundwater flow. An evaluation of a September 2014 rainfall event yielded a similar interpretation (data not presented).



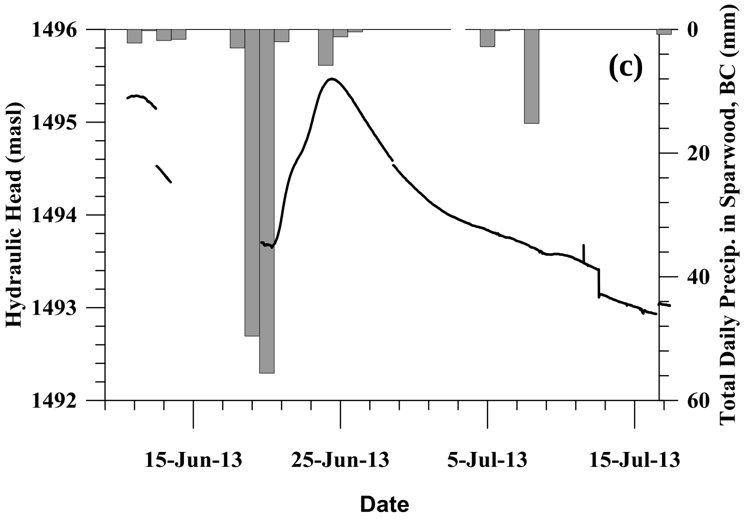


Figure 15. Water level responses (solid line) to the June 2013 precipitation event (grey bars); (a) well 12-09d (screened 6.2–9.2 mbgs), (b) well 12-06a (screened 10.5–13.5 mgbs), (c) well 12-09c (screened 34.2–40.2 mgbs).

5.2.3.2 Perched Aquifers

Monitoring wells 12-09d and 12-06a (Table 1; Figure 6) were screened in gravel sediments at shallow depths (<15 mbgs) above the fine-grained glacio-lacustrine deposits (see Section 5.1.2). A review of lithological logs and hydraulic head data suggested that thick unsaturated zones existed beneath the screened intervals of these wells. For example, at 12-06a, the adjacent well 12-06b (Table 1; Figure 6) was screened from 19.6–22.6 mbgs and was continuously dry. As such, these two monitoring wells were considered perched aquifers (Schwartz and Zhang, 2004). The glacio-lacustrine deposits identified at 5–15 mbgs were interpreted as controlling the development of perched aquifer conditions. Perched conditions were only observed in well 12-09d for approximately three months each spring following snow-melt and large precipitation events (see Appendix A). The perched conditions at well 12-06a continued throughout the study period and had a wide range in hydraulic head values (9.4 m) compared to well 12-09d (3.5 m; Table 7). Additionally, well 12-06a had a substantial saturated thickness (up to 10.2 m) above the bottom of the screened interval. The close proximity of the well to the waste rock dump suggested the continuous perched conditions were a product of hydrological conditions related to the rock drain. Outflow from the waste rock dump through the rock drain was interpreted to maintain the perched conditions throughout the study.

Multiple groundwater springs were observed at the SE extent of the catchment (Figure 15). These springs were observed between 1448 and 1481 masl and were considered to be associated with perched aquifers because bedrock mapping (see Section 5.1.1) suggested the bedrock surface was at elevations <1420 masl at these locations. The marked differences in elevation of the groundwater springs may have demonstrated leakage beneath the fine-grained glacio-lacustrine sediments was occurring. Major groundwater springs that flowed continuously (Seep 1, 2, 7a, 7b, 7c; Figure 16) were located between 1453 and 1461 masl. The hydraulic head of the perched aquifers were monitoring at two groundwater springs, Seep 1 and Seep 2. Minor groundwater springs at elevations >1462 masl and <1452 masl flow only during spring freshet, approximately May through July. Groundwater discharge rates in the major springs were up to 0.0031 m^3/s during spring freshet, but were <0.001 m^3/s during the winter months.

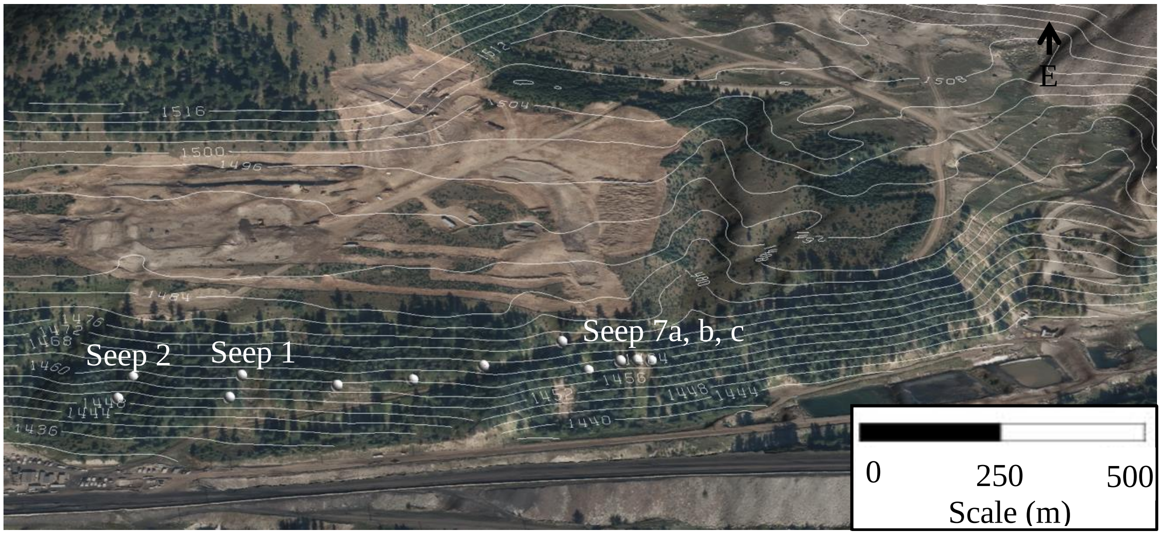


Figure 16. Groundwater springs (white dots) along the southern extent of the catchment with labels denoting springs that flowed continuously throughout the year. Contour lines represent 2-m intervals in surface elevation (masl).

Average hydraulic head measurements (2012–2014) collected from the drivepoint wells and monitoring wells (12-06a, 12-09d; drivepoint wells at Seep 1, Seep 2; and AWTF wells 12-01, 12-03, 12-04; Table 1; Figure 6) were used to create a water level map of the perched aquifers (Figure 17). The water level map was created assuming that these data reflected a single laterally extensive perched aquifer. It illustrates that the groundwater flow direction in the perched system was generally to the SSE. This flow direction was confirmed by the occurrence of CIs in groundwater spring samples as far as Seep 2 (~720 m from the intake of the underground culvert). Hydraulic head data from the drivepoint wells at Seep 1 and Seep 2 (see Appendix A) as well as monitoring well 12-09d suggested that the saturated thickness of the perched aquifers may have been <4.0 m.

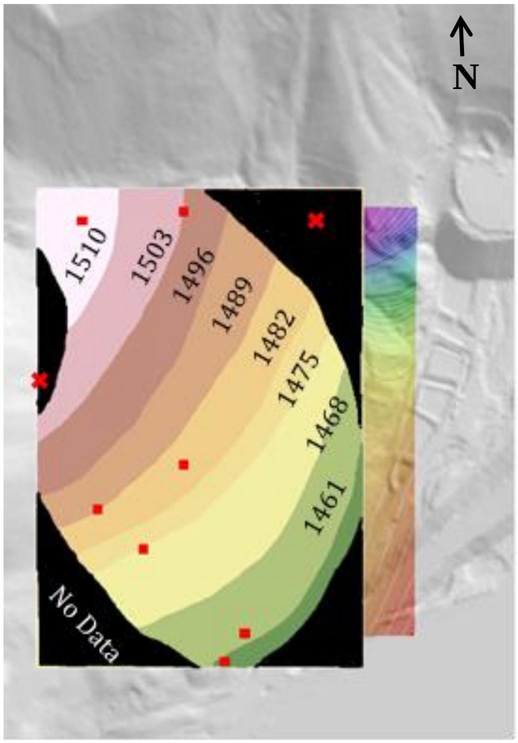


Figure 17. Water level map (masl) of the perched aquifers (shown as a single aquifer) constructed using average hydraulic head values. The wells used to generate the contour map are shown in red and bedrock outcrops are shown with a red cross.

5.2.3.3 Basal Alluvial Aquifer

A thick saturated zone was encountered in the overburden deposits directly above the contact with bedrock shale and was termed the basal alluvial aquifer. This aquifer was largely overlain by a shallow confining layer (<15 mbgs) that was separated from the underlying aquifer by a thick unsaturated zone. The lower-*K* shale bedrock likely provided the lower boundary upon which this aquifer formed. Based on lithological logs and particle size analyses (see Section 5.1.2) it appeared that the basal alluvial aquifer was within the gravel paleochannels and glacial till sediments. This aquifer had a maximum saturated thickness up to ~18 m, as determined from the mapped bedrock surface and the hydraulic head data (12-09c and 12-10b; Table 1; Figure 6). The greatest saturated thickness and largest annual range in hydraulic head (9.4–10.1 m) were measured in monitoring wells located in the thalweg of the U-shaped bedrock surface (12-09c and 12-10b; Table 1; Table 7; Figure 6). Along the eastern periphery of the valley, the basal alluvial aquifer thinned and the annual range in hydraulic head decreased to <3 m. Saturated conditions were only observed in these peripheral areas during spring freshet (12-07c; Table 1; Figure 6). These observations also suggested that the concave upward topography of the top of the shale bedrock surface as well as the input of water following spring freshet and precipitation events controlled the lateral and vertical extent of the basal alluvial aquifer. This interpretation on the extent of the aquifer, and the perceived flow paths within it, were also supported by the recharge calculations using the water table fluctuation method (see Section 5.2.3.1). Recharge estimates using this method exceeded the volume of rainfall during several precipitation events that were examined, demonstrating that there must be a rapid lateral transport of recharge waters to the deeper portions of the overburden sediments as controlled by the bedrock topography.

A water level map of the basal alluvial aquifer was generated (Figure 18) from the measured hydraulic heads in seven wells (i.e. 12-07a, 12-09b, 12-09c, 12-10b, 12-11, 12-12 and AWTF well 12-05) and the Line Creek stream elevation. The hydraulic head measurements on the water-level map are presented as average water levels in 2012–2014. A similar set of contours was developed if monthly average levels were generated (data not presented). The contours of these water level maps reflected the topography of the bedrock surface, revealing the important control that the bedrock surface has on groundwater flow (e.g. gradient and direction) in the overburden sediments. The water table sloped in the same direction as the bedrock thalweg, toward the SSE, which was similar to the perched aquifers as well.

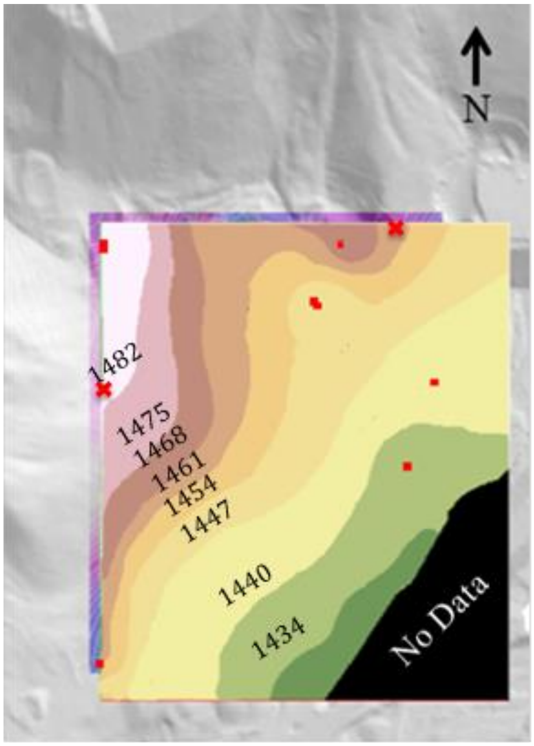


Figure 18. Water level map of the basal alluvial aquifer constructed using average hydraulic head values (masl) and Line Creek stream elevation. The wells used to generate the contour map are shown in red and bedrock outcrops are shown with a red cross.

5.3 Groundwater Temperature Monitoring

Groundwater temperatures measured using data loggers ranged from 1.5 to 6.3°C, and were cooler and less variable with increasing depth (Figure 19). Groundwater temperatures in shallow monitoring wells approximated mean annual air temperature (5°C), although the influence of constructed sedimentation ponds near several monitoring wells were noted, i.e. well nest 12-07 and well 12-11 (Table 1; Figure 6). Shallow groundwater temperatures are generally expected to be 1–2°C higher than the mean annual air temperature and reflect the cyclic nature of surface air temperature albeit with increasing dampening of this cycle over depths <20 m (Busby et al., 2009; Bense and Kooi, 2004). Infiltration of ponded water may explain the bias of temperatures at 12-11 (located ~5 m from a sedimentation pond) below the mean annual air temperature because the adjacent pond was large enough to persist year-round and was not expected to freeze to its full depth. Well nest 12-07 (12-07a, 12-07b, 12-07c) located ~8 m from several small ponds seemed to remain above the mean annual air temperature by 1–2°C, consistent with the elevated temperatures of the rock drain water (data not presented) that fed the ponds directly adjacent to these wells. Essilfie-Dughan et al. (2015) present temperatures in multiport boreholes atop the waste rock dump of up to 15°C.

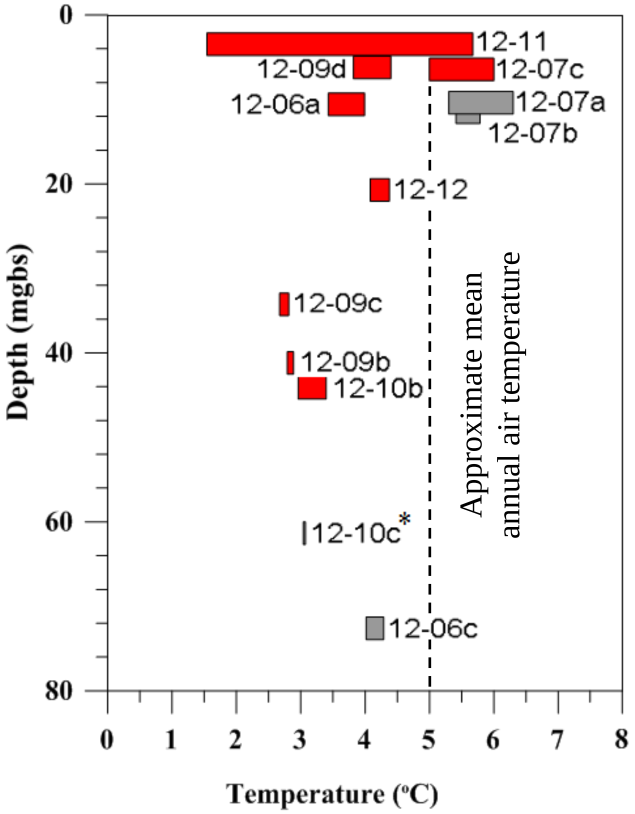


Figure 19. Temperature ranges measured in WLC monitoring wells (* denotes incomplete temperature record) shown with red (overburden) and grey (bedrock) color bars. The mean annual air temperature is shown with a dashed line.

Deeper wells in the basal alluvial aquifer generally had a cooler and narrower range in groundwater temperatures. The coldest groundwater temperatures were measured at well 12-09c at the northwest edge of the study site. The deeper wells appeared to be up to 2°C cooler than the mean annual surface temperature and may have represented water dominantly recharged at higher elevations. Similarly, two shallower wells (12-09d and 12-06a) may have represented water recharge at higher elevations as well. Annual surface air temperatures at higher elevations were expected to be cooler and characterized by a greater proportion of snow relative to rain than at the valley bottom. For instance, Shatilla (2013) states in 2012 between 1300 and 1850 masl the proportion of snow to rain at WLC varied from 28 to 66%. Barbour et al. (2015) determined that the catchment has a local temperature and precipitation lapse rate of approximately -0.48°C/100 m and +21 mm/100 m change in elevation.

Groundwater temperatures in deep bedrock wells (12-06c, 12-10c; Table 1; Figure 6) were below the mean annual air temperature. However, it was noted that the temperatures in the deepest well (12-06c; 80 mgbs) were consistently elevated above all wells between 30 and 60 mgbs. Manning and Caine (2007) report that groundwater temperatures found in deeper bedrock monitoring wells in mountainous terrain may be influenced by geothermal gradients due to limited groundwater circulation. The low-*K* of the bedrock supported that limited groundwater circulation was occurring in this zone but further study would be required to positively identify the influence of geothermal gradients at these depths.

Groundwater temperature trends varied by location and were evaluated in time-series plots using the more precise Solinst® 3001 Levelogger Edge data loggers (Figure 20). Overall, the maximum temperatures in individual overburden groundwater wells were observed in winter prior to spring freshet, at which point temperatures gradually decreased over the summer months. This phenomenon may have been attributed to the presence of waste rock effluent in the aquifers as high temperatures were measured in multi-port boreholes drilled atop the waste rock dump (up to 15° C; Essilfie-Dughan et al., 2015). Monitoring wells screened deep in the bedrock formation (i.e. 12-06c) and in the AWTF area had a less variable groundwater temperature trends and range. SRK Consulting (Canada) Inc. (2013c) reports that groundwater in the AWTF area was not impacted by mining based on chemical analyses of water samples. Thus, monitoring wells with no impact from mining appeared to have less variable groundwater temperatures. This may have also suggested that the high groundwater temperature variability and occurrence of maximum groundwater temperatures in winter in proximity to the waste rock dump was the result of mine-related activities. Groundwater temperatures for all monitoring wells through time are presented in Appendix A.

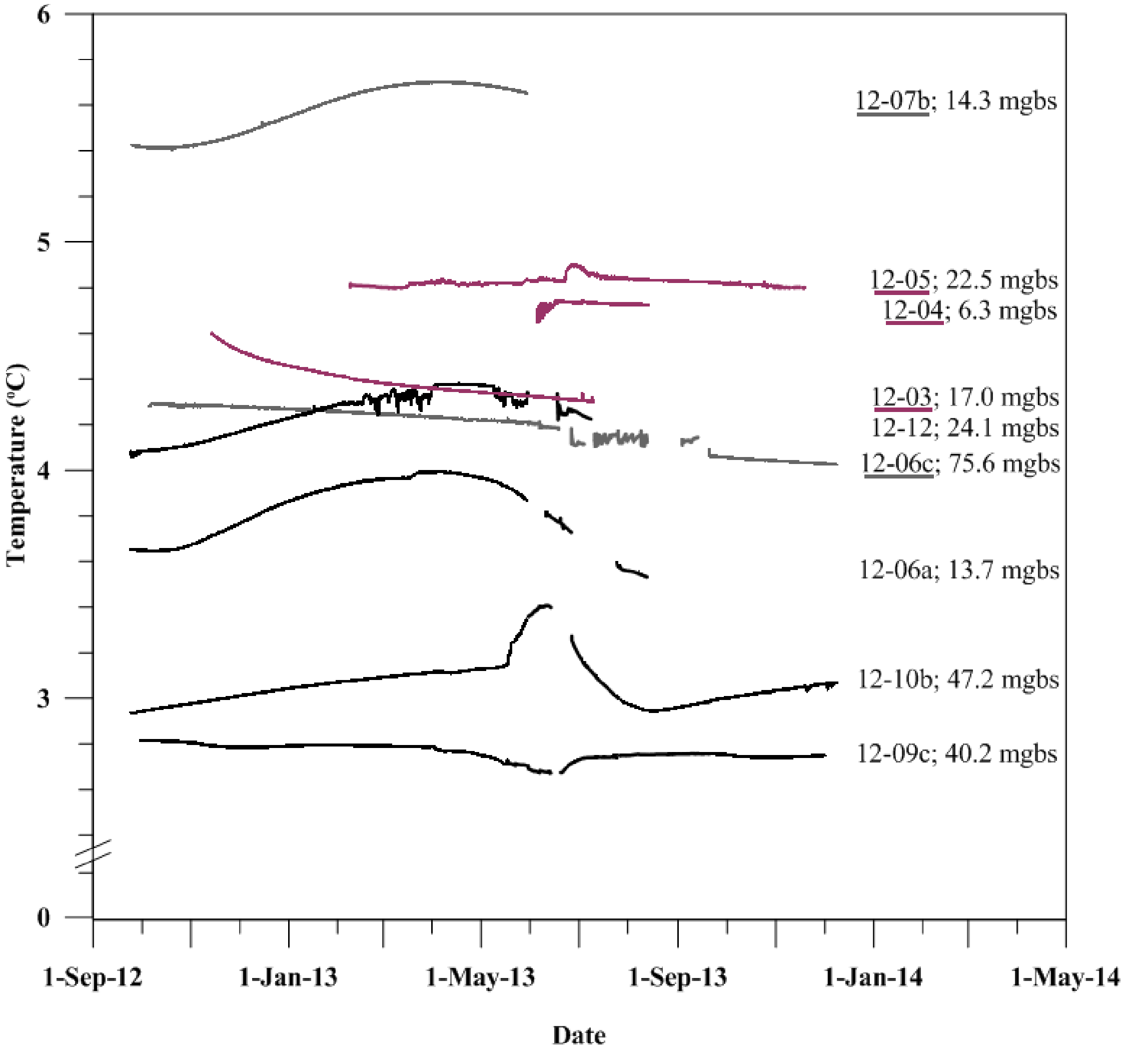


Figure 20. Groundwater temperature data (Solinst® 3001 Levelogger Edge) from monitoring wells in the overburden sediments (black), the bedrock formation (grey), and AWTF area (red). Next to the monitoring well label is the depth of the bottom of the screen intake zone.

Two exceptions to the general groundwater temperature trends were noted. At well nest 12-09 (Table 1; Figure 6) groundwater temperatures decreased more abruptly during spring freshet than the other monitoring wells. Well nest 12-09 was the most northerly well nest, and was located in close proximity to the steep western edge of the catchment beneath the high alpine cirques of the Wisukitsak range. The groundwater temperature and hydraulic head data from monitoring well 12-09c (screened 34.2–40.2 mgbs; Table 1; Figure 6) are shown in Figure 21. The abrupt temperature decrease beginning in early April 2013 and 2014 was interpreted as a result of the infiltration of snow-melt water along the western portion of the catchment (see

Section 6.3.1). A Solinst® 3001 Levelogger Edge was used in Year 1 and a Solinst® 3001 LTC Levelogger Junior was used in Year 2.

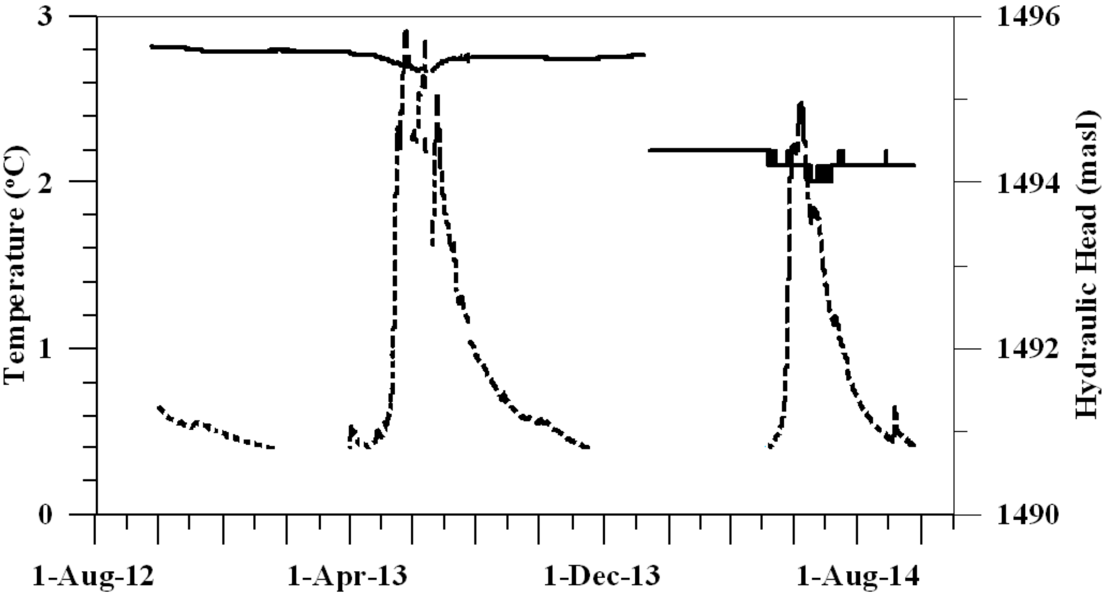


Figure 21. Well 12-09c temperature and hydraulic head data showing the simultaneous arrival of colder groundwater and increased hydraulic head. Year 1 and Year 2 temperatures are dissimilar because different models of data loggers were used.

Another anomalous groundwater temperature trend was observed in monitoring well 12-10b (44.1–47.1 mbgs; Table 1; Figure 6), which displayed a coincident timing of maximum hydraulic head and maximum groundwater temperature (Figure 22). Groundwater temperatures increased ~0.6°C over a week-long period starting approximately June 1 in both 2013 and 2014. This occurrence was interpreted to be the result of ponded surface water, which had temperatures measured as high as 16°C that subsequently infiltrated into the aquifers. The ponded water formed due to a surface water stream (Upper Toe sampling location; field-measured temperature ranged from 2.8 to 6.7°C) originating from the waste rock dump beginning in early–mid May of 2013 and 2014. Based on observations of the timing when the ponded water formed, it was estimated that water percolated through ~44 m of alluvial and glacial deposits in approximately three weeks. If correct, this also suggested that groundwater leakage through the shallow glacio-lacustrine sediments occurs to the underlying basal alluvial aquifer. Leakage beneath the shallow

shallow glacio-lacustrine sediments was also supported by the marked differences in groundwater spring elevations (1448–1481 masl; see Section 5.2.3.2)

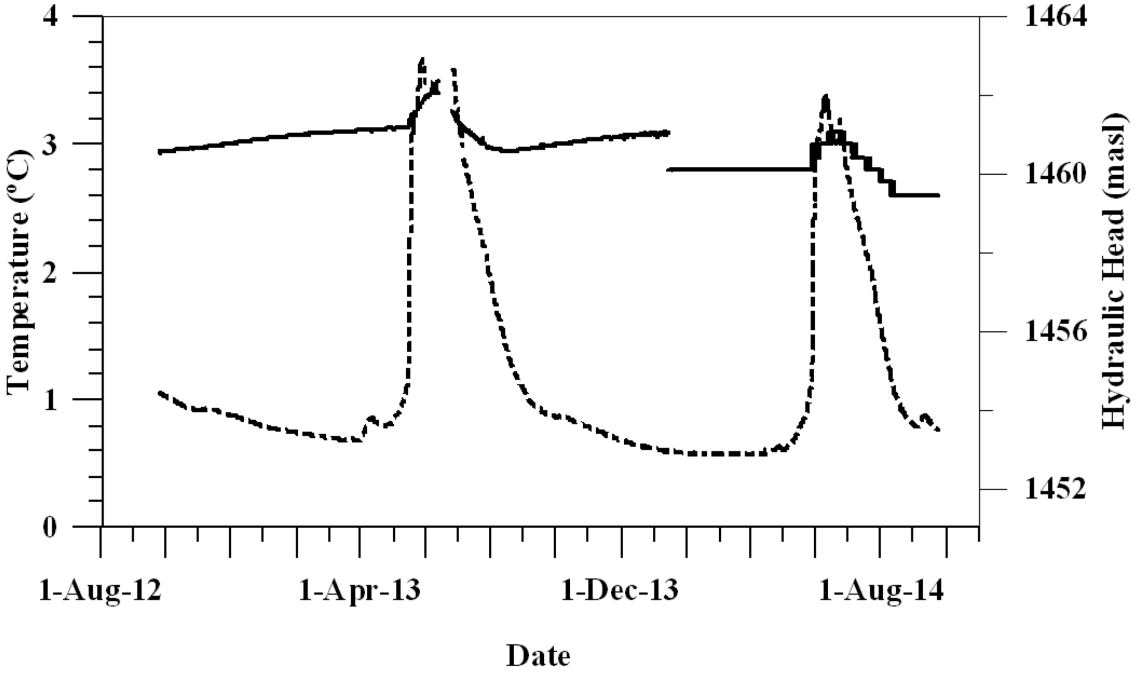


Figure 22. Well 12-10b temperature and hydraulic head data showing the simultaneous timing of maximum hydraulic head and maximum groundwater temperatures. Year 1 and Year 2 temperatures are dissimilar because different models of data loggers were used.

5.4 Environmental Isotopes

5.4.1 Isotopes of Water (δ^2H and δ^{18}O)

The stable isotope composition of groundwater (δ^2H and δ^{18}O) in overburden sediments ranged from -144.2 to -135.7‰ for δ^2H and -19.2 to -16.8‰ for δ^{18}O (Figure 23). Monitoring well 12-09b screened in the overburden was excluded due to the dissolved ion chemistry of groundwater at this location was indicative of groundwater sourced from the bedrock (see Section 5.6.4.2). The results were plotted against the Calgary Local Meteoric Water Line (LMWL), which was used as a proxy in the absence of a LMWL for the Elk Valley. δ^2H and δ^{18}O values plotted close to the LMWL, indicating no evaporation effects. The mean variation in the δ^{18}O amongst individual monitoring wells and groundwater springs was 0.7‰ over the study period, although the samples may be biased because winter sampling was less extensive. The arithmetic mean $\delta^{18}O$ values from overburden groundwater samples differed slightly among sampling sites, ranging from -18.7 to -18.0‰. A narrow range of isotopic values comparable to groundwater samples was also measured in squeezed porewater samples (n = 174; data not presented). Evaluating time-series plots of individual sampling sites (data not presented) displayed few seasonal trends, although the anomalous temperature trends at the northern most monitoring well 12-09c (screened 34.2–40.2 mgbs; Table 1; Figure 6) had a depleted $\delta^{18}O$ when minimum groundwater temperatures were recorded. This occurrence supported a snow-melt derived recharge mechanism proposed at this location using groundwater temperature data (see Section 5.3). The lack of discernable seasonality at the other sampling sites was interpreted to be caused by the thick unsaturated zones in the overburden sediments, which could attenuate the range of isotopic composition found in local precipitation. Clark and Fritz (1997) state that seasonal variation in water isotopes is largely attenuated above the water table and is a function of the physical characteristics of the unsaturated zone, the length of the flowpath and the residence time.

The stable isotope composition of groundwater from the bedrock (including overburden well 12-09b) ranged from -149.1 to -142.8 for $\delta^{2}H$ and -19.4 to -18.0‰ for $\delta^{18}O$ (Figure 23). The arithmetic mean $\delta^{18}O$ values from the bedrock formation groundwater samples also differed slightly among sampling sites, ranging from -19.0 to -18.5‰. The isotopically depleted values of $\delta^{2}H$ and $\delta^{18}O$ in the bedrock compared to all other water samples suggested that groundwater within this formation recharged under slightly cooler conditions (e.g. recharged at greater elevations). In alpine environments there is a decrease of 0.15–0.5‰ in $\delta^{18}O$ per 100 m rise in altitude (Gat, 1980; Dansgaard, 1962). This also highlighted that the groundwater flow system in the shale bedrock was different from that in the overburden and consequently may have longer residence times.

The stable isotope composition of the rock drain ($\delta^{2}H$ and $\delta^{18}O$) ranged from -143.0 to -138.9‰ for $\delta^{2}H$ and -19.0 to -17.8‰ for $\delta^{18}O$. The rock drain water samples had similar isotopic composition and range as the overburden groundwater samples. The arithmetic mean $\delta^{18}O$ values from rock drain samples differed slightly amongst the sampling sites, ranging from -18.0 to -18.6‰. The values of $\delta^{2}H$ and $\delta^{18}O$ in the aquifers and the rock drain approximated the average isotopic composition of annual precipitation (Figure 23b). Shatilla (2013) sampled the WLC rock drain from April 19 to September 19, 2012 and concludes that the limited variability in isotope values of $\delta^{18}O$ associated with the rock drain is derived from a well-mixed source. Similarly, the limited variability in isotopic values in this study suggested a highly mixed groundwater reservoir.

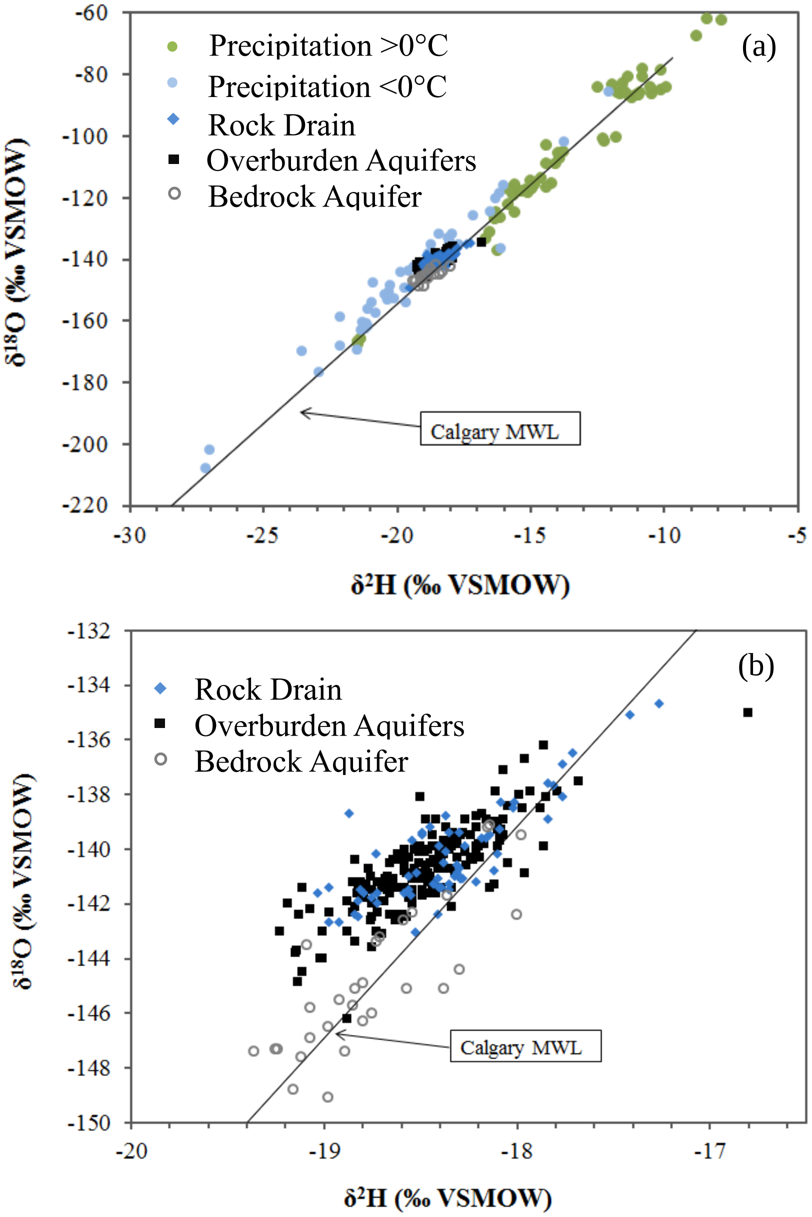


Figure 23. Cross plot of the stable isotopes of water ($\delta^{2}H$ and $\delta^{18}O$) from (a) precipitation, rock drain and groundwater samples and the Calgary Meteoric Water Line (MWL) and (b) rock drain and groundwater samples and the Calgary Meteoric Water Line (MWL).

5.4.2 Tritium-Helium (3) Groundwater Age Dating

Based on $^{3}H/^{3}He$ analyses, groundwater ages within the overburden aquifers were determined to be 0.8, 1.2 and 2.8 years (± 0.5–0.7), respectively. These samples were collected at three monitoring wells (12-09c, 12-11 and 12-12; Table 1; Figure 6) representing mid-screen depths of 36, 4.5 and 22 mbgs in the overburden sediments, respectively. The greatest groundwater age was measured at well 12-12, which was located near discharge areas adjacent to Line Creek. These results suggested that the residence time of groundwater within the overburden aquifers was short and could be on the order of years. An evaluation of groundwater residence times using estimates of groundwater velocity is presented in Section 5.7.

5.5 Vertical and Horizontal Gradients in Aquifers

The vertical hydraulic gradients between the basal alluvial aquifer and the bedrock formation were calculated to determine the potential vertical groundwater flow between these strata. Two well nests had monitoring wells screened in the basal alluvial aquifer and the bedrock formation (12-07 and 12-10; Table 1; Figure 6). However, at well nest 12-07 saturated conditions were recorded in the basal alluvial aquifer well (12-07c) for only a portion of the year and water levels in the bedrock formation wells (12-07a and 12-07b) were near the bottom of the screened intervals. The bottom of the screened intervals of monitoring wells 12-07a and 12-07b were below the bottom of the screened interval of 12-07c by 3.5 and 5.8 m, respectively. Over the period when saturated conditions existed in well 12-07c the vertical gradient with the underlying monitoring wells 12-07a and 12-07b was near unity and up to 1.3 and 1.1, respectively. A vertical hydraulic gradient near unity suggested perched conditions existed in the basal alluvial aquifer at well 12-07c.

At well nest 12-10 (Table 1: Figure 6), vertical hydraulic gradients were calculated between the basal alluvial aquifer well (12-10b) and the bedrock formation (12-10c). The distance between the middle of the two monitoring well screens was 17.1 m. The vertical hydraulic gradient range, determined using time-series data of hydraulic head, was from 0.019 to 0.22 in a downward direction with an average of 0.055. Greater vertical hydraulic gradients were calculated during spring freshet, between the months of June and August, when maximum hydraulic head values in the basal alluvial aquifer were recorded. The lowest vertical hydraulic gradient occurred in late winter, directly prior to the onset of spring freshet, when the hydraulic head values in the overburden sediments were similar to the bedrock formation. However, the *K* of the basal alluvial aquifer at this location was three orders of magnitude greater than the bedrock formation so the vertical hydraulic gradients within each unit may be different than the overall calculated gradient. Additionally, the range in vertical hydraulic gradients may have been greater at well nest 12-10 because of a malfunctioning data logger over a portion of the study at well 12-10c.

Vertical hydraulic gradients were also calculated between two wells in the basal alluvial aquifer at well nest 12-09 (Table 1; Figure 6). The vertical gradient was calculated between the shallower well (12-09c) and the deeper well (12-09b), and the vertical distance between the middle of the well screens was ~6.3 m. These wells were screened above and below a 2-m thick fine-grained sediment interval composed of silt and clay (SRK Consulting (Canada) Inc., 2013a) that was a local confining layer in the overburden aquifers above well 12-09b. The semi-confining layer at this location was continuously saturated above and below the fine-grained sediment layer. The vertical hydraulic gradient ranged from 0.071 to 0.26 with an average of 0.12, indicating downward flow of groundwater through the semi-confining layer. Additionally, well 12-09b had a markedly different groundwater chemistry than well 12-09c, which was interpreted to be a result of interaction of groundwater in this low-*K* overburden zone with the shale bedrock (see Section 5.6.4.2).

Horizontal hydraulic gradients were determined for the basal alluvial aquifer between monitoring wells located in the thalweg of the bedrock contact (12-09c and 12-10b; Table 1; Figure 6), where the greatest saturated thicknesses were measured. Shown in Figure 24 is a map view of the cross sections that illustrate the groundwater system and display the horizontal distance between wells 12-09c and 12-10b (339.73 m). Based on time-series data, the difference in hydraulic head between the two wells was from 1.67 to 4.88 m.

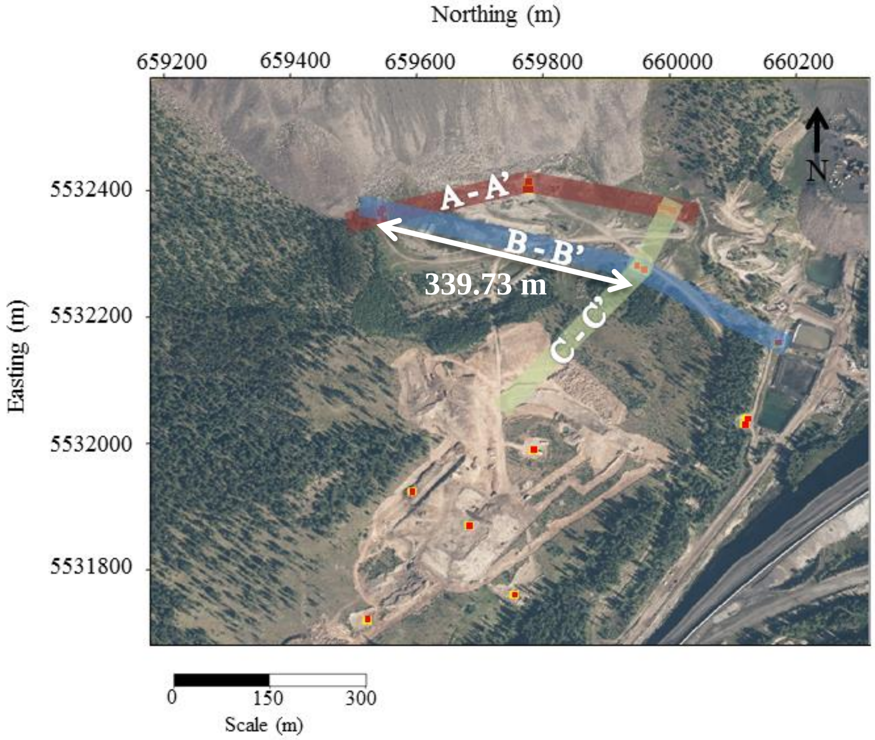


Figure 24**.** Plan view map showing the cross-section transects.

Thus, the maximum, minimum and average horizontal hydraulic gradient in the basal alluvial aquifer were 0.12, 0.091 and 0.11, respectively. This was similar to the gradient of the thawleg of the catchment, measured using Mira GOCAD software, of approximately 0.12. Shown in Figure 25 is the cross section B-B' illustrating the average horizontal hydraulic gradient of the basal alluvial aquifer, displayed alongside lithological logs and the results of particle size analyses. Where the saturated thickness of the basal alluvial aquifer deepens at well 12-12, the gradient had an apparent decrease.

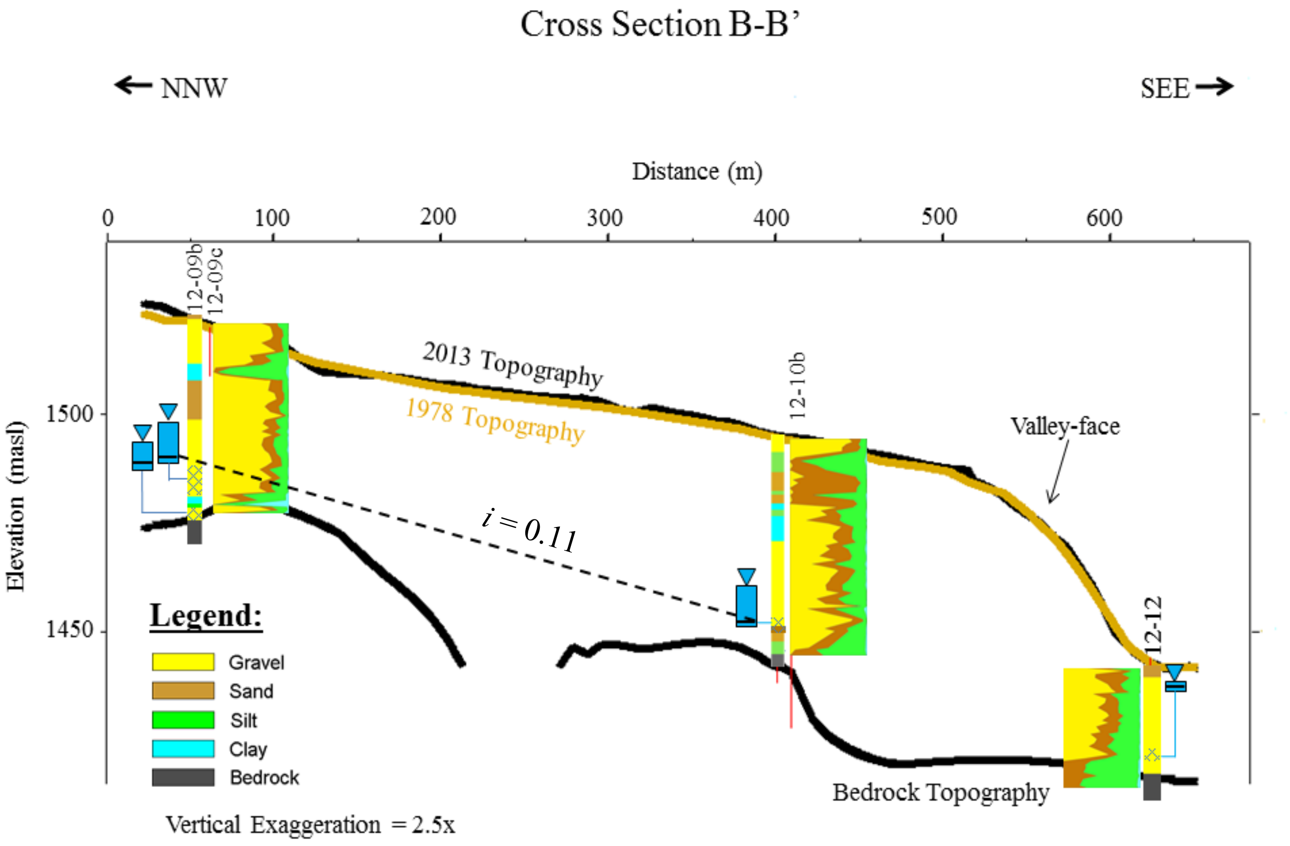


Figure 25. Cross section B-B’ oriented parallel to the groundwater flow direction with dashed lines denoting the average gradient calculated between wells 12-09c and 12-10b and the small solid line representing average water levels. Also shown are the lithological logs and particle size analysis results. The locations of the cross section is shown in Figure 24.

5.6 Hydrochemistry

The chemical composition of groundwater was compared with waste rock effluent to determine the impact of waste rock on groundwater chemistry in the downgradient aquifers. The chemistry of the waste rock effluent was defined primarily using the chemistry of water intercepted by the underground drainage culvert sampled at the culvert outlet. As such, the culvert water was assumed to represented water flowing through the rock drain, and established the baseline hydrochemistry of mine-impacted water. The distribution of water types found in geologic units and selected chemical data are presented, as are apparent relations among/between constituents.

5.6.1 Rock Drain End-member Chemistry

Two surface streams (Upper Toe and Lower Toe sampling locations) sourced from the toe of the waste rock dump represented rock drain water that was not intercepted by the underground drainage culvert. A time-series comparison of major ions selected in accordance with Day et al. (2012) (i.e. SO_4^{2-}, Ca^{2+} and Mg^{2+}) for the culvert outlet, Upper Toe, and Lower Toe surface streams demonstrated that the concentrations and trends among the three locations were similar (Figure 26). The concentrations of major ions in the rock drain water samples were inversely related to discharge rate at the culvert outlet, with maximum concentrations of major ions measured when flow was the lowest during winter months.

BCG Engineering Inc. (2013) suggests that surface water runoff upgradient of the waste rock dump contributes more than than 65% of the total annual flow within the rock drain. Thus, sampling of the rock drain during the late winter months in March and April represented water that was the least diluted by runoff from upgradient of the waste rock dump. However, unlike the culvert outlet, flow within the surface streams only occurred in response to spring freshet (i.e. when there was increased surface water flow within the catchment). The implication of collecting samples representative of the rock drain at the three locations was that during periods of increased surface water flow in the catchment, waste rock effluent was discharged in surface waters over a cross-valley distance of ~354 m.

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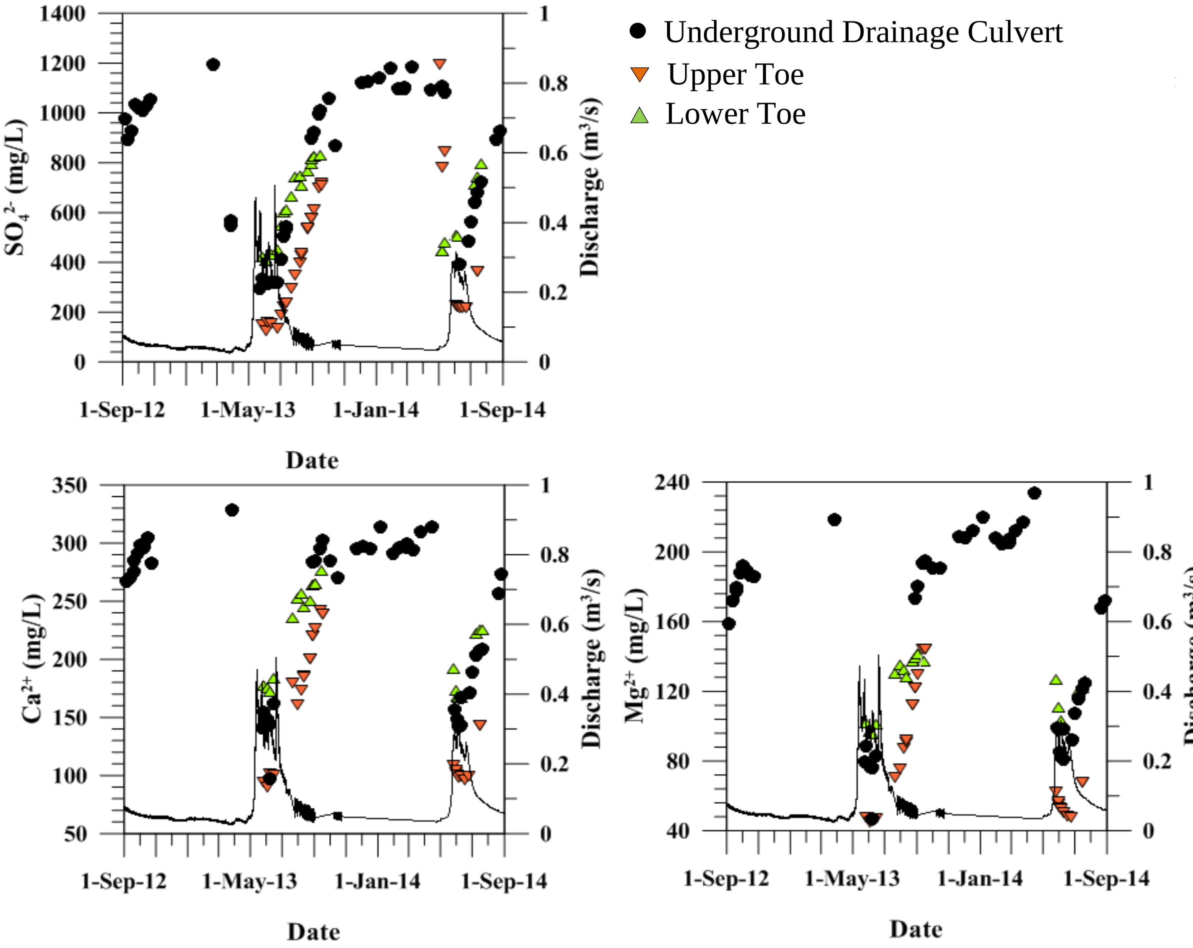

Figure 26. Time-series plots of major ions (SO_4^{2-}, Ca^{2+} and Mg^{2+}) for the underground drainage culvert, and the two surface streams (Upper Toe and Lower Toe) representing the rock drain shown as symbols alongside discharge rates at the culvert outlet shown as a black line. The locations of the sampling sites are presented in Figure 6.

5.6.2 Field Measured Parameters in Overburden Aquifers

The geochemical conditions within the overburden aquifers, SpC, pH, LDO and ORP, were measured *in situ* (n = 87) in wells after groundwater sample collection. The pH measurements were also taken on groundwater samples (n = 193) and for rock drain samples (n = 159) *ex situ*. Additional monitoring of SpC in Year 2 of the study was conducted using downhole data loggers at selected monitoring wells. These wells were chosen based on preliminary evaluation of Year 1 groundwater chemistry data.

5.6.2.1 Specific Conductivity

Manual measurements of SpC in the overburden aquifers ranged from 256 to 2481 µS/cm. Elevated SpC values **(**831 to 2481µS/cm) were generally measured in close proximity to the waste rock dump and the underground drainage culvert (12-06 and 12-12; Table 1; Figure 6). The lowest values of SpC in overburden groundwater **(**255 to 535 µS/cm) were measured in monitoring wells upgradient of the water rock dump (MW11-06; AMEC Environmental & Infrastructure), in the AWTF monitoring wells (12-01, 12-04 and 12-05; SRK Consulting (Canada) Inc., 2013c), and in the most northerly monitoring well at the study site during the spring months (12-09c; Table 1; Figure 6). Trends in SpC recorded using downhole data loggers at selected wells in Year 2 of the study showed that SpC values varied annually, with maximum values generally observed several days or months prior to maximum hydraulic head values (Figure 7). Several exceptions are noted below.

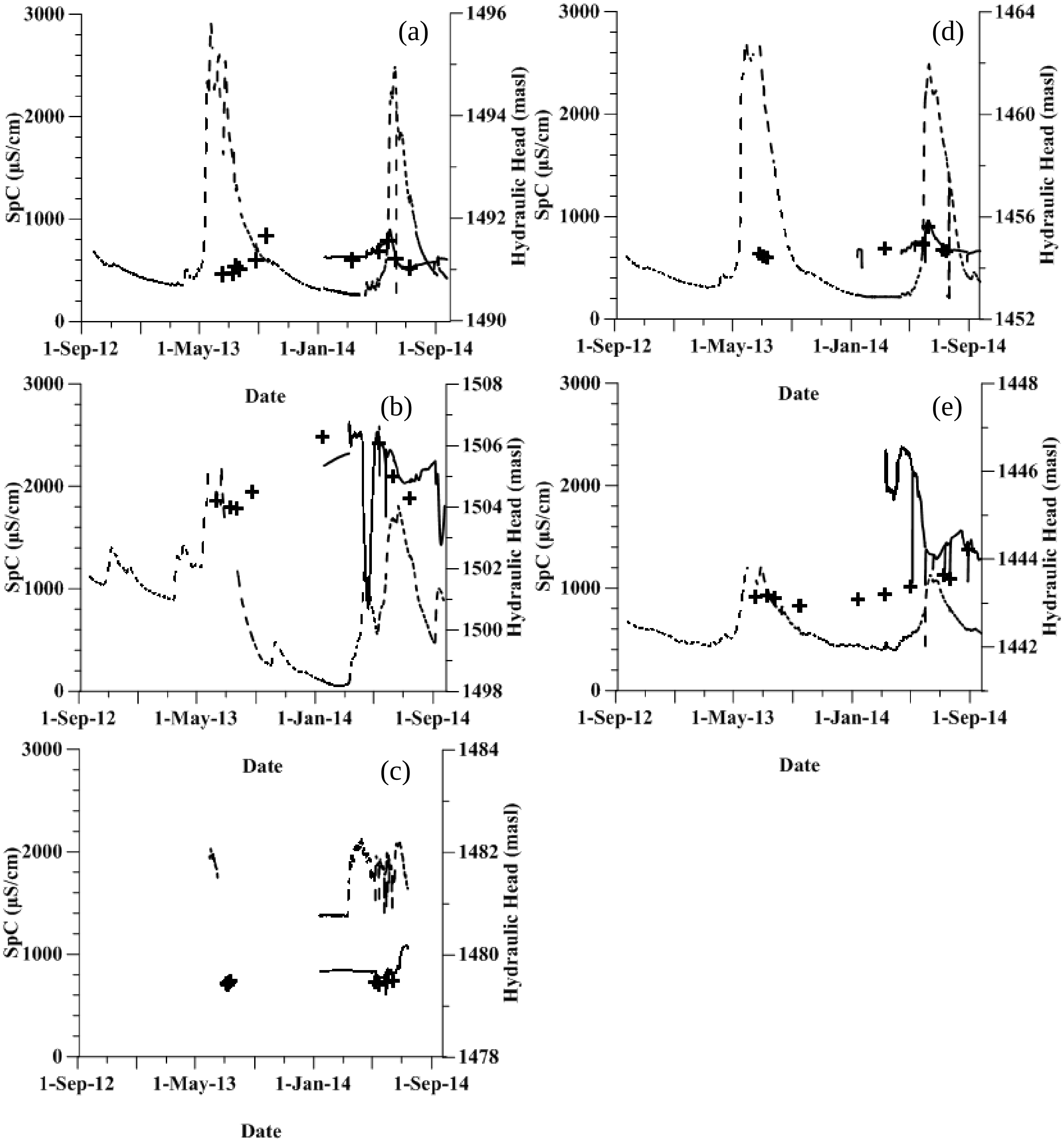

Figure 27**.** Trends in SpC (solid line) and hydraulic head (dashed line) from monitoring wells: (a) 12-09c, (b) 12-06a, (c) 12-07c, (d) 12-10b, (e) 12-12 (cross symbol denotes manual SpC measurements).

The groundwater SpC trends evaluated in this study was similar to the rock drain at the underground drainage culvert outlet described by Shatilla (2013), where minimum SpC values were recorded during periods of increase water flow (Figure 28). The similar trends between the two datasets suggested a link exists between the rock drain and groundwater chemistry. Shatilla

(2013) concludes that dilution was the primary mechanism affecting ion concentrations and SpC at the culvert outlet.

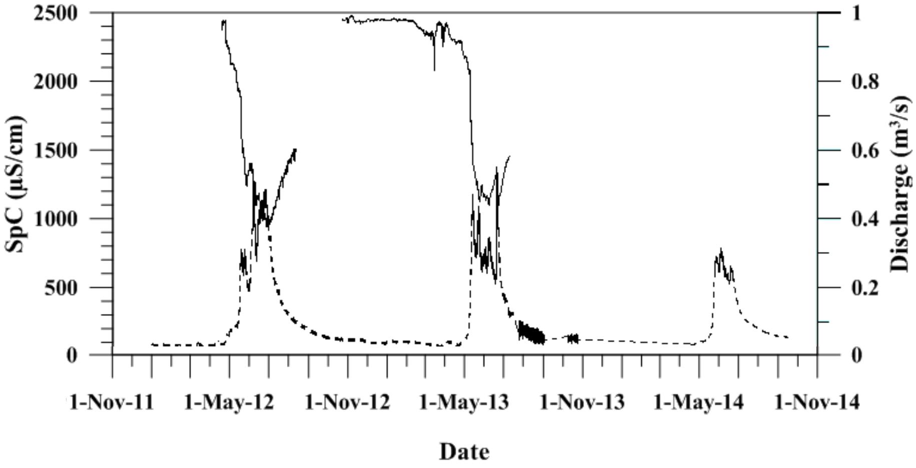

Figure 28. Trends in SpC (solid line) and flow rates (dashed line) from the rock drain collected at the underground drainage culvert outlet (from Shatilla, 2013).

Trends in SpC logger data at two monitoring wells were interpreted based on their location relative to the culvert and waste rock dump as well as the western slope of the catchment. For example, additional input periods of fresh water were measured at well 12-06a (Figure 27b), producing decreased SpC and short-term increases in hydraulic head in the early spring. This occurrence was attributed to overland flow of rain and snow-melt off of the waste rock dump. Snow-melt off of the waste rock dump was observed during winter field sampling, when water flowed down the waste rock dump even though temperatures were sub-zero. These data suggested that the waste rock dump can alter the physical hydrology of the catchment by changing the timing of maximum hydraulic head in proximal groundwater wells. Additionally, at well 12-09 a similar occurrence was recorded where the arrival of snow-melt water increased hydraulic head but simultaneously decreased the SpC. At this well the values of SpC were lower than most monitoring wells and the arrival of snow-melt returned SpC values to near-background levels.

SpC data from well 12-10b (Figure 27d; Table 1) in the basal alluvial aquifer showed a different response to spring freshet conditions than the other wells. At this well the highest hydraulic head values occurred simultaneously with the highest values of SpC. This occurrence was consistent with temperature data at this well (see Section 5.3), in that the maximum groundwater temperatures were also coincident with maximum hydraulic head. These data suggest that ponded waters with high SpC (data not presented) exposed to warmer surface temperatures percolated through ~44 m of overburden each spring.

Furthermore, manual measurements of SpC generally agreed with the data logger values, except for wells 12-12 and 12-07c where SpC values were consistently lower (Figure 27c and 27e), potentially as a result of improper well development. In well 12-12, silt material covered approximately half of the screened interval suggesting groundwater entered preferentially through the top of the screen (Driscol, 1984). Consequently, purging and sampling may have drawn in groundwater from a shallower and more dilute zone of the formation. This produced a post-sampling SpC response in well 12-12 that was observed over the course of ~36 h following sample collection.

5.6.2.2 pH, Liquid Dissolved Oxygen and Oxidative-Reductive Potential

The field-measured values of pH were generally neutral to slightly alkaline, with pH ranging from 6.8 to 9.1. The field-measured average pH of the perched aquifers and basal alluvial aquifer were 7.3 and 7.5, respectively. Elevated pH values (>8.5) were measured in monitoring well 12-09b (Table 1; Figure 6). This well had been installed in a formation with a low-*K* located at the base of the overburden deposits and consequently was suspected of being influenced by bedrock sediments. The average values of pH in the overburden aquifers were consistent with the field-measured pH values for the rock drain that averaged 7.5. Higher pH values at the culvert outlet were consistently measured during low flow periods when dilution of the rock drain was minimal.

Overburden groundwater had LDO and ORP values ranging from 6.8 to 13.3 mg/L and 80 to 340 mV, respectively (excluding 12-09b and AWTF wells). *In situ* LDO and ORP measurements suggested oxic groundwater existed in the majority of monitoring wells in the overburden aquifers. Several exceptions were noted for well 12-09b and multiple AWTF wells (SRK Consulting (Canada) Inc., 2013c). Well 12-09b was interpreted as anoxic/suboxic portion of the basal alluvial aquifer based on low LDO values ranging from 0.0 to 0.1 mg/L. The screened portion of well 12-09b was situated above the low-*K* bedrock in a thin 2-m gravel layer below a fine-grained overburden sediment layer. The measurements from these wells, suggested the presence of local suboxic conditions in the overburden aquifers. In the AWTF wells (12-01 and 12-03), LDO was <2.5 mg/L. Consistent with low LDO values, SRK Consulting (Canada) Inc. (2013c) reported a sulfur smell in wells 12-03 and 12-04, possibly indicating sulfate reduction at the time of sampling in February 2012. Differences in chemical parameters such as LDO were also noted in well 12-01 between sampling in July and September 2013, which may be related to recharge from snow melt.

5.6.3 Field Parameters of Bedrock Formation

To define the geochemical conditions in the bedrock formation SpC, pH, LDO and ORP were measured *in situ* (n = 18) in wells after groundwater sample collection. Shallow bedrock wells (12-07a and 12-07c; middle of screened interval ~1.5 m and ~3 m below the overburden-bedrock contact, respectively) had markedly different values for geochemical parameters (n = 9) than the remaining bedrock wells and are discussed separately.

The groundwater in the bedrock formation had SpC ranging from 540 to 1682 µS/cm. Generally, greater values of SpC ranging from 1191 to 1682 µS/cm were measured in the deep bedrock wells (12-10c and 12-06c; middle of screened interval ~6 and ~18 m below overburden-bedrock contact, respectively). SpC values in the shallow bedrock monitoring wells ranged from 540 to 753 µS/cm and may have represented dilution of shallow bedrock groundwater by infiltrating precipitation.

Groundwater within the bedrock formation varied from circum-neutral to alkaline, with an average pH of 7.9. The pH of shallow bedrock wells was on average lower than deeper bedrock wells, with values of 7.3 and 8.3, respectively. The pH of shallow bedrock wells was comparable to the overburden monitoring wells that averaged 7.4.

Values for LDO and ORP within deeper bedrock wells suggested that anoxic conditions persisted throughout the study period. LDO values were consistently measured at 0 mg/L and ORP ranged from -60 to -260 mV. Shallow bedrock wells had LDO and ORP values ranging from 1.0 to 5.5 mg/L and -40 to 300 mV, respectively. The variability in these parameters within shallow bedrock groundwater may have been the result of a natural seasonality, poor well completion or sampling procedure that could have introduced groundwater from the overlying formation. Similarly, groundwater temperatures suggested (see Section 5.3) that shallow bedrock monitoring wells received warm recharge water from the infiltration of precipitation and ponded water through the overburden sediments.

5.6.4 Major Ion Geochemistry and Mineral Phases

The chemical composition of rock drain (n = 153) and groundwater (n = 342) samples were used to define the major-ion geochemistry of waters in the catchment. Groundwater samples collected from different geologic units and the rock drain were contrasted to determine linkages between these environments.

5.6.4.1 Ion Balance of Water Samples

The CBE of all rock drain and groundwater samples was calculated with the results from three analyses: Cl^-, NO_3^-, and SO_4^{2-} was measured by ICS, alkalinity (as mg/L $CaCO_3$) was measured by titration, and Ca^{2+}, Mg^{2+}, Na^{2+}, and K^+ was measured by ICP-OES. Surface and groundwater samples with results for these three analyses including a laboratory-measured alkalinity had a mean CBE of 11.4% (±8.0; n = 392), with 369 positive results. The mean CBE of these samples using a field-measured alkalinity was 6.7% (±6.3%; n = 261) with 202 positive results. The difference between field-measured and laboratory-measured alkalinity was 24.5% (±20.5%) with field measurements reporting higher concentrations in 249 of 261 measurements. This is caused by chemical changes of the water sample in transit to the laboratory, particularly precipitation of carbonate minerals or degassing of CO_2 prior to the laboratory titration (Bachman, 1984).

The CBE of porewater samples was calculated with the results from three analyses: Cl^-, NO_3^-, and SO_4^{2-} was measured by ICS, alkalinity (as mg/L $CaCO_3$) was measured by alkalinity test strips, and Ca^{2+}, Mg^{2+}, Na^{2+}, and K^+ was measured by ICP-OES. The mean CBE for porewater samples was 8.3% (±13.5%; n = 26) with 18 positive results.

5.6.4.2 Water-Chemistry Classification

The distribution of major ions in all surface and groundwater samples are presented on a Piper diagram in Figure 29. These data were consistent with previous research that described the chemistry of the mine drainage in the Elk Valley as dominated by SO_4^{2-}, Ca^{2+}, Mg^{2+}, and alkalinity (Day et al., 2012). Overburden groundwater samples were generally defined as a $Ca^{2+}/(CO_3^{2-}+HCO_3^-)$ type water. Water samples from the rock drain were more mineralized than the overburden groundwater and defined as a $Mg^{2+}(Ca^{2+})/SO_4^{2-}$ type water. An increasing proportion of Mg^{2+} relative to Ca^{2+}, and SO_4^{2-} relative to HCO_3^- was observed for overburden groundwater samples with increasing proximity to the waste rock dump and the underground drainage culvert. The bedrock formation had a $(Na^++K^+)/(CO_3^{2-}+HCO_3^-)$ type water, although shallow bedrock wells (12-07a and 12-07b; Table 1; Figure 28) were a mixed-cation/$(CO_3^{2-}+HCO_3^-)$ type water. Groundwater samples from the low-*K* monitoring well 12-09b (Table 1; Figure 6), screened in the overburden, were consistent with the bedrock type water. This suggested bedrock groundwater may be upwelling into the overburden but no upward hydraulic gradients were measured in this study (see Section 5.5). The anomalous major ion composition from well 12-09b is discussed in subsequent sections alongside bedrock groundwater samples to simplifie the presentation of the results. Lastly, the proposed upward movement of groundwater from the bedrock into the overburden was also inferred by the moderately elevated Na^+ concentrations at sampling locations near discharge areas along Line Creek (see Section 5.6.4.9). Groundwater from the overburden aquifers interpreted to be devoid of interaction with the bedrock aquifer had concentrations of sodium (Na^+) and potassium (K^+) <3.0 mg/L.

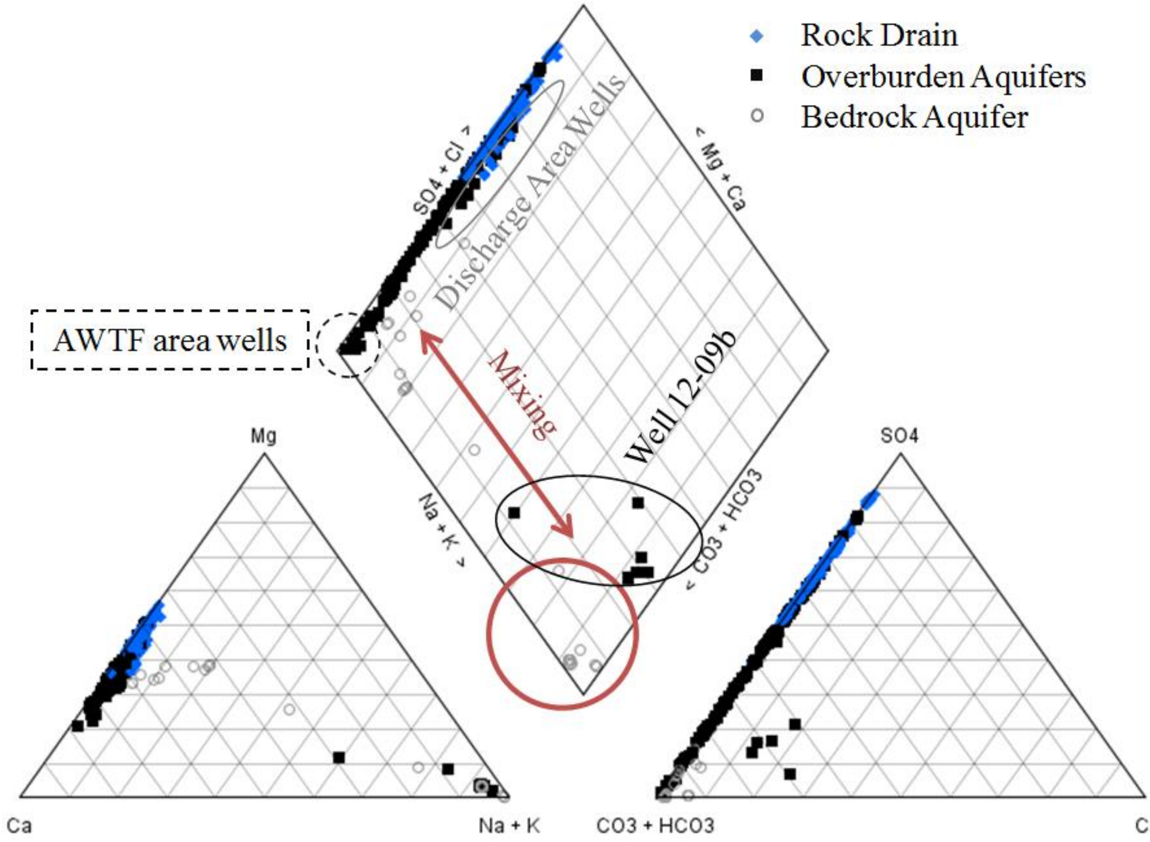

Figure 29. Piper diagram of rock drain and groundwater samples (circled in red are the deep bedrock wells 12-06c and 12-10c; the red line represents mixing between overburden and shallow bedrock groundwater; the black circle outlines the anomalous major-ion chemistry from monitoring well 12-09b; dashed line represents groundwater samples from the AWTF area; and the grey circle demarks lower elevation water samples near discharge areas).

5.6.4.3 Mineral Phases

The results of PHREEQC modelling to determine mineral saturation indices (SI) demonstrated that the rock drain and overburden groundwater ranged from unsaturated to supersaturated with respect to Ca-Mg carbonates (calcite, dolomite). These results are in agreement with previous findings reported by Harrison et al. (2000) for Elk Valley groundwater. Shown in Figure 30 is the SI of calcite plotted relative to the field-measured pH of water samples. High pH water samples were supersaturated with respect to calcite and dolomite. Additionally, high concentrations of Mg^{2+} and SO_4^{2-} in solution may influence the precipitation and dissolution reactions of these carbonate minerals. Nordstrom (2008) reports that high concentrations of Mg^{2+} and SO_4^{2-} in groundwater inhibit the precipitation of calcite.

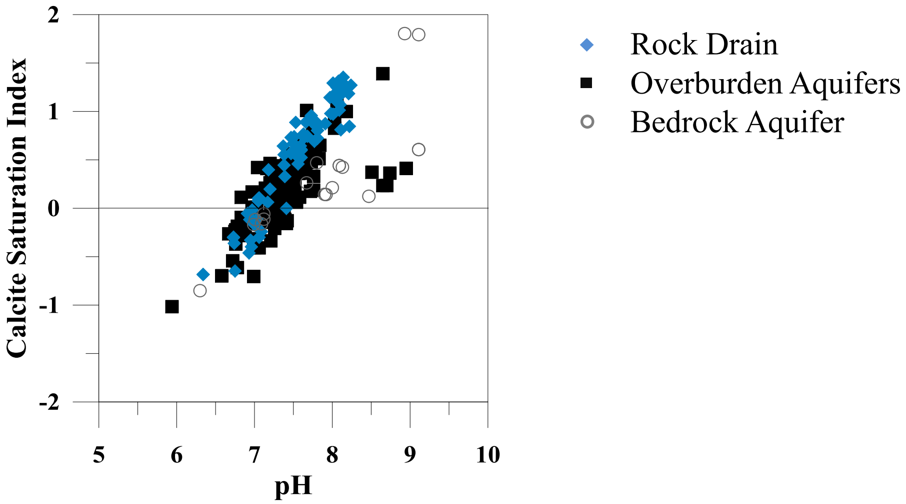

Figure 30. The saturation index of calcite plotted vs. field-measured pH.

The presence of abundant SO_4^{2-} and Ca^{2+} ions in groundwater samples could suggest that gypsum ($CaSO_4$) was a logical choice of a mineral that controlled these ions in the overburden aquifers. Shown in Figure 31 is the SI of gypsum plotted against SO_4^{2-} concentration. The precipitation of gypsum (SI = 0) was not predicted by geochemical modeling for any concentration of SO_4^{2-}. Essilfie-Dughan et al. (2015) report similar results in porewater from the WLC waste rock dump and confirmed an absence of gypsum in core samples using electron microprobe, x-ray diffraction and x-ray adsorption analytical methods. Other SO_4^{2-} minerals formed from common major ions including Mg^{2+}, K^+ and Na^+ are considerably more soluble (Deutsch, 1997) and not expected to precipitate in this groundwater system according to calculated SI.

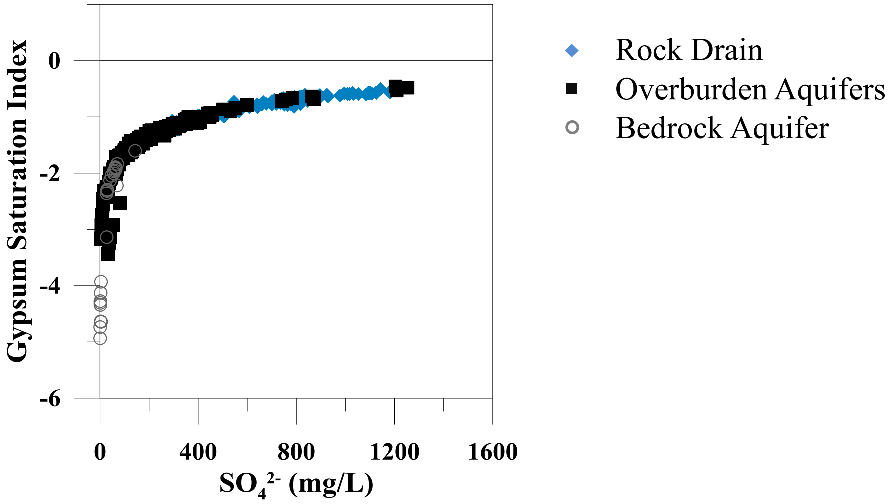

Figure 31. The saturation index of gypsum for all water samples plotted vs SO_4^{2-} concentration.

Conversely, barite ($BaSO_4$) was saturated in the majority of groundwater samples although concentrations of barium (Ba^{2+}) were low (<0.72 mg/L). Since the concentration of Ba^{2+} was always greatly exceeded by SO_4^{2-} concentration, barite precipitation/dissolution reactions would have limited effect on the mobility of dissolved SO_4^{2-}. Additionally, the low solubility of barite precludes SO_4^{2-} ions from being liberated into solution following mineral precipitation (Deutsch, 1997). Thus, SO_4^{2-} minerals were determined not to be an influential mineralogical control on SO_4^{2-} as well as Ca^{2+} and Mg^{2+} concentrations in the overburden aquifers.

5.6.4.4 Sulfate

Concentrations of SO_4^{2-} in the overburden groundwater were from 3.1 to 1280 mg/L, and concentrations in the rock drain ranged from 296 to 1260 mg/L. Background concentrations of SO_4^{2-} in the overburden aquifers were determined from sampling AWTF monitoring wells and a well upgradient of the waste rock dump (MW11-06; AMEC Environment & Infrastructure, 2013), and were <32.5 mg/L. Previous studies of the WLC catchment also report background concentrations of SO_4^{2-} to be <50.0 mg/L (AMEC Environmental & Infrastructure, 2013; SRK Consulting (Canada) Inc., 2013c). All sampling locations exceeded background concentrations of SO_4^{2-} except for the AWTF area (SRK Consulting (Canada) Inc., 2013b), upgradient of the waste rock dump at well MW11-06 (AMEC Environment & Infrastructure, 2013) and deeper wells in the bedrock formation.

Concentrations of SO_4^{2-} in the overburden groundwater generally decreased with the increasing distance from the waste rock dump and the underground drainage culvert along the determined groundwater flow paths. Geochemical processes that may decrease SO_4^{2-} concentrations in groundwater were deemed unlikely because mineralogical controls on SO_4^{2-} where negligible. Additionally *in situ* geochemical parameters in the overburden aquifers indicated that SO_4^{2-} reduction was unlikely. The abundant of dissolved oxygen in the overburden aquifers should be a preferred electron acceptor for microbial populations rather than SO_4^{2-} under the observed geochemical regime (Tesoriero and Puckett, 2011). Thus, observed changes in SO_4^{2-} concentrations in the overburden groundwater samples were attributed to physical processes such as dilution and dispersion. This confirms previous research that states SO_4^{2-} is typically considered mobile since it has only a negligible potential for adsorption (by ion-exchange) at circumneutral pH (Drever, 1997). For this reason, key constituent concentrations in the overburden aquifers were plotted against SO_4^{2-} concentrations to examine the extent to which they change either by dilution (conservative and non-reacting) or by reaction (non-conservative) (Figure 32-37).

In the bedrock aquifer SO_4^{2-} concentrations ranged from 0.4 to 179 mg/L. Deep bedrock wells (12-06c and 12-10c) had a considerably lower average SO_4^{2-} concentration of 11.9 mg/L (n = 16). *In situ* chemical parameters measured in the bedrock aquifer, particularly the deep bedrock wells, suggested that SO_4^{2-} reduction may be occurring. LDO was consistently measured at 0 mg/L and ORP ranged from -70 to -240 mV. Furthermore, the odour of H_2S was noted in these wells, a product of the bacterial reduction of SO_4^{2-} that can be represented by:

$$SO_4^{2-}{}_{(aq)} + 2C_{organic} + 2H_2O_{(l)} = H_2S_{(g)} + 2HCO_3^{-}{}_{(aq)} \qquad (5.1)$$

Reducing conditions sufficient to reduce SO_4^{2-} were not measured consistently in shallow bedrock wells (12-07a and 12-07b; Table 1; Figure 6), possibly due to the infiltration of oxic groundwater from the overlying basal alluvial aquifer.

5.6.4.5 Specific Conductance and Sulfate

To examine the relationship between SpC and SO_4^{2-} concentrations derived from the waste rock dump, a benchmark concentration was utilized based on the evaluation of SO_4^{2-} concentrations in groundwater (see Section 5.6.4.4). Although background concentrations were generally <50 mg/L, a 100 mg/L SO_4^{2-} was used to represent water that affected by waste rock effluent (MEND Report 10.3, 2015). Based on this criterion all sampling locations were impacted by waste rock effluent except for the AWTF area (SRK Consulting (Canada) Inc., 2013b), upgradient of the waste rock dump at well MW11-06 (AMEC Environment & Infrastructure, 2013) and deeper wells in the bedrock formation. At SO_4^{2-} concentrations above this selected level (n = 496), the coefficient of determination (R^2) between SpC and SO_4^{2-} concentration was 0.95 and the equation of best linear fit was: SpC (µS/cm) = 1.66 × [SO_4^{2-} (mg/L)] + 500. Below 100 mg/L SO_4^{2-} concentrations, overburden groundwater SpC values and SO_4^{2-} concentrations were poorly correlated ($R^2 = 0.49$) most likely due to the predominance of HCO_3^- in water samples.

5.6.4.6 Calcium

Concentrations of Ca^{2+} in the overburden groundwater and rock drain ranged from 48.4 to 325 mg/L (excluding well 12-09b) and 95.8 to 304 mg/L, respectively. Ca^{2+} was the most abundant cation in overburden groundwater and the most abundant ion in groundwater unaffected by waste rock effluent (<100 mg/L SO_4^{2-}). Groundwater samples from upgradient of the waste rock dump and in AWTF area monitoring wells had Ca^{2+} concentrations up to 52.6 mg/L and 76.1 mg/L, respectively. Ca^{2+} was moderately correlated with SO_4^{2-} ($R^2 = 0.85$) in all overburden groundwater samples. This moderate correlation may have suggested that carbonate mineral precipitation/dissolution reactions influenced its mobility in the subsurface relative to SO_4^{2-}. The expected presence of carbonate minerals and their effect on Ca^{2+} concentrations were also discussed in Section 5.6.4.3. Additionally, Ca^{2+} concentrations in groundwater were not controlled by gypsum precipitation.

Concentrations of Ca^{2+} were markedly lower in monitoring wells screened in the bedrock formation than in the overburden aquifers. Concentrations of Ca^{2+} in the bedrock ranged from 3.0 to 93.4 mg/L. In shallow bedrock wells (12-07a and 12-07b; Table 1; Figure 6) the concentrations of Ca^{2+} were generally higher relative to the deeper bedrock wells (12-10c and 12-06c; Table 1; Figure 6).

5.6.4.7 Magnesium

Concentrations of Mg^{2+} in overburden groundwater samples ranged from 15.2 to 221 mg/L (excluding well 12-09b). Concentrations of Mg^{2+} in the rock drain ranged from 47.5 to 212 mg/L. Mg^{2+} in groundwater upgradient of the waste rock dump and in the AWTF area were <20.3 mg/L and <87.0 mg/L, respectively. Mg^{2+} was the third most abundant ion in mine-impacted surface and groundwater (>100 mg/L SO_4^{2-}) in the catchment. Concentrations of Mg^{2+} where markedly lower in monitoring wells screened in the bedrock formation. Concentrations of Mg^{2+} in the bedrock ranged from 0.9 to 44.8 mg/L. In shallow bedrock wells (12-07a and 12-07b; Table 1; Figure 6) the concentrations of Mg^{2+} were higher relative to the deeper bedrock wells (12-10c and 12-06c; Table 1; Figure 6).

The Mg/Ca ratio is an important indicator of the lithological composition of the source rock, with ratios of 0.7–0.9 generally associated with dolomitic limestone (Razowska-Jaworek, 2014). The average ratio of dissolved Mg^{2+} and Ca^{2+} (Mg/Ca) concentrations (meq/L) in overburden groundwater samples (>100 mg/L SO_4^{2-}) and in the rock drain was 0.63 and 0.94, respectively. Conversely, the Mg/Ca ratio of overburden groundwater samples from areas with no impact from mining such as the AWTF monitoring wells and a well upgradient of the waste rock dump (MW11-06; AMEC Environmental and Infrastructure) was <0.43. Thus, the Mg/Ca ratio of the rock drain confirmed previous research that indicated the geochemical composition of waste rock effluent is primarily controlled by the dissolution of carbonate minerals such as dolomite and siderite (SRK Consulting (Canada) Inc., 2013b; Essilfie-Dughan, 2015). Groundwater samples had a lower Mg/Ca ratio than the rock drain due to presumed mixing of groundwater sourced from non-mine impacted and mine-impacted areas. Typically, an Mg/Ca ratio of <0.7 is associated with groundwater sourced from limestone (Razowska-Jaworek, 2014), which several reports have listed in descriptions of the western peaks and cirques found in the undisturbed portion of the catchment (Golder Associates, 1979; Shatilla, 2013).

Mg^{2+} concentrations were also moderately correlated with SO_4^{2-} concentration in all of the overburden groundwater samples (R^2 = 0.96). Using PHREEQC modelling software, carbonate minerals that controlled Mg^{2+} concentrations in groundwater such as dolomite were predicted to be supersaturated (see Section 5.6.4.3). Nordstrom (2008) reports that the supersaturation of carbonate minerals such as calcite can be a attributed to elevated concentrations of Mg^{2+} and SO_4^{2-} in solution; these two ions are known inhibitors of calcite precipitation. Thus, in this study, the increased Mg/Ca ratio of mine-affected groundwater may have influenced the precipitation and dissolution reactions of carbonate minerals such as calcite.

The total hardness of water samples (Ca^{2+}+Mg^{2+}) was calculated according to (WHO, 2008):

$$CaCO_3 = 2.5\ (Ca^{2+}) + 4.1\ (Mg^{2+}) \tag{5.2}$$

Rock drain and overburden groundwater samples were classified as hard based on the US-EPA (2008). Conversely, deep bedrock wells (12-06c and 12-10c; Tab1e 1; Figure 6) were found to be very soft. Groundwater samples from shallow bedrock wells (12-07b and 12-07c; Tab1e 1; Figure 6) had a wide range of water hardness and varied from very soft to hard.

5.6.4.8 Alkalinity, Dissolved Inorganic Carbon and Carbon-13 Isotopes

Field-determined alkalinity of overburden groundwater samples ranged from 109 to 386 mg/L as $CaCO_3$. Similarly, values for field-determined alkalinity for rock drain samples varied from 120 to 372 mg/L as $CaCO_3$ (Figure 32). Based on measured pH values, HCO_3^- was determined to be the dominant species of DIC. Additional anions that could have produced alkalinity such as the hydroxyl ion, bisulfide and organic anions are typically considered negligible under the observed geochemical regime.

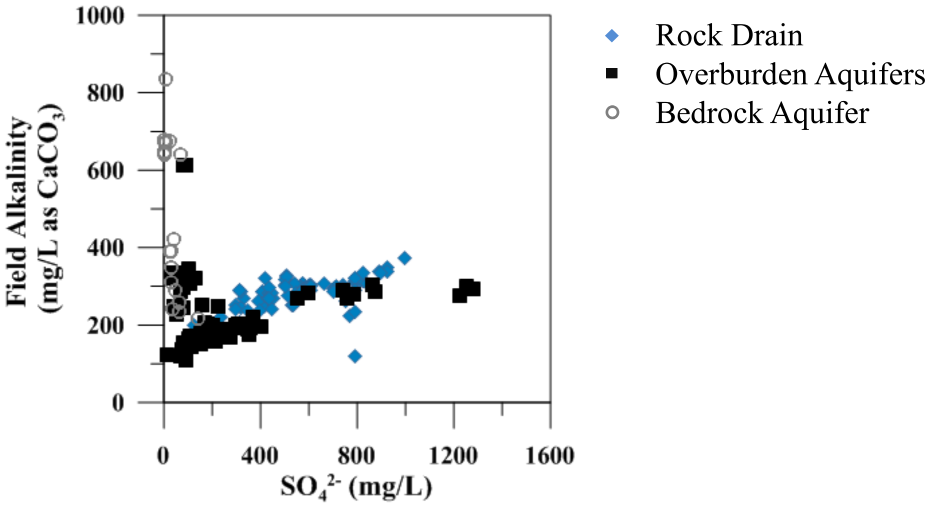

Figure 32. Field alkalinity of all water samples plotted vs SO_4^{2-} concentration.

SO_4^{2-} concentrations and alkalinity were marginally correlated in the rock drain (R^2 = 0.43). Alkalinity values were generally the lowest at the culvert outlet during high-flow periods and increased after spring freshet. This was attributed to dilution of rock drain water, which also simultaneously lowered the pH and SpC. Following spring freshet these chemical parameters increased. When water samples from the culvert had higher pH values during low-flow periods, a greater contribution of CO_3^{2-} was expected.

There was no apparent relationship between alkalinity and SO_4^{2-} concentration in overburden groundwater samples, likely due to additional inputs of DIC in the groundwater system. Based on Li et al. (2005), DIC in groundwater downgradient of the waste rock dump could have been affected by additional precipitation/dissolution of carbonate minerals, atmospheric CO_2 dissolved in precipitation that infiltrates into the subsurface and organic material degradation in the soil. Lastly, HCO_3^- might have also been introduced into overburden groundwater through interactions with the bedrock groundwater undergoing SO_4^{2-} reduction (Equation 5.1). This could be a possible explanation for the bedrock aquifer having relatively high alkalinity (up to 650 mg/L), low SO_4^{2-} concentrations, anoxic conditions measured *in situ*, presence of H_2S gas during monitoring well sampling and the occurrence of a monitoring well in overburden deposits with strong indications of bedrock upwelling (12-09b; Table 1; Figure 6).

A useful indicator of the sources of DIC in groundwater is the $\delta^{13}C_{DIC}$ (Li et al., 2005). The $\delta^{13}C_{DIC}$ values of water samples from the overburden aquifers, rock drain, and the bedrock aquifer ranged from -14.4 to -5.8 (n = 12) , -6.0 to -3.0 (n = 3), and -2.6 to 8.0‰ PBD (n = 6), respectively. $\delta^{13}C_{DIC}$ were plotted against δ^2H values and demonstrated these two geologic units were two geochemically distinct groundwater flow systems (Figure 33). The values of $\delta^{13}C_{DIC}$ in the overburden aquifers were depleted relative to the bedrock formation groundwater and the rock drain, possibly demonstrating the influence of soil-gas CO_2. The values of $\delta^{13}C_{DIC}$ in the bedrock formation were enriched relative to the overburden groundwater and the rock drain, possibly in response to dissolution of $CaCO_3$ minerals ($\delta^{13}C_{DIC} \cong 0‰$) in the absence of soil-gas CO_2 at these depths. The values of $\delta^{13}C_{DIC}$ in the bedrock aquifer were as high as +8‰ PBD, suggesting that at certain locations methanogenesis may be occurring. In biological processes such as methanogenesis, the lighter ^{12}C carbon isotope is preferentially utilized, which results in the remaining DIC being enriched in the heavier ^{13}C isotope (Baedecker and Back, 1979). Methanogenesis is the final stage of anaerobic bacterial decomposition of organic matter that follows after all or most of the SO_4^{2-} has been consumed by SO_4^{2-} reduction (Rice, 1993).

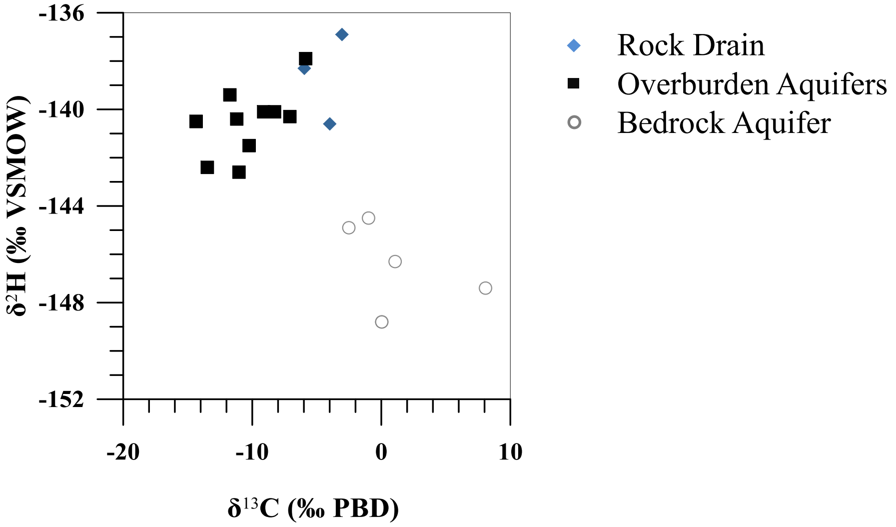

Figure 33. δ^2H (‰ VSMOW) plotted vs $\delta^{13}C$ (‰ PBD).

5.6.4.9 Sodium, Chloride and Potassium

Concentrations of Na^+ in overburden aquifers and rock drain water samples were generally <3.0 and <2.0 mg/L, respectively. In the perched aquifers, measured at groundwater springs, the concentrations of Na^+ were continuously <3.00 mg/L. The overall low Na^+

concentrations in the overburden aquifers may reflect the non-marine origin of the coal and coal interburden of the Elk Valley (Kennedy et al., 2012). Conversely, in the bedrock formation Na^+ ranged from 2.5 to 385 mg/L with higher concentrations observed with increasing depth below the overburden-bedrock contact.

Several locations in the overburden aquifers had elevated Na^+ concentrations that were attributed to interaction with the bedrock formation ($Na^++K^+/CO_3^{2-}+HCO_3^-$ water-type). In one of these locations, Na^+ concentrations were as high as 223 mg/L (12-09b: Table 1; Figure 6) and were possibly due to geochemical upwelling or diffusion of salts from the bedrock shale. Additionally, water samples from the overburden aquifer collected at lower elevations (<1439 masl) near discharge areas to Line Creek had slightly elevated concentrations of Na^+ up to 12.8 mg/L. These locations included monitoring well 12-12 (Table 1; Figure 6), and the groundwater seepages along Line Creek. At these locations, Na^+ was up to 4% of the total cation millequivalents compared to <1% in all other overburden aquifer samples (>100 mg/L SO_4^{2-}). This occurrence was attributed to groundwater in the bedrock formation because it was the only observed source of Na^+ in the catchment (see Section 5.6.4.2). Schwartz and Zhang (2004) report that clay minerals typically exhibit a preference for higher valence state cations to occupy available exchange sites. Thus, Na^+ introduced into the overburden groundwater system through the bedrock formation should be transported without significant exchange on clay minerals in a groundwater system dominated by Mg^{2+} and Ca^{2+} cations (>100 mg/L SO_4^{2-}).

Furthermore, one of the rock drain sampling locations (Lower Toe sampling site; see Section 5.6.1) exhibited a seasonality of Na^+ concentrations from <2.0 up to 13.8 mg/L. This increase in Na^+ concentration prior to and following spring freshet suggested that portions of the rock drain may also interact with bedrock sediments, as inferred by a bedrock outcrop near the Lower Toe sampling site; additionally lithological logs from proximal drillholes indicated that the bedrock was <8 mbgs.

Chloride (Cl^-) concentrations ranged from the MDL (0.05 mg/L) to 5.16 mg/L in the overburden aquifers (excluding well 12-09b) and 1.0 to 31.1 mg/L in the bedrock formation groundwater. Interestingly, Cl^- concentrations were the highest in well 12-09b (Table 1; Figure 6) up to 81.5 mg/L. Cl^- concentrations in the rock drain ranged from the MDL to 10.4 mg/L.

The concentrations of K^+ in overburden aquifers and bedrock formation were from 0.3 to 2.6 mg/L and no substantial differences between the geologic units were noted. The concentrations of K^+ in the rock drain water samples were slightly higher than in the groundwater, ranging from 1.0 to 3.0 mg/L.

5.6.4.10 Dissolved Si

Dissolved silica (Si) was measured at elevated concentrations in groundwater samples when compared to the rock drain water samples. Dissolved Si was measured in the perched aquifers up to 9.9 mg/L with an average concentration of 4.7 mg/L. Conversely, the average concentration of dissolved Si in the rock drain samples was 2.7 mg/L, suggesting that the overburden sediments were the source of this ion. Average dissolved Si concentrations in the bedrock groundwater were 4.8 mg/L and may have also contributed dissolved Si to the overburden aquifers. Kellermeier et al. (2010) states that dissolved Si can modify the progress of $CaCO_3$ crystallization and can restrain its dissolution as well. This may have implications in the overburden aquifers with respect to calcite dissolution and precipitation reactions (see Section 5.6.4.3).

5.6.5 Geochemistry of Constituents of Interest in Groundwater and the Rock Drain

Minor and trace elements listed as CIs in the Elk Valley Water Quality Plan (2014) were evaluated in groundwater and the rock drain with linear correlations with SO_4^{2-}. British Columbia water quality guidelines (WQG) for CIs are displayed graphically in Figure 34–36. However, the BC WQG is often dependent on the water hardness, which varies seasonally. Full details on the relationship between water hardness and the BC WQG are outlined in the Elk Valley Water Quality Plan (2014).

5.6.5.1 Nitrate

NO_3^- concentrations in the rock drain and overburden aquifers ranged from the MDL (0.03 mg/L as N) to 40.9 and 41.3 mg/L as N, respectively. Background concentrations of NO_3^- in the catchment are <0.5 mg/L as N (AMEC Environmental & Infrastructure, 2013; SRK Consulting (Canada) Inc., 2013c), suggesting that explosive residuals within the waste rock dump were the only source of NO_3^-. Substantial variability of NO_3^- relative to SO_4^{2-} concentration was observed in water samples from the rock drain and overburden aquifers datasets (Figure 33). Reports on NO_3^- isotopic ratios ($\delta^{15}N_{NO3}$ and $\delta^{18}O_{NO3}$) suggest that significant denitrification did not produce the variable NO_3^-/SO_4^{2-} ratio (Nessa Fazilatun Mahmood, University of Saskatchewan, personal communication). Therefore, it was proposed spatial variability in the flushing of NO_3^- from the waste rock dump produced the variable NO_3^-/SO_4^{2-} ratio of the rock drain and groundwater samples. As a result, significant geochemical processes affecting NO_3^- concentrations in the overburden aquifers were unlikely. This was also supported by the appreciable LDO concentrations in the overburden aquifers, suggesting aerobic respiration by microbes in the subsurface was not sufficient to change the redox state of groundwater. Facultative anaerobes begin to use NO_3^- as an electron acceptor during denitrification only once LDO is depleted (Tesoriero and Puckett, 2011). The lowest *in situ* LDO measurements for a mine-impacted groundwater wells, down to 3.2 mg/L, occurred at the southern extent of the catchment near discharge areas to Line Creek (12-12; Table 1; Figure 6).

Concentrations of NO_3^- were markedly lower in monitoring wells screened in the bedrock formation than in the overburden aquifers. Concentrations of NO_3^- in the bedrock ranged from the MDL (0.03 mg/L as N) to 10.6 mg/L as N (Figure 34). Both the shallow bedrock wells (12-07a and 12-07b; Table 1; Figure 6) and the deeper bedrock wells (12-10c and 12-06c; Table 1; Figure 6) had occasional concentrations of NO_3^- elevated above background, suggesting infiltration of waste rock effluent may have occurred into this unit.

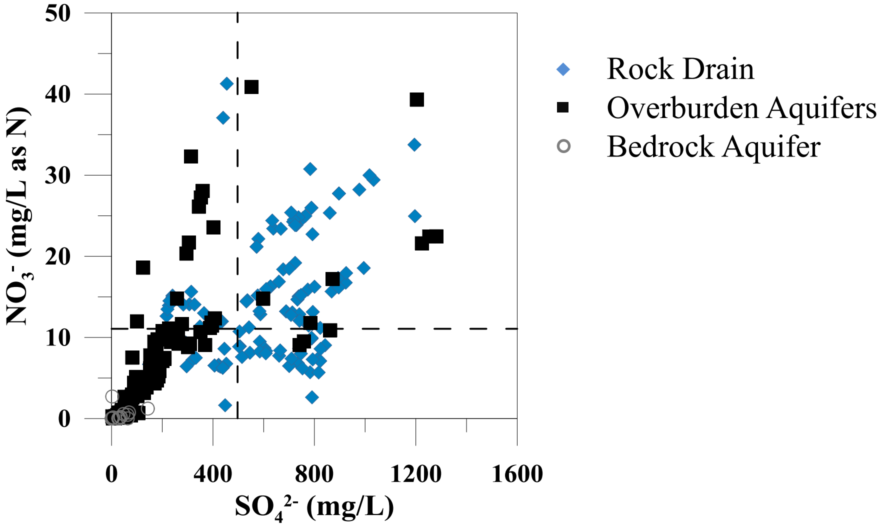

Figure 34. Concentrations of NO_3^- as N plotted vs SO_4^{2-} and the dashed lines are the BC WQG (Elk Valley Water Quality Plan, 2014).

5.6.5.2 Selenium

Se concentrations in the rock drain ranged from 80.5 to 607 µg/L and in the overburden aquifers ranged from the MDL (0.5 µg/L) to 526 mg/L. Se concentrations were strongly correlated with SO_4^{2-} concentrations for overburden groundwater samples (R^2 = 0.95) with a slope of 3.6×10^{-4} (Figure 35). This correlation suggested that Se was transported through overburden groundwater similarly to SO_4^{2-}, i.e. as a conservative non-reactive ion. When measured, the only form of Se detected was selenate (n = 10), the most oxidized Se species (Se^{6+}). Geochemical parameters (pH, LDO and ORP) measured in the overburden aquifers confirmed that the environmental conditions required to reduce Se were unfavorable. These results are consistent with previous leaching studies of WLC waste rock that showed selenate to be the primary selenium species of drainage waters due to presence of oxidizing and basic waters (Kennedy et al., 2012).

Se concentrations in the bedrock formation ranged from the MDL (0.5 µg/L) to 93.0 µg/L (Figure 35), with higher concentrations in shallow bedrock wells (12-07a and 12-07b; Table 1; Figure 6). This suggested that waste rock effluent from the overlying aquifer may infiltrate to the shallow intervals in the bedrock formation, which was also indicated by the mixed-cation/(CO_3^{2-} +HCO_3^-) type water at this interval (see Section 5.6.4.2). Although the measured geochemical conditions (LDO, ORP, pH) in the shallow bedrock may not have been entirely favorable for selenate reduction, a poor correlation between Se and SO_4^{2-} (R^2 = 0.18) at this interval suggested processes affecting their concentrations may be occurring. For example, CH2M HILL (2010) report that selenate reduction is faster than sulfate reduction and can occur at higher ORP, which may have produced the poor correlation in the shallow bedrock of this study. The geochemical conditions in the groundwater from the deep bedrock monitoring wells appeared favorable for selenate reduction, but the existence of waste rock effluent at these depths was not confirmed. This suggested that waste rock effluent may infiltrate to the shallow intervals in the bedrock formation. Although the geochemical conditions in the groundwater from the deep bedrock monitoring wells were favorable to selenate reduction, the existence of waste rock effluent at these depths was not confirmed.

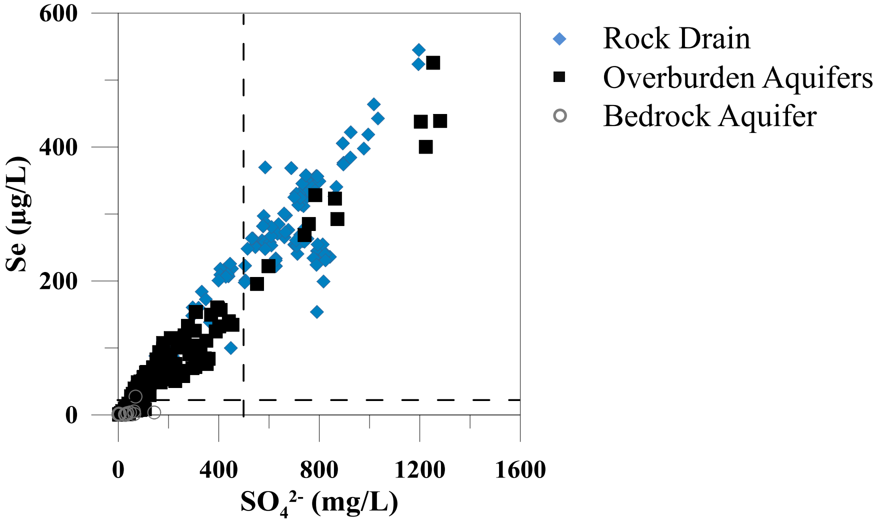

Figure 35. Concentrations of Se plotted vs SO_4^{2-} and the dashed lines are the BC WQG (Elk Valley Water Quality Plan, 2014).

5.6.5.3 Cadmium

The concentration of Cd in the overburden aquifers ranged from the MDL (0.01 µg/L) to 0.22 µg/L and never exceeded the BC WQG for aquatic life in hard waters exceeding 300 mg/L as $CaCO_3$ (0.37 µg/L; Elk Valley Water Quality Plan, 2014). Conversely, Cd concentrations in the rock drain water samples ranged from 0.02 to 3.92 µg/L. Cd and SO_4^{2-} concentrations were not correlated in overburden groundwater samples but were moderately correlated in the rock drain (Figure 36). The substantial disparity between Cd concentrations in the rock drain and overburden groundwater samples suggested that geochemical processes affecting dissolved Cd in the overburden aquifers may exist.

Several mechanisms of Cd attenuation have been proposed in literature including that aqueous Cd ions have a strong affinity for $CaCO_3$ minerals such as calcite (Martin-Garin et al. (2003). The current study showed that calcite was expected to precipitate in the subsurface according to determined mineral SI (Figure 30). Ion exchange of Cd cation for Ca^{2+} at the mineral-water interface, defect-enhanced diffusion into the lattice and co-precipitation are all possible uptake mechanisms of aqueous Cd by calcite. Cd adsorption also has an inhibitory effect on calcite dissolution suggesting that Cd preferentially attaches to reactive dissolution sites, e.g. kink and edge sites (Reeder, 1996; Schosseler et al., 1999). Potential Cd adsorption on calcite could have important implications on abundant calcite precipitation-dissolution reactions inferred from PHREEQC modelling (see Section 5.6.4.3). Alternatively, many types of substrate in natural groundwater systems (e.g. silica, clays, hydrated metal oxides and organic matter) are capable of attenuating Cd either individually or together (Farrah and Pickering, 1977).

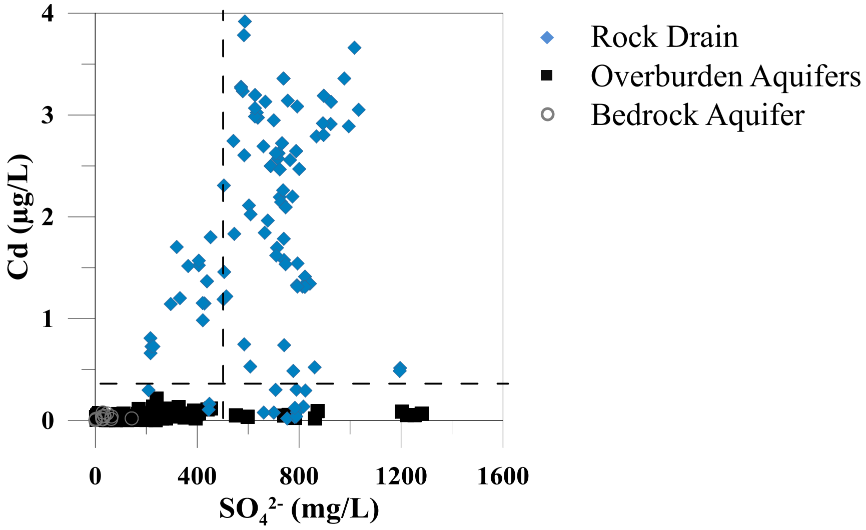

Figure 36. Concentrations of Cd plotted vs SO_4^{2-} and the dashed lines are the BC WQG (Elk Valley Water Quality Plan, 2014).

5.6.5.4 Time-Series Plots of Constituents of Interest in Groundwater Discharge Areas

Two groundwater discharge areas (Line Creek seepage zone and groundwater springs) were sampled at regular intervals and compared to the rock drain to quantify the concentrations and timing of CIs that may be entering Line Creek. Shown in Figure 37 are time-series plots of SO_4^{2-} concentrations discharge from the rock drain (underground drainage culvert; see Section 5.6.1), the basal alluvial aquifer (Line Creek seepage zone), and the perched aquifers (Seep 7a; see Section 5.2.3.2). The SO_4^{2-} concentrations in the rock drain followed the typical seasonal dilution during spring freshet described in literature (Shatilla, 2013; Day et al., 2012). The basal alluvial aquifer and perched aquifers discharge areas were sampled only from June 13, 2014 to September 23, 2014. Although these groundwater discharge locations were only sampled for a short period compared with the rock drain seasonality in SO_4^{2-} was evident. The basal alluvial aquifer showed increasing SO_4^{2-} through the sampling period up to a concentration of 502 mg/L. The SO_4^{2-} concentrations in the perched aquifers at Seep 7a were at a maximum of 262 on July 28, 2014 and appeared to decrease into the fall. Other major groundwater springs representing the perched aquifers (e.g. Seep 1; see Appendix C) also decreased in concentrations of SO_4^{2-} over the fall and winter (data not presented). Thus, it appeared that groundwater discharge areas displayed seasonality in SO_4^{2-} concentrations that were similar to the rock drain, albeit the concentrations of SO_4^{2-} were lower and the timing of maximum concentrations may have been different.

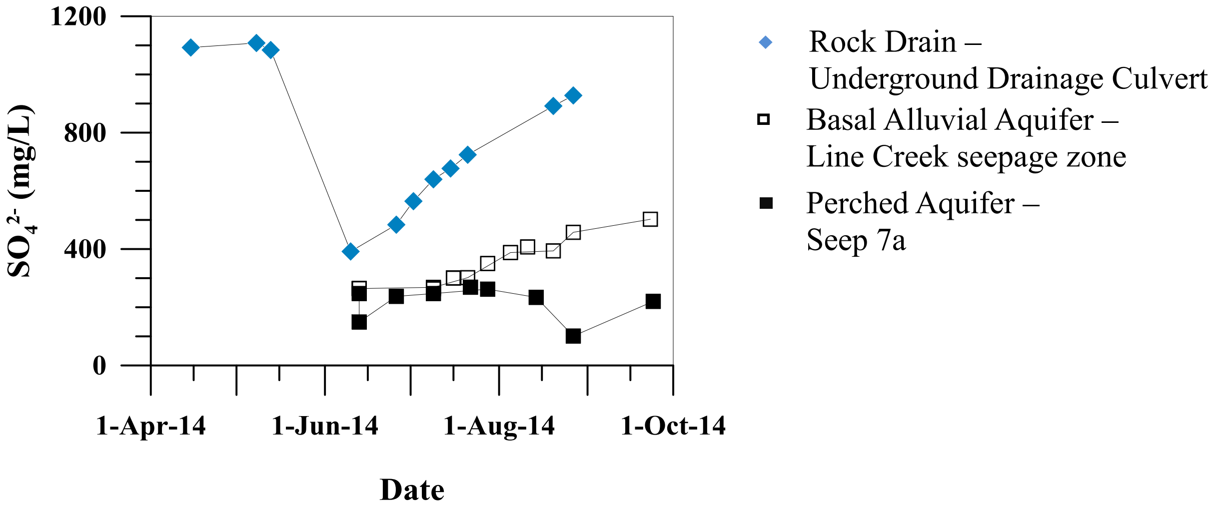

Figure 37. Groundwater concentrations of SO_4^{2-} in two groundwater discharge locations (Line Creek seepage zone and Seep 7a) and the rock drain vs time.

5.6.6 High-resolution Vertical Profiles of Hydrochemistry

The results of acid digestion of core samples, analyses of porewater from squeezing core samples and leaching of air-rotary drill cuttings were assessed in conjunction with monitoring well data. Vertical profiles were created to contrast CIs that behaved conservatively in the overburden aquifers (Se, SO_4^{2-} and NO_3^-) with non-conservative elements such as Cd. An evaluation of these data sets obtained from core samples analyses confirmed that elevated concentrations of CIs were present throughout the unsaturated zone in addition to the overburden aquifers. For instance, Se porewater concentrations exceeded the BC WQG for aquatic life (2 µg/L; Elk Valley Water Quality Plan, 2014) in 98% of analyzed core samples (n = 223).

Similarly, porewater SO_4^{2-} concentrations exceeded the 100 mg/L criterion (MEND Report 10.3, 2015; see Section 5.6.4.4) in 87% of samples (n = 110).

Several other trends were noted amongst the vertical profiles. Markedly higher concentrations of Se and SO_4^{2-} in porewaters were encountered at depth in boreholes near groundwater discharge areas (<1450 masl; 12-11 and 12-12; Table 1; Figure 6), particularly in the overburden sediments <5 m above the bedrock contact. At these two locations the concentrations of Se and SO_4^{2-} exceeded concentrations measured in groundwater and the rock drain (see Section 5.6.4 and 5.6.4.4), with four porewater samples exceeding 3000 mg/L SO_4^{2-}. This occurrence may reflect that contaminants can migrate to the bottom of an aquifer prior to extensive lateral migration (Everett, 1985). However, the source or the geochemical process that may have formed the elevated concentrations of Se and SO_4^{2-} is not clear. Also of note was that these intervals with the apparently elevated concentrations of Se and SO_4^{2-} had near background concentrations of NO_3^- (<1 mg/L as N). This may have reflected that LDO was absent in proximity to the overburden-bedrock contact at these two locations and significant denitrification had occurred.

Vertical profiles were created to contrast CIs that behaved conservatively in the overburden aquifers (Se, SO_4^{2-} and NO_3^-) with non-conservative elements such as Cd. Monitoring well 12-10b was selected as an illustrative example because groundwater samples, temperature data (see Section 5.3), and SpC data (see Section 5.6.2.1) from this well screen interval suggested this location was recharged by surface-ponded waste rock effluent. Shown in Figure 38 are the profiles of Se and Cd at well 12-10b with solid digest chemistry (labelled Total Se and Cd), porewater chemistry, and leached water chemistry (corrected back to porewater concentration) from the adjacent borehole 12-10c. Se was contrasted with Cd in vertical profiles because the analysis sequence of porewaters resulted in trace element analysis being performed preferentially over anion determination due to the small sample volumes obtained from squeezing core. Also shown are the concentrations of Se and Cd in groundwater at the depth of the screen intake zone. Porewater concentrations of CIs appeared to approximate the groundwater concentrations at the equivalent depth interval in all sampled boreholes.

The solid digest results from vertical profiles at well 12-10b showed that a noticeable increase of Cd concentrations in the solid phase existed in the fine-grained glacio-lacustrine sediments (Figure 38). This was not attributed to primary Cd-sulfide minerals in the glacio-lacustrine sediments because the dominant exposed strata in the catchment were deposited prior to the coal-bearing formations and their associated interburden (Butrenchuk, 1989). Thus, the valley-bottom sediments were principally eroded from different lithostratigraphic units than the waste rock. Comparing the digestible concentration from core samples in this study (mean = 0.68 ± 0.37 mg/kg; range = 0.173−3.01 mg/kg; n = 187) to the waste rock samples from an accompanying study of Elk Valley dumps (mean = 2.91 ± 1.17 mg/kg; range = 0.77−7.55 mg/kg; n = 282; Biswas et al., 2015) also indicated that the source rock of the unconsolidated valley-bottom sediments was likely different than the waste rock. If an enrichment of digestible Cd concentrations in the natural geologic media seen in this study was the result of waste rock drainage, then this may demonstrate a potential lithological control on dissolved Cd concentrations downgradient of the waste rock dump.

Similarly, the mean Se digestible concentrations were much lower in this study (mean = 0.59 ± 0.94 mg/kg; range = MDL(0.001)−7.52 mg/kg; n = 186) than in a study of Elk Valley waste rock dumps. Hendry et al. (2015) determine waste rock dumps across the Valley did not vary significantly between mine sites and had a mean digestible Se concentration of 3.12 ± 1.43 mg/kg (n = 260), with the exception of 4% of the samples that yielded concentrations of >6 mg/kg. Also, in the current study the profile for Se in the solid phase did not display the apparent increase through the fine-grained glacio-lacustrine sediments as was noted for Cd, which may be another indication that Se was not readily bound to the solid phase. Of note was that the digestible concentration of Cd (mg/kg) was comparable to Se (mg/kg) in vertical profiles. However, in porewater the concentrations of Se (mg/L) were up to 3 orders of magnitude higher than Cd (mg/L). The dissimilar porewater concentrations of Cd and Se may have reflected the difference in concentrations of Cd and Se in waste rock effluent (Figure 35 and 36), but could have also been due to the apparent attenuation of Cd in the overburden aquifers (see Section 5.6.5.3).

The Cd and Se concentrations from leaching of drill cuttings at the adjacent well 12-10c showed that these results were comparable to Cd and Se porewater concentrations (Figure 38). Mazurek et al. (2008) report that leach solutions are the sum of 1) the constituents originally dissolved in the porewater, 2) the constituents present in fluid inclusion, and 3) water-rock interaction during the leaching process. In this study, the results of leaching were dominated by the constituents originally dissolved in porewater. Thus, the method of leaching drill cuttings were considered suitable for determining Cd and Se concentrations in the absence of porewater samples or drillcore.

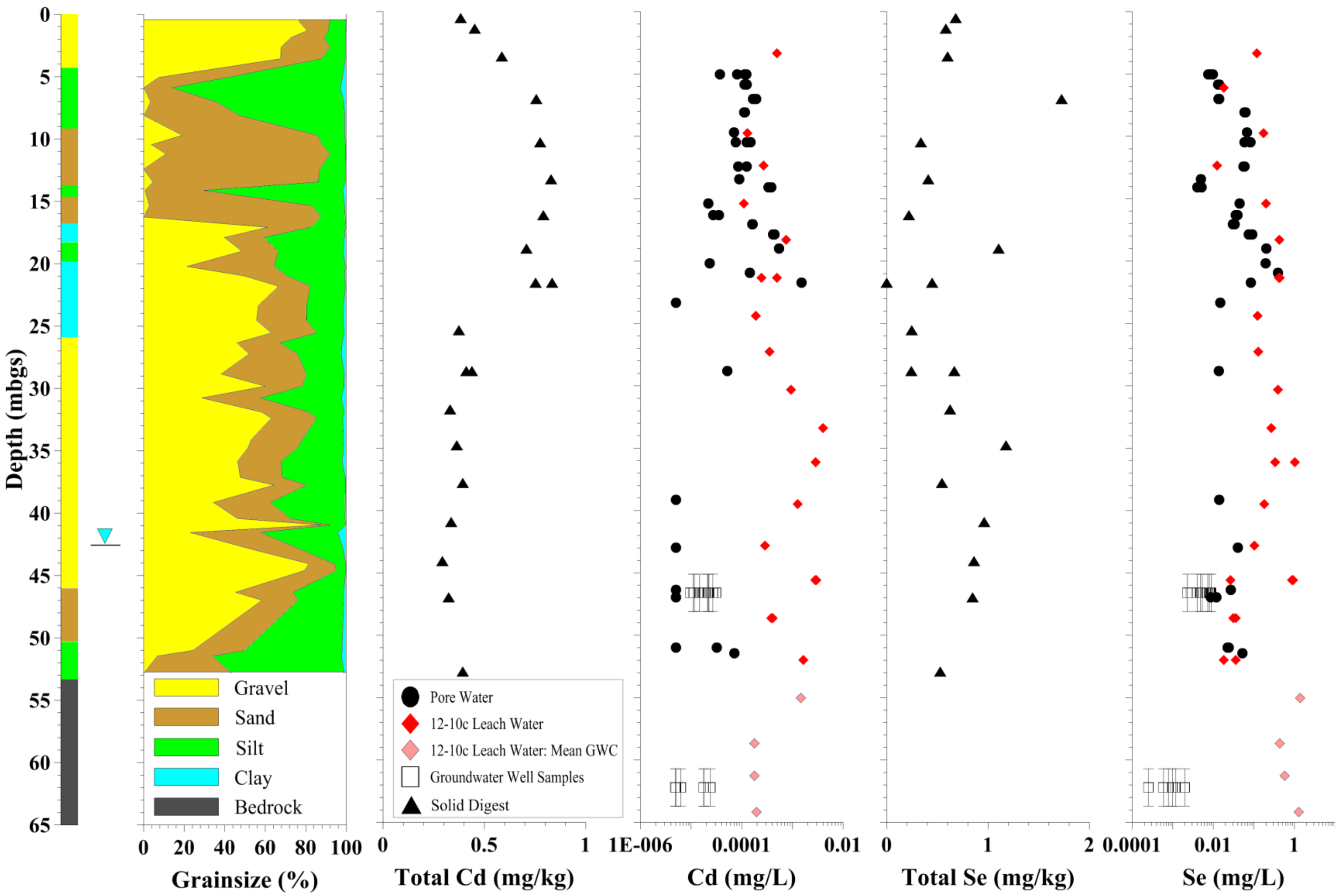

Figure 38. Vertical profile of Cd and Se concentration from solid digest and pore water analyses of core samples from well 12-10b and leached water concentrations from the drill cuttings at well 12-10c. Open squares represent groundwater samples from well 12-10b and 12-10c (T-bars represent screened interval of the well).

5.7 Quantifying Groundwater Flow in Basal Alluvial Aquifer

The volume of water migrating through the basal alluvial aquifer was estimated using Darcy's Law (Equation 4.1). The value of K used in this calculation was the geometric mean of K from all the falling head tests for monitoring wells completed within the basal aquifer (3.4×10^{-5} m/s; Section 5.2.1). The arithmetic mean of total porosity (n_T) from the bulk overburden deposit was determined to be 30% (see Section 5.2.2) and was used as the effective porosity (n_e). The average horizontal gradient between well 12-09c and 12-10b was used (approximately 0.11).

The cross sectional area of the basal alluvial aquifer was defined using cross section C-C' (Figure 39), which was oriented perpendicular to the groundwater flow direction (map of cross sections shown in Figure 24). Although the monitoring well 12-10b (Table 1; Figure 6) was not located in the center of the thalweg of the bedrock surface, the observed water levels from this well were extrapolated horizontally. The cross sectional area of the basal alluvial aquifer below this extrapolated water level, based on the average water level at monitoring well 12-10b over the study period, was 3510 m^2, as determined using Mira GOCAD® software. This area did not account for flow occurring through shallow fractured bedrock or released at the springs at the SE extent of the catchment. Furthermore, the bedrock topography in the vicinity of well 12-10b was defined using two lithological logs and one proximal ERT survey but measurement error was expected due to the sparse data points.

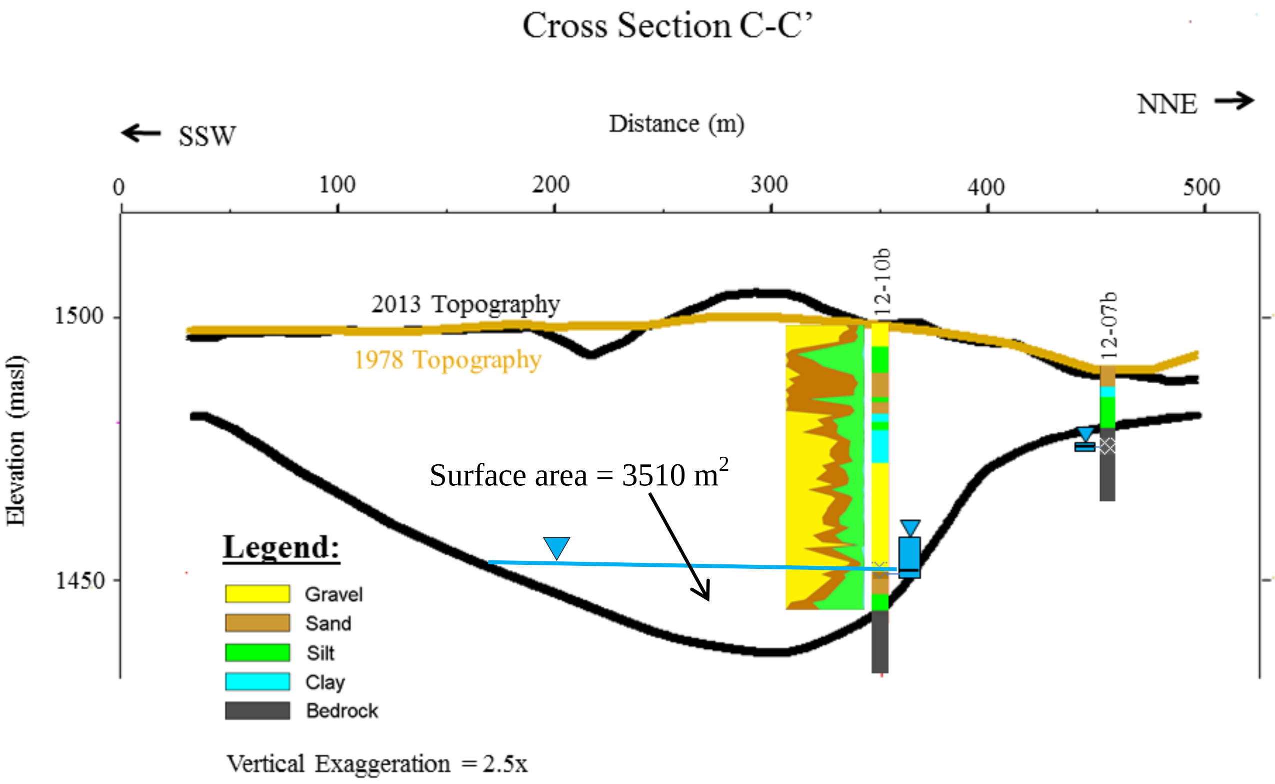

Figure 39**.** Cross section C-C' oriented perpendicular to the groundwater flow direction displaying the annual average water level and approximate surface area of the saturated zone above the bedrock. Also shown are the lithological logs and particle size analyses results. The location of the cross section is presented in Figure 24.

Several other assumptions in the calculation *Q* and *v* included: groundwater flow is perpendicular to the cross section C-C', that the *K* was constant and represented by the geometric mean of the measured values of *K*, that the heads (and gradients) within the aquifer were constant, and that the effective porosity was equal to the arithmetic mean of values measured on recovered core samples. For example, estimates of *K* in the monitoring wells 12-09c and 12-10b alone were about one order of magnitude greater than geometric mean of *K*. The mean n_T of all core samples may also not be representative of the n_e of the bulk deposit or the gravel paleochannels in which groundwater flow was focused. Furthermore, the cross sectional area of the aquifer is dependent on seasonal recharge and may vary from year to year.

The average *Q* of groundwater in the basal alluvial aquifer over the study period at monitoring well 12-10b was 0.013 m^3/s or 0.41M m^3/year. The annual discharge of the rock drain measured at the underground drainage culvert outlet over the study period averaged 2.5M m^3/year. Base flow in the underground drainage culvert was approximately 0.035 m^3/s (1.1 M m^3/year) during the winter months. Combining the baseflow and the flow through the basal alluvial aquifer highlights that at nearly half (50%) of the water flow from the valley can be associated with groundwater flow (e.g. basal aquifer plus base flow). If the flow through the aquifer alone is considered, then about 16% of the flow from the basin is associated with flow within the basal alluvial aquifer alone. It is important to note that the annual total volume of water released from the watershed based on these calculations was about 2.9M m^3/year. The total area of the watershed is approximately 10.7 km^2 and consequently the average recharge over the entire valley based on these estimates would be approximately 270 mm/year. Estimates of the valley wide water balance currently undertaken suggest that this number is closer to 300 mm/year (Sean Carey, McMaster University, personal communication). The 30 mm/year difference further highlights that the estimate of Q presented here may be underestimated. Based on a 300 mm/year recharge scenario the total water released from the watershed would have to be 3.2 Mm^3/year, and 0.7 Mm^3/year could be attributed to groundwater. Therefore, the annual groundwater outflow from the catchment may have been underestimated by 41%, which could be attributed in part to outflow through the bedrock formation and the perched aquifer unit. Lastly, some water infiltrating the aquifers may be hampered by low-K horizons evident in drill logs.

Another reason for this underestimation may be due to groundwater that is entering the basal alluvial aquifer downgradient of the cross sectional area taken at well 12-10b. This was supported by the increasing height of the water table above the bedrock contact in a downgradient direction in the basal alluvial aquifer (see Figure 25; cross section B-B'); where the average water table height in well 12-09c, 12-10b and 12-12 was 12.12, 9.84 and 22.91 m above the bedrock contact, respectively. The increase in saturated thickness of the aquifer along the groundwater flow path may infer that additional groundwater could be entering the basal alluvial aquifer below monitoring well 12-10b.

It is also possible that a proportion of the total groundwater discharge from the valley is from perched aquifers at the southern extent of the valley through groundwater springs. The Q of the perched aquifers was not quantified because of the disparity between the elevations of groundwater springs, which suggested many perched aquifers may exist. However, flow rates at major groundwater springs were measured up to 0.0031 m^3/s (see Section 5.2.3.2) with saturated thicknesses of the perched aquifer units in monitoring wells interpreted to be <4.0 m. The saturated thickness of a perched aquifer at well 12-06a (Table 1; Figure 6) located in close proximity to the waste rock dump was larger. As shown in Figure 40, cross section A-A’, the range in hydraulic head in well 12-06a was comparable to the basal alluvial aquifer, and also appeared to represent a more hydrologically active zone when compared to other wells in the perched aquifers (i.e. 12-09d; Table 1; Figure 6). Thus, the occurrence of a major water-bearing zone in the perched aquifer at well 12-06a at the toe of the waste rock dump suggested that perched aquifers may contribute noticeably to total groundwater discharge from the catchment.

The average v as estimated from the average q from the cross-section described above (q ~3.7×10^{-6} m/s) was 1.25×10^{-5} m/s or 1.08 m/day. This would yield a travel time for effluent from the toe of the waste rock dump to the Line Creek discharge seepages (~650 m) of approximately 1.9 years. This time frame is consistent with the results of the $^{3}H/^{3}He$ dating, where the groundwater age measured at the lower elevation monitoring wells near discharge areas were up to 2.8 years (± 0.5–0.7) (see Section 5.4.2).

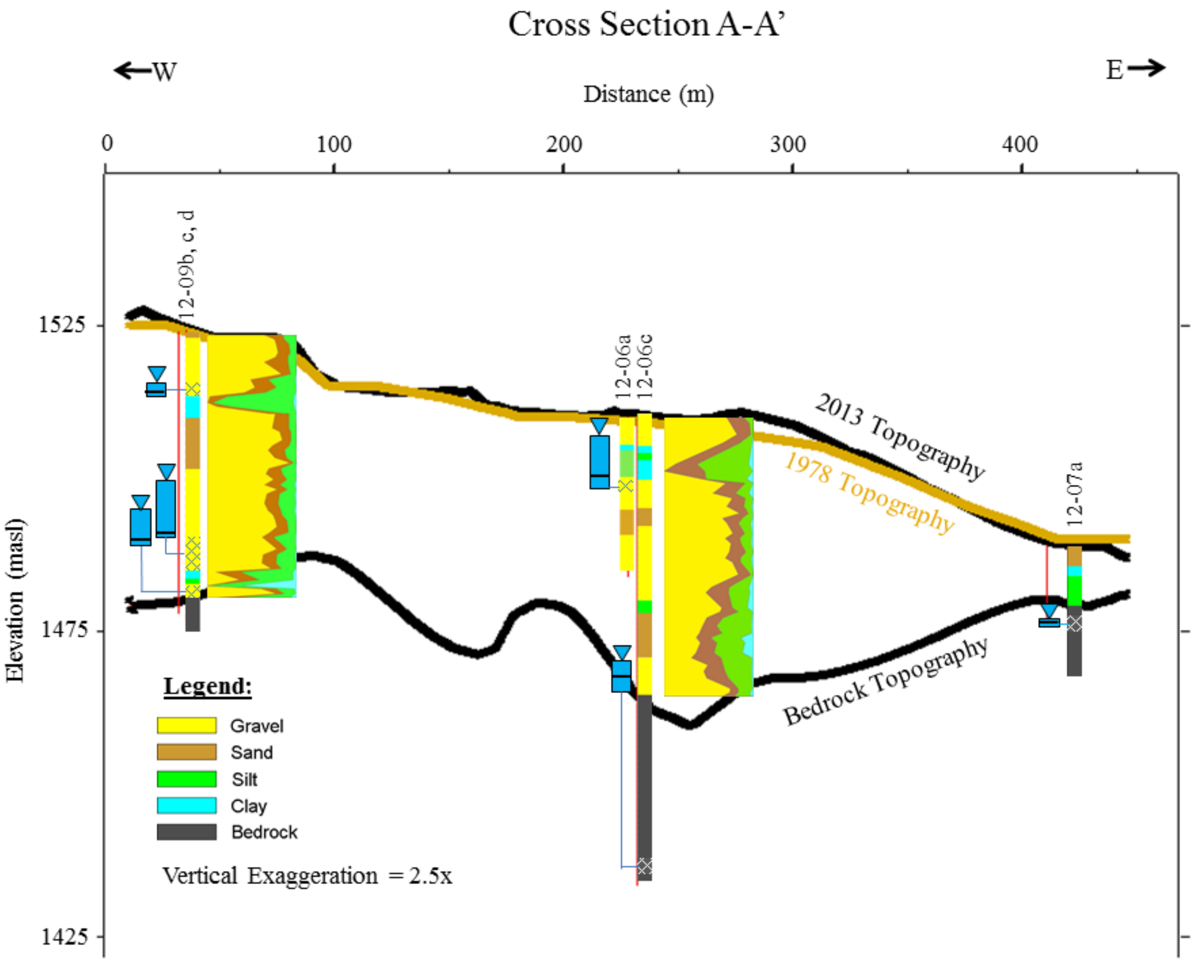

Figure 40. Cross section A-A' at the toe of the waste rock dump showing the perched aquifer in well 12-06a and 12-09d.

5.8 Sulfate Loading to Line Creek From Groundwater and the Rock Drain

Concentrations of the CIs (SO_4^{2-}, Se and NO_3^-) at the groundwater seepages (~1433 masl) along Line Creek were comparable to concentrations at a nearby monitoring well 12-12 (middle of screened interval was ~1424 masl; Table 1; Figure 6), which was sampled extensively over the study period. Shown in Figure 41 is the comparison of SO_4^{2-} concentrations at the Line Creek groundwater seepages sampled from the drivepoint wells, and in monitoring well 12-12 and 12-10b (middle of screened interval was ~1451 masl; Table 1; Figure 6). Monitoring well 12-10b was displayed for comparison because of its location along the major groundwater flow path of the basal alluvial aquifer (Figure 25; cross section B-B') upgradient of discharge areas. The increased concentrations of SO_4^{2-} between the upgradient (12-10b) and downgradient discharge locations (12-12 and Line Creek seepage zone) suggested that additional effluent enters the aquifer prior to discharge. Alternatively, the amount of dilution at well 12-10b was greater than at lower elevation discharge areas.

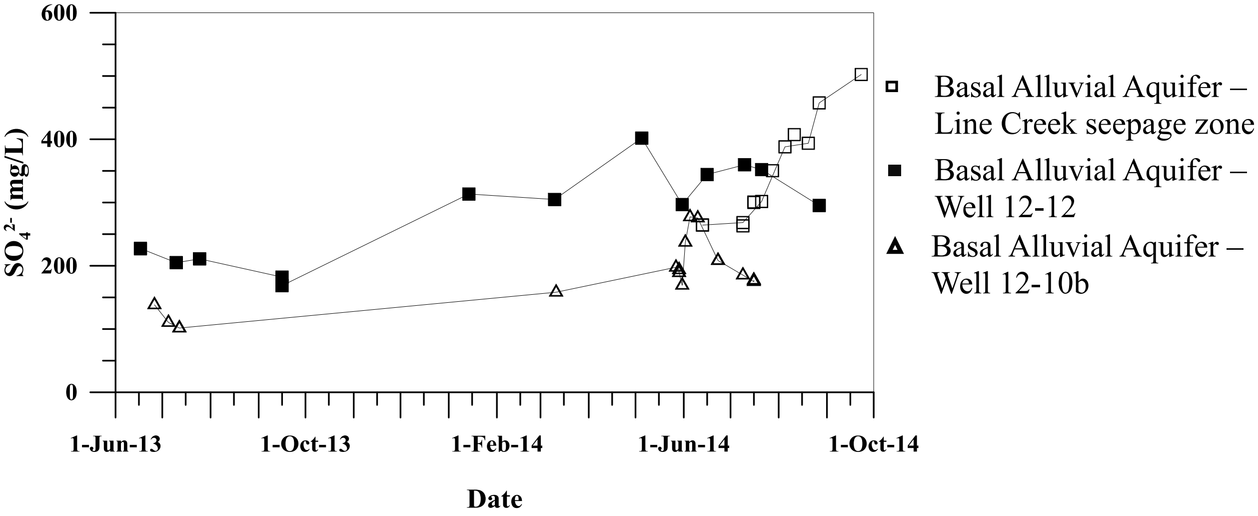

Figure 41. Groundwater concentrations of SO_4^{2-} in the Line Creek seepage zone, in monitoring well 12-12 and monitoring well 12-10b vs. time.

The comparable SO_4^{2-} concentration ranges between the two lower elevation sampling locations suggested that the discharge concentrations of SO_4^{2-} to Line Creek ranged from 169 to 502 mg/L. Similarly, the range of concentrations of conservative CIs Se and NO_3^- ranged from 48.6 to 166 ug/L and 4.3 to 32.3 mg/L, respectively. The annual average concentrations of CIs at these discharge locations were difficult to quantify because of the limited sampling intervals at the groundwater seepages (June 13, 2014 to September 24, 2014) and limited SpC data in the well 12-12 (March 4, 2014 to August 27, 2014). A poor well completion in monitoring well 12-12 was also concluded to produce anomalous trends in SpC (see Section 5.6.2.1) and did not allow for the SpC-SO_4^{2-} relationship outlined in Section 5.6.4.5 to be used. Therefore, an average SO_4^{2-} concentration was calculated from all groundwater samples for the two discharge locations, i.e. monitoring well 12-12 (n = 13) and the Line Creek seepage zone (n = 12). Monitoring well 12-11, located near well 12-12, was not used to estimate loading because groundwater temperatures (see Section 5.3) and measurements of water level elevations suggested groundwater samples from this well were impacted by proximal surface water ponds sourced from the culvert outlet. The estimate of average annual concentration of SO_4^{2-} was 310 mg/L during the study period. This was multiplied by the 2-year annual average Q from the basal alluvial aquifer (0.41 Mm^3/year; see Section 5.7) to determine the annual load of SO_4^{2-} into Line Creek from groundwater. The loading of SO_4^{2-} to Line Creek through the basal alluvial aquifer was approximately 1.3×10^5 kg/year.

Annual loading of SO_4^{2-} from the WLC culvert outlet was calculated over Year 1 of the study period using a method similar to that outlined in Day et al. (2012). A weekly average of flow rate was determined and missing concentration data for individual weeks was created by using the last date for which data was available. An estimate of Year 2 was not calculated due to construction at the culvert outlet which limited the number of water samples and the completeness of flow data. The Year 1 estimate of loading from the rock drain in the catchment as measured at the culvert outlet was 1.8×10^6 kg/year. This result was similar to Day et al. (2012) that report 1.2×10^6 kg/year SO_4^{2-} at the culvert outlet in 2008. Using the Year 1 estimate of SO_4^{2-} loading the contribution of groundwater to the total loading from WLC was approximately 7%.

5.9 Potential for Natural and Enhanced Attenuation of CIs

Natural attenuation of Se, NO_3^- and SO_4^{2-} was not expected in the dominant aquifer, i.e. the basal alluvial aquifer, due to the dominantly oxidizing conditions measured *in situ*. These CIs are known to be mobile under the observed geochemical regime and, thus, remediation strategies will likely need to alter the geochemical conditions in this geologic unit to attempt to attenuate their concentrations. Altering the geochemical conditions could encourage indigenous bacterial populations to metabolize target contaminants through the addition of various amendments, discussed as ‘in situ bioremediation’ in EPA (2013). In situ bioremediation has become widely used for contaminated site treatment because of its relatively low cost, adaptability to site-specific conditions, and efficacy when properly implemented (Stroo, 2010). However, these strategies must address contaminants dissolved in groundwater as well as those sorbed to the aquifer matrix to be effective. Cd attenuation was proposed in the overburden sediments as a result of the research presented herein and will need to be addressed prior to any future remedial work. Further investigation will be needed to determine the reservoir of Cd that may exist either in the vadose zone or saturated zones of the overburden aquifers. Additionally, the stability of possible minerals that may control Cd concentrations in groundwater will need to be characterized to avoid producing secondary contaminants. This study has provided site characterization and a conceptual understanding to guide the subsequent design, implementation, and operation of in situ bioremediation.

CHAPTER 6
CONCEPTUAL MODEL

A conceptual model of the study area hydrogeology was developed based on the geologic setting, hydrogeological parameters and evaluation of hydraulic gradients in the groundwater system. Delineation of the hydrostratigraphic units was completed using subsurface mapping, testing of core samples and hydraulic testing of aquifers. Physical processes controlling groundwater geochemistry were evaluated.

6.1 Hydrostratigraphy

6.1.1 Unconsolidated Overburden Sediments

The conceptual model of the geologic setting was based primarily on a braided river depositional model. This model was proposed in response to the abundance of coarse gravel and sand sediments at the site. Braided river deposition occurs in glacial outwash plains along the mountainous reaches of river systems where there are high gradients, abundant sediment and sporadic water discharge (Boggs, 2001). The center-line of the catchment was shown to have a gradient of ~0.12, there was abundant sediment that created up to 64 m of overburden at the southern extent of the valley, and sporadic water discharge was inferred from the region's recent deglaciation. Typically, braided rivers aggrade vertically by depositing sediment in one part of the system and diverting flow to other parts. This phenomenon produced lateral migration of the stream braids and multiple paleochannels described in ERT surveys (Worley Parsons Ltd., 2013).

Fine-grained sediments, in a braided river model of deposition, are deposited during low-discharge periods or in flood plains during high-discharge periods (Cant, 1982). High-discharge events also cause fine-grained beds of silt and clay, formed under decreasing current velocity within the stream bed, to be reworked. Therefore, braided stream deposits often form sheet sands and gravels, with thin impersistent clays and silts enclosed within coarser sediments (Cant, 1982; Figure 41; see Section 5.1.2).

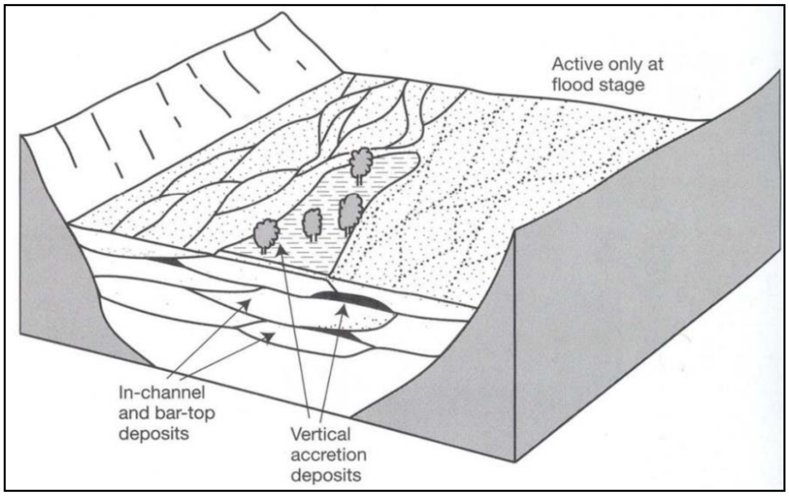

Figure 41. Geometry of typical braided river deposits (from Boggs, 2001).

In addition to braided river deposition, several intervals observed in lithological logs were formed in glacio-lacustrine and glacial till depositional environments. The glacio-lacustrine sediments reflect a period when surface outflow within the catchment was dammed (possibly by the Line Creek glacier or glacial moraines). The existence of glacial till, characterized by heterogeneous particle sizes, supported the interpretation that the overburden sediments were formed in part by glaciers and glacial re-advances (see Section 5.1.2).

Thus, the glacial-deposit/alluvial aquifer system in the overburden sediments was formed from a complex mix of interbedded materials, in which high permeability alluvial deposits occur within lower permeability glacial tills and glacio-lacustrine deposits. Due to the variability of depositional environments and sediment sources delineation of aquifers in these deposits involves considerable speculation. The shifting position of river paleochannels that reworked the overburden deposits produced a characteristic textural variability and resulting in considerable heterogeneity in the distribution of hydraulic properties; *K* varied by >3 orders of magnitude in the permeable zones. Estimates of total porosity were also variable, with higher porosity occurring in fine-grained intervals (see Section 5.2.2).

6.1.2 Bedrock

The bedrock beneath the overburden sediments was determined to be the Fernie Formation, which is a pervasive unit found throughout the Canadian Cordillera. The Fernie Formation is a marine deposited shale, siltstone and sandstone that forms a significant regional aquitard (Riddell, 2012; Michael and Bachu, 2001). The occurrence of thin-bedded sandstones observed in outcrops may have suggested that the bedrock at this location was deposited in the transitional period between the Jurassic to the Lower Cretaceous, when estuarine conditions became freshwater sedimentation of the coal bearing Kootenay Group. Shale strata such as the Fernie Formation generally behave as regional aquitards, but can locally contain members that may host aquifers, including fractured shale sequences and coarse clastic intervals (Riddell, 2012).

Prior to this study no hydraulic testing had been performed on the Fernie Formation. Groundwater flow was likely focused in bedding planes and sandy intervals as well as through fractures and weathered intervals produced by glacial processes. Estimates of K were lower than the overburden deposits and less variable, but may have been elevated due to the location of the monitoring wells in the weathered upper section (~18 m) of this unit. Thus, the Fernie Formation was described as a poor aquifer (see Sections 5.2.1).Testing of core samples determined that the porosity was also lower than the overburden deposits.

6.2 Conceptual Model of Hydrogeology

Groundwater flow was focused at the base of the overburden sediments in the basal alluvial aquifer, with minor components in the underlying bedrock formation and in overlying perched aquifers. This was confirmed based on hydraulic parameters, the bedrock topography and hydraulic head data. The dominant groundwater flow direction along the periphery of the valley was laterally toward the center of the valley, while groundwater in the thalweg of the overburden-bedrock contact flowed parallel to the NW-SE orientation of the catchment toward discharge areas. This is similar to a study by Roy and Masaki (2009) where groundwater flow in an alpine catchment moraine-talus field is channeled by bedrock topography. A conceptual cross-section of groundwater flow within the basal alluvial aquifer is shown in Figure 42, with the size of the blue arrows reflecting the interpreted contribution of groundwater along different pathways in the overburden sediments. This model was supported by the increased saturated thickness in the thalweg of the bedrock, and the intermittent and shallow saturated thickness along the periphery of the valley (see Section 5.2.3.1). Leakage beneath perched aquifers was inferred from the marked differences in groundwater spring elevations (1448–1481 masl; see Section 5.2.3.2) and groundwater temperature data resulting from ponded water infiltration (see Section 5.3).

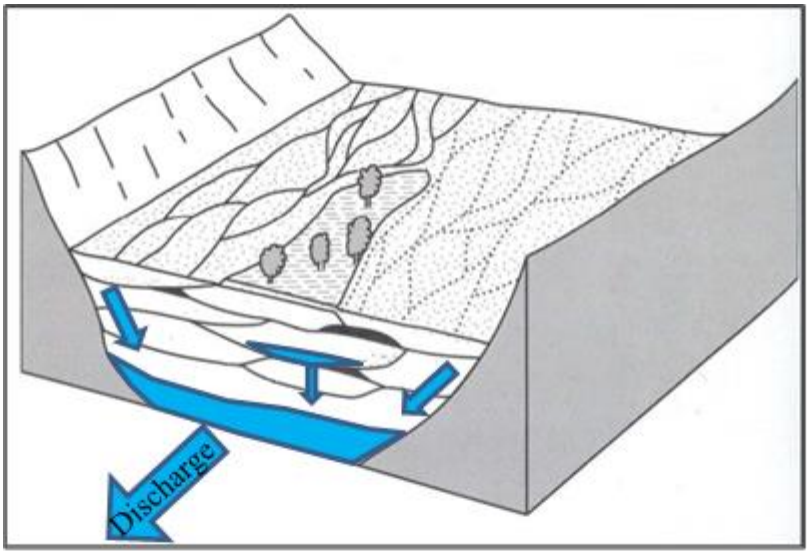

Figure 42. Conceptual model of groundwater in the basal alluvial aquifer (modified from Boggs, 2001). Blue denotes saturated conditions and blue arrows illustrate flow directions.

Groundwater flow through the perched aquifers in the overburden sediments and bedrock formation were not quantified, but were considered minor components of the groundwater system. However, an additional flow component of the basal alluvial aquifer through the weathered and fractured shallow intervals of the bedrock formation may be considerable. Exchange of groundwater between the bedrock formation and basal alluvial aquifer was inferred from groundwater geochemistry from shallow bedrock wells, which often had the basal alluvial aquifer type water. Additionally, downward vertical hydraulic gradients were determined at two locations, also suggesting the basal alluvial aquifer may have percolated into the bedrock formation (see Section 5.5). Thus, the lower boundary of the basal alluvial aquifer may have partially extended into the bedrock formation. Shown in Figure 43 is a depiction of groundwater flow through overburden sediments with a component occurring through the bedrock formation.

Tiedeman et al. (1998) shows that in formerly glaciated terrain the groundwater recharge into a kettle lake is up to 60% along flowpaths that involve movement in bedrock. However, the *K* of the bedrock in that study was an order of magnitude greater than in the current study area and the formation was a metamorphic rock with significant dykes that may have enhanced flow.

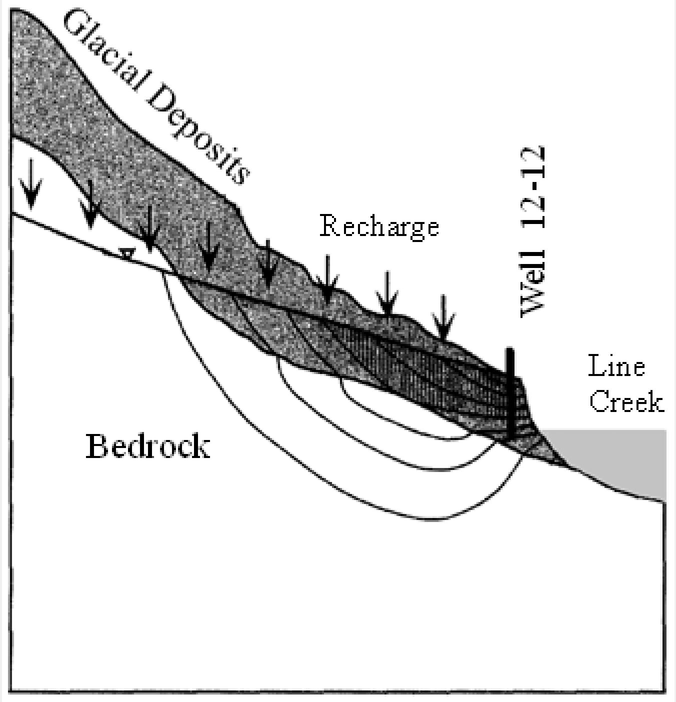

Figure 43. Groundwater flow paths can be divided into bedrock and glacial deposit flow (modified from Tiedman et al., 1998).

6.3 Dilution to Overburden Aquifers

The distribution of CIs in the overburden aquifers was seasonally variable. Dilution was determined to be the dominant mechanism controlling the concentrations of conservative CIs (Se, SO_4^{2-} and NO_3^-). The sources of dilution to the overburden aquifers were analogous to natural sources of recharge in the catchment. Based on stable isotopes of water (δ^2H and $\delta^{18}O$) and groundwater temperature data, natural recharge to the overburden aquifers was proposed through: upgradient recharge of snow-melt water and precipitation in upland areas, and percolation of precipitation and ponded water through unconsolidated sediments at the valley bottom (see Sections 5.3, 5.4 and 5.6.2.1).

6.3.1 Upland Recharge

Recharge to the overburden aquifers through colluvial deposits along the western slopes of the catchment was evaluated using a digitized 1979 geophysical survey of the western slope of the catchment (Golder Associates Ltd., 1979) and LiDAR data (provided by Teck Coal Ltd.). The 1979 pre-mining geophysical survey outlined the depth to bedrock of the colluvial deposits beneath the high alpine cirques of the Wisukistak Range, which formed the western catchment boundary. The colluvial deposits were shown to be up to 35 m thick, although were considerably thinner beneath the ephemeral stream channels described by AMEC Environmental & Infrastructure (2013). Shown in Figure 44 is the lower portion of the middle of five alpine cirques outlining the ephemeral stream channel and eroded the colluvium. Colluvial deposits were proposed to provide recharge to underlying aquifers because of their coarse-grained structure and high infiltration capacity (Den Van Brink and Jungerius, 2006). Groundwater temperature and stable isotopes of water (δ^{2}H and δ^{18}O) data at the northern-most monitoring wells, which were located at the base of the steep western slope, supported this recharge mechanism. At these wells recharge to the aquifers during spring freshet had a signature for water sourced at high elevations, i.e. colder temperatures and depleted isotopes of water (see Section 5.4.1).

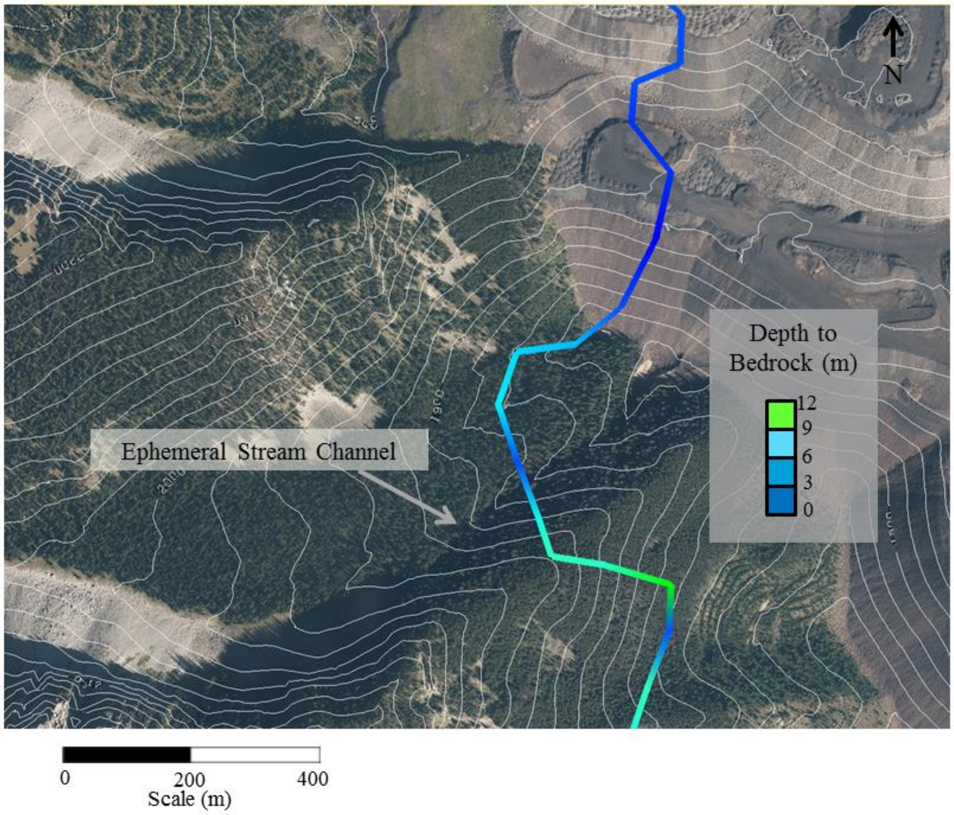

Figure 44. Colluvial deposits of the Wisukistak range shown with 20 m contour lines (blue line is the 1979 geophysics surveys completed by Golder Associates Ltd.).

Recharge to the overburden aquifers through the colluvial deposits may have also been enhanced by to the topography of the Wisukistak Range. Precipitation in mountainous regions increases with elevation and the Wisukistak Range is up to 2650 masl (Shatilla, 2013). Barbour et al. (2015) determined that the catchment has a local temperature and precipitation lapse rate of approximately -0.48°C/100 m and +21 mm/100 m change in elevation. Additionally, it is bordered by the deeply incised Elk Valley to the east and the WLC valley to the west, producing a large range of elevation over a small area. Precipitation is affected by changes in elevation of airmasses by two distinct processes, i.e. convective instability and large-scale orographic lifting (Baron and Denning, 1993). Convective instability is brought about by differential heating of low- vs high-elevation air masses, enhancing precipitation. Large-scale orographic lifting occurs when rising air cools and condenses as it encounters mountain barriers, and thus enhancing precipitation. Therefore, this phenomenon may increase precipitation over the western boundary of the catchment were substantial recharge to aquifers was proposed.

6.3.2 Infiltrating Precipitation and Lateral Groundwater Flow in the Overburden Sediments

The percolation of surface ponded water directly through the overburden sediments was presented as a pathway for waste rock effluent to enter the overburden aquifers (see Section 5.3). Similarly, natural recharge to the aquifers occurred when precipitation infiltrated directly through the overburden sediments (see Section 5.2.3.1). This mechanism also influenced groundwater flow along the boundaries of the study site, driving groundwater flow from areas unaffected by mining toward the center of the catchment. This lateral flow component in the groundwater system diluted waste rock effluent in the subsurface prior to discharge to Line Creek.

The recharge and dilution of CIs by the lateral flow component of the groundwater system was supported by water level maps of the basal alluvial aquifer (see Section 5.2.1.3), the mapped bedrock topography (see Section 5.1.1), and the excess recharge described using rainfall events and estimates of S_y (see Section 5.2.3.1). The bedrock surface was shown to be an important lower boundary controlling groundwater flow in the basal alluvial aquifer, and the rise in bedrock elevation beneath the AWTF area to the east and beneath well nest 12-07 to the west may have influenced groundwater flow toward the center of the valley. The occurrence of groundwater flow being channeled by the bedrock topography toward the center of the valley was also proposed by examining the apparent excess of recharge from individual rainfall events. This aspect of the proposed conceptual model differs from the literature on groundwater systems in alpine/sub-alpine environments due to the use of a network of groundwater wells in this study and the associated internal data on the structure of the overburden and bedrock provided by drilling.

CHAPTER 7
SUMMARY AND CONCLUSIONS

Steelmaking coal mining in the Elk Valley, BC, Canada has produced increasing surface water quality concerns downstream of open-pit mines and waste rock dumps. In 2014, Teck Resources Ltd. Elk Valley Water Quality Plan identified strategies and solutions to address these concerns, although the contribution of groundwater from mine-impacted tributaries was not discussed. This study is a component of a recent multidisciplinary research program to characterize the release of CIs (Se, SO_4^{2-}, Cd and NO_3^-) from key watersheds of concern, in this case the WLC catchment. An evaluation of the hydrogeology, groundwater quality and the effect of waste rock effluent on the altered hydrological regime of the catchment were completed. The objectives of the research presented in this thesis were: (1) to characterize the hydrogeology and hydrochemistry in the WLC valley downgradient of a waste rock dump, (2) to estimate the rates of annual groundwater flow and mass fluxes of CIs in the dominant aquifer, and (3) to evaluate the potential for natural or enhanced attenuation of CIs in the groundwater system.

The study site was instrumented with 13 monitoring wells across the valley bottom site and 8 shallow drivepoint wells located along the bank of Line Creek and at groundwater springs. Samples of core and drill cuttings were analyzed to determine geotechnical parameters, hydraulic properties, porewater chemistry, solid digest chemistry and leached water chemistry. Data loggers were installed in monitoring wells from September 2012 to September 2014 to record hydraulic head, temperature, SpC. Falling head hydraulic tests were conducted to determine the *K* of aquifers in two geologic formations, i.e. the overburden and bedrock. Groundwater sampling was conducted from May 2013 to September 2014 concurrently with *in situ* measurement of geochemical parameters. Additional water samples were collected at groundwater springs, the rock drain and from monitoring wells adjacent to the study site (AWTF area). These water samples helped to assess the impact and extent of coal waste rock seepage on groundwater. All water samples were analyzed for major anions, major cations, trace constituents, stable isotopes of water, and select samples were analyzed for selenium speciation and $^3H/^3He$ isotopes.

Lithological logs showed that the geology of the study site was defined by a shale bedrock overlain by unconsolidated overburden sediments (up to 64 m thick). The overburden sediments were principally formed by braided stream deposition producing extensive coarse-grained gravel and sand intervals. The inconsistent occurrence of fine-grained glacial till supported that the valley bottom sediments were formed from a complex series of cut and fill events. The glacial till and discrete glacio-lacustrine deposits were encountered at varying depths in the overburden, producing marked contrast in the distribution of hydraulic parameters. The results of *K*-testing in the overburden sediments indicated variations in the permeable zones of more than 3 orders of magnitude (10^{-4} to 10^{-7} m/s), with a geometric mean of 3.4×10^{-5} m/s. This variability reflected the differences in particle size distributions of individual layers within this unit. Porosities ranged from 0.16 to 0.49 but were estimated to be 0.30 for the bulk deposit. Downward vertical hydraulic gradients were measured at two well nests within the overburden deposit and ranged from 0.02 to 0.26. The average horizontal hydraulic gradient between well 12-09c and 12-10b, found along the dominant groundwater flow path, was 0.11 and was similar to the gradient of the catchment center-line of approximately 0.12.

The shale bedrock was identified as the Fernie Formation and had porosities ranging from 0.16 to 0.25. Although the number of *K*-tests in the Fernie Formation shale bedrock were limited, the *K* was lower than the overburden aquifers with a geometric mean of 3.3×10^{-8} m/s. Groundwater flow in the bedrock was presumed to occur along fractured and sandy intervals observed in well logs and outcrops. Overall, this stratum was characterized as a poor aquifer and was geochemically distinct from the overburden aquifers based on $\delta^{13}C_{DIC}$ and stable isotopes of water ($\delta^{2}H$ and $\delta^{18}O$).

Based on the evaluation of downhole data loggers (hydraulic head, temperature, SpC) and the chemistry of water samples, groundwater flow and the transport of CIs from the waste rock dump occurred primarily in an unconfined aquifer located at the base of the overburden sediments (i.e. the basal alluvial aquifer). The U-shaped topography of the low-*K* bedrock formed the base of this aquifer. Hydraulic head data demonstrated that the dominant groundwater flow direction was longitudinally along the NW–SE orientation of the catchment toward discharge areas. Groundwater in the basal alluvial aquifer along the periphery of the valley flowed laterally toward the deeper thalweg of the bedrock surface. Minor components of groundwater flow also occurred in perched aquifers located atop discrete glacio-lacustrine intervals but their contribution to total groundwater flow in the catchment could not be quantified. Groundwater flux through the basal alluvial aquifer was estimated to be approximately 16% of total flow from the basin. If base flow in the rock drain was considered as entirely due to groundwater then the total groundwater contribution of water flow from the valley was roughly 50%. The residence time of groundwater in the basal alluvial aquifer across the approximate 650 m flow path was determined to be 1.9 years based on estimates of groundwater velocity and less than 3 years based on $^3H/^3He$ dating.

Geochemical analysis demonstrated several chemistry end-members of groundwater samples: a $(Na^+ + K^+)/(CO_3^{2-} + HCO_3^-)$ type water in the bedrock formation, a $Ca^{2+}/(CO_3^{2-} + HCO_3^-)$ type water in the overburden aquifers not impacted by mining, and a $Mg^{2+}(Ca^{2+})/SO_4^{2-}$ type water in mine-impacted overburden groundwater. Groundwater in the overburden ranged from unsaturated to supersaturated with respect to Ca-Mg carbonates (calcite, dolomite). Geochemical controls on SO_4^{2-} were not encountered in the overburden aquifers, suggesting SO_4^{2-} was a conservative ion in solution. Evaluation of SO_4^{2-} concentrations using a 100 mg/L concentration criterion indicated that 8 out of 9 monitoring wells installed in the overburden aquifers were mine-impacted for at least a portion of the study period.

Major ions and CIs listed in the Elk Valley Water Quality Plan (2014) were evaluated using linear correlations with SO_4^{2-} concentrations. This served to distinguish between conservative (Mg^{2+}, Se, NO_3^-) and non-conservative constituents (Ca^{2+}, HCO_3^-, Cd) undergoing geochemical reactions such as mineral precipitation/dissolution or adsorption. Se was highly correlated in groundwater with SO_4^{2-} ($R^2 = 0.95$), suggesting that no significant attenuation of Se existed in the overburden aquifers. Furthermore, no attenuation of NO_3^- was evident in overburden aquifers, although the correlation with SO_4^{2-} was poor, likely due to spatial variability in the flushing of NO_3^- from the waste rock dump. Thus, reduction of Se and SO_4^{2-} and denitrification of NO_3^- in solution was not apparent and was consistent with the predominantly oxidizing conditions in the overburden aquifers. This suggests that mine-impacted groundwater flowing through unconsolidated overburden sediments transported Se, SO_4^{2-} and NO_3^- with no evident removal of mass.

Cadmium was observed to be a non-conservative CI in groundwater and appeared to be attenuated in the overburden aquifers relative to SO_4^{2-}. Concentrations of Cd in groundwater were below the BC WQG for aquatic life (0.37 µg/L) and regularly measured near the MDL (0.01 µg/L). However, Cd concentrations in the rock drain often exceeded BC WQG. This suggested that Cd attenuation in groundwater may have been a product of the subsurface receiving environment (i.e. natural geologic media) and the conditions producing this phenomenon were absent within the waste rock dump. Further evaluation of the subsurface Cd reservoir would be needed prior to the subsequent design, implementation, and operation of in situ bioremediation technologies.

The heterogeneity of the overburden deposits produced vertical and lateral dispersion of solutes sourced from the waste rock dump. This was evident in high-resolution vertical profiling that demonstrated that Se concentrations above BC WQG for aquatic life occurred in 98% of analyzed porewater from core samples (n = 223). Porewater SO_4^{2-} concentrations in core samples exceeded the 100 mg/L criterion (MEND Report 10.3, 2015) in 87% of samples (n = 110). Additionally, concentrations of Se exceeding BC WQG in groundwater within the catchment boundary were measured as far as 720 m from the subsurface intake of the underground drainage culvert. Concentrations of Se and NO_3^- decreased linearly with SO_4^{2-} in the overburden aquifers along groundwater flow paths, suggesting dilution was the primary mechanism controlling the concentrations of these constituents and their temporal variability. Thus, two major discharge pathways for mine-impacted water existed from the waste rock dump toward Line Creek, i.e. overburden aquifers and rock drain. However, these two pathways differed in their temporal CI concentrations and in the degree of waste rock effluent dilution. This was supported by calculations of annual groundwater and SO_4^{2-} flux, which suggested that the basal alluvial aquifer discharged 16% of the water but only 7% of the SO_4^{2-} load from the entire catchment. The source of this dilution was proposed to be lateral cross-valley groundwater flow as well as direct infiltration of precipitation in upland areas and through the overburden sediments.

The concentrations of CIs in the deeper bedrock formation monitoring wells were not greatly elevated when compared to overburden aquifers. Furthermore, the geochemical conditions within these deeper bedrock monitoring wells were sufficiently reducing to possibly inhibit the mobility of SO_4^{2-}, NO_3^-, and Se. The infiltration of mine-impacted water into shallow fractured bedrock intervals <3 m below the overburden-bedrock contact was established using the dissolved ion chemistry of groundwater samples. However, from a mine management perspective, the lower boundary of the basal alluvial aquifer in which CIs were transported can be approximated at the overburden-bedrock contact and this boundary was easily defined using cost-effective geophysical methods.

7.1 Recommendations for Future Work

The research described in this thesis was part of a larger ongoing program to characterize the release of CIs from coal mine waste rock dumps in the Elk Valley. Below are suggestions for additional groundwater related studies that could aid in the development of sustainable mining of coal in the Elk Valley, BC.

1) Additional work at monitoring well 12-12 and 12-10c is recommended; specifically, removal of fine-grained sediments from the well screen to improve the estimates of *K* and investigate the drilling methods that may have produced the infill of silt in the well screen. The cause of these silted-in wells is currently attributed to overpumping of the wells at high rates, which allows fine-grained sediments to preferentially migrate into the screen from the top of the screened interval. Fine-grained sediments that occurred in the formation above the screened interval may have also slumped into the screen during well development. Understanding the effects of drilling practices on aquifer characterization could be useful in future groundwater studies in similar geologic media.

2) A post-sampling SpC response (see Section 5.6.2.1) was observed at monitoring well 12-12. It was suspected that sampling at this well may have accessed a shallower and more dilute zone of the aquifer. Removal of the fine-grained materials and subsequent low-flow sampling of well 12-12 could provide samples more representative of the aquifer at this location and a long-term compliance well. It should be noted that the porewater samples from below the screened interval of well 12-12 had some of the highest concentrations of Se and SO_4^{2-} measured at the study site. This may suggest that CIs from the waste rock dump have migrated to the bottom of an aquifer prior to extensive lateral movement or that historic or current processes may allow CIs to concentrate within this zone. An investigation of possible stratification of the basal alluvial aquifer with respect to CI concentrations may also be prudent to address future remedial options as well as phenomena pertaining to CI discharge into surface waters.

3) In conjunction with the low-flow sampling of monitoring well 12-12, continued sampling of the Line Creek drivepoint wells is recommended to fully characterize the seasonality of CI concentrations discharging to Line Creek. This will allow for a more robust estimate of loading

from the groundwater system to surface waters. The trend in CI concentrations sampled at the discharge areas along the bank of Line Creek with drivepoint wells suggested that concentrations may continue to increase throughout the winter. Thus, if groundwater discharge is fairly consistent throughout the year then there may be a significant increase in loading during the winter months. Additionally, upstream and downstream sampling of Line Creek may corroborate loading estimates.

4) Additional studies of groundwater-surface water interactions along Line Creek with respect to CIs are recommended. Mapping of the bedrock surface in this study suggested that Line Creek may be underlain by up to 20 m of overburden sediments but the role of this zone in transporting CIs beneath Line Creek is not understood. The hyporheic zone beneath stream beds may also play a role in attenuating CIs or influence which areas discharge mine-impacted groundwater.

5) Another improvement to CI loading estimates in the basal alluvial aquifer would be possible by the development of a transect of multiple monitoring wells perpendicular to the dominant groundwater flow direction. Multiple sampling points in the dominant aquifer would allow the CI plume to be properly depicted near monitoring well 12-10b. This will also allow for more accurate calculation of mass flux of CIs as well.

6) The downward movement of mine-impacted groundwater into the underlying bedrock formation was proposed in shallow bedrock wells. However, the occurrence of waste rock effluent at deeper intervals below the overburden-bedrock contact was not confirmed, even though occasionally elevated NO_3^- concentrations above background values were noted. Sampling of bedrock wells 12-10c and 12-12 for $\delta^{15}N_{NO3}$ and $\delta^{18}O_{NO3}$ could help elucidate the source of nitrogen in the deeper bedrock wells. It is possible that the deeper bedrock wells in this study exist at the boundary between a nitrate reduction and iron reduction zone.

7) An investigation of the role of PO_4^{3-} on the WLC rock drain and groundwater system is recommended. The WLC catchment has phosphate deposits that outcrop along the western portion of the valley (see Butrenchuk, 1989). Aqueous PO_4^{3-} is known to be preferentially absorbed onto mineral surface over other anions such as selenate and selenite, which may have

implications in the rock drain and groundwater system. Small algal blooms were noted in sedimentation ponds downstream of the toe of the waste rock dump suggesting possible nutrient loading from the waste rock dump via the rock drain may be substantial.

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APPENDIX A

ADDITIONAL FIGURES

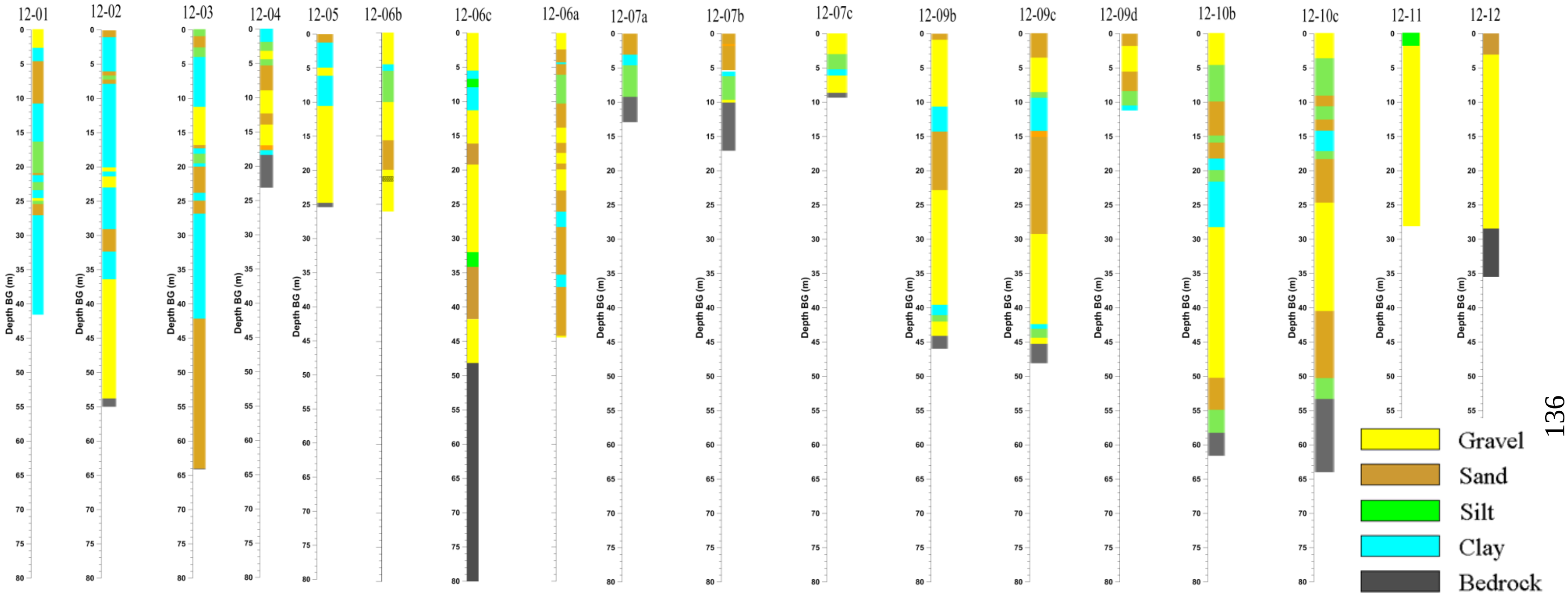


Figure A1. Simplified lithological logs of all wells including AWTF wells (i.e. 12-01, 12-02, 12-03, 12-04 and 12-05).

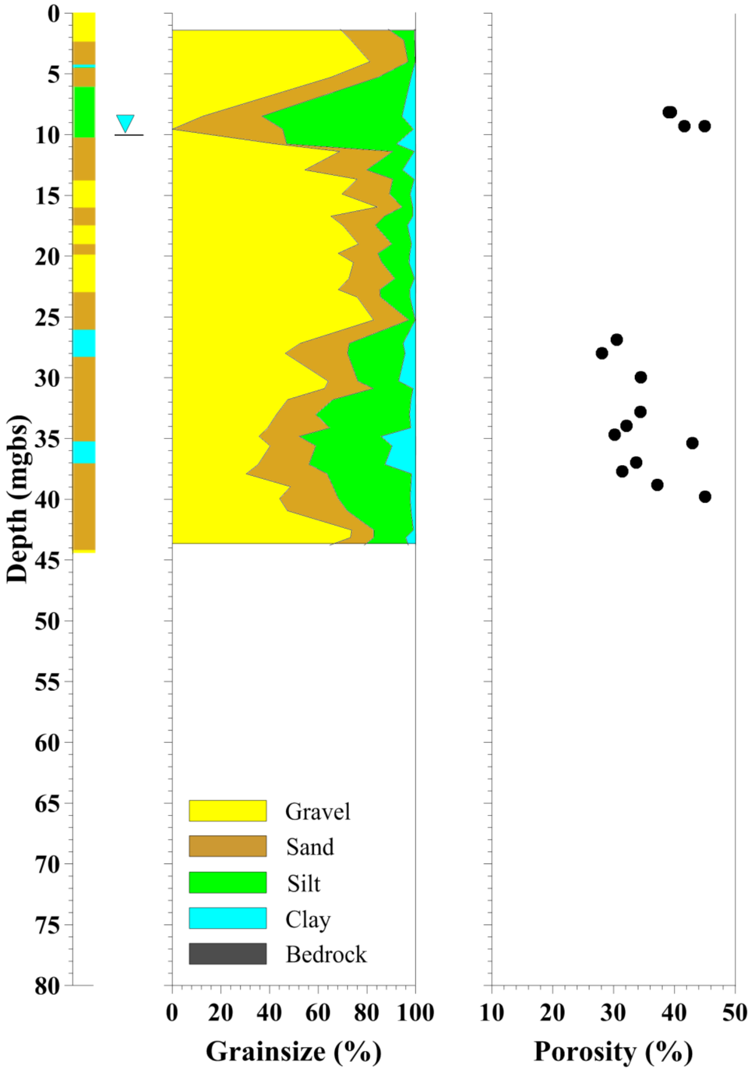


Figure A2. Porosity values of core samples collected from monitoring well 12-06a shown with the results of particle size analysis. The inverted triangle represents the average water level.

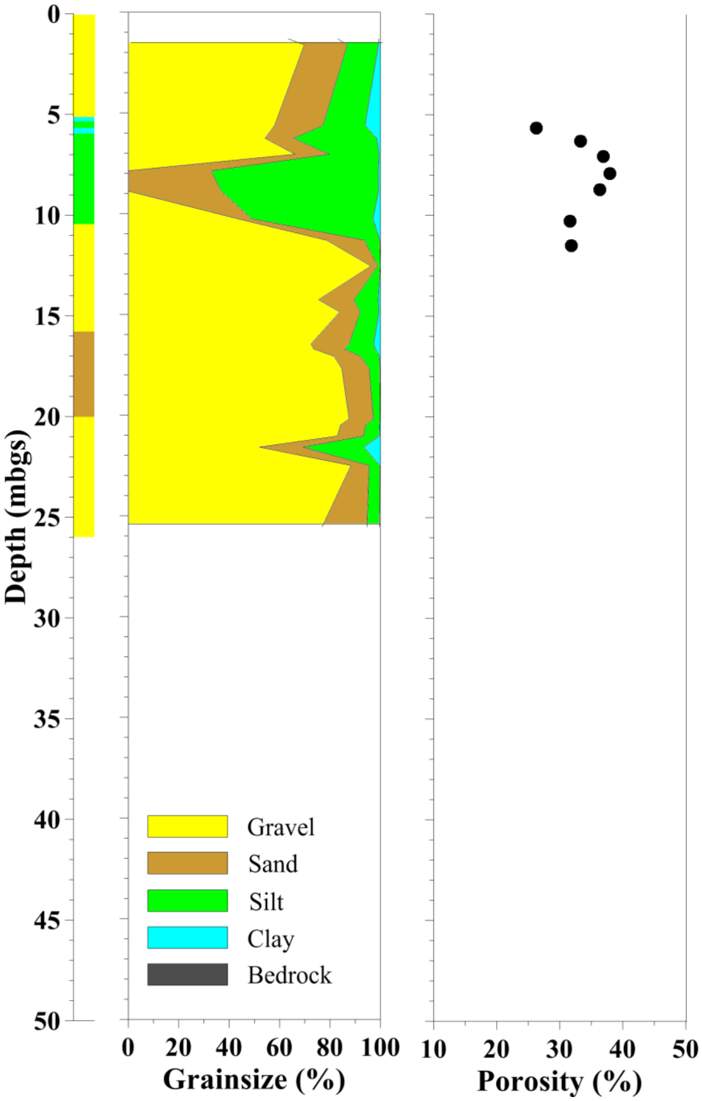


Figure A3. Porosity values of core samples collected from monitoring well 12-06b shown with the results of particle size analysis.

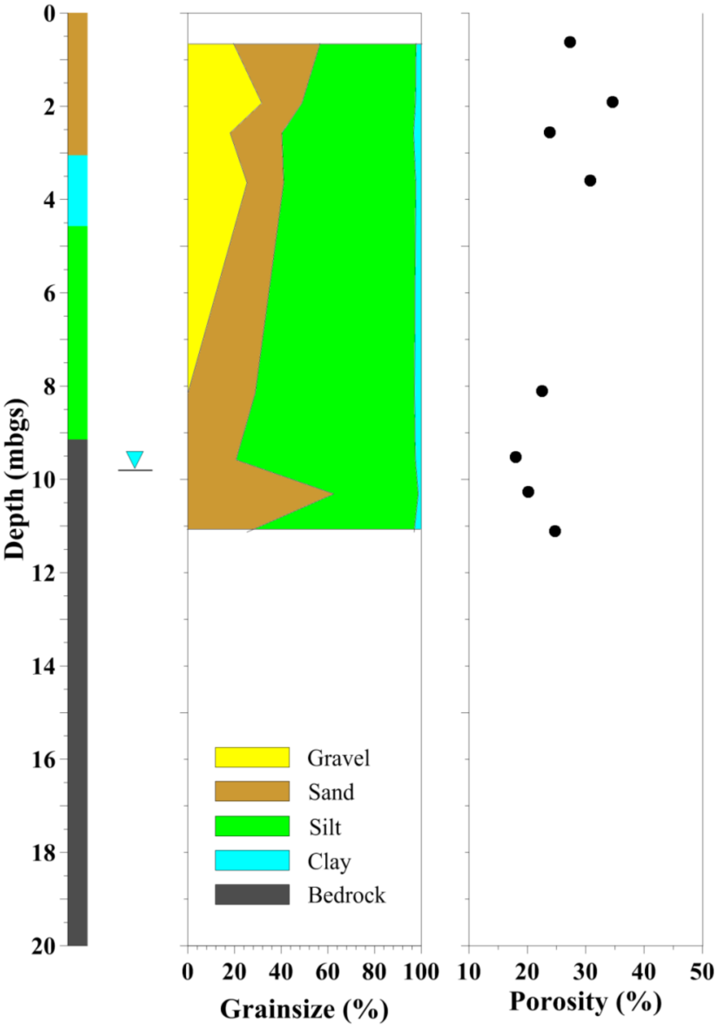


Figure A4. Porosity values of core samples collected from monitoring well 12-07a shown with the results of particle size analysis. The inverted triangle represents the average water level.

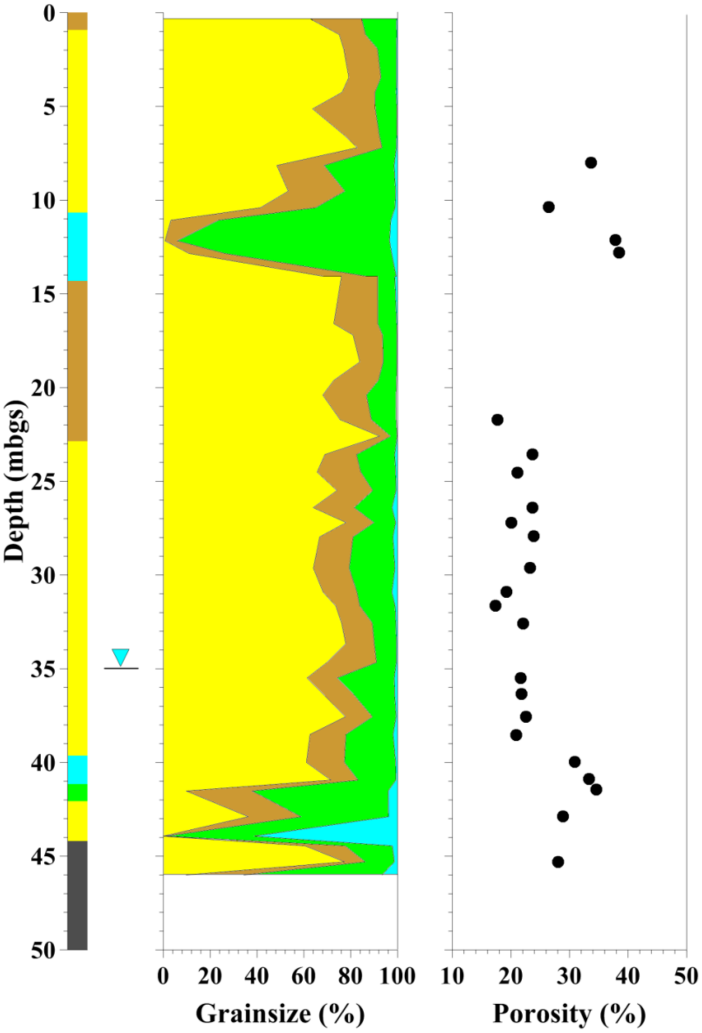


Figure A5.Porosity values of core samples collected from monitoring well 12-09b shown with the results of particle size analysis. The inverted triangle represents the average water level.

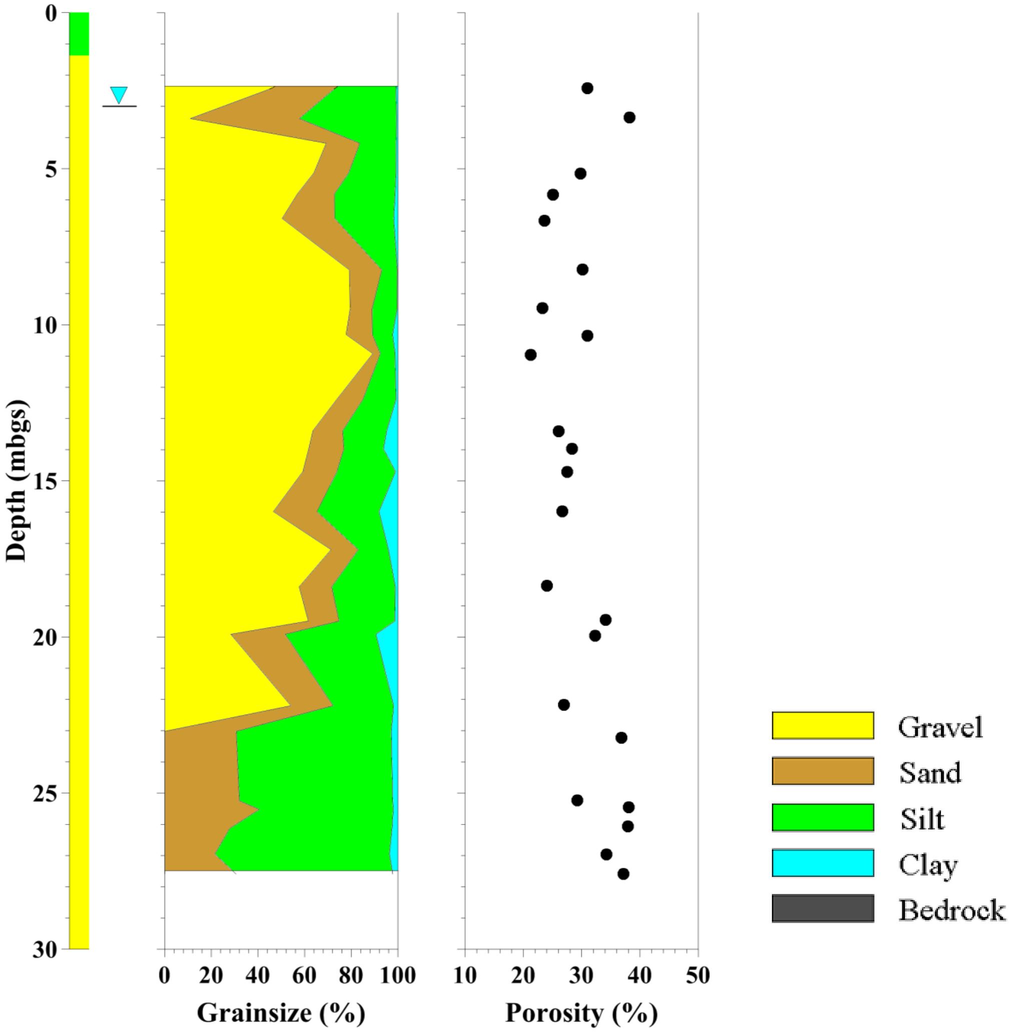


Figure A6. Porosity values of core samples collected from monitoring well 12-11 shown with the results of particle size analysis. The inverted triangle represents the average water level.

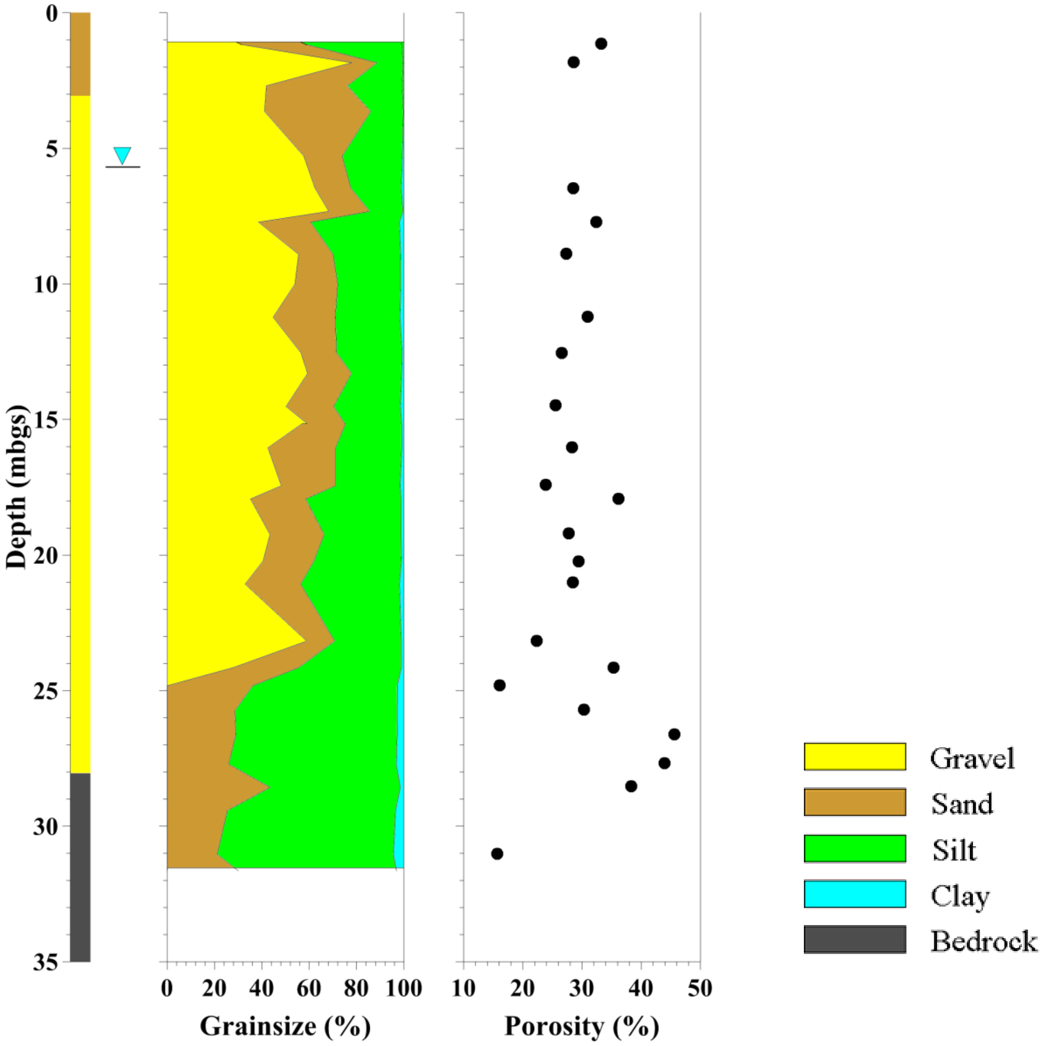


Figure A7. Porosity values of core samples collected from monitoring well 12-12 shown with the results of particle size analysis. The inverted triangle represents the average water level.

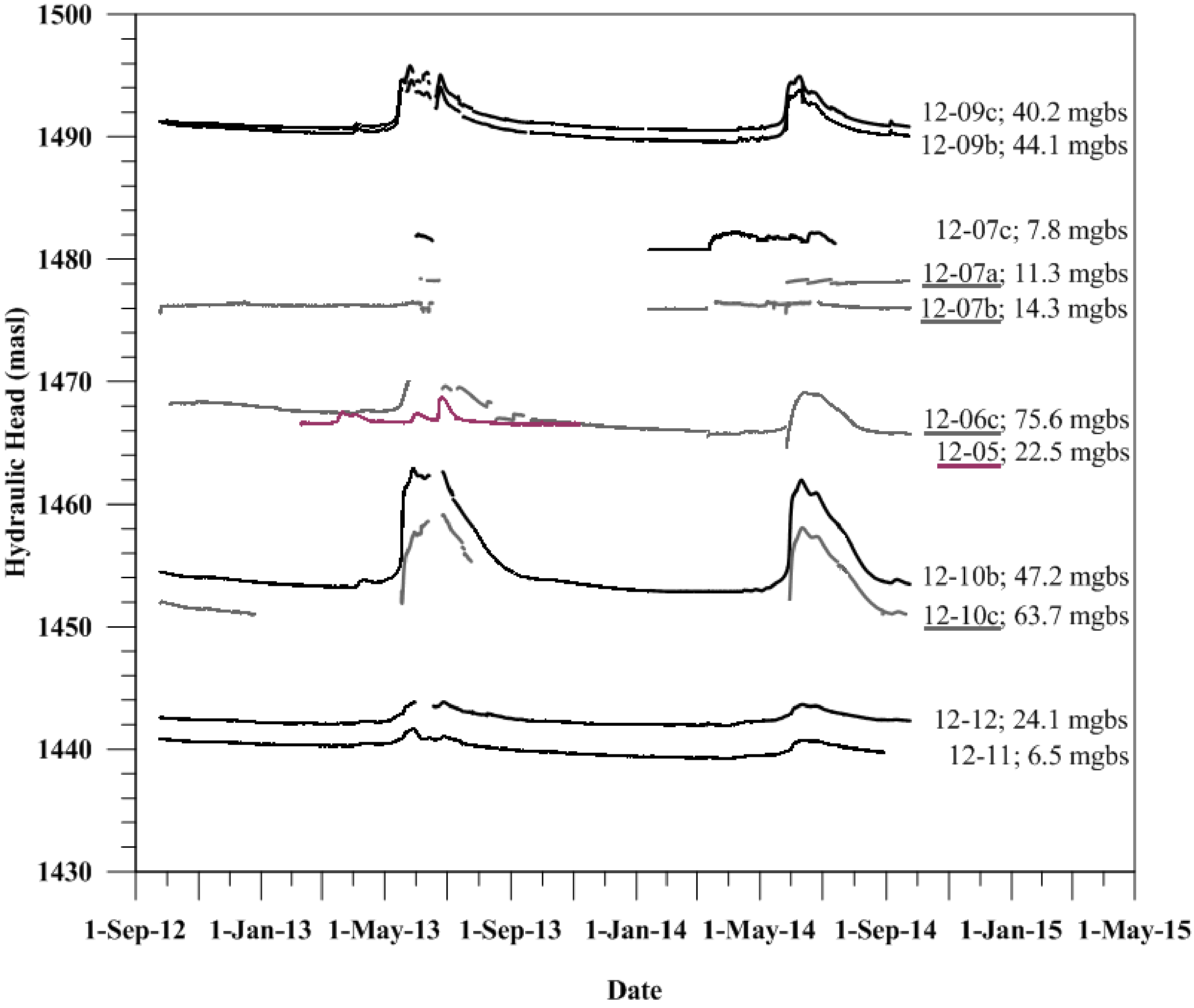


Figure A8. Hydraulic head hydrographs from monitoring wells that were not screened in perched aquifers in the overburden sediments (black), the bedrock formation (grey), and AWTF area (red). Next to the monitoring well label is the depth of the bottom of the screen intake zone.

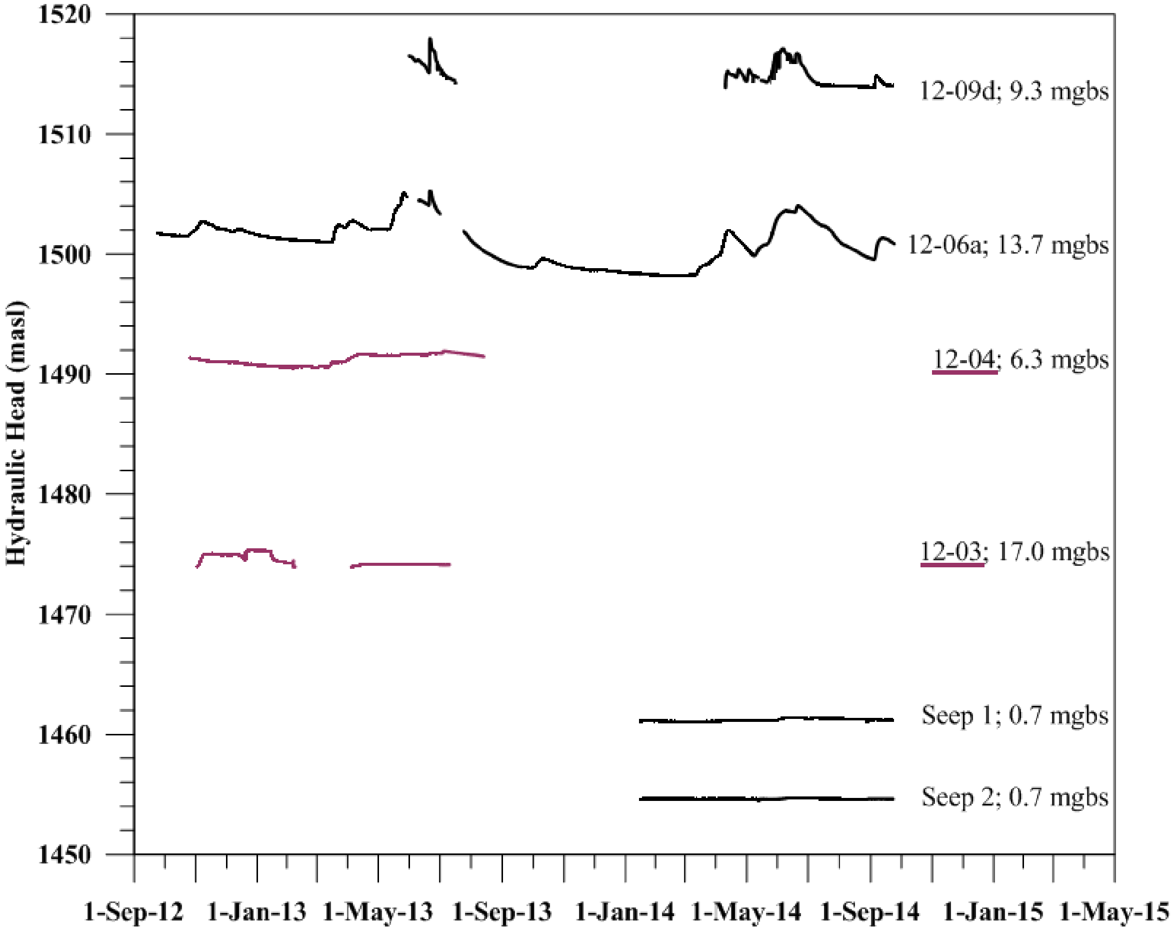


Figure A9. Hydraulic head hydrographs from monitoring wells in perched aquifers in the overburden sediments (black) and AWTF area (red). Next to the monitoring well label is the depth of the bottom of the screen intake zone.

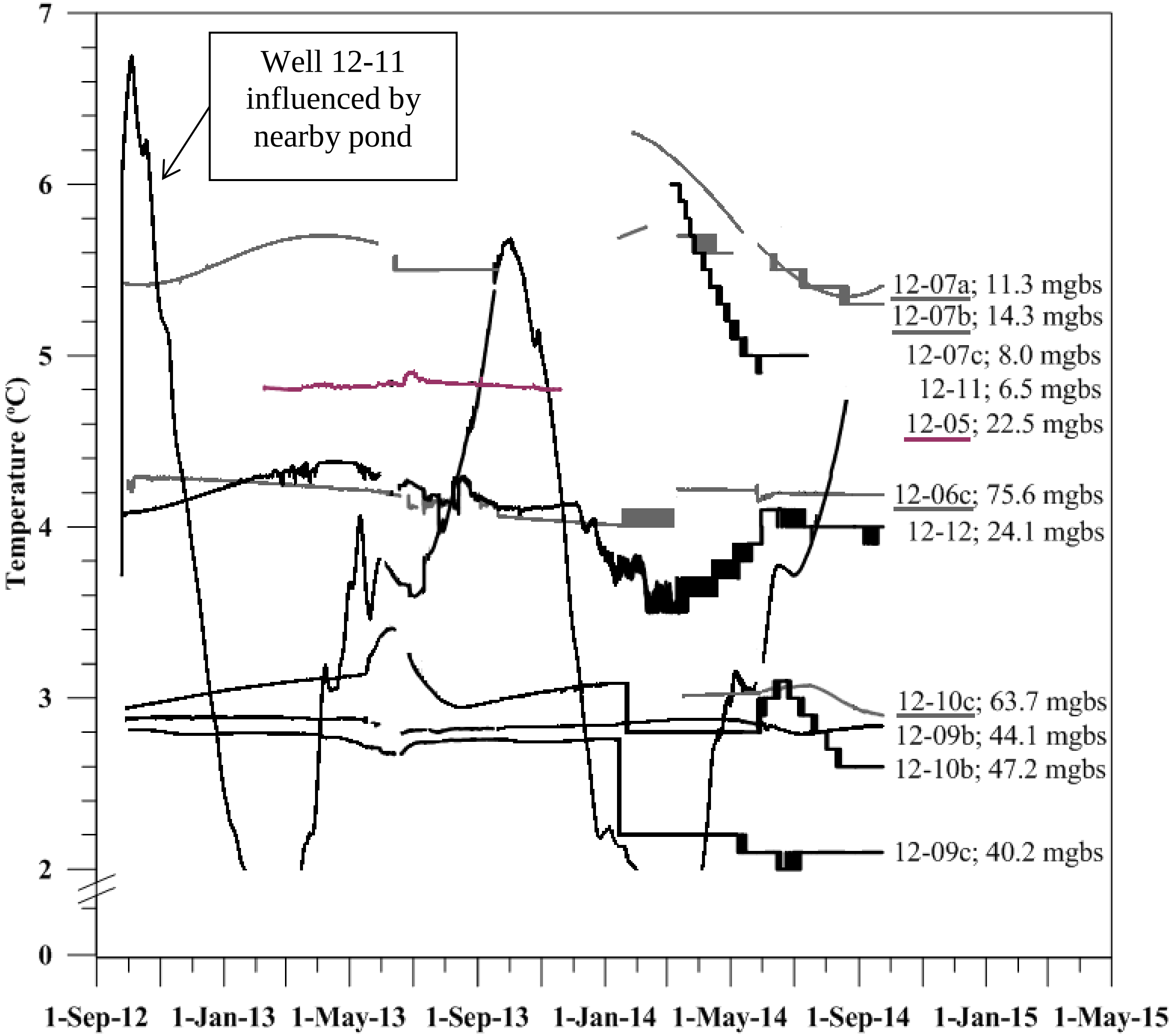


Figure A10. Groundwater temperature data (Solinst® 3001 Levelogger Edge and Solinst® 3001 LTC Levelogger Junior) from monitoring wells that were not screened in perched aquifers in the overburden sediments (black), the bedrock formation (grey), and AWTF area (red). Next to the monitoring well label is the depth of the bottom of the screen intake zone.

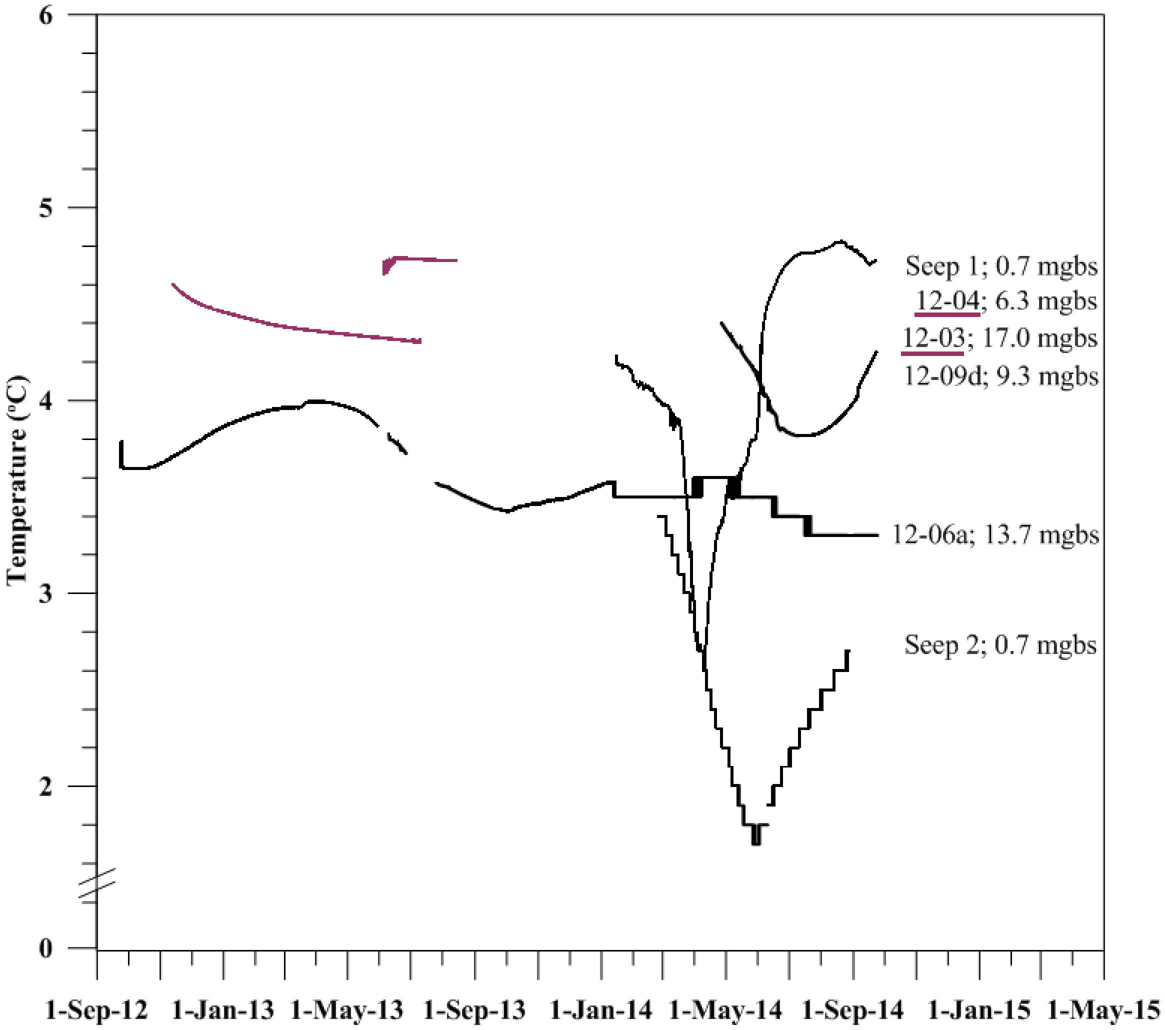
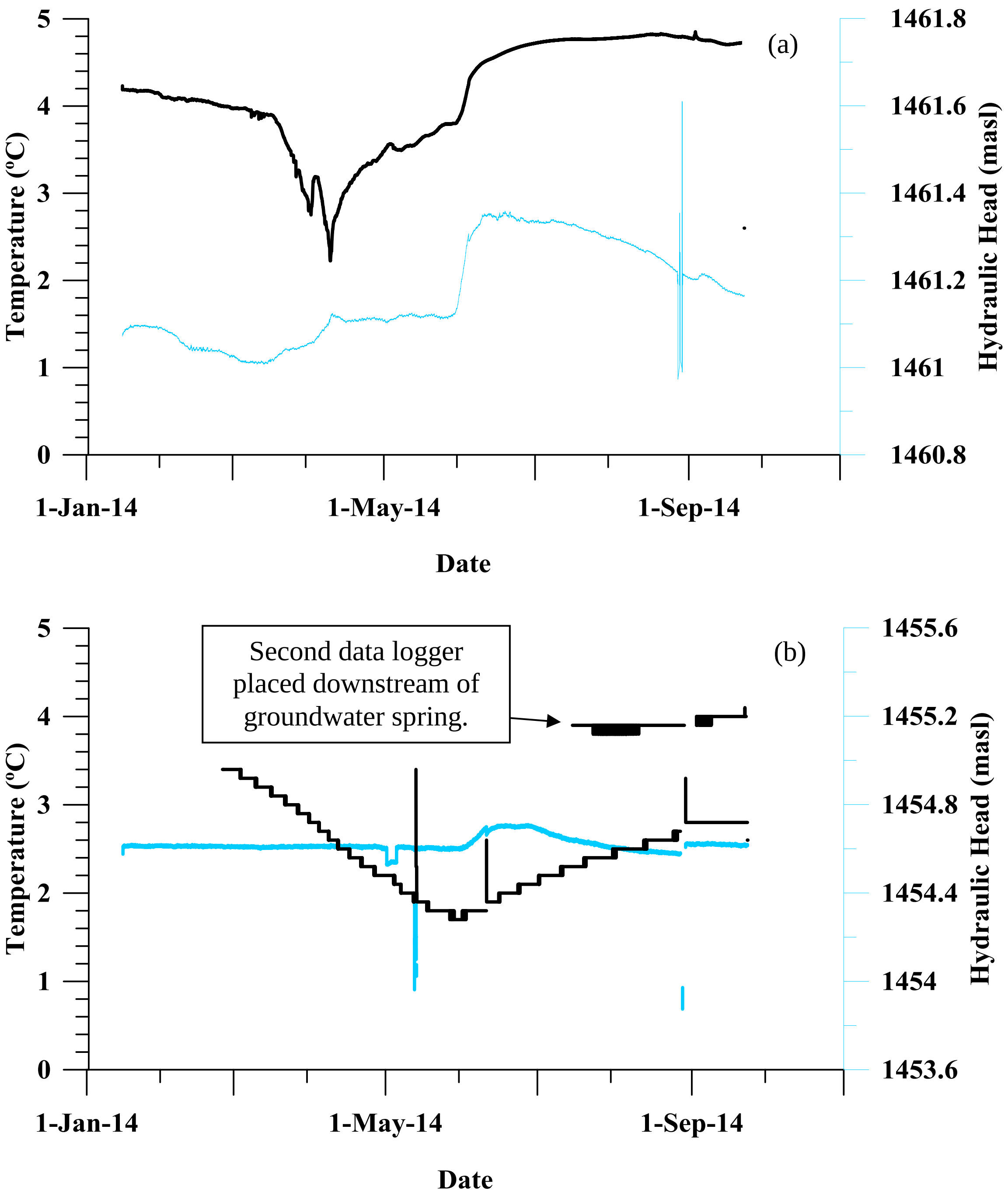


Figure A11. Groundwater temperature data (Solinst® 3001 Levelogger Edge and Solinst® 3001 LTC Levelogger Junior) from monitoring wells that were screened in perched aquifers in the overburden sediments (black) and AWTF area (red). Next to the monitoring well label is the depth of the bottom of the screen intake zone.



Second data logger placed downstream of groundwater spring.

Figure A12. Level logger data from drivepoint wells at (a) Seep 1 and (b) Seep 2

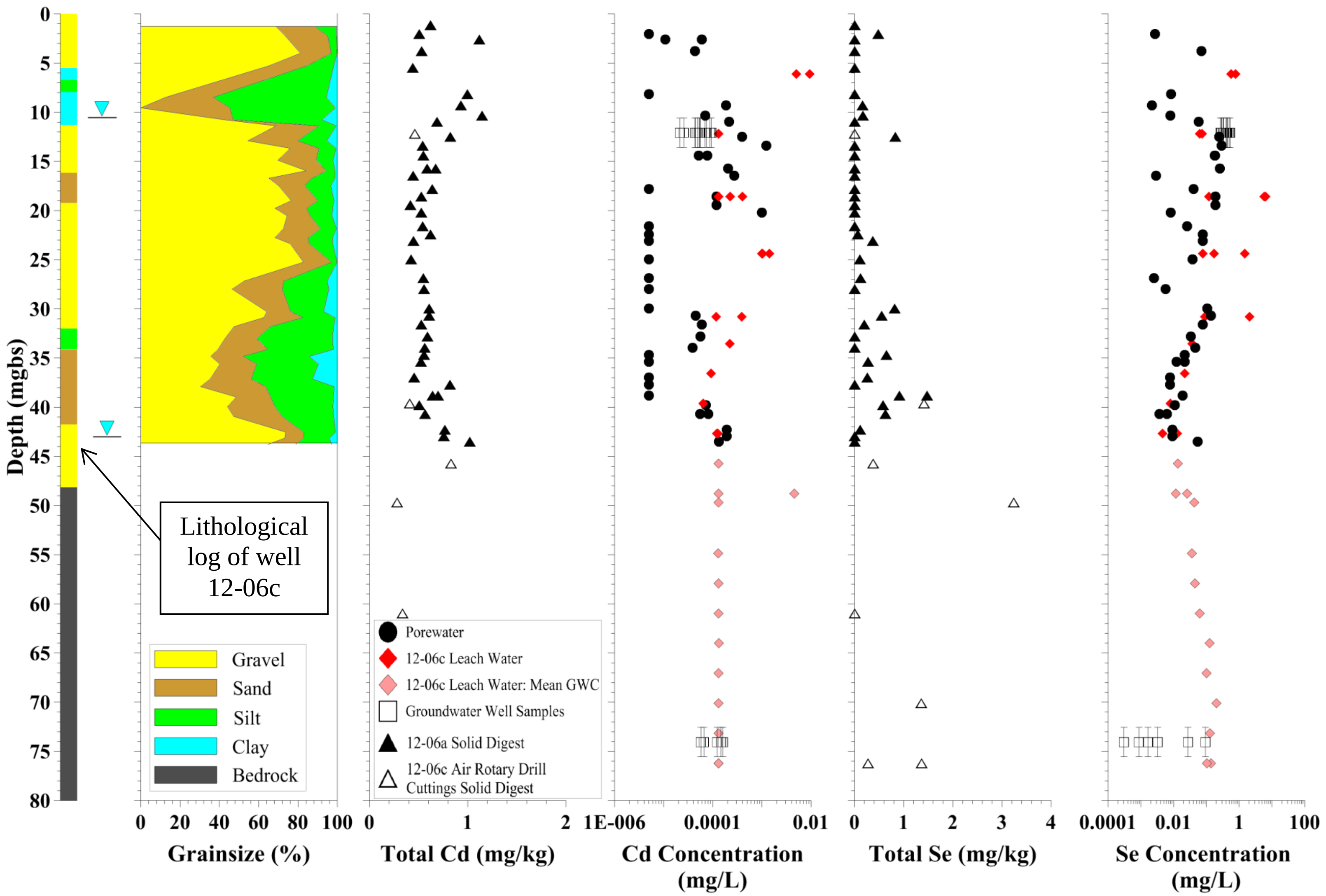


Figure A13. Vertical profile of Cd and Se concentration from solid digest and pore water analyses of core samples from well 12-06a and leached water concentrations from the drill cuttings at well 12-06c. Open squares represent groundwater samples from well 12-06a and 12-06c (T-bars represent screened interval of the well). The inverted triangles represent the average water levels.

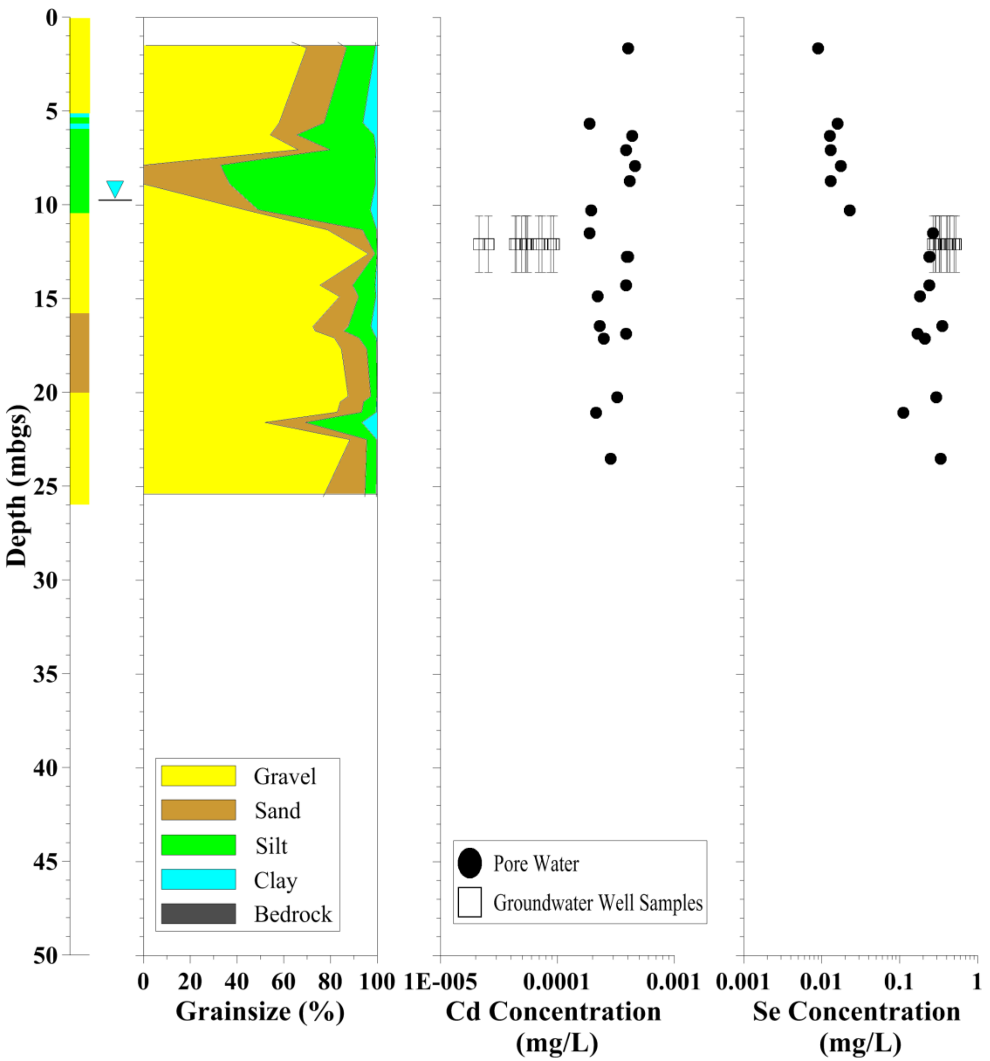


Figure A14. Vertical profile of Cd and Se concentration from solid digest and pore water analyses of core samples from well 12-06b. Open squares represent groundwater samples from well 12-06a (T-bars represent screened interval of the well). The inverted triangle represents the average water level.

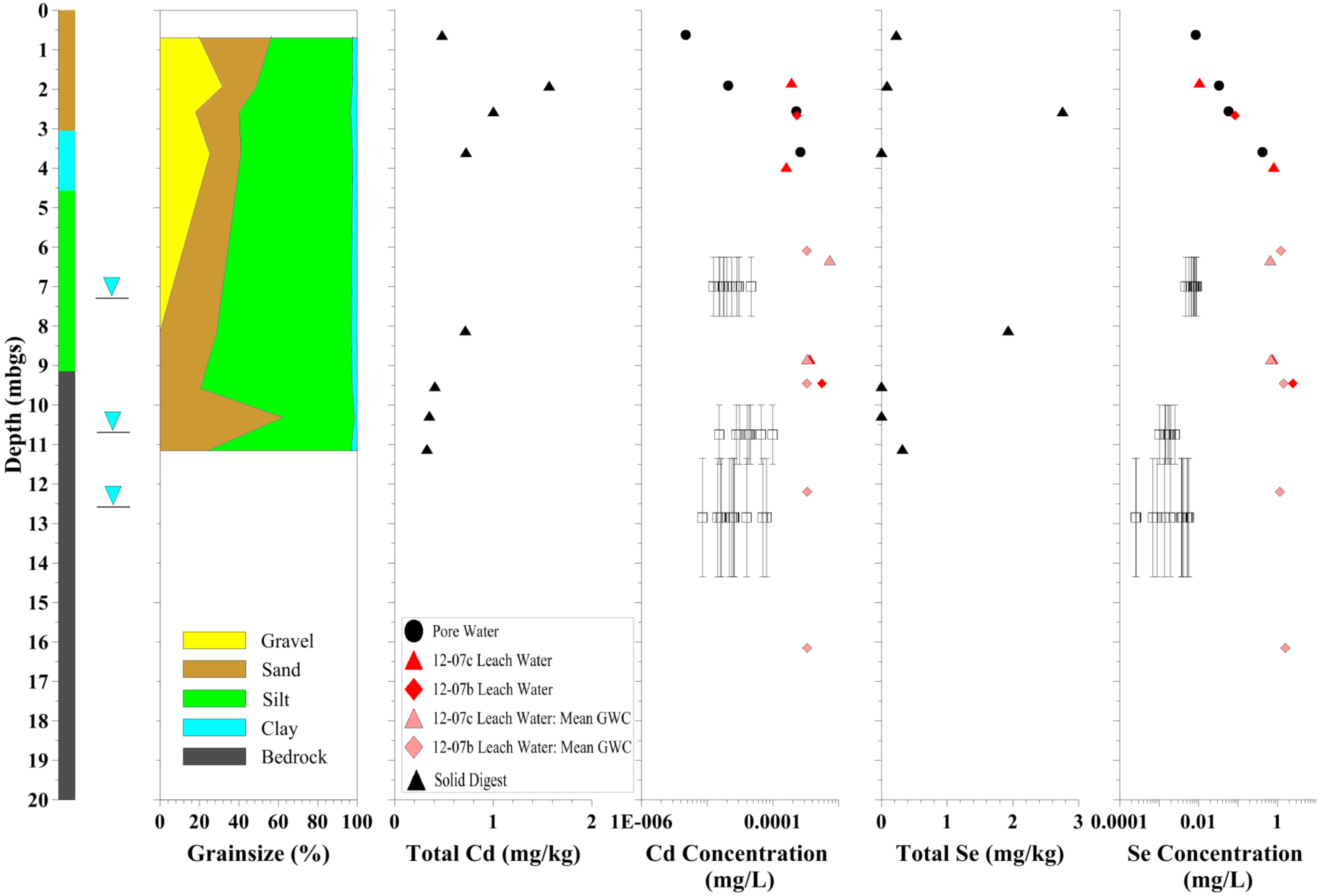


Figure A15. Vertical profile of Cd and Se concentration from solid digest and pore water analyses of core samples from well 12-07a,. and leached water concentrations from the drill cuttings at well 12-07b and 12-07c. Open squares represent groundwater samples from all three wells (T-bars represent screened interval of the well). The inverted triangles represent the average water levels.

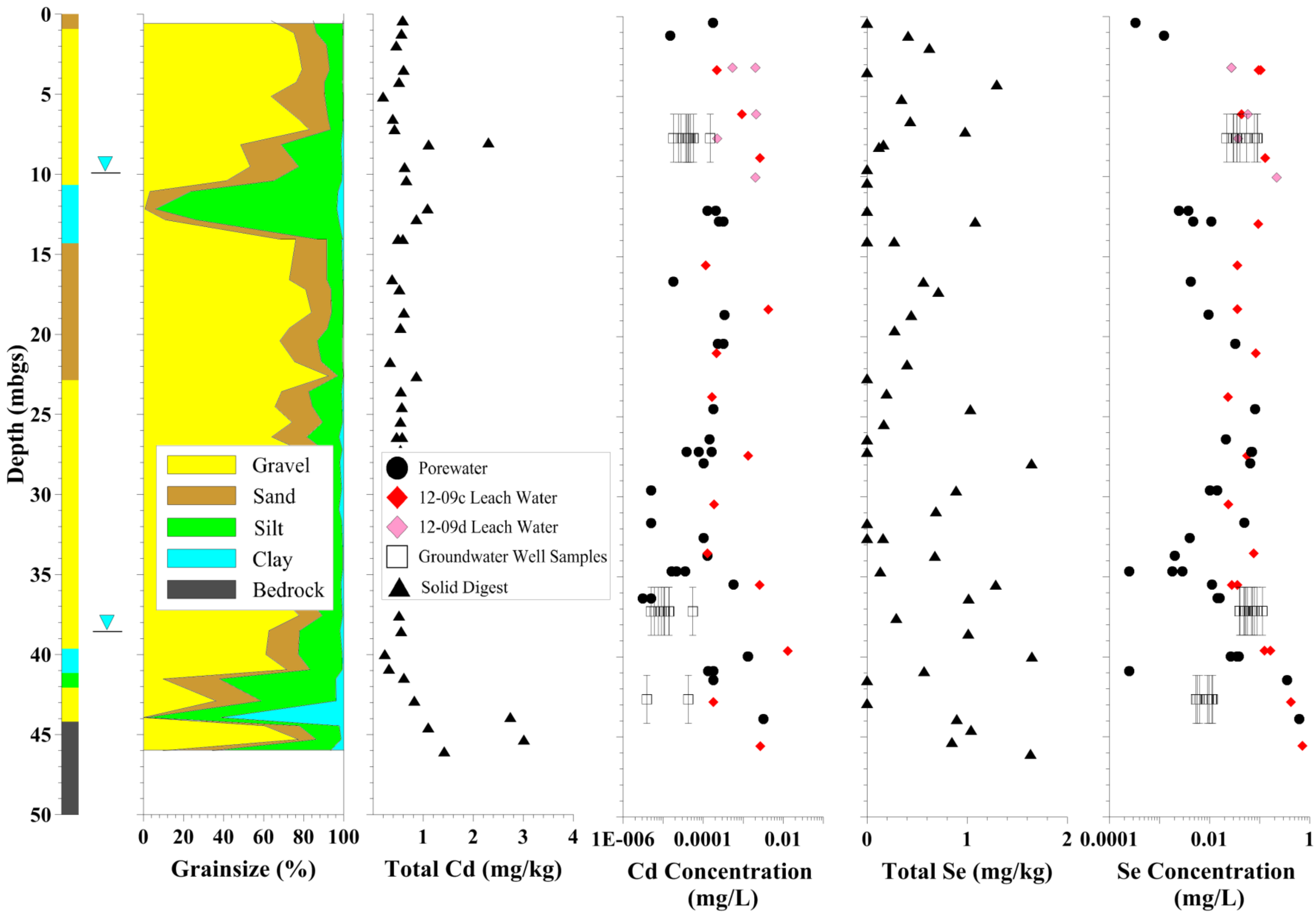


Figure A16. Vertical profile of Cd and Se concentration from solid digest and pore water analyses of core samples from well 12-09b, and leached water concentrations from the drill cuttings at well 12-09c, and 12-09d. Open squares represent groundwater samples from all three wells (T-bars represent screened interval of the well). The inverted triangles represent the average water levels.

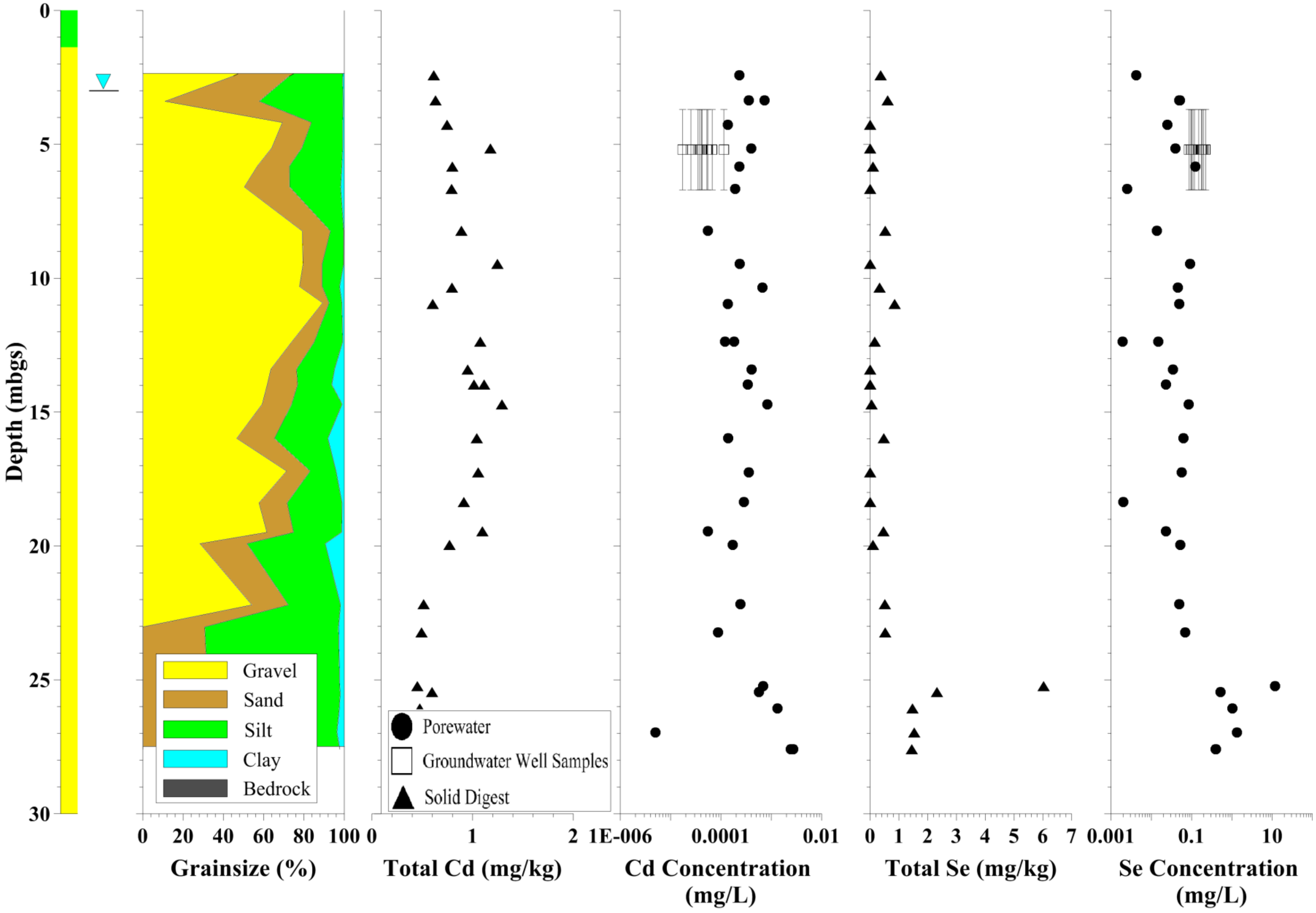


Figure A17. Vertical profile of Cd and Se concentration from solid digest and pore water analyses of core samples from well 12-11. Open squares represent groundwater samples (T-bars represent screened interval of the well). The inverted triangle represents the average water level.

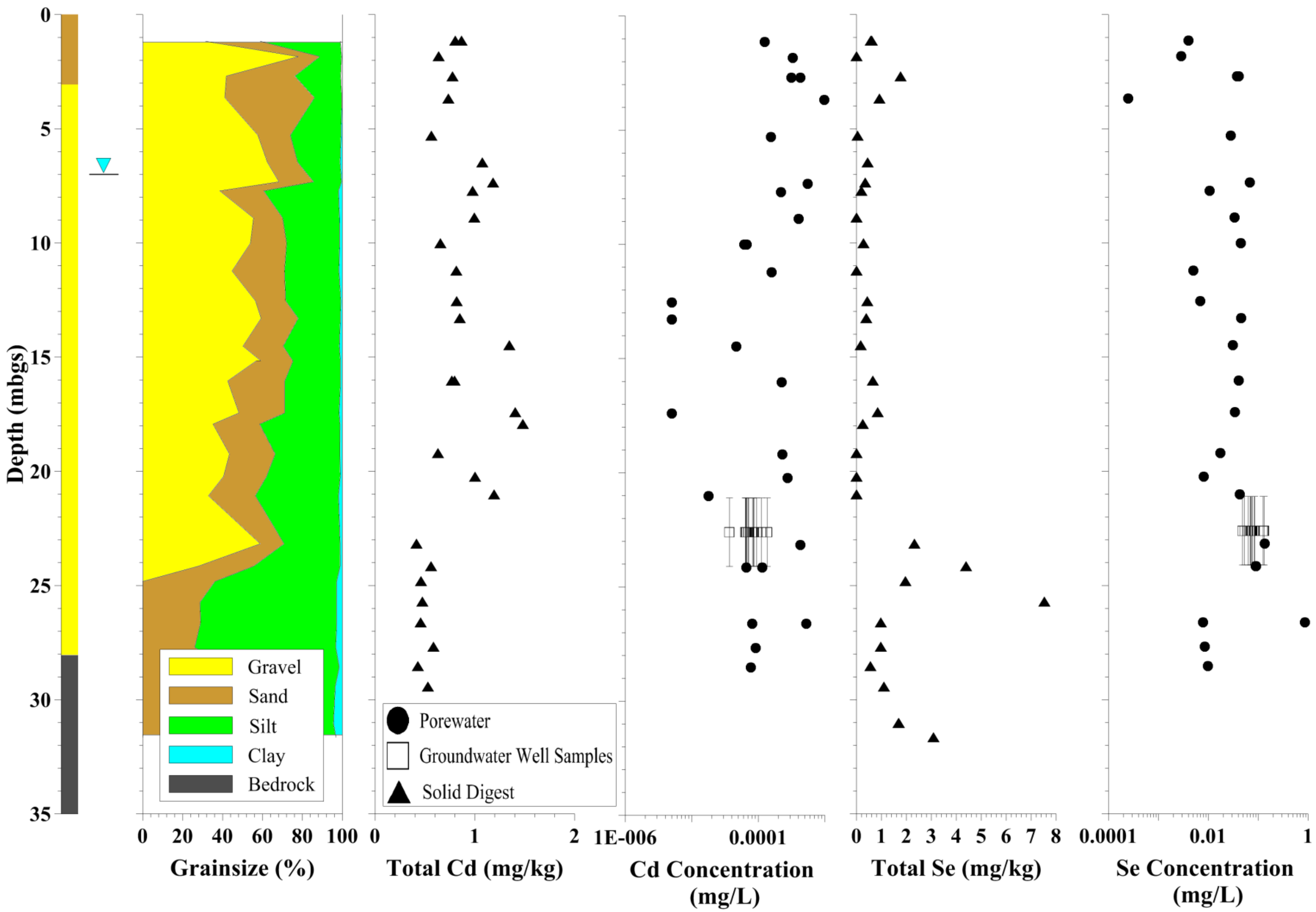


Figure A18. Vertical profile of Cd and Se concentration from solid digest and pore water analyses of core samples from well 12-12. Open squares represent groundwater samples (T-bars represent screened interval of the well). The inverted triangle represents the average water level.

APPENDIX B

ADDITIONAL HYDRAULIC TESTING

Hydraulic testing was also performed in two monitoring wells where the water level was within the screened interval of the well (Table B1). In these instance during analysis saturated screen lengths where used in place of the total physical screen length. The Bouwer-Rice method for estimating *K* is deemed appropriate for this analysis however larger errors of *K* may occur (Stanford et al., 2000). According to Bouwer (1989) a double straight line effect may be visible in the semi-log plot of normalized water level displacement (y_t) vs time (t), indicative of the filter pack material draining more rapidly than the formation (data not presented). At well 12-07c a concave upward trend was observed in all *K*-tests for the graph of log y_t vs time. In this instance the steep second segment was analyzed for the *K*, which was proposed to be more representative of the formation.

Table B1. Summary of *K* values from monitoring wells with partially submerged submerged well screens.

Borehole	**K_{min} (m/s)**	**K_{max} (m/s)**	**K_{mean} (m/s)**	**Geology**	**Comments**
LCO-WLC-12-07c	2.1×10^{-7}	9.2×10^{-7}	5.9×10^{-7}	Overburden	
LCO-WLC-12-09d	6.8×10^{-8}	8.6×10^{-8}	7.4×10^{-8}	Overburden	
LCO-WLC-12-06b	-	-	-	Overburden	insufficient water for hydraulic testing
LCO-WLC-12-07a	-	-	-	Bedrock	insufficient water for hydraulic testing
LCO-WLC-12-07b	-	-	-	Bedrock	insufficient water for hydraulic testing

APPENDIX C

GROUNDWATER SPRING SAMPLING

The Seep 2 location was also chosen to represent groundwater discharge from perched aquifers because of the intermittent period of high mineralization attributed to a plume of waste rock effluent. Concentrations of SO_4^{2-} at Seep 2 where found to be at ~40 mg/L throughout the year but were elevated during the summer. Frequent sampling of this groundwater spring using an ISCO® autosampler was conducted to record a breakthrough curve of the plume containing CIs (Figure C1). The breakthrough of CIs was shown to occur simultaneously for conservative elements (SO_4^{2-}, NO_3^-, Se) and the breakthrough of CIs was also uncharacteristically well defined. This may have suggested that the CIs at this location were sourced from a subsurface store of water that was expelled with the onset of spring freshet. Concentrations of CIs in the plume at Seep 2 were comparable to other groundwater springs discharging the perched aquifers, although the concentrations of CIs did increase slightly with increasing proximity to the waste rock dump. Shown in Figure C2 are time-series of SO_4^{2-} concentration discharging from the rock drain (underground drainage culvert; see Section 5.6.1), the basal alluvial aquifer (Line Creek seepage zone; see Section 5.6.5.4), and the perched aquifers (Seep 2; see Section 5.2.3.2).

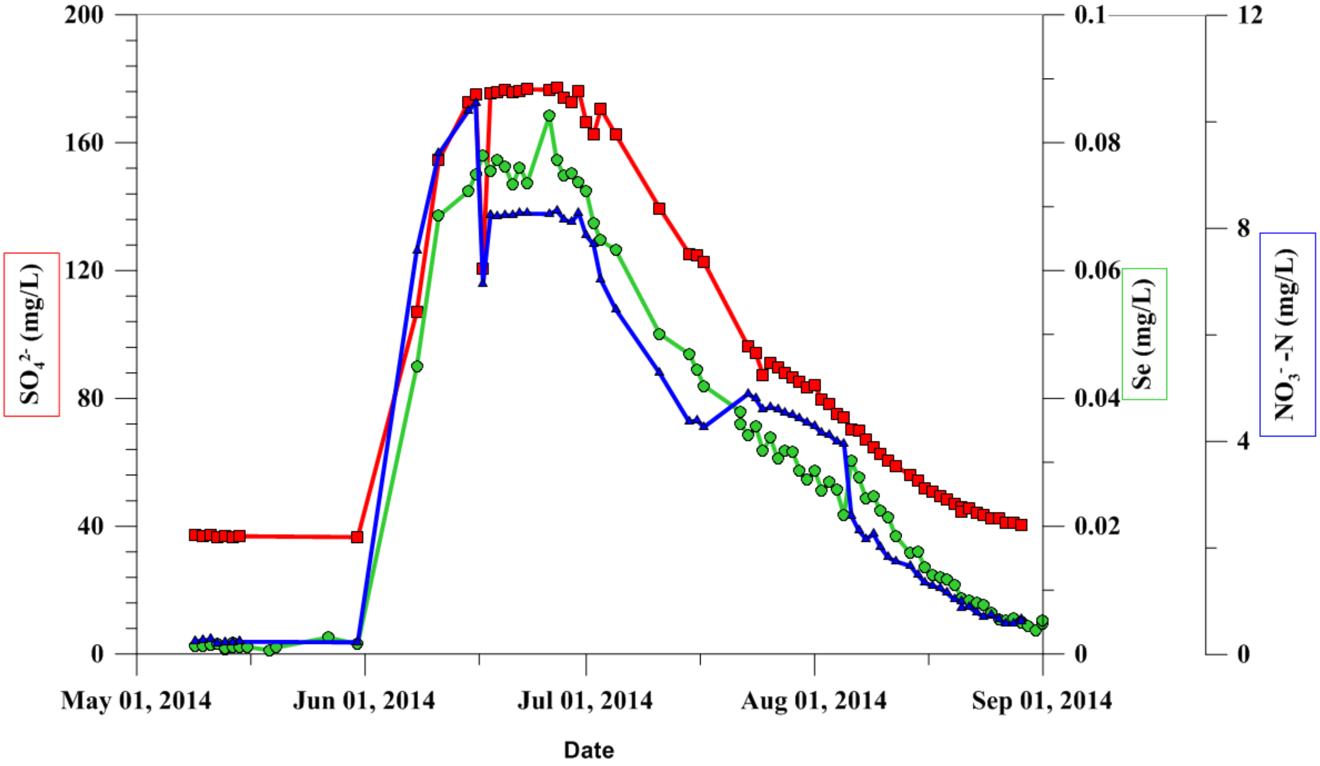


Figure C1. Concentration of SO_4^{2-} in groundwater at Seep 2 sampled using an ISCO autosampler recording the breakthrough curve of waste rock effluent.

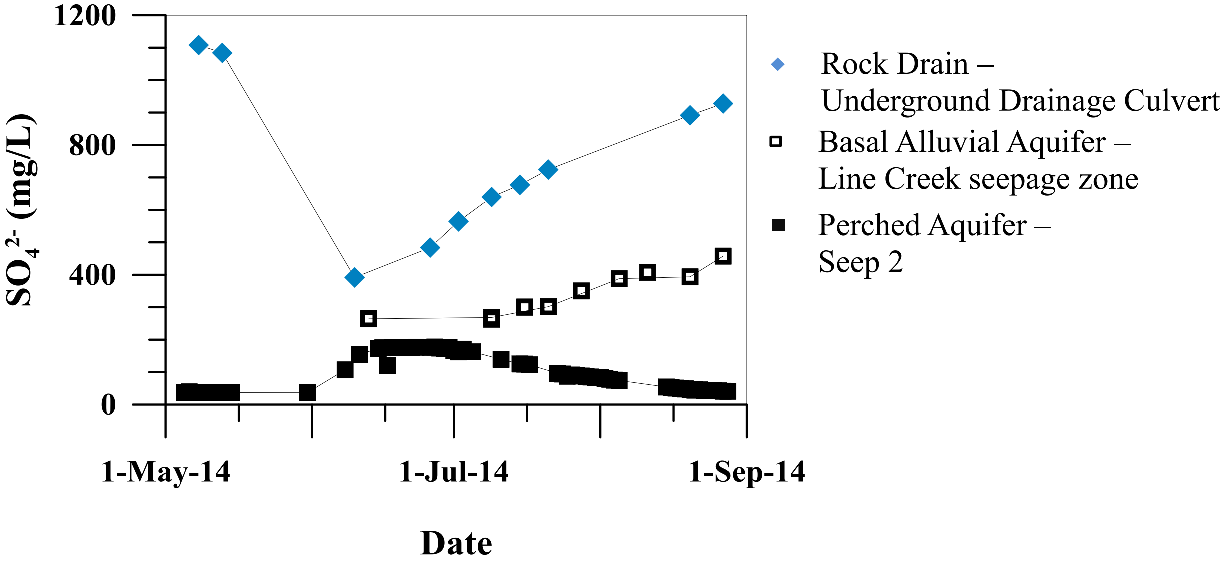


Figure C2. Groundwater concentrations of SO_4^{2-} at two groundwater discharge locations (Line Creek seepage zone and Seep 2) and the rock drain vs time.

APPENDIX D

RAW DATA

D1. Geotechnical Data

Hole ID	Sample Number	Depth (mbgs)	Depth Error (m)	Tray (g)	Wet Core (g)	Wax Core air (g)	Wax Core Water (g)	Wet Core After Wax (g)	Wt of Wax (g)	Dry Core (g)	Wt Water (g)	GWC (%)	Wet Density (kg/m3)	Dry Density (kg/m3)	Particle Density (kg/m3), estimated	Porosity (%)
12-06a	30000 A	1.14	0.08	1.44	47.47					45.86	1.61	3.62			2700	
12-06a	30000 B	1.14	0.08	1.46	53.41					51.52	1.89	3.78			2700	
12-06a	30001 A	2.06	0.08	1.44	50.39					48.28	2.11	4.50			2700	
12-06a	30001 B	2.06	0.08	1.51	61.59					58.71	2.88	5.03			2700	
12-06a	30002 A	2.60	0.09	1.46	55.83					48.57	7.26	15.41			2700	
12-06a	30002 B	2.60	0.09	1.46	55.18					48.21	6.97	14.91			2700	
12-06a	30003 A	3.79	0.11	1.43	70.33					64.69	5.64	8.92			2700	
12-06a	30003 B	3.79	0.11	1.47	72.66					67.47	5.19	7.86			2700	
12-06a	30004 A	5.49	0.15	1.43	45.67					44.18	1.49	3.49			2700	
12-06a	30004 B	5.49	0.15	1.45	54.64					52.72	1.92	3.74			2700	
12-06a	30005 A	10.36	0.30	1.45	73.79					62.61	11.18	18.28			2700	
12-06a	30005 B	10.36	0.30	1.44	62.05					53.52	8.53	16.38			2700	
12-06a	30006 A	8.15	0.23	1.44	40.00	43.81	19.39	39.09	3.81	32.84	6.25	19.90	1960.61	1635.15	2700	39.44
12-06a	30006 B	8.15	0.23	1.44	56.67	61.48	27.84	55.10	4.81	46.26	8.84	19.72	1969.18	1644.78	2700	39.08
12-06a	30007 A	9.30	0.15	1.45	41.92	45.30	19.34	40.64	3.38	32.95	7.69	24.41	1848.66	1485.91	2700	44.97
12-06a	30007 B	9.30	0.15	1.45	40.24	43.84	19.30	38.91	3.60	32.26	6.65	21.58	1916.30	1576.12	2700	41.63
12-06a	30008 A	10.97	0.30	1.43	51.38					47.51	3.87	8.40			2700	
12-06a	30008 B	10.97	0.30	1.45	63.20					56.50	6.70	12.17			2700	
12-06a	30009 A	12.50	0.30	1.45	66.50					59.57	6.93	11.92			2700	
12-06a	30009 B	12.50	0.30	1.45	82.58					74.48	8.10	11.09			2700	
12-06a	30010 A	13.41	0.15	1.45	63.39					58.75	4.64	8.10			2700	
12-06a	30010 B	13.41	0.15	1.47	64.89					60.48	4.41	7.47			2700	
12-06a	30011 A	14.40	0.38	1.43	71.24					66.72	4.52	6.92			2700	
12-06a	30011 B	14.40	0.38	1.45	61.92					57.85	4.07	7.22			2700	

12-06a	30012 A	15.74	0.11	1.43	67.75					63.60	4.15	6.68			2700	
12-06a	30012 B	15.74	0.11	1.46	69.60					65.65	3.95	6.15			2700	
12-06a	30013 A	16.46	0.15	1.47	54.09					51.40	2.69	5.39			2700	
12-06a	30013 B	16.46	0.15	1.47	48.64					46.05	2.59	5.81			2700	
12-06a	30014 A	17.82	0.17	1.48	55.59					51.51	4.08	8.16			2700	
12-06a	30014 B	17.82	0.17	1.46	52.24					48.07	4.17	8.95			2700	
12-06a	30015 A	18.59	0.30	1.47	58.18					54.60	3.58	6.74			2700	
12-06a	30015 B	18.59	0.30	1.48	60.04					56.07	3.97	7.27			2700	
12-06a	30016 A	19.43	0.23	1.44	46.82					44.93	1.89	4.35			2700	
12-06a	30016 B	19.43	0.23	1.45	45.47					43.65	1.82	4.31			2700	
12-06a	30017 A	20.19	0.23	1.45	65.86					61.02	4.84	8.12			2700	
12-06a	30017 B	20.19	0.23	1.44	64.31					59.59	4.72	8.12			2700	
12-06a	30018 A	21.61	0.12	1.45	53.27					50.40	2.87	5.86			2700	
12-06a	30018 B	21.61	0.12	1.46	58.01					54.78	3.23	6.06			2700	
12-06a	30019 A	22.45	0.20	1.44	45.33					43.01	2.32	5.58			2700	
12-06a	30019 B	22.45	0.20	1.44	46.12					43.66	2.46	5.83			2700	
12-06a	30020 A	23.10	0.15	1.44	69.27					64.81	4.46	7.04			2700	
12-06a	30020 B	23.10	0.15	1.46	76.94					72.77	4.17	5.85			2700	
12-06a	30021 A	24.96	0.18	1.45	43.42					41.49	1.93	4.82			2700	
12-06a	30021 B	24.96	0.18	1.45	42.83					40.66	2.17	5.53			2700	
12-06a	30022A	26.87	0.20	1.44	51.58	56.91	27.02	50.47	5.33	45.45	6.13	13.93	2136.62	1875.40	2700	30.54
12-06a	30023A	27.98	0.06	1.43	62.86	66.65	33.57	62.45	3.79	56.10	6.76	12.37	2181.95	1941.84	2700	28.08
12-06a	30024A	29.98	0.20	1.44	45.66	49.77	22.96	44.85	4.11	39.77	5.89	15.37	2040.98	1769.13	2700	34.48
12-06a	30025A	30.71	0.08	1.47	37.12					33.05	4.07	12.89			2700	
12-06a	30026A	31.59	0.11	1.44	41.26					36.53	4.73	13.48			2700	
12-06a	30027A	32.81	0.11	1.43	62.80	68.06	31.74	61.47	5.26	54.69	8.11	15.23	2040.04	1770.45	2700	34.43
12-06a	30028A	33.97	0.05	1.42	63.44	68.40	33.11	61.82	4.96	55.57	7.87	14.53	2098.82	1832.49	2700	32.13
12-06a	30029A	34.67	0.05	1.43	105.21	112.06	56.12	102.82	6.85	92.53	12.68	13.92	2147.40	1885.03	2700	30.18
12-06a	30030A	35.39	0.11	1.43	46.86	51.08	22.51	43.97	4.22	38.98	7.88	20.99	1862.72	1539.62	2700	42.98
12-06a	30031A	36.97	0.06	1.43	106.39	113.31	56.52	101.61	6.92	91.37	15.02	16.70	2088.64	1789.75	2700	33.71
12-06a	30032A	37.72	0.08	1.44	58.43	64.02	30.36	57.20	5.59	51.41	7.02	14.05	2111.98	1851.83	2700	31.41

12-06a	30033A	38.82	0.04	1.43	42.08	45.50	21.00	40.23	3.42	36.52	5.56	15.84	1964.69	1695.97	2700	37.19
12-06a	30034A	39.78	0.06	1.44	44.03	48.33	21.23	40.39	4.30	35.92	8.11	23.52	1832.48	1483.54	2700	45.05
12-06a	30035A	40.71	0.14	1.42	53.15					47.02	6.13	13.44			2700	
12-06a	30036A	42.28	0.15	1.45	50.99					45.51	5.48	12.44			2700	
12-06a	30037A	42.96	0.08	1.44	48.04					43.31	4.73	11.30			2700	
12-06a	30038A	43.49	0.18	1.43	49.66					44.21	5.45	12.74			2700	
12-06b	30039A	1.37	0.15	1.45	44.43					42.82	1.61	3.89			2700	
12-06b	30040A	1.65	0.12	1.45	61.29					56.33	4.96	9.04			2700	
12-06b	30041A	5.67	0.12	1.42	63.08	65.87	34.23	62.78	2.79	56.59	6.19	11.22	2213.86	1990.53	2700	26.28
12-06b	30042A	6.31	0.15	1.46	66.05	69.38	34.27	65.32	3.33	56.36	8.96	16.32	2094.10	1800.29	2700	33.32
12-06b	30043A	7.07	0.12	1.48	86.79	91.94	43.97	84.87	5.15	71.63	13.24	18.87	2025.00	1703.48	2700	36.91
12-06b	30044A	7.92	0.15	1.44	54.93	58.60	27.39	53.56	3.67	45.28	8.28	18.89	1991.64	1675.24	2700	37.95
12-06b	30045A	8.73	0.11	1.44	76.42	79.97	38.83	75.41	3.55	63.75	11.66	18.71	2040.12	1718.53	2700	36.35
12-06b	30046A	10.29	0.14	1.45	60.39	63.64	31.56	60.10	3.25	52.33	7.77	15.27	2126.95	1845.17	2700	31.66
12-06b	30047A	11.49	0.27	1.48	45.87	49.89	24.83	40.73	4.02	37.54	3.19	8.85	2003.39	1840.56	2700	31.83
12-06b	30048A	12.76	0.11	1.47	47.69					44.99	2.70	6.20			2700	
12-06b	30049A	14.28	0.11	1.45	63.40					59.26	4.14	7.16			2700	
12-06b	30050A	14.86	0.08	1.46	42.06					39.52	2.54	6.67			2700	
12-06b	30051A	16.44	0.08	1.47	48.38					46.09	2.29	5.13			2700	
12-06b	30052A	17.13	0.15	1.45	52.91					49.07	3.84	8.06			2700	
12-06b	30053A	16.87	0.26	1.46	47.77					45.33	2.44	5.56			2700	
12-06b	30054A	17.68	0.09	1.44	53.33					50.76	2.57	5.21			2700	
12-06b	30055A	20.25	0.17	1.49	65.34					60.98	4.36	7.33			2700	
12-06b	30056A	21.06	0.12	1.45	51.58					47.86	3.72	8.02			2700	
12-06b	30057A	22.56	0.15	1.47	33.24					32.06	1.18	3.86			2700	
12-06b	30058A	24.77	0.23	1.43	34.79					33.67	1.12	3.47			2700	
12-06b	30059A	23.53	0.09	1.48	52.78					50.25	2.53	5.19			2700	
12-06b	30060A	25.53	0.08	1.47	46.79					44.39	2.40	5.59			2700	
12-07a	30326A	0.62	0.08	1.46	45.72	48.86	24.11	45.18	3.14	41.46	3.72	9.30	2145.72	1963.15	2700	27.29

12-07a	30327A	1.91	0.08	1.45	31.47	33.53	15.74	31.30	2.06	27.33	3.97	15.34	2036.90	1766.00	2700	34.59
12-07a	30328A	2.56	0.09	1.44	37.65	40.14	20.30	37.02	2.49	34.86	2.16	6.46	2189.16	2056.26	2700	23.84
12-07a	30329A	3.60	0.06	1.43	50.64	55.07	26.22	48.27	4.43	44.28	3.99	9.31	2042.03	1868.08	2700	30.81
12-07a	30330A	8.11	0.06	1.44	23.00	24.81	12.25	22.74	1.81	21.88	0.86	4.21	2180.13	2092.10	2700	22.51
12-07a	30331A	9.53	0.05	1.45	46.76	50.37	25.74	46.33	3.61	45.16	1.17	2.68	2272.98	2213.72	2700	18.01
12-07a	30332A	10.27	0.06	1.45	26.06	28.13	14.09	25.62	2.07	25.04	0.58	2.46	2207.73	2154.75	2700	20.19
12-07a	30333A	11.11	0.08	1.46	15.92	17.58	8.18	15.47	1.66	15.16	0.31	2.26	2077.33	2031.36	2700	24.76
12-09b	30229A	0.40	0.09	1.43	44.16					41.05	3.11	7.85			2700	
12-09b	30230A	1.20	0.14	1.46	55.69					50.95	4.74	9.58			2700	
12-09b	30231A	1.95	0.12	1.45	51.07					49.20	1.87	3.92			2700	
12-09b	30232A	3.47	0.12	1.42	61.32					58.91	2.41	4.19			2700	
12-09b	30233A	4.24	0.09	1.43	49.69					47.58	2.11	4.57			2700	
12-09b	30234A	5.15	0.12	1.40	53.47					52.57	0.90	1.76			2700	
12-09b	30235A	6.54	0.08	1.43	49.47					47.86	1.61	3.46			2700	
12-09b	30236A	7.18	0.08	1.41	60.13					57.83	2.30	4.08			2700	
12-09b	30237A	8.14	0.09	1.43	42.06					40.65	1.41	3.60			2700	
12-09b	30238A	9.54	0.12	1.42	47.96					47.01	0.95	2.08			2700	
12-09b	30239A	10.38	0.08	1.44	34.45	37.77	18.38	32.79	3.32	30.83	1.96	6.67	2117.65	1985.26	2700	26.47
12-09b	30240A	8.00	0.08	1.40	40.26	42.70	20.60	39.85	2.44	34.61	5.24	15.78	2072.35	1789.93	2700	33.71
12-09b	30241A	12.13	0.06	1.41	42.64	45.94	21.02	42.31	3.30	35.55	6.76	19.80	2011.16	1678.75	2700	37.82
12-09b	30242A	12.80	0.06	1.40	34.58	36.86	16.92	34.32	2.28	28.91	5.41	19.67	1988.68	1661.87	2700	38.45
12-09b	30243A	14.04	0.08	1.45	71.44					65.63	5.81	9.05			2700	
12-09b	30244A	14.04	0.08												2700	
12-09b	30245A	16.57	0.08	1.45	67.83					63.39	4.44	7.17			2700	
12-09b	30246A	17.19	0.09	1.44	58.87					54.66	4.21	7.91			2700	
12-09b	30247A	18.64	0.11	1.43	73.81					69.88	3.93	5.74			2700	
12-09b	30248A	19.60	0.09	1.44	70.59					66.88	3.71	5.67			2700	
12-09b	30249A	20.45	0.15	1.43	61.39					58.13	3.26	5.75			2700	
12-09b	30250A	21.72	0.11	1.44	47.22	50.41	26.59	46.43	3.19	44.65	1.78	4.12	2313.74	2222.20	2700	17.70
12-09b	30251A	22.60	0.11	1.44	49.76					47.38	2.38	5.18			2700	

12-09b	30252A	23.56	0.09	1.47	39.22	42.68	21.09	38.09	3.46	36.18	1.91	5.50	2174.16	2060.76	2700	23.68
12-09b	30253A	24.54	0.12	1.47	50.66	54.14	28.24	49.12	3.48	46.53	2.59	5.75	2252.60	2130.16	2700	21.11
12-09b	30254A	25.45	0.06	1.45	65.79					62.99	2.80	4.55			2700	
12-09b	30255A	26.41	0.11	1.41	67.69	71.31	37.12	67.05	3.62	61.79	5.26	8.71	2240.14	2060.63	2700	23.68
12-09b	30256A	27.20	0.11	1.44	48.21	50.70	27.00	47.73	2.49	44.92	2.81	6.46	2297.96	2158.46	2700	20.06
12-09b	30257A	27.92	0.06	1.44	57.15	60.80	31.49	55.27	3.65	51.51	3.76	7.51	2209.40	2055.07	2700	23.89
12-09b	30258A	29.61	0.08	1.48	74.65	79.16	41.09	72.50	4.51	67.97	4.53	6.81	2212.79	2071.64	2700	23.27
12-09b	30259A	30.91	0.09	1.46	69.37	73.73	39.09	67.50	4.36	64.42	3.08	4.89	2287.31	2180.64	2700	19.24
12-09b	30260A	31.64	0.09	1.42	63.55	67.38	36.29	62.80	3.83	59.41	3.39	5.85	2362.31	2231.84	2700	17.34
12-09b	30261A	32.58	0.12	1.44	64.01	68.03	35.56	63.25	4.02	58.47	4.78	8.38	2280.05	2103.73	2700	22.08
12-09b	30262A	33.68	0.12	1.45	56.29					52.61	3.68	7.19			2700	
12-09b	30263A	34.66	0.09	1.43	84.59					79.79	4.80	6.13			2700	
12-09b	30264A	35.49	0.11	1.45		67.90	35.36	63.74	4.16	58.59	5.15	9.01	2305.59	2114.97	2700	21.67
12-09b	30265A	36.35	0.08	1.44	63.43	67.15	35.34	62.90	3.72	58.02	4.88	8.62	2292.81	2110.76	2700	21.82
12-09b	30266A	37.57	0.11	1.45	64.51	68.29	35.77	63.23	3.78	58.82	4.41	7.69	2252.35	2091.57	2700	22.53
12-09b	30267A	38.54	0.14	1.42	40.90	43.38	22.69	40.11	2.48	38.03	2.08	5.68	2256.88	2135.55	2700	20.91
12-09b	30268A	39.97	0.08	1.45	48.16	51.39	25.18	46.14	3.23	41.95	4.19	10.35	2058.90	1865.87	2700	30.89
12-09b	30269A	40.89	0.05	1.45	43.81	46.67	22.31	42.92	2.86	37.95	4.97	13.62	2044.27	1799.27	2700	33.36
12-09b	30270A	41.45	0.03	1.41	31.13	33.67	15.62	29.81	2.54	26.75	3.06	12.08	1979.18	1765.93	2700	34.60
12-09b	30271A	42.89	0.09	1.46	36.76	39.62	18.56	35.70	2.86	34.05	1.65	5.06	2017.49	1920.26	2700	28.88
12-09b	30272A	43.89	0.06	1.45	48.92					45.15	3.77	8.63			2700	
12-09b	30273A	46.06	0.15	1.47	28.54					27.46	1.08	4.16			2700	
12-09b	30274A	44.55	0.20	1.44	56.24					54.87	1.37	2.56			2700	
12-09b	30275A	45.31	0.11	1.44	46.95	51.04	24.26	46.37	4.09	42.79	3.58	8.66	2110.77	1942.59	2700	28.05
12-10b	30276A	0.53	0.11	1.44	66.21					64.75	1.46	2.31			2700	
12-10b	30277A	1.36	0.14	1.45	51.64					50.44	1.20	2.45			2700	
12-10b	30278A	1.89	0.12	1.42	60.65					58.70	1.95	3.40			2700	
12-10b	30279A	2.64	0.11	1.47	62.57					60.36	2.21	3.75			2700	
12-10b	30280A	3.60	0.12	1.51	53.89					52.37	1.52	2.99			2700	
12-10b	30281A	5.03	0.06	1.45	78.88	85.25	40.06	77.91	6.37	67.19	10.72	16.31	2066.80	1777.03	2700	34.18

12-10b	30282A	5.85	0.06	1.48	60.75	65.61	27.97	60.15	4.86	47.30	12.85	28.04	1884.26	1471.57	2700	45.50
12-10b	30283A	7.01	0.09	1.47	51.75	56.32	25.07	51.03	4.57	42.37	8.66	21.17	1972.29	1627.65	2700	39.72
12-10b	30284A	8.08	0.06	1.44	70.97	78.53	33.40	69.14	7.56	55.82	13.32	24.49	1908.05	1532.64	2700	43.24
12-10b	30285A	9.68	0.08	1.44	44.03					39.62	4.41	11.55			2700	
12-10b	30286A	10.49	0.12	1.47	35.03					31.19	3.84	12.92			2700	
12-10b	30287A	11.17	0.08	1.45	39.06					37.24	1.82	5.09			2700	
12-10b	30288A	12.44	0.12	1.40	47.84					38.88	8.96	23.91			2700	
12-10b	30289A	13.46	0.11	1.45	41.12					37.96	3.16	8.66			2700	
12-10b	30290A	14.10	0.08	1.45	56.93	62.61	27.35	55.99	5.68	45.85	10.14	22.84	1959.22	1594.97	2700	40.93
12-10b	30291A	15.39	0.15	1.47	49.02					43.00	6.02	14.50			2700	
12-10b	30292A	16.31	0.15	1.42	48.88					42.44	6.44	15.70			2700	
12-10b	30293A	17.05	0.08	1.43	90.07	97.49	49.71	89.32	7.42	81.89	7.43	9.23	2287.29	2093.93	2700	22.45
12-10b	30294A	17.88	0.08	1.46	66.88	72.04	35.45	66.72	5.16	60.23	6.49	11.04	2186.15	1968.74	2700	27.08
12-10b	30295A	18.99	0.09	1.48	67.70	74.52	35.68	67.13	6.82	60.68	6.45	10.90	2178.38	1964.36	2700	27.25
12-10b	30296A	20.19	0.08	1.44	67.03	71.81	36.21	65.98	4.78	62.01	3.97	6.55	2201.06	2065.67	2700	23.49
12-10b	30297A	20.94	0.06	1.41	31.24	34.14	16.14	29.16	2.90	27.40	1.76	6.77	1998.87	1872.10	2700	30.66
12-10b	30298A	21.75	0.05	1.48	70.80	76.05	38.52	70.34	5.25	65.14	5.20	8.17	2243.45	2074.03	2700	23.18
12-10b	30299A	23.35	0.09	1.45	58.52	61.71	32.49	57.68	3.19	53.91	3.77	7.19	2264.89	2113.03	2700	21.74
12-10b	30300A	24.52	0.08	1.44	62.92	63.83	32.87	55.41	0.91	53.13	2.28	4.41	1853.83	1775.52	2700	34.24
12-10b	30301A	25.54	0.09	1.44	75.20	79.81	42.86	74.06	4.61	70.97	3.09	4.44	2349.14	2249.18	2700	16.70
12-10b	30302A	26.33	0.09	1.44	67.90	72.65	36.88	65.57	4.75	61.66	3.91	6.49	2172.50	2040.05	2700	24.44
12-10b	30303A	27.20	0.08	1.45	61.99	66.48	34.09	59.68	4.49	57.30	2.38	4.26	2201.59	2111.61	2700	21.79
12-10b	30304A	28.82	0.08	1.45	66.87					63.25	3.62	5.86			2700	
12-10b	30305A	29.78	0.06	1.46	51.22	56.46	27.33	49.10	5.24	46.89	2.21	4.86	2138.01	2038.83	2700	24.49
12-10b	30306A	30.80	0.14	1.47	45.85					45.14	0.71	1.63			2700	
12-10b	30307A	31.88	0.09	1.47	64.42					62.10	2.32	3.83			2700	
12-10b	30308A	32.37	0.09	1.48	50.42					48.54	1.88	3.99			2700	
12-10b	30309A	34.18	0.17	1.47	69.13					66.48	2.65	4.08			2700	
12-10b	30310A	34.76	0.11	1.48	61.45					59.37	2.08	3.59			2700	
12-10b	30311A	35.81	0.09	1.44	63.75					63.28	0.47	0.76			2700	
12-10b	30312A	37.09	0.06	1.41	68.70	63.32	33.00	52.58	-5.38	49.94	2.64	5.44	1434.68	1360.66	2700	49.61

12-10b	30313A	37.78	0.14	1.44	59.53	63.80	33.97	57.04	4.27	55.27	1.77	3.29	2299.40	2226.20	2700	17.55
12-10b	30314A	39.14	0.09	1.43	52.25	56.23	27.96	50.79	3.98	47.40	3.39	7.37	2153.25	2005.36	2700	25.73
12-10b	30315A	40.40	0.08	1.42	50.03	54.53	27.24	48.42	4.50	45.84	2.58	5.81	2201.32	2080.48	2700	22.95
12-10b	30316A	40.93	0.09	1.45	58.89					56.25	2.64	4.82			2700	
12-10b	30317A	41.54	0.09	1.41	83.62	85.72	45.09	78.41	2.10	73.23	5.18	7.21	2054.80	1916.57	2700	29.02
12-10b	30318A	42.98	0.15	1.43	72.53	77.74	41.58	71.86	5.21	68.31	3.55	5.31	2392.89	2272.28	2700	15.84
12-10b	30319A	44.04	0.09	1.40	71.13					68.08	3.05	4.57			2700	
12-10b	30320A	44.61	0.11	1.44	119.04					113.38	5.66	5.06			2700	
12-10b	30321A	46.36	0.12	1.45	39.92	42.86	21.87	38.02	2.94	35.51	2.51	7.37	2168.71	2019.86	2700	25.19
12-10b	30322A	46.97	0.09	1.45	60.90	64.52	33.85	60.17	3.62	55.63	4.54	8.38	2278.20	2102.06	2700	22.15
12-10b	30323A	50.99	0.09	1.38	44.24	47.72	23.30	43.51	3.48	40.02	3.49	9.03	2140.62	1963.29	2700	27.29
12-10b	30324A	51.44	0.08	1.41	56.56	61.93	28.22	54.77	5.37	48.06	6.71	14.38	1999.46	1748.03	2700	35.26
12-10b	30325A	52.90	0.17	1.44	48.09					45.30	2.79	6.36			2700	
12-11	30172A	2.42	0.08	1.46	61.44	65.31	31.91	60.76	3.87	53.94	6.82	13.00	2106.28	1864.04	2700	30.96
12-11	30173A	3.35	0.06	1.42	70.67	75.34	34.79	69.55	4.67	58.69	10.86	18.96	1983.98	1667.73	2700	38.23
12-11	30174A	4.27	0.17	1.44	59.34					54.91	4.43	8.29			2700	
12-11	30175A	5.15	0.12	1.43	50.87	53.67	26.64	49.64	2.80	45.12	4.52	10.35	2091.35	1895.27	2700	29.80
12-11	30176A	5.84	0.14	1.46	61.08	64.39	33.39	60.28	3.31	54.94	5.34	9.99	2223.87	2021.98	2700	25.11
12-11	30177A	6.66	0.17	1.47	70.05	73.58	38.55	69.48	3.53	63.81	5.67	9.10	2250.21	2062.61	2700	23.61
12-11	30178A	8.23	0.09	1.47	44.60	47.90	22.89	43.66	3.30	39.97	3.69	9.58	2066.49	1885.75	2700	30.16
12-11	30179A	9.46	0.08	1.45	70.14	74.44	38.77	67.56	4.30	63.50	4.06	6.54	2207.04	2071.50	2700	23.28
12-11	30180A	10.35	0.14	1.47	46.91	49.46	25.41	42.91	2.55	39.35	3.56	9.40	2038.48	1863.36	2700	30.99
12-11	30181A	10.96	0.14	1.42	44.01	46.80	24.28	43.48	2.79	40.99	2.49	6.29	2260.15	2126.35	2700	21.25
12-11	30182A	12.37	0.09	1.46	61.88					57.57	4.31	7.68			2700	
12-11	30183A	13.41	0.12	1.46	45.86	48.87	24.52	44.87	3.01	41.65	3.22	8.01	2156.30	1996.35	2700	26.06
12-11	30184A	13.98	0.11	1.46	53.38	56.72	28.14	53.02	3.34	47.83	5.19	11.19	2150.86	1934.36	2700	28.36
12-11	30185A	14.71	0.11	1.43	54.68	57.30	29.42	53.56	2.62	48.65	4.91	10.40	2159.88	1956.45	2700	27.54
12-11	30186A	15.97	0.09	1.43	51.68	54.68	27.56	51.29	3.00	46.82	4.47	9.85	2174.17	1979.26	2700	26.69
12-11	30187A	17.25	0.15	1.44	52.98					49.01	3.97	8.35			2700	
12-11	30188A	18.36	0.08	1.44	60.94	64.11	33.49	60.27	3.17	55.27	5.00	9.29	2241.30	2050.81	2700	24.04

12-11	30189A	19.45	0.09	1.45	38.61	41.41	19.34	38.22	2.80	33.59	4.63	14.41	2035.59	1779.27	2700	34.10
12-11	30190A	19.96	0.15	1.41	40.86	43.81	20.61	39.17	2.95	36.19	2.98	8.57	1985.36	1828.68	2700	32.27
12-11	30191A	22.17	0.08	1.43	38.19	41.18	20.51	36.81	2.99	33.93	2.88	8.86	2146.06	1971.37	2700	26.99
12-11	30192A	23.23	0.18	1.45	34.82	37.83	16.81	33.92	3.01	30.00	3.92	13.73	1940.63	1706.35	2700	36.80
12-11	30193A	25.24	0.15	1.44	33.54	36.31	17.68	31.44	2.77	29.46	1.98	7.07	2045.39	1910.39	2700	29.24
12-11	30194A	25.45	0.15	1.41	41.27	44.05	20.32	46.99	2.78	34.61	12.38	37.29	2296.74	1672.92	2700	38.04
12-11	30195A	26.06	0.12	1.42	31.68	33.78	15.46	31.31	2.10	26.78	4.53	17.86	1975.47	1676.07	2700	37.92
12-11	30196A	26.96	0.11	1.41	48.15	52.10	24.09	47.11	3.95	41.63	5.48	13.63	2016.44	1774.64	2700	34.27
12-11	30197A	27.58	0.15	1.39	43.97	46.80	21.57	43.52	2.83	37.34	6.18	17.19	1987.16	1695.67	2700	37.20
12-12	30198A	1.14	0.08	1.46	41.99	44.86	20.78	41.22	2.87	37.45	3.77	10.48	1990.96	1802.18	2700	33.25
12-12	30199A	1.83	0.09	1.44	59.57	64.45	32.09	54.55	4.88	51.39	3.16	6.33	2049.30	1927.37	2700	28.62
12-12	30200A	2.70	0.11	1.45	50.09					43.34	6.75	16.11			2700	
12-12	30201A	3.67	0.14	1.42	60.27					45.82	14.45	32.55			2700	
12-12	30202A	5.30	0.12	1.44	76.67					71.85	4.82	6.85			2700	
12-12	30203A	6.48	0.11	1.45	55.11	58.49	29.26	53.95	3.38	48.89	5.06	10.67	2136.34	1930.43	2700	28.50
12-12	30204A	7.35	0.12	1.46	59.64					55.26	4.38	8.14			2700	
12-12	30205A	7.71	0.09	1.43	48.96	52.11	24.69	47.62	3.15	43.41	4.21	10.03	2008.09	1825.06	2700	32.41
12-12	30206A	8.88	0.08	1.48	43.82	47.24	22.92	42.89	3.42	39.92	2.97	7.73	2113.18	1961.61	2700	27.35
12-12	30207A	10.01	0.11	1.46	71.23					66.61	4.62	7.09			2700	
12-12	30208A	11.22	0.09	1.42	47.21	49.83	24.12	46.92	2.62	42.32	4.60	11.25	2073.57	1863.93	2700	30.97
12-12	30209A	12.54	0.11	1.42	50.04	53.01	26.53	49.82	2.97	45.67	4.15	9.38	2167.42	1981.57	2700	26.61
12-12	30210A	13.29	0.09	1.43	88.57					82.12	6.45	7.99			2700	
12-12	30211A	14.48	0.06	1.46	52.58	55.42	28.49	52.03	2.84	47.56	4.47	9.70	2205.71	2010.74	2700	25.53
12-12	30212A														2700	
12-12	30213A	16.03	0.09	1.45	60.36	63.61	32.18	59.94	3.25	53.58	6.36	12.20	2171.23	1935.14	2700	28.33
12-12	30214A	17.40	0.06	1.47	49.98	53.01	27.33	49.03	3.03	45.56	3.47	7.87	2217.02	2055.26	2700	23.88
12-12	30215A	17.92	0.09	1.44	25.55	26.93	12.33	24.13	1.38	22.48	1.65	7.84	1859.52	1724.30	2700	36.14
12-12	30216A	19.20	0.06	1.48	41.45	44.51	22.07	39.63	3.06	36.86	2.77	7.83	2103.50	1950.77	2700	27.75
12-12	30217A	20.24	0.12	1.42	68.46	72.02	36.21	67.50	3.56	60.41	7.09	12.02	2134.61	1905.57	2700	29.42
12-12	30218A	21.02	0.05	1.42	49.64	53.30	26.16	48.61	3.66	44.24	4.37	10.21	2128.83	1931.69	2700	28.46

12-12	30219A	23.16	0.09	1.43	79.03	82.74	44.02	78.25	3.71	72.17	6.08	8.59	2277.67	2097.40	2700	22.32
12-12	30220A	24.16	0.11	1.45	51.30	54.31	25.72	50.46	3.01	43.95	6.51	15.32	2014.47	1746.88	2700	35.30
12-12	30221A	24.81	0.09	1.42	30.32	32.63	16.96	29.72	2.31	29.36	0.36	1.29	2294.56	2265.37	2700	16.10
12-12	30222A	25.71	0.08	1.43	31.95	34.39	15.77	30.54	2.44	29.68	0.86	3.04	1939.12	1881.83	2700	30.30
12-12	30223A	26.61	0.09	1.43	50.32	55.02	22.88	45.61	4.70	39.29	6.32	16.69	1713.98	1468.79	2700	45.60
12-12	30224A	27.68	0.06	1.41	56.75	60.04	26.99	55.33	3.29	44.47	10.86	25.22	1896.20	1514.29	2700	43.92
12-12	30225A	28.53	0.06	1.45	54.22	57.25	26.80	53.71	3.03	45.00	8.71	20.00	1997.75	1664.79	2700	38.34
12-12	30226A	29.43	0.11	1.43	48.09					46.93	1.16	2.55			2700	
12-12	30227A	31.01	0.08	1.46	56.90	60.53	32.42	54.82	3.63	54.31	0.51	0.96	2299.55	2277.57	2700	15.65
12-12	30228A	31.64	0.09	1.46	43.39					43.04	0.35	0.84			2700	

D2. Particle Size Distribution Data

HoleID	Depth From (mbgs)	Depth To (mbgs)	%gravel	%sand	%silt	%clay
12-06a	1.22	1.42	69.00	19.68	10.85	0.48
12-06a	2.13	2.33	73.44	21.67	4.51	0.37
12-06a	3.90	4.10	81.20	15.65	3.00	0.16
12-06a	5.18	5.38	65.15	19.33	13.63	1.88
12-06a	8.38	8.58	12.56	24.19	57.65	5.58
12-06a	9.45	9.65	0.00	45.37	53.72	0.90
12-06a	10.67	10.87	42.85	4.14	45.21	7.78
12-06a	11.28	11.48	68.83	21.69	8.95	0.52
12-06a	12.80	13.00	54.47	25.35	14.83	5.35
12-06a	13.56	13.76	76.00	14.56	8.83	0.59
12-06a	14.78	14.98	69.73	19.47	8.54	2.26
12-06a	15.85	16.05	84.23	10.14	4.45	1.18
12-06a	16.61	16.81	65.17	21.97	11.70	1.16
12-06a	17.37	17.57	70.09	13.28	13.25	3.38
12-06a	18.90	19.10	76.52	13.60	8.18	1.70
12-06a	19.66	19.86	68.16	16.28	13.16	2.40
12-06a	20.42	20.62	74.43	11.65	11.20	2.73
12-06a	21.73	21.93	72.61	18.75	8.13	0.50
12-06a	22.65	22.85	68.23	17.01	12.37	2.41
12-06a	23.26	23.46	75.98	9.52	12.17	2.32

12-06a	25.15	25.35	82.74	14.39	2.69	0.18
12-06a	27.07	27.27	52.55	20.15	22.14	5.16
12-06a	27.89	28.09	46.41	25.56	23.68	4.35
12-06a	30.18	30.38	64.09	12.13	16.79	6.99
12-06a	30.78	30.98	62.59	20.01	16.32	1.08
12-06a	31.70	31.90	47.39	18.53	32.11	1.95
12-06a	32.92	33.12	42.79	16.14	38.56	2.52
12-06a	34.02	34.22	39.23	25.43	33.30	2.04
12-06a	34.72	34.92	35.62	16.45	33.70	14.24
12-06a	35.51	35.71	40.22	18.70	31.39	9.71
12-06a	37.03	37.23	35.29	20.83	31.28	12.60
12-06a	37.80	38.00	30.37	33.23	34.69	1.71
12-06a	38.86	39.06	48.57	17.46	31.95	2.02
12-06a	39.84	40.04	44.11	24.11	29.52	2.27
12-06a	40.84	41.04	47.30	24.54	26.24	1.90
12-06a	42.43	42.63	73.71	9.07	16.28	0.94
12-06a	43.04	43.24	73.25	9.47	13.24	4.06
12-06a	43.68	43.88	64.67	14.15	18.16	3.01
12-06b	1.22	1.42	63.38	19.67	16.27	0.68
12-06b	1.52	1.72	69.76	16.99	12.40	0.85
12-06b	5.52	5.72	58.02	19.15	16.67	6.17
12-06b	6.16	6.36	54.23	11.25	33.07	1.45
12-06b	6.95	7.15	66.12	13.57	19.73	0.58
12-06b	7.77	7.97	0.00	32.85	66.29	0.86
12-06b	8.78	8.98	0.00	36.80	62.43	0.78
12-06b	10.15	10.35	43.30	5.62	48.08	3.01
12-06b	11.22	11.42	78.66	14.94	6.13	0.29
12-06b	12.50	12.70	96.22	2.68	1.04	0.06
12-06b	14.17	14.37	75.47	13.94	9.69	0.89
12-06b	14.78	14.98	83.86	8.05	7.47	0.62
12-06b	16.37	16.57	72.47	15.07	9.72	2.73
12-06b	16.98	17.18	81.61	10.46	7.51	0.42
12-06b	17.59	17.79	84.68	10.83	4.26	0.22
12-06b	20.39	20.59	84.18	9.91	5.55	0.36
12-06b	20.94	21.14	82.86	10.43	6.31	0.39
12-06b	21.49	21.69	51.98	17.24	24.19	6.59
12-06b	22.40	22.60	88.30	7.15	4.29	0.25
12-06b	25.45	25.65	76.84	17.82	4.93	0.41
12-09b	1.07	1.27	75.11	11.15	13.37	0.37

12-09b	1.83	2.03	76.97	14.38	8.17	0.47
12-09b	3.35	3.55	79.20	13.68	6.68	0.44
12-09b	4.15	4.35	76.27	14.02	9.11	0.60
12-09b	5.03	5.23	63.69	26.75	9.24	0.31
12-09b	6.46	6.66	77.48	14.71	7.44	0.37
12-09b	7.10	7.30	82.76	10.60	6.16	0.47
12-09b	8.05	8.25	48.45	20.16	29.99	1.42
12-09b	9.42	9.62	53.30	24.12	21.80	0.77
12-09b	10.30	10.50	41.45	23.51	34.03	1.02
12-09b	10.97	11.17	3.21	20.22	73.69	2.89
12-09b	12.07	12.27	0.72	5.18	90.68	3.40
12-09b	12.74	12.94	10.87	15.19	71.40	2.54
12-09b	13.96	14.16	76.04	15.44	7.41	1.11
12-09b	16.49	16.69	72.78	18.72	8.12	0.39
12-09b	17.10	17.30	81.02	12.56	6.14	0.28
12-09b	18.53	18.73	83.85	10.00	5.83	0.32
12-09b	19.51	19.71	72.78	19.02	7.78	0.42
12-09b	20.30	20.50	68.05	18.63	12.71	0.61
12-09b	21.61	21.81	75.45	13.33	10.65	0.56
12-09b	22.49	22.69	92.33	4.56	2.90	0.21
12-09b	23.47	23.67	68.96	13.47	16.44	1.13
12-09b	24.41	24.61	65.64	18.62	14.97	0.77
12-09b	25.39	25.59	74.12	15.21	10.04	0.63
12-09b	26.30	26.50	63.96	17.46	16.24	2.36
12-09b	27.10	27.30	77.99	11.83	9.39	0.79
12-09b	27.86	28.06	66.76	14.24	17.04	1.96
12-09b	29.54	29.74	64.04	15.27	19.61	1.08
12-09b	30.82	31.02	68.24	14.38	14.95	2.42
12-09b	31.55	31.75	73.60	10.25	15.15	1.00
12-09b	32.46	32.66	76.11	13.05	10.15	0.69
12-09b	33.56	33.76	77.86	12.19	9.49	0.47
12-09b	34.56	34.76	69.86	21.11	8.51	0.53
12-09b	35.39	35.59	61.31	12.84	24.49	1.35
12-09b	36.27	36.47	68.35	12.83	17.65	1.16
12-09b	37.46	37.66	77.70	11.48	10.23	0.59
12-09b	38.40	38.60	62.62	15.31	20.19	1.88
12-09b	39.90	40.10	61.08	16.19	21.97	0.75
12-09b	40.84	41.04	71.57	11.56	16.18	0.71
12-09b	41.42	41.62	9.75	28.09	58.17	3.99
12-09b	42.79	42.99	36.24	22.49	37.42	3.84
12-09b	43.83	44.03	0.00	1.24	37.55	61.22

12-09b	44.35	44.55	60.53	17.11	20.13	2.25
12-09b	45.20	45.40	77.38	8.78	12.52	1.33
12-09b	45.90	46.10	9.72	24.64	59.03	6.60
12-07a	0.55	0.75	19.52	37.08	41.19	2.21
12-07a	1.83	2.03	31.65	17.19	48.65	2.48
12-07a	2.47	2.67	18.06	22.19	56.43	3.30
12-07a	3.54	3.74	25.35	15.65	56.61	2.38
12-07a	8.05	8.25	0.00	28.82	68.24	2.95
12-07a	9.48	9.68	0.00	20.60	76.88	2.51
12-07a	10.21	10.41	0.00	62.45	36.22	1.36
12-07a	11.03	11.23	0.00	25.24	71.68	3.07
12-10b	1.22	1.42	80.66	10.35	8.66	0.33
12-10b	1.77	1.97	72.66	16.29	10.50	0.56
12-10b	2.53	2.73	67.79	24.02	7.67	0.50
12-10b	3.47	3.67	67.56	20.25	11.70	0.52
12-10b	4.97	5.17	7.34	33.98	56.73	1.96
12-10b	5.79	5.99	0.04	13.84	83.15	2.97
12-10b	6.92	7.12	3.48	32.19	63.11	1.20
12-10b	8.02	8.22	0.15	47.16	51.87	0.85
12-10b	9.60	9.80	19.07	66.48	13.68	0.79
12-10b	10.36	10.56	3.81	84.21	11.59	0.40
12-10b	11.09	11.29	11.03	80.91	7.73	0.36
12-10b	12.31	12.51	0.00	86.88	12.65	0.48
12-10b	13.35	13.55	4.47	81.60	13.42	0.53
12-10b	14.02	14.22	0.70	29.01	68.51	1.78
12-10b	15.24	15.44	2.81	79.99	16.35	0.86
12-10b	16.15	16.35	0.14	87.33	11.93	0.59
12-10b	16.98	17.18	61.20	21.10	17.17	0.54
12-10b	17.80	18.00	39.85	19.37	39.79	0.97
12-10b	18.90	19.10	48.47	17.92	32.00	1.61
12-10b	20.12	20.32	21.43	42.94	35.10	0.53
12-10b	20.88	21.08	49.62	21.22	28.22	0.94
12-10b	21.70	21.90	66.57	15.66	17.37	0.42
12-10b	23.26	23.46	56.53	23.78	18.21	1.49
12-10b	24.44	24.64	55.69	24.66	18.07	1.60
12-10b	25.45	25.65	63.03	22.21	13.64	1.12
12-10b	26.24	26.44	46.02	21.13	30.76	2.10
12-10b	27.13	27.33	52.02	23.85	21.57	2.57
12-10b	28.74	28.94	38.23	42.04	18.73	1.01

12-10b	29.72	29.92	60.06	18.19	20.67	1.08
12-10b	30.66	30.86	28.71	28.94	39.88	2.47
12-10b	31.79	31.99	58.16	23.19	17.64	1.00
12-10b	32.28	32.48	62.95	22.26	13.04	1.73
12-10b	34.02	34.22	53.02	25.19	20.29	1.49
12-10b	34.66	34.86	51.49	24.28	22.95	1.29
12-10b	35.72	35.92	46.40	21.42	30.04	2.15
12-10b	37.03	37.23	47.66	20.67	31.11	0.56
12-10b	37.64	37.84	64.41	15.98	19.06	0.55
12-10b	39.04	39.24	34.42	27.84	37.15	0.60
12-10b	40.33	40.53	46.31	26.19	26.83	0.68
12-10b	40.84	41.04	87.72	4.30	7.66	0.31
12-10b	41.45	41.65	23.02	34.82	38.00	4.14
12-10b	42.82	43.02	54.09	23.54	20.90	1.45
12-10b	43.95	44.15	81.53	12.44	5.67	0.36
12-10b	44.50	44.70	79.26	15.80	4.68	0.25
12-10b	46.24	46.44	45.39	28.41	24.82	1.40
12-10b	46.88	47.08	58.36	17.70	22.58	1.35
12-10b	50.90	51.10	24.27	25.51	48.08	2.15
12-10b	51.36	51.56	6.67	27.28	63.62	2.43
12-10b	52.73	52.93	0.00	43.39	55.53	1.08
12-11	2.35	2.55	44.94	27.60	26.61	0.84
12-11	3.29	3.49	10.99	46.67	41.74	0.59
12-11	4.08	4.28	69.23	14.38	15.63	0.74
12-11	5.03	5.23	63.98	14.89	20.30	0.82
12-11	5.70	5.90	56.92	15.85	26.01	1.23
12-11	6.49	6.69	50.34	22.50	25.35	1.81
12-11	8.14	8.34	79.17	13.86	6.69	0.28
12-11	9.39	9.59	79.50	9.37	10.78	0.35
12-11	10.21	10.41	77.75	11.25	8.68	2.32
12-11	10.82	11.02	89.21	3.19	6.38	1.22
12-11	12.28	12.48	73.83	11.17	14.17	0.83
12-11	13.29	13.49	63.54	12.72	18.94	4.79
12-11	13.87	14.07	61.75	15.03	16.99	6.24
12-11	14.60	14.80	59.23	14.57	25.15	1.06
12-11	15.88	16.08	46.59	18.66	26.60	8.15
12-11	17.10	17.30	71.32	11.63	12.95	4.11
12-11	18.29	18.49	57.65	13.94	27.27	1.14
12-11	19.39	19.59	61.57	13.15	23.95	1.31
12-11	19.81	20.01	28.33	23.30	38.91	9.47

12-11	22.10	22.30	54.09	18.07	25.97	1.87
12-11	22.92	23.12	0.00	30.66	66.46	2.88
12-11	25.15	25.35	0.00	32.00	65.73	2.31
12-11	25.42	25.62	0.00	40.54	57.41	2.07
12-11	26.85	27.05	0.00	21.48	74.86	3.68
12-11	27.49	27.69	0.00	30.58	67.19	2.22
12-12	1.07	1.27	31.43	27.39	40.17	1.01
12-12	1.74	1.94	77.96	10.61	11.04	0.38
12-12	2.59	2.79	41.89	34.20	23.07	0.85
12-12	3.54	3.74	41.11	44.81	13.83	0.24
12-12	5.18	5.38	57.66	16.23	25.41	0.72
12-12	6.37	6.57	62.44	15.12	21.27	1.16
12-12	7.22	7.42	68.24	17.24	14.07	0.45
12-12	7.62	7.82	38.56	21.98	37.55	1.92
12-12	8.81	9.01	55.50	14.53	28.54	1.42
12-12	9.91	10.11	53.93	18.08	26.62	1.39
12-12	11.13	11.33	44.70	26.25	27.38	1.66
12-12	12.44	12.64	56.47	15.05	27.66	0.81
12-12	13.20	13.40	59.28	18.50	21.23	1.00
12-12	14.42	14.62	50.19	20.12	28.22	1.47
12-12	15.06	15.26	56.88	18.36	23.81	0.94
12-12	15.94	16.14	42.54	28.53	27.99	0.93
12-12	17.34	17.54	48.19	22.84	27.35	1.61
12-12	17.83	18.03	35.19	23.29	40.33	1.19
12-12	19.14	19.34	43.43	22.83	32.50	1.24
12-12	20.12	20.32	40.49	21.48	36.97	1.07
12-12	20.97	21.17	32.89	23.44	41.76	1.90
12-12	23.07	23.27	58.87	11.84	28.14	1.16
12-12	24.05	24.25	27.93	27.60	43.35	1.15
12-12	24.72	24.92	0.00	36.10	61.06	2.83
12-12	25.63	25.83	0.00	28.63	68.49	2.86
12-12	26.52	26.72	0.00	28.96	68.18	2.83
12-12	27.61	27.81	0.00	25.96	70.78	3.29
12-12	28.47	28.67	0.00	43.46	54.97	1.59
12-12	29.32	29.52	0.00	25.41	71.04	3.53
12-12	30.94	31.14	0.00	21.12	74.45	4.42
12-12	31.55	31.75	0.00	30.04	66.77	3.20

D3. Squeeze Porewater Data

HoleID	Sample Number	Depth (mbgs)	Depth Error (mbgs)	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm	ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm
WLC_12-06a	30000A	1.14	0.08										
WLC_12-06a	30001A	2.06	0.08	0.0272	0.5870	60.1704	36.3252	0.2028	19.0454	0.0326	13.3040	101.0012	0.0050
WLC_12-06a	30002A	2.60	0.09	0.0067	0.1117	4.8458	15.4130	0.0458	12.0096	0.0519	5.3127	54.4037	0.0062
WLC_12-06a	30002A-MSREP	2.60	0.09	0.0067	0.1024	5.0356	14.9711	0.0438	11.7169	0.0235	5.1452	53.6106	0.0063
WLC_12-06a	30003A	3.79	0.11	0.0268	0.1365	20.3252	45.8825	0.0823	8.8064	0.0857	7.2128	98.2785	0.0050
WLC_12-06a	30004A	5.49	0.15										
WLC_12-06a	30005A	10.36	0.30	0.0327	0.2449	13.4991	34.5434	0.0884	12.3023	0.0434	8.7945	95.3731	0.0037
WLC_12-06a	30006A	8.15	0.23	0.0320	0.1222	13.6547	60.2494	0.0942	7.8636	0.0427	8.0799	183.2573	0.0024
WLC_12-06a	30007A	9.30	0.15	0.0240	0.1482	8.3269	48.8685	0.0594	7.8153	0.0726	5.9332	158.7749	0.0042
WLC_12-06a	30008A	10.97	0.30	0.0369	0.1983	16.9057	111.9698	0.1275	11.1182	0.1011	8.5361	242.8845	0.0061
WLC_12-06a	30009A	12.50	0.30	0.0238	0.2590	14.5691	92.8925	0.0773	9.5694	0.0344	8.1997	252.0777	0.0057
WLC_12-06a	30010A	13.41	0.15	0.0743	0.2530	64.8603	138.1871	2.5022	17.7795	0.7983	19.5718	412.3311	0.0053
WLC_12-06a	30011A	14.40	0.38	0.0840	0.4159	100.7741	109.0070	0.2528	24.8086	0.0886	23.5367	228.4867	0.0172
WLC_12-06a	30011A-MSREP	14.40	0.38	0.0846	0.4124	102.1354	109.7431	0.2520	24.6609	0.0908	23.6263	231.6716	0.0175
WLC_12-06a	30012A	15.74	0.11	0.0388	0.6530	58.9623	84.1438	0.1367	19.0232	0.0849	14.0534	172.1134	0.0114
WLC_12-06a	30013A	16.46	0.15	0.0670	0.3623	22.7526	341.9795	0.2075	17.9852	0.2595	31.0665	712.9384	0.0053
WLC_12-06a	30014A	17.82	0.17	0.0715	0.2230	67.7794	126.2347	0.0462	6.0352	0.0361	36.4582	193.6874	0.0026
WLC_12-06a	30015A	18.59	0.30	0.0309	0.4883	45.9637	88.1690	0.3650	36.9521	0.2145	10.5873	211.3062	0.0214
WLC_12-06a	30016A	19.43	0.23	0.0309	0.4883	45.9637	88.1690	0.3650	36.9521	0.2145	10.5873	211.3062	0.0214
WLC_12-06a	30017B	20.19	0.23	0.0067	0.1462	8.9657	38.1251	0.1613	19.1793	0.0660	3.9064	86.1931	0.0106
WLC_12-06a	30017B-ICSRep	20.19	0.23	0.0067	0.1462	8.9657	38.1251	0.1613	19.1793	0.0660	3.9064	86.1931	0.0106
WLC_12-06a	30017B-ICSRep	20.19	0.23	0.0067	0.1462	8.9657	38.1251	0.1613	19.1793	0.0660	3.9064	86.1931	0.0106
WLC_12-06a	30018B	21.61	0.12	0.0652	0.2874	85.1679	112.7919	0.0936	9.9160	0.0620	31.1388	145.6112	0.0063
WLC_12-06a	30019B	22.45	0.20	0.0500	0.3940	130.6975	64.0191	0.0925	21.6121	0.0604	17.7507	169.6065	0.0065
WLC_12-06a	30020B	23.10	0.15	0.0500	0.3940	130.6975	64.0191	0.0925	21.6121	0.0604	17.7507	169.6065	0.0065
WLC_12-06a	30021B	24.96	0.18	0.0943	0.2732	177.8245	82.1010	0.1687	25.5145	0.0382	59.5865	156.1200	0.0076
WLC_12-06a	30022B	26.87	0.20	0.0531	0.2438	150.0101	40.6878	0.0878	5.5912	0.0653	60.2384	90.4051	0.0017
WLC_12-06a	30023B	27.98	0.06	0.0369	0.0984	119.4959	33.8299	0.0975	3.9644	0.0675	94.2058	67.0055	0.0018
WLC_12-06a	30024B	29.98	0.20	0.0531		18.8477	39.6727	0.0093		0.0217	8.3542	102.7955	0.0082
WLC_12-06a	30025B	30.71	0.08	0.0234	0.1076	8.1192	37.3609	0.0202	5.1909	0.0227	4.3495	111.3282	0.0023
WLC_12-06a	30026B	31.59	0.11	0.0277	0.1634	10.8880	32.0985	0.0972	16.4726	0.0786	4.0648	94.2164	0.0063
WLC_12-06a	30027B	32.81	0.11	0.0287	0.6508	11.9202	19.8316	0.3015	9.0783	0.0920	4.2041	58.9001	0.0023
WLC_12-06a	30028B	33.97	0.05	0.0282	0.1282	8.9890	21.0175	0.0900	14.4902	0.0986	3.0920	59.1536	0.0055
WLC_12-06a	30029B	34.67	0.05	0.0318	0.2566	10.9519	21.1757	0.1138	12.8794	0.0597	4.5511	58.9597	0.0039
WLC_12-06a	30030B	35.39	0.11	0.0318	0.2566	10.9519	21.1757	0.1138	12.8794	0.0597	4.5511	58.9597	0.0039
WLC_12-06a	30030B-MSRep	35.39	0.11	0.0371	0.3514	13.8813	27.7455	0.0129	12.5147	0.0544	6.1419	65.2322	0.0052
WLC_12-06a	30031B	36.97	0.06	0.0476	0.5766	16.5821	18.1631	0.0878	15.7872	0.0626	4.4895	53.8790	0.0045

ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm	ICP-MS Ga ppm	ICP-MS Ge ppm	ICP-MS As ppm	ICP-MS Se ppm	ICP-MS Rb ppm	ICP-MS Sr ppm
0.0049	0.0109	0.0106	0.1439	0.0671	0.0005	0.0114	0.0248	0.3516	0.0000	0.0000	0.0021	0.0027	0.0029	0.3591
0.0031	0.0011	0.0026	0.0414	0.1830	0.0004	0.0037	0.0020	0.0302	0.0000	0.0000	0.0003	0.0000	0.0010	0.1547
0.0029	0.0011	0.0027	0.0416	0.0820	0.0004	0.0036	0.0019	0.0312	0.0000	0.0000	0.0003	0.0000	0.0011	0.1558
0.0024	0.0009	0.0048	0.2579	0.2630	0.0009	0.0065	0.0046	0.0784	0.0000	0.0001	0.0062	0.0702	0.0022	0.6103
0.0040	0.0013	0.0015	0.0920	0.0221	0.0004	0.0073	0.0045	0.0540	0.0000	0.0001	0.0023	0.0079	0.0041	0.2917
0.0034	0.0015	0.0009	0.2052	0.0171	0.0013	0.0077	0.0051	0.0359	0.0000	0.0002	0.0014	0.0083	0.0024	0.2939
0.0017	0.0008	0.0008	0.1837	0.2699	0.0011	0.0095	0.0026	0.0539	0.0000	0.0000	0.0017	0.0022	0.0024	0.3694
0.0029	0.0036	0.0026	0.4091	0.3583	0.0045	0.1199	0.0049	0.0928	0.0000	0.0000	0.0059	0.0582	0.0077	0.5998
0.0030	0.0012	0.0019	0.4246	0.1716	0.0035	0.0189	0.0057	0.1027	0.0000	0.0000	0.0206	0.2451	0.0055	0.6247
0.0920	0.0132	0.0277	0.8854	2.3819	0.0042	0.0695	0.0541	0.3357	0.0003	0.0003	0.0110	0.2897	0.0140	0.7977
0.0109	0.0034	0.0078	0.2739	0.1608	0.0018	0.0475	0.0340	0.1010	0.0000	0.0002	0.0066	0.1828	0.0102	1.3927
0.0106	0.0034	0.0077	0.2731	0.1387	0.0018	0.0479	0.0338	0.0993	0.0000	0.0007	0.0065	0.1793	0.0100	1.3922
0.0078	0.0014	0.0029	0.2867	0.2972	0.0038	0.0852	0.0082	0.1214	0.0000	0.0000	0.0196	0.2578	0.0040	0.7452
0.0191	0.0026	0.0025	1.6900	0.2230	0.0035	0.0296	0.0168	0.0808	0.0000	0.0005	0.0018	0.0029	0.0101	0.8794
0.0045	0.0024	0.0053	0.3736	0.1151	0.0015	0.0171	0.0235	0.0946	0.0000	0.0001	0.0038	0.0405	0.0102	0.9105
0.0143	0.0029	0.0032	0.2440	0.5785	0.0024	0.0146	0.0089	0.1307	ud	ud	0.0128	0.1872	0.0042	1.0458
0.0143	0.0029	0.0032	0.2440	0.5785	0.0024	0.0146	0.0089	0.1307	0.0000	0.0000	0.0128	0.1872	0.0042	1.0458
0.0087	0.0016	0.0022	0.1709	0.7745	0.0018	0.0140	0.0055	0.0563	ud	0.0000	ud	0.0082	0.0026	0.5962
0.0087	0.0016	0.0022	0.1709	0.7745	0.0018	0.0140	0.0055	0.0563	ud	0.0000	ud	0.0082	0.0026	0.5962
0.0087	0.0016	0.0022	0.1709	0.7745	0.0018	0.0140	0.0055	0.0563	ud	0.0000	ud	0.0082	0.0026	0.5962
0.0037	0.0013	0.0014	0.1876	0.2237	0.0014	0.0138	0.0037	0.3204	0.0000	0.0001	0.0041	0.0260	0.0093	0.7319
0.0063	0.0043	0.0203	0.1872	0.0183	0.0019	0.0148	0.0279	0.3579	ud	0.0001	0.0024	0.0770	0.0067	0.7150
0.0063	0.0043	0.0203	0.1872	0.0183	0.0019	0.0148	0.0279	0.3579	0.0000	0.0001	0.0024	0.0770	0.0067	0.7150
0.0065	0.0044	0.0237	0.1267	0.0181	0.0005	0.0091	0.0075	0.1641	0.0000	0.0001	0.0048	0.0376	0.0116	0.9530
0.0017	0.0016	0.0101	0.0565	0.0384	0.0002	0.0039	0.0093	0.0377	0.0000	0.0001	0.0013	0.0025	0.0100	0.4188
0.0018	0.0023	0.0070	0.0784	0.1592	0.0013	0.0140	0.0095	0.0158	0.0000	0.0001	0.0028	0.0057	0.0218	0.3295
0.0059	0.0022	0.0019	0.0931	ud	0.0006	0.0093	0.0058	0.0786	ud	0.0001	0.0071	0.1072	0.0049	0.4908
0.0017	0.0014	0.0016	0.1004	0.0268	0.0006	0.0065	0.0100	0.0516	0.0000	0.0001	0.0106	0.1385	0.0021	0.3802
0.0041	0.0018	0.0018	0.0621	0.2433	0.0007	0.0075	0.0205	0.0549	0.0000	0.0001	0.0061	0.0772	0.0022	0.2921
0.0039	0.0030	0.0025	0.0499	0.1389	0.0006	0.0050	0.0116	0.0605	0.0000	0.0001	0.0020	0.0337	0.0021	0.1964
0.0041	0.0027	0.0035	0.0273	0.2414	0.0005	0.0053	0.0109	0.0244	0.0000	0.0000	0.0025	0.0456	0.0012	0.1988
0.0035	0.0046	0.0023	0.0320	0.0320	0.0003	0.0058	0.0218	0.1115	0.0001	0.0000	0.0013	0.0220	0.0040	0.2489
0.0035	0.0046	0.0023	0.0320	0.0320	0.0003	0.0058	0.0218	0.1115	0.0001	0.0000	0.0013	0.0220	0.0040	0.2489
0.0029	0.0025	0.0024	0.0724	0.0360	0.0005	0.0081	0.0104	0.0638	0.0000	0.0001	0.0003	0.0121	0.0027	0.1609
0.0042	0.0025	0.0021	0.0165	0.0138	0.0002	0.0079	0.0105	0.1141	ud	0.0000	0.0011	0.0078	0.0021	0.2503
0.0042	0.0025	0.0021	0.0165	0.0138	0.0002	0.0079	0.0105	0.1141	0.0000	0.0000	0.0011	0.0078	0.0021	0.2503

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Y	Zr	Nb	Mo	Ag	Cd	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0001	0.0002	0.0004	0.0210	0.0001	0.0000	0.0001	0.0006	0.0000	0.1606	0.0001	0.0002	0.0000	0.0000	0.0001
0.0000	0.0001	0.0003	0.0044	0.0001	0.0000	0.0001	0.0003	0.0000	0.3280	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.0047	0.0000	0.0001	0.0001	0.0003	0.0000	0.3281	0.0000	0.0000	0.0000	0.0000	0.0000
0.0003	0.0002	0.0003	0.0265	0.0001	0.0000	0.0001	0.0010	0.0000	0.5962	0.0001	0.0001	0.0000	0.0001	0.0001
0.0001	0.0001	0.0001	0.0370	0.0001	0.0001	0.0001	0.0034	0.0000	0.1060	0.0000	0.0001	0.0000	0.0001	0.0000
0.0000	0.0001	0.0003	0.0245	0.0001	0.0000	0.0001	0.0026	0.0000	0.0529	0.0000	0.0000	0.0000	0.0001	0.0001
0.0001	0.0001	0.0003	0.0153	0.0001	0.0002	0.0001	0.0048	0.0000	0.3178	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0003	0.0203	0.0001	0.0002	0.0001	0.0004	0.0000	0.5000	0.0000	0.0000	0.0000	0.0000	0.0001
0.0001	0.0001	0.0001	0.0112	0.0001	0.0004	0.0001	0.0004	0.0000	0.3655	0.0000	0.0000	0.0000	0.0000	0.0000
0.0076	0.0017	0.0007	0.0276	0.0001	0.0012	0.0002	0.0006	0.0005	0.3377	0.0049	0.0109	0.0015	0.0077	0.0022
0.0001	0.0002	0.0002	0.0906	0.0001	0.0001	0.0006	0.0006	0.0001	1.2633	0.0001	0.0001	0.0000	0.0001	0.0001
0.0001	0.0002	0.0002	0.0922	0.0001	0.0001	0.0005	0.0006	0.0001	1.2669	0.0001	0.0001	0.0000	0.0001	0.0001
0.0002	0.0001	0.0003	0.0267	0.0001	0.0002	0.0001	0.0004	0.0000	1.5604	0.0001	0.0002	0.0000	0.0002	0.0001
0.0019	0.0010	0.0002	0.0655	0.0001	0.0003	0.0001	0.0021	0.0001	0.1984	0.0006	0.0012	0.0002	0.0012	0.0003
0.0001	0.0002	0.0002	0.2064	0.0000	0.0000	0.0000	0.0011	0.0002	0.4689	0.0001	0.0000	0.0000	0.0001	0.0000
0.0014	0.0002	0.0002	0.0244	0.0000	0.0001	0.0002	0.0006	0.0001	1.4269	0.0007	0.0018	0.0003	0.0013	0.0004
0.0014	0.0002	0.0002	0.0244	0.0000	0.0001	0.0002	0.0006	0.0001	1.4269	0.0007	0.0018	0.0003	0.0013	0.0004
0.0002	0.0002	0.0003	0.0147	ud	0.0010	0.0001	0.0007	0.0000	0.5257	0.0001	0.0001	0.0000	0.0001	0.0001
0.0002	0.0002	0.0003	0.0147	ud	0.0010	0.0001	0.0007	0.0000	0.5257	0.0001	0.0001	0.0000	0.0001	0.0001
0.0002	0.0002	0.0003	0.0147	ud	0.0010	0.0001	0.0007	0.0000	0.5257	0.0001	0.0001	0.0000	0.0001	0.0001
0.0001	0.0001	0.0002	0.1029	0.0001	0.0000	0.0001	0.0006	0.0001	0.7982	0.0000	0.0001	0.0000	0.0000	0.0000
0.0001	0.0001	0.0003	0.0545	ud	ud	0.0002	0.0005	0.0000	0.2434	0.0001	0.0001	0.0000	0.0001	0.0002
0.0001	0.0001	0.0003	0.0545	0.0001	0.0000	0.0002	0.0005	0.0000	0.2434	0.0001	0.0001	0.0000	0.0001	0.0002
0.0001	0.0001	0.0002	0.2299	0.0001	0.0000	0.0001	0.0004	0.0001	0.1128	0.0000	0.0001	0.0000	0.0000	0.0001
0.0001	0.0001	0.0002	0.0939	0.0000	0.0000	0.0001	0.0008	0.0000	0.1426	0.0000	0.0001	0.0000	0.0001	0.0001
0.0001	0.0000	0.0002	0.1075	0.0001	0.0000	0.0000	0.0008	0.0001	0.3877	0.0001	0.0001	0.0000	0.0001	0.0000
0.0000	0.0000	0.0003	0.0151	ud	ud	0.0000	0.0004	0.0000	0.0714	0.0000	0.0000	0.0000	ud	0.0001
0.0000	0.0000	0.0001	0.0073	0.0001	0.0000	0.0000	0.0003	0.0000	0.3071	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0184	0.0001	0.0001	0.0001	0.0003	0.0000	0.5463	0.0001	0.0001	0.0000	0.0001	0.0000
0.0007	0.0002	0.0003	0.0385	0.0001	0.0001	0.0001	0.0003	0.0000	0.1127	0.0003	0.0008	0.0001	0.0009	0.0004
0.0002	0.0001	0.0002	0.0118	0.0001	0.0000	0.0001	0.0006	0.0000	0.5470	0.0001	0.0002	0.0000	0.0001	0.0001
0.0002	0.0001	0.0002	0.0120	ud	ud	0.0001	0.0003	0.0000	0.1648	0.0001	0.0002	0.0000	0.0002	0.0001
0.0002	0.0001	0.0002	0.0120	0.0001	0.0000	0.0001	0.0003	0.0000	0.1648	0.0001	0.0002	0.0000	0.0002	0.0001
0.0000	0.0000	0.0002	0.0568	0.0001	0.0000	0.0001	0.0006	0.0000	0.3559	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0002	0.0204	ud	ud	0.0001	0.0002	0.0000	0.0751	0.0000	0.0000	0.0000	0.0000	0.0001
0.0000	0.0000	0.0002	0.0204	0.0001	0.0000	0.0001	0.0002	0.0000	0.0751	0.0000	0.0000	0.0000	0.0000	0.0001

ICP-MS Eu ppm	ICP-MS Gd ppm	ICP-MS Tb ppm	ICP-MS Dy ppm	ICP-MS Ho ppm	ICP-MS Er ppm	ICP-MS Tm ppm	ICP-MS Yb ppm	ICP-MS Lu ppm	ICP-MS Hf ppm	ICP-MS Ta ppm	ICP-MS W ppm	ICP-MS Hg ppm	ICP-MS Tl ppm	ICP-MS Pb ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0005	0.0000	0.0002
0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0017	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0015	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0007	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0012	0.0000	0.0003
0.0005	0.0022	0.0003	0.0014	0.0003	0.0006	0.0001	0.0003	0.0001	0.0000	0.0000	0.0003	0.0002	0.0002	0.0068
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0010	0.0055	0.0000	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0082	0.0000	0.0006
0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0029	0.0000	0.0007
0.0001	0.0004	0.0001	0.0003	0.0001	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0008	0.0000	0.0001	0.0013
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0006	0.0001	0.0004
0.0001	0.0005	0.0001	0.0003	0.0000	0.0001	0.0000	0.0001	0.0000	ud	0.0000	0.0003	0.0008	0.0000	0.0010
0.0001	0.0005	0.0001	0.0003	0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0003	0.0008	0.0000	0.0010
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	ud	0.0000	0.0001	ud	ud	0.0009
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	ud	0.0000	0.0001	ud	ud	0.0009
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	ud	0.0000	0.0001	ud	ud	0.0009
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0014	0.0004	0.0001	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	ud	0.0005	0.0022	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0022	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	0.0046	0.0001	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0009	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0015	0.0000	0.0002
ud	ud	0.0000	ud	ud	0.0000	0.0000	0.0000	0.0000	ud	ud		0.0001	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0002	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0004	0.0000	0.0003
0.0001	0.0002	0.0000	0.0002	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0001	0.0000	0.0003
0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	0.0000	0.0001	ud	0.0000	0.0006
0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0002
ud	0.0000	0.0000	0.0000	ud	0.0000	ud	ud	0.0000	ud	0.0000	0.0025	ud	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0025	0.0000	0.0000	0.0000

ICP-MS Th ppm	ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)
0.0000	0.0031									
0.0000	0.0007	0.358	4.831	0.025	0.100	0.689	0.025	6.040	0.010	56.295
0.0000	0.0007					8.728				
0.0000	0.0027									
0.0000	0.0046	0.226	5.886	0.025	0.100	0.015	0.025	96.370		
0.0000	0.0039	0.025	7.886	0.025	0.100	0.015	0.025	361.448		
0.0000	0.0041	0.025	6.854	0.025	0.100	0.015	0.025	328.076	0.010	162.574
0.0000	0.0049									
0.0000	0.0034		13.180			9.330		27.470	0.010	272.438
0.0002	0.0054	0.572	98.171	0.185	2.447	14.183	0.025	656.374		
0.0000	0.0052									
0.0000	0.0050									
0.0000	0.0022									
0.0002	0.0103	0.859	165.436	0.025	0.100	0.450	0.025	831.803		
0.0000	0.0052								0.010	206.547
0.0001	0.0040									
0.0001	0.0040									
ud	0.0023	1.284	220.184	0.025	0.100	6.040	0.025	431.557		
ud	0.0023									
ud	0.0023	1.407	222.142	0.025	0.100	6.168	0.025	433.591		
0.0000	0.0025									
ud	0.0066									
0.0000	0.0066	0.656	434.468	0.102	1.885	4.827	0.025	165.379		
0.0000	0.0059	0.713	6.885	0.025	0.100	1.070	0.025	51.028		
0.0000	0.0015	0.889	175.786	0.025	0.100	<0.03	0.025	182.265		
0.0000	0.0013	1.602	210.592	0.025	0.100	0.597	0.025	174.835	0.010	66.164
ud	0.0053	0.025	5.630	0.025	0.100	5.292	0.025	240.959		
0.0000	0.0028	0.417	5.878	0.025	0.100	5.538	0.025	226.309	0.010	118.378
0.0000	0.0030	0.492	7.119	0.025	0.100	3.937	0.025	163.338		
0.0000	0.0022	0.355	6.481	0.025	0.100	3.382	0.025	74.033		
0.0000	0.0027	0.754	8.149	0.025	0.100	4.196	0.025	48.387		
ud	0.0029	0.485	10.523	n.a.	n.a.	5.109	n.a.	40.919		
0.0000	0.0029	0.967	20.046	0.025	0.100	1.206	0.025	102.155	0.010	65.451
0.0000	0.0052							100.111	0.010	65.451
ud	0.0035									
0.0000	0.0035	0.536	5.759	0.293	0.100	0.876	0.025	30.466		

ICP-OES Cd (mg/L)	ICP-OES K (mg/L)	ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Lab pH	Field Alkalinity as CaCO3 mg/L
0.013	4.650	15.275	4.489	0.045	699.282	0.010	8.16	130
							8.16	130
								130
0.013	5.364	48.125	7.751	0.031	2637.702	0.010	7.48	180
							8.00	140
0.013	7.477	98.496	13.367	0.037	1374.721	0.275	7.98	170
							8.34	
							8.34	
							7.83	
0.013	32.125	122.903	60.533	0.070	1279.185	0.010	7.96	170
							7.87	
							8.02	140
							8.24	
0.013	76.329	30.758	103.337	0.079	3057.357	0.010	8.42	60
0.013	4.334	33.983	7.815	0.028	2180.733	0.156	8.34	170
							8.74	180
							8.84	140
0.013	6.122	23.632	13.316	0.058	2617.481	0.010	8.14	140
0.013	6.122	23.632	13.316	0.058	2617.481	0.010	8.14	140

HoleID	Sample Number	Depth (mbgs)	Depth Error (mbgs)	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm	ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm
WLC_12-06a	30033B	38.82	0.04	0.0285	0.6867	11.4947	18.6226	0.0451	24.0283	0.0820	5.5505	49.5343	0.0075
WLC_12-06a	30034B	39.78	0.06	0.0424		12.8775	20.6853	0.0106		0.0277	5.1214	53.9330	0.0063
WLC_12-06a	30035B	40.71	0.14	0.0235	0.3252	7.8739	20.2209	0.0886	11.6579	0.0189	5.2602	59.3343	0.0035
WLC_12-06a	30035B-MSREP	40.71	0.14	0.0231	0.3112	7.9598	20.1722	0.0989	11.8314	0.0170	5.2504	59.7128	0.0035
WLC_12-06a	30036B	42.28	0.15	0.0340	0.1903	17.4132	23.1490	0.0899	12.0320	0.0512	6.8427	67.5806	0.0081
WLC_12-06a	30037B	42.96	0.08	0.0340	0.1903	17.4132	23.1490	0.0899	12.0320	0.0512	6.8427	67.5806	0.0081
WLC_12-06a	30038B	43.49	0.18	0.0458	0.4066	23.6146	33.7110	0.1276	15.7854	0.0703	12.5659	88.4419	0.0049
WLC_12-06b	30039A	1.37	0.15										
WLC_12-06b	30040A	1.65	0.12	0.0500	0.2816	224.1537	98.0156	0.0687	31.6780	0.0362	13.0068	198.5105	0.0100
WLC_12-06b	30041A	5.67	0.12	0.0312	0.1629	15.2549	63.2126	0.0305	21.2673	0.0455	6.4073	156.5804	0.0061
WLC_12-06b	30042A	6.31	0.15	0.0297	0.1871	12.9614	71.2128	0.0714	15.4327	0.0342	8.6231	252.6874	0.0047
WLC_12-06b	30043A	7.07	0.12	0.0252	0.1132	9.9008	59.4897	0.1850	7.9948	0.0290	5.8394	208.0904	0.0027
WLC_12-06b	30044A	7.92	0.15	0.0305	0.1375	10.3318	81.7215	0.0797	12.4876	0.0320	6.7990	282.5231	0.0046
WLC_12-06b	30045A	8.73	0.11	0.0363	0.0990	11.3199	112.3706	0.1189	8.1161	0.0357	9.2241	427.1902	0.0033
WLC_12-06b	30046A	10.29	0.14	0.0183	0.1251	5.8206	52.8890	0.0384	9.6361	0.0308	4.3042	160.8167	0.0041
WLC_12-06b	30047A	11.49	0.27	0.0319	0.1983	20.1080	107.6941	0.2226	23.8784	0.0612	6.8827	213.1134	0.0087
WLC_12-06b	30048A	12.76	0.11	0.0277	0.2104	60.2495	148.0622	0.1322	33.1302	0.0492	17.2901	210.6115	0.0104
WLC_12-06b	30048A-REP	12.76	0.11	0.0280	0.2052	60.6006	151.1649	0.1342	36.0566	0.0522	17.1070	208.7829	0.0100
WLC_12-06b	30049A	14.28	0.11	0.0732	0.2364	158.2823	249.9888	0.1063	19.1367	0.0364	26.9919	310.4965	0.0065
WLC_12-06b	30050A	14.86	0.08	0.0465	0.2182	72.3581	123.3577	0.1425	29.1648	0.1046	77.0681	251.0712	0.0098
WLC_12-06b	30051A	16.44	0.08	0.0511	0.3238	84.7981	120.6403	0.0816	20.5894	0.0257	22.5584	242.9656	0.0076
WLC_12-06b	30052A	17.13	0.15	0.0424	0.1439	64.2986	123.8887	0.1410	14.2914	0.0334	24.5601	212.8383	0.0044
WLC_12-06b	30053A	16.87	0.26	0.0243	0.1536	141.3378	90.5709	0.3579	8.9710	0.1219	5.5626	189.4252	0.0033
WLC_12-06b	30054A	17.68	0.09										
WLC_12-06b	30055A	20.25	0.17	0.0616	2.0412	103.2087	149.3063	0.1056	28.3627	0.1168	44.4104	233.0261	0.0092
WLC_12-06b	30056A	21.06	0.12	0.0323	0.1656	60.7180	123.2095	0.1039	12.8134	0.0321	13.5311	225.7169	0.0045
WLC_12-06b	30057A	22.56	0.15										
WLC_12-06b	30058A	24.77	0.23										
WLC_12-06b	30059A	23.53	0.09	0.0400	0.7289	62.2312	109.3066	0.1887	34.9313	0.0504	14.7720	254.7129	0.0124
WLC_12-06b	30060A	25.53	0.08										
WLC_12-07a	30326A	0.62	0.08	0.0054	0.3371	13.3084	19.7522	0.0810	19.1595	0.0797	4.9601	64.0482	0.0069
WLC_12-07a	30327A	1.91	0.08	0.0115	0.3280	4.6980	18.0280	0.0202	14.2021	0.0602	2.6997	71.3247	0.0056
WLC_12-07a	30328A	2.56	0.09	0.0269	0.3013	14.8070	70.6284	0.0797	7.5110	0.0943	6.1974	370.0778	0.0036
WLC_12-07a	30329A	3.60	0.06	0.1058	0.4017	47.4838	180.7136	0.0221	26.6515	0.0689	22.1183	698.2545	0.0103
WLC_12-09b	30229A	0.40	0.09	0.0108	0.6902	33.5109	48.4301	0.1035	38.0074	0.1685	1.7734	141.6164	0.0156
WLC_12-09b	30230A	1.20	0.14	0.0130	0.4673	9.5369	32.7301	0.0273	31.2562	0.1042	5.0134	98.6301	0.0126
WLC_12-09b	30231A	1.95	0.12										
WLC_12-09b	30232A	3.47	0.12										

ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm	ICP-MS Ga ppm	ICP-MS Ge ppm	ICP-MS As ppm	ICP-MS Se ppm	ICP-MS Rb ppm	ICP-MS Sr ppm
0.0046	0.0022	0.0041	0.0221	0.0807	0.0006	0.0162	0.0167	0.0168	0.0000	0.0000	0.0015	0.0187	0.0029	0.6977
0.0037	0.0024	0.0023	0.0467	ud	0.0004	0.0072	0.0121	0.0801	ud	0.0000	0.0012	0.0108	0.0037	0.2556
0.0043	0.0013	0.0012	0.0880	0.0271	0.0005	0.0081	0.0046	0.0585	0.0000	0.0000	0.0009	0.0037	0.0028	0.1648
0.0061	0.0015	0.0012	0.0885	0.0450	0.0006	0.0080	0.0047	0.0605	0.0000	0.0000	0.0009	0.0062	0.0029	0.1627
0.0039	0.0022	0.0026	0.0894	0.2468	0.0009	0.0089	0.0076	0.0683	ud	0.0000	0.0013	0.0092	0.0045	0.4029
0.0039	0.0022	0.0026	0.0894	0.2468	0.0009	0.0089	0.0076	0.0683	0.0000	0.0000	0.0013	0.0092	0.0045	0.4029
0.0043	0.0036	0.0075	0.0968	0.1928	0.0011	0.0136	0.0121	0.0556	0.0000	0.0000	0.0056	0.0537	0.0026	0.4045
0.0066	0.0025	0.0217	0.1706	0.1385	0.0018	0.0221	0.0128	0.1527	0.0000	0.0000	0.0016	0.0090	0.0106	0.4021
0.0037	0.0022	0.0029	0.2883	0.6046	0.0033	0.0193	0.0095	0.1022	0.0000	0.0001	0.0020	0.0160	0.0045	0.2455
0.0031	0.0020	0.0059	0.6068	0.0653	0.0027	0.0273	0.0085	0.0942	0.0000	0.0000	0.0013	0.0127	0.0074	0.5074
0.0022	0.0013	0.0029	0.2735	0.1014	0.0017	0.0158	0.0054	0.0933	0.0000	0.0000	0.0013	0.0130	0.0042	0.3098
0.0030	0.0015	0.0027	0.7597	0.1022	0.0035	0.0230	0.0180	0.1129	0.0000	0.0001	0.0016	0.0177	0.0048	0.3783
0.0092	0.0022	0.0024	0.6610	0.1277	0.0038	0.0312	0.0054	0.1195	0.0000	0.0001	0.0012	0.0130	0.0053	0.5603
0.0024	0.0015	0.0016	0.1971	0.0257	0.0010	0.0169	0.0073	0.1384	0.0000	0.0000	0.0018	0.0229	0.0037	0.2150
0.0059	0.0037	0.0189	0.1595	0.1488	0.0014	0.0250	0.0104	0.1434	0.0000	0.0000	0.0207	0.2684	0.0048	0.3783
0.0063	0.0038	0.0042	0.2251	0.0773	0.0027	0.0818	0.0201	0.0641	0.0000	0.0001	0.0107	0.2390	0.0115	0.5799
0.0061	0.0038	0.0041	0.2280	0.0855	0.0028	0.0842	0.0204	0.0651	0.0000	0.0012	0.0129	0.2423	0.0119	0.5836
0.0042	0.0034	0.0028	0.4118	0.0746	0.0026	0.0312	0.0091	0.0977	0.0000	0.0002	0.0108	0.2407	0.0067	0.6933
0.0058	0.0035	0.0061	0.1916	0.2027	0.0015	0.0297	0.0103	0.0429	0.0000	0.0001	0.0074	0.1811	0.0101	0.6512
0.0046	0.0033	0.0024	0.2338	0.0506	0.0016	0.0490	0.0268	0.1302	0.0000	0.0000	0.0133	0.3514	0.0121	0.7334
0.0029	0.0037	0.0031	0.1723	0.0727	0.0015	0.0529	0.0365	0.0307	0.0000	0.0011	0.0072	0.2103	0.0121	0.6118
0.0100	0.0028	0.0035	0.2334	0.2847	0.0025	0.0548	0.0510	0.1375	0.0000	0.0008	0.0059	0.1693	0.0055	0.4253
0.0065	0.0026	0.0044	0.3743	0.1544	0.0016	0.0246	0.0447	0.2317	0.0000	0.0015	0.0105	0.2945	0.0079	0.6164
0.0029	0.0026	0.0022	0.1480	0.0672	0.0012	0.0303	0.0237	0.0339	0.0000	0.0006	0.0035	0.1114	0.0083	0.5760
0.0081	0.0026	0.0089	0.1664	0.0688	0.0018	0.0444	0.0135	0.1903	0.0000	0.0016	0.0168	0.3344	0.0046	0.6447
0.0042	0.0026	0.0026	0.0672	0.0375	0.0007	0.0120	0.0082	0.1464	0.0000	0.0000	0.0013	0.0084	0.0021	0.2146
0.0034	0.0032	0.0020	0.0260	0.0468	0.0002	0.0047	0.0055	0.0220	0.0000	0.0000	0.0023	0.0329	0.0018	0.1813
0.0022	0.0021	0.0024	0.3239	0.0760	0.0016	0.0185	0.0086	0.0742	0.0000	0.0000	0.0055	0.0577	0.0029	0.4568
0.0066	0.0013	0.0050	0.4215	0.0569	0.0028	0.0741	0.0141	0.1938	0.0000	0.0001	0.0345	0.4195	0.0102	1.7014
0.0088	0.0050	0.0052	0.1915	0.1748	0.0023	0.0204	0.0105	0.1573	0.0000	0.0001	0.0005	0.0003	0.0009	0.2490
0.0070	0.0027	0.0033	0.1099	0.0651	0.0009	0.0117	0.0119	0.1124	0.0000	0.0000	0.0001	0.0012	0.0048	0.2043

ICP-MS Y ppm	ICP-MS Zr ppm	ICP-MS Nb ppm	ICP-MS Mo ppm	ICP-MS Ag ppm	ICP-MS Cd ppm	ICP-MS Sn ppm	ICP-MS Sb ppm	ICP-MS Cs ppm	ICP-MS Ba ppm	ICP-MS La ppm	ICP-MS Ce ppm	ICP-MS Pr ppm	ICP-MS Nd ppm	ICP-MS Sm ppm
0.0001	0.0000	0.0002	0.0669	0.0001	0.0000	0.0001	0.0024	0.0000	0.5902	0.0000	0.0001	0.0000	0.0000	0.0000
ud	ud	0.0003	0.0077	ud	0.0001	0.0000	0.0003	0.0000	0.0720	0.0000	0.0000	0.0000	ud	0.0002
0.0001	0.0001	0.0001	0.0054	0.0001	0.0001	0.0000	0.0002	0.0001	0.2658	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0001	0.0001	0.0055	0.0001	0.0001	0.0000	0.0002	0.0001	0.2631	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0000	0.0002	0.0228	ud	0.0002	0.0002	0.0004	0.0000	0.5947	0.0000	0.0000	0.0000	0.0000	0.0001
0.0001	0.0000	0.0002	0.0228	0.0001	0.0002	0.0002	0.0004	0.0000	0.5947	0.0000	0.0000	0.0000	0.0000	0.0001
0.0003	0.0003	0.0002	0.0260	0.0001	0.0001	0.0001	0.0008	0.0000	0.9138	0.0001	0.0002	0.0000	0.0002	0.0000
0.0002	0.0002	0.0003	0.0257	0.0001	0.0004	0.0002	0.0006	0.0001	1.5793	0.0001	0.0001	0.0000	0.0000	0.0000
0.0002	0.0002	0.0001	0.0134	0.0001	0.0002	0.0001	0.0007	0.0000	0.5517	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0002	0.0002	0.0190	0.0001	0.0004	0.0001	0.0017	0.0001	0.2686	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0002	0.0186	0.0001	0.0004	0.0002	0.0024	0.0000	0.1216	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0002	0.0124	0.0001	0.0005	0.0003	0.0022	0.0000	0.3358	0.0006	0.0007	0.0000	0.0000	0.0000
0.0001	0.0002	0.0003	0.0194	0.0001	0.0004	0.0001	0.0023	0.0000	0.4948	0.0000	0.0000	0.0000	0.0001	0.0000
0.0001	0.0001	0.0002	0.0063	0.0001	0.0002	0.0000	0.0011	0.0000	0.3445	0.0000	0.0000	0.0000	0.0000	0.0000
0.0003	0.0002	0.0002	0.0255	0.0001	0.0002	0.0002	0.0003	0.0000	0.5964	0.0001	0.0002	0.0000	0.0002	0.0000
0.0001	0.0002	0.0002	0.0493	0.0001	0.0004	0.0002	0.0006	0.0001	0.1721	0.0001	0.0001	0.0000	0.0000	0.0000
0.0001	0.0002	0.0002	0.0514	0.0001	0.0004	0.0002	0.0006	0.0001	0.1750	0.0001	0.0001	0.0000	0.0000	0.0000
0.0001	0.0002	0.0002	0.0552	0.0001	0.0004	0.0001	0.0003	0.0001	0.4977	0.0001	0.0001	0.0000	0.0001	0.0000
0.0002	0.0002	0.0001	0.0321	0.0003	0.0002	0.0002	0.0005	0.0004	0.1788	0.0001	0.0002	0.0000	0.0001	0.0001
0.0001	0.0001	0.0001	0.0207	0.0001	0.0002	0.0001	0.0005	0.0001	0.8423	0.0001	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0002	0.0313	0.0000	0.0003	0.0001	0.0003	0.0001	0.2135	0.0000	0.0000	0.0000	0.0000	0.0000
0.0008	0.0003	0.0002	0.0196	0.0001	0.0004	0.0002	0.0004	0.0001	0.6123	0.0004	0.0010	0.0001	0.0007	0.0002
0.0002	0.0005	0.0004	0.0367	0.0010	0.0003	0.0003	0.0007	0.0006	1.0992	0.0002	0.0002	0.0000	0.0001	0.0001
0.0001	0.0001	0.0002	0.0266	0.0001	0.0002	0.0001	0.0003	0.0000	0.1369	0.0000	0.0001	0.0000	0.0000	0.0000
0.0002	0.0002	0.0002	0.0404	0.0001	0.0003	0.0002	0.0006	0.0000	0.7098	0.0002	0.0001	0.0000	0.0001	0.0000
0.0002	0.0002	0.0001	0.0421	0.0001	0.0000	0.0001	0.0018	0.0000	0.7253	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0000	0.0003	0.0132	0.0001	0.0000	0.0000	0.0006	0.0000	0.2941	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0001	0.0002	0.0113	0.0001	0.0002	0.0001	0.0020	0.0000	0.5344	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0009	0.0002	0.0252	0.0004	0.0003	0.0002	0.0011	0.0001	0.0860	0.0001	0.0000	0.0000	0.0000	0.0000
0.0002	0.0002	0.0001	0.0118	0.0000	0.0002	0.0020	0.0008	0.0000	1.4157	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0001	0.0001	0.0107	0.0001	0.0000	0.0002	0.0006	0.0000	0.0400	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Hg	Tl	Pb
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000	0.0002
ud	ud	0.0000	ud	ud	ud	ud	ud	0.0000	ud	0.0000		0.0059	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	0.0000	ud	0.0000	0.0004	0.0012	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0012	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0003	0.0000	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0001	0.0009
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0001	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0007
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0026
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0032	0.0005	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0031	0.0009	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0013	0.0003	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0003	0.0002	0.0015
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0006	0.0002	0.0003
0.0000	0.0002	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0004	0.0004	0.0000	0.0012
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0017	0.0000	0.0022
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0001	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0001	0.0000	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0117	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0013	0.0000	0.0000	0.0007

ICP-MS Th ppm	ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)
0.0000	0.0058									
ud	0.0032	0.581	9.372	0.025	0.100	0.431	0.025	47.686		
0.0000	0.0019	0.114	3.480	0.025	0.100	0.739	0.025	55.930	0.010	57.049
0.0000	0.0020	0.114	3.480	0.025	0.100	0.739	0.025	55.930	0.010	57.049
ud	0.0028	0.025	29.696	0.025	0.100	0.969	0.025	57.002		
0.0000	0.0028	0.327	48.357	0.025	2.355	0.549	0.025	127.768		
0.0000	0.0058	0.847	48.291	0.025	0.100	0.294	0.025	128.049		
0.0000	0.0040									
0.0000	0.0047	0.486	23.032			0.280		386.842		
0.0000	0.0064		7.698					706.681	0.010	265.576
0.0000	0.0049		5.855					542.123	0.010	215.122
0.0000	0.0068								0.010	294.916
0.0000	0.0084		8.737					1387.512	0.010	433.702
0.0000	0.0056	0.218	5.402					368.748	0.010	179.347
0.0000	0.0071									
0.0000	0.0058	0.546	373.856	0.998		13.897		1106.862		
0.0000	0.0057	0.546	373.856	0.998		13.897		1106.862		
0.0000	0.0068									
0.0000	0.0073									
0.0000	0.0065									
0.0000	0.0047								0.010	199.989
0.0000	0.0035	1.075	286.022			6.213		402.999		
0.0000	0.0050									
0.0000	0.0038	1.118	152.956	0.248		6.069		652.078		
0.0000	0.0050									
0.0000	0.0030	0.500	10.427			7.332		72.908		
0.0000	0.0033	0.275	19.587					104.059	0.010	73.706
0.0000	0.0059	0.454	30.833			0.832		843.480	0.010	324.695
0.0000	0.0174									
0.0000	0.0034									
0.0000	0.0027	0.372	33.956	0.025	0.100	19.702	0.025	41.277		

ICP-OES Cd (mg/L)	ICP-OES K (mg/L)	ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Lab pH	Field Alkalinity as CaCO3 mg/L
							8.72	90
								160
0.013	4.704	18.476	6.403	0.042	2383.529	0.010	8.09	160
0.013	4.704	18.476	6.403	0.042	2383.529	0.010	8.09	160
							8.41	140
							8.83	
							8.02	
							8.46	
0.013	7.168	78.384	11.152	0.039	1833.751	0.010	7.46	
0.013	5.652	63.603	9.003	0.082	1701.852	0.010	7.27	
0.013	7.084	94.064	9.596	0.039	1141.444	0.010	8.67	
0.013	8.618	125.587	11.472	0.036	2514.072	0.010	7.85	
0.013	4.497	62.566	6.581	0.045	4570.178	0.010	8.10	
							8.08	
							8.47	
							8.47	
							8.09	
							8.00	
							8.08	
0.014	22.842	121.592	56.366	0.032	230.741	0.253	7.94	
							8.01	
							8.68	
							8.23	
							8.36	
							8.44	
0.013	2.348	21.103	4.543	0.070	2249.181	0.044	8.52	
0.013	6.902	79.466	13.241	0.112	2979.549	0.063	8.59	
							8.15	
							8.35	

HoleID	Sample Number	Depth (mbgs)	Depth Error (mbgs)	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm	ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm
WLC_12-09b	30233A	4.24	0.09										
WLC_12-09b	30234A	5.15	0.12										
WLC_12-09b	30235A	6.54	0.08										
WLC_12-09b	30236A	7.18	0.08										
WLC_12-09b	30237A	8.14	0.09										
WLC_12-09b	30238A	9.54	0.12										
WLC_12-09b	30239A	10.38	0.08										
WLC_12-09b	30240A	8.00	0.08										
WLC_12-09b	30241A-1	12.13	0.06	0.0289	0.0955	11.0385	91.2548	0.2444	11.1586	0.0468	9.5795	415.1660	0.0053
WLC_12-09b	30241A-2	12.13	0.06	0.0289	0.0946	10.7488	90.4264	0.2397	13.7286	0.0503	9.4692	430.7650	0.0053
WLC_12-09b	30242A-1	12.80	0.06	0.0271	0.1758	8.7387	83.9701	0.2068	8.3849	0.0577	9.4123	311.3651	0.0038
WLC_12-09b	30242A-2	12.80	0.06	0.0247	0.2221	8.2572	84.1809	0.1661	6.2971	0.0699	7.6054	312.9271	0.0027
WLC_12-09b	30243A	14.04	0.08										
WLC_12-09b	30244A	14.04	0.08										
WLC_12-09b	30245A	16.57	0.08	0.0408	0.1761	31.7669	69.3363	0.1586	30.5271	0.0370	26.8688	132.3724	0.0124
WLC_12-09b	30246A	17.19	0.09										
WLC_12-09b	30247A	18.64	0.11	0.0410	0.2396	29.9989	82.1044	0.1863	25.6300	0.0778	5.1898	142.4984	0.0104
WLC_12-09b	30248A	19.60	0.09										
WLC_12-09b	30249A-1	20.45	0.15	0.0884	0.2582	92.3747	126.1564	0.1351	20.9371	0.0599	30.7943	182.4484	0.0086
WLC_12-09b	30249A-2	20.45	0.15	0.0867	0.2636	88.6364	124.1910	0.2316	20.5311	0.0528	29.1975	180.5295	0.0090
WLC_12-09b	30250A	21.72	0.11										
WLC_12-09b	30251A	22.60	0.11										
WLC_12-09b	30252A	23.56	0.09										
WLC_12-09b	30253A	24.54	0.12	0.0485	0.8398	61.7372	90.1277	0.1432	43.4168	0.0638	31.2421	145.2288	0.0197
WLC_12-09b	30254A	25.45	0.06										
WLC_12-09b	30255A	26.41	0.11	0.0584	0.3287	79.0718	93.6323	0.2176	21.4870	0.0840	24.7679	151.8092	0.0097
WLC_12-09b	30256A	27.20	0.11	0.0449	0.1925	39.2753	78.5817	0.1574	19.8194	0.0831	14.9197	128.0526	0.0091
WLC_12-09b	30256A	27.20	0.11	0.0452	0.1822	44.2087	82.8694	0.1961	19.9689	0.0640	34.8557	126.9345	0.0092
WLC_12-09b	30256A-Rep	27.20	0.11	0.0442	0.1800	41.9843	81.1400	0.2051	19.5140	0.0592	34.0102	123.1462	0.0090
WLC_12-09b	30257A	27.92	0.06	0.0498	0.3889	55.4460	84.2732	0.1575	18.2018	0.0943	24.9906	136.4103	0.0084
WLC_12-09b	30258A-1	29.61	0.08	0.0974	0.3958	120.1296	138.1284	0.1156	18.4751	0.0850	43.9349	148.9343	0.0083
WLC_12-09b	30258A-2	29.61	0.08	0.0931	0.3811	119.5315	132.3778	0.2101	18.2886	0.0824	44.3280	141.7552	0.0083
WLC_12-09b	30259A	30.91	0.09										
WLC_12-09b	30260A	31.64	0.09	0.0506	0.3349	102.4659	111.7151	0.0678	28.1209	0.1134	19.6226	168.0507	0.0127
WLC_12-09b	30261A	32.58	0.12	0.0492	0.2868	50.6274	61.0425	0.0739	18.8664	0.1978	16.1198	98.4438	0.0086
WLC_12-09b	30261A-ICSRep	32.58	0.12	0.0492	0.2868	50.6274	61.0425	0.0739	18.8664	0.1978	16.1198	98.4438	0.0086
WLC_12-09b	30261A-ICSRep	32.58	0.12	0.0492	0.2868	50.6274	61.0425	0.0739	18.8664	0.1978	16.1198	98.4438	0.0086

ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Rb	Sr
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0033	0.0042	0.0028	0.8171	0.0576	0.0023	0.0280	0.0025	0.2914	0.0000	0.0001	0.0022	0.0038	0.0059	0.3437
0.0035	0.0043	0.0017	0.8269	0.0300	0.0023	0.0278	0.0032	0.2981	0.0000	0.0002	0.0017	0.0025	0.0062	0.3535
0.0026	0.0027	0.0020	0.4197	0.0718	0.0017	0.0200	0.0021	0.2562	0.0000	0.0001	0.0002	0.0047	0.0031	0.3225
0.0025	0.0015	0.0016	0.3268	0.0576	0.0030	0.0350	0.0032	0.1760	0.0000	0.0001	0.0004	0.0108	0.0022	0.2638
0.0107	0.0028	0.0050	0.1366	0.0701	0.0012	0.0154	0.0030	0.1432	0.0000	0.0001	0.0015	0.0042	0.0050	0.3780
0.0069	0.0027	0.0036	0.1544	0.0707	0.0017	0.0215	0.0076	0.1483	0.0000	0.0001	0.0000	0.0096	0.0036	0.3146
0.0053	0.0030	0.0030	0.3226	0.0474	0.0058	0.0370	0.0143	0.2346	0.0000	0.0002	0.0033	0.0327	0.0121	0.7198
0.0057	0.0030	0.0035	0.3170	0.0945	0.0057	0.0366	0.0146	0.2277	0.0000	0.0001	0.0022	0.0330	0.0121	0.7207
0.0109	0.0035	0.0056	0.1303	0.0930	0.0031	0.0256	0.0284	0.1599	0.0000	0.0001	0.0052	0.0810	0.0072	0.4559
0.0054	0.0025	0.0037	0.2307	0.0536	0.0039	0.0271	0.0173	0.1357	0.0000	0.0001	0.0022	0.0214	0.0103	0.4281
0.0051	0.0041	0.0028	0.1100	0.0686	0.0034	0.0247	0.0160	0.1353	0.0000	0.0001	0.0027	0.0696	0.0072	0.3818
0.0054	0.0043	0.0057	0.1079	0.1120	0.0034	0.0237	0.0175	0.1427	0.0000	0.0001	0.0036	0.0682	0.0074	0.3786
0.0069	0.0043	0.0053	0.1065	0.1104	0.0032	0.0237	0.0169	0.1395	0.0000	0.0004	0.0038	0.0701	0.0074	0.3738
0.0052	0.0022	0.0021	0.1498	0.0827	0.0018	0.0171	0.0181	0.0652	0.0000	0.0000	0.0042	0.0649	0.0078	0.3497
0.0049	0.0034	0.0028	0.1389	0.0502	0.0023	0.0124	0.0019	0.2885	0.0000	0.0001	0.0027	0.0142	0.0109	0.5000
0.0053	0.0033	0.0030	0.1336	0.0563	0.0020	0.0122	0.0024	0.2787	0.0000	0.0001	0.0032	0.0102	0.0106	0.4874
0.0070	0.0034	0.0023	0.1983	0.0604	0.0010	0.0124	0.0025	0.4000	0.0000	0.0001	0.0048	0.0495	0.0122	0.5539
0.0046	0.0026	0.0032	0.1519	0.0537	0.0035	0.0215	0.0228	0.1258	0.0000	0.0001	0.0018	0.0040	0.0070	0.3468
0.0046	0.0026	0.0032	0.1519	0.0537	0.0035	0.0215	0.0228	0.1258	0.0000	0.0001	0.0018	0.0040	0.0070	0.3468
0.0046	0.0026	0.0032	0.1519	0.0537	0.0035	0.0215	0.0228	0.1258	0.0000	0.0001	0.0018	0.0040	0.0070	0.3468
0.0074	0.0046	0.0272	0.1128	0.1424	0.0013	0.0084	0.0043	0.1527	0.0000	0.0001	0.0001	0.0020	0.0067	0.2289
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Y ppm	Zr ppm	Nb ppm	Mo ppm	Ag ppm	Cd ppm	Sn ppm	Sb ppm	Cs ppm	Ba ppm	La ppm	Ce ppm	Pr ppm	Nd ppm	Sm ppm
0.0001	0.0001	0.0000	0.0068	0.0001	0.0001	0.0001	0.0021	0.0000	0.1965	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0069	0.0001	0.0002	0.0001	0.0021	0.0000	0.1998	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0002	0.0145	0.0003	0.0003	0.0001	0.0014	0.0000	0.1675	0.0001	0.0001	0.0000	0.0000	0.0000
0.0001	0.0001	0.0002	0.0321	0.0001	0.0002	0.0001	0.0013	0.0000	0.1605	0.0001	0.0001	0.0000	0.0001	0.0000
0.0000	0.0001	0.0000	0.0260	0.0003	0.0000	0.0001	0.0007	0.0001	0.0662	0.0001	0.0001	0.0000	0.0000	0.0000
0.0001	0.0005	0.0001	0.0304	0.0001	0.0003	0.0001	0.0011	0.0000	0.3347	0.0000	0.0001	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0654	0.0001	0.0002	0.0001	0.0015	0.0001	0.2602	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0656	0.0001	0.0003	0.0001	0.0016	0.0001	0.2592	0.0000	0.0001	0.0000	0.0000	0.0000
0.0000	0.0001	0.0001	0.0571	0.0009	0.0002	0.0001	0.0008	0.0000	0.0924	0.0001	0.0000	0.0000	0.0000	0.0000
0.0001	0.0003	0.0001	0.0749	0.0000	0.0001	0.0001	0.0008	0.0001	0.4345	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0001	0.0438	0.0001	0.0000	0.0001	0.0007	0.0001	0.0934	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0434	0.0003	0.0001	0.0001	0.0007	0.0001	0.0952	0.0001	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0435	0.0003	0.0002	0.0001	0.0007	0.0001	0.0950	0.0001	0.0001	0.0000	0.0000	0.0000
0.0002	0.0001	0.0001	0.0610	0.0015	0.0001	0.0001	0.0006	0.0001	0.0781	0.0001	0.0001	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0898	0.0001	0.0000	0.0001	0.0010	0.0001	0.2860	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0001	0.0882	0.0001	0.0000	0.0001	0.0010	0.0001	0.2833	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.2516	0.0001	0.0000	0.0001	0.0006	0.0001	0.0875	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.1263	0.0001	0.0001	0.0001	0.0009	0.0000	0.2999	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.1263	0.0001	0.0001	0.0001	0.0009	0.0000	0.2999	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.1263	0.0001	0.0001	0.0001	0.0009	0.0000	0.2999	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0001	0.0257	0.0022	0.0001	0.0001	0.0006	0.0000	0.0686	0.0001	0.0001	0.0000	0.0001	0.0000
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Eu ppm	Gd ppm	Tb ppm	Dy ppm	Ho ppm	Er ppm	Tm ppm	Yb ppm	Lu ppm	Hf ppm	Ta ppm	W ppm	Hg ppm	Tl ppm	Pb ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0001	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0004	0.0001	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0003	0.0001	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0029	0.0005	0.0001	0.0008
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0000	0.0001	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0021	0.0000	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0003	0.0001	0.0022
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0001	0.0022
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0015	0.0002	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0009	0.0001	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0023	0.0001	0.0007
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018	0.0011	0.0001	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0087	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0087	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0087	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0003	0.0001	0.0006
ICP-MS	ICP-MS	ICS		ICS	ICS		ICS	ICS		ICS	ICS	ICP-OES	ICP-OES	

Th ppm	U ppm	Flouride as mg/L F	Chloride as mg/L Cl	Nitrite as mg/L N	Bromide as mg/L Br	Nitrate as mg/L N	Phosphate as mg/L P	Sulphate as mg/L SO4	As (mg/L)	Ca (mg/L)
									0.010	410.683
0.0000	0.0034	1.790	14.269	0.025	0.100	0.566	0.025	862.237	0.010	337.066
0.0000	0.0035	1.790	14.269	0.025	0.100	0.566	0.025	862.237	0.010	337.066
0.0000	0.0028	0.025	3.815	0.025	0.100	0.015	0.025	743.623	0.010	287.916
0.0000	0.0023	0.025	4.097	0.025	0.100	0.285	0.025	775.087	0.010	293.040
0.0000	0.0031									
0.0000	0.0037	0.787	52.915	0.025	0.100	7.874	0.025	355.729		
0.0000	0.0051	1.271	148.915	0.025	0.100	5.909	0.025	528.001		
0.0000	0.0051	1.002	148.422	0.025	0.100	5.927	0.025	523.386		
0.0000	0.0052									
0.0000	0.0041	1.780	186.122	0.025	0.672	4.004	0.025	804.823		
0.0000	0.0032									
0.0000	0.0031									
0.0000	0.0033									
0.0000	0.0030	0.862	141.695	0.025	1.472	5.827	0.025	298.099		
0.0000	0.0057	1.635	308.561	0.025	2.137	2.064	0.025	353.364		
0.0000	0.0057	1.635	308.561	0.025	2.137	2.064	0.025	353.364		
0.0000	0.0044	0.941	257.175	0.025	0.100	4.401	0.025	428.665		
0.0000	0.0033	1.065	92.697	0.025	1.119	3.430	0.025	197.448	0.010	100.307
0.0000	0.0033	0.909	86.600	0.025	0.100	3.368	0.025	200.026	0.010	100.307
0.0000	0.0033	0.569	88.481	0.025	0.100	3.495	0.025	200.292	0.010	100.307
0.0000	0.0030	0.328	50.787	0.025	0.100	3.275	0.025	111.031		

ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES Field Alkalinity

Cd (mg/L)	K (mg/L)	Mg (mg/L)	Na (mg/L)	P (mg/L)	S (mg/L)	Se (mg/L)	Lab pH	as CaCO3 mg/L
0.013	10.775	103.139	12.372	0.045	441.947	0.010	8.39	
0.013	7.929	75.981	9.129	0.047	326.500	0.010	8.37	
0.013	7.929	75.981	9.129	0.047	326.500	0.010	8.37	
0.013	7.492	67.639	8.492	0.030	286.397	0.010	8.44	
0.013	7.618	71.273	8.646	0.050	279.593	0.010	8.44	
							8.36	
							8.36	
							8.40	
							8.91	
							8.73	
							8.55	
							8.55	
							8.51	
							8.47	
							8.63	
							8.63	
							8.63	
							8.40	
							8.54	
							8.54	
							8.26	
0.013	14.327	51.592	40.355	0.195	89.436	0.010	8.62	
0.013	14.327	51.592	40.355	0.195	89.436	0.010	8.62	
0.013	14.327	51.592	40.355	0.195	89.436	0.010	8.62	
							8.70	

HoleID Sample Number Depth Depth ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

		(mbgs)	Error (mbgs)	Li ppm	B ppm	Na ppm	Mg ppm	Al ppm	Si ppm	P ppm	K ppm	Ca ppm	Sc ppm
WLC_12-09b	30263A-1	34.66	0.09	0.0345	0.2068	39.7769	43.4502	0.1507	31.8252	0.0512	7.1843	79.6515	0.0138
WLC_12-09b	30263A-2	34.66	0.09	0.0342	0.1829	39.9366	43.3444	0.2671	34.6157	0.0440	14.3837	76.3134	0.0134
WLC_12-09b	30263A-2-Rep	34.66	0.09	0.0348	0.1899	39.2908	44.9583	0.2868	35.3522	0.0455	14.6437	79.3670	0.0142
WLC_12-09b	30264A	35.49	0.11	0.0754	0.5010	93.2856	114.0955	0.1609	15.8813	0.0850	26.7383	138.6475	0.0073
WLC_12-09b	30265A	36.35	0.08	0.0599	0.2818	64.6644	70.1389	0.1252	58.0331	0.0680	12.9287	117.2411	0.0262
WLC_12-09b	30265A-Rep	36.35	0.08	0.0607	0.2888	64.8535	70.8597	0.2668	70.1161	0.0665	12.7721	120.3252	0.0271
WLC_12-09b	30266A	37.57	0.11										
WLC_12-09b	30267A	38.54	0.14										
WLC_12-09b	30268A	39.97	0.08	0.3421	1.7618	708.5237	101.9302	0.1328	11.3576	0.2019	8.0170	252.2016	0.0060
WLC_12-09b	30268A-Rep	39.97	0.08	0.3849	1.9559	664.5717	97.0547	0.2261	16.2584	0.1276	3.1822	297.3325	0.0058
WLC_12-09b	30268A-Rep	39.97	0.08	0.3937	1.9715	681.7400	98.2320	0.2276	16.1389	0.1275	3.1099	297.8130	0.0060
WLC_12-09b	30269A-1	40.89	0.05	0.5713	1.6076	747.3694	60.6463	0.0217	20.8948	0.1619	0.0008	110.4232	0.0092
WLC_12-09b	30269A-2	40.89	0.05	0.5617	1.6105	754.5401	61.0655	0.2057	17.2791	0.1851	0.0008	111.3354	0.0092
WLC_12-09b	30270A	41.45	0.03	0.0888	1.3827	457.5257	7.7750	0.1449	13.3199	0.2070	0.0008	19.9246	0.0070
WLC_12-09b	30270A-OESRep	41.45	0.03	0.0888	1.3827	457.5257	7.7750	0.1449	13.3199	0.2070	0.0008	19.9246	0.0070
WLC_12-09b	30271A	42.89	0.09										
WLC_12-09b	30272A	43.89	0.06	7.5783	2.7152	2679.4896	473.3033	0.1805	63.2736	0.1855	82.5799	663.1396	0.0234
WLC_12-09b	30273A	46.06	0.15										
WLC_12-09b	30274A	44.55	0.20										
WLC_12-09b	30275A	45.31	0.11										
WLC_12-10b	30276A	0.53	0.11										
WLC_12-10b	30277A	1.36	0.14										
WLC_12-10b	30278A	1.89	0.12										
WLC_12-10b	30279A	2.64	0.11										
WLC_12-10b	30280A	3.60	0.12										
WLC_12-10b	30281A-1	5.03	0.06	0.0224	0.1526	17.0462	50.5748	0.0125	9.8514	0.0280	8.0705	164.3041	0.0035
WLC_12-10b	30281A-1-Rep	5.03	0.06	0.0228	0.1637	18.6924	52.9394	0.0091	7.5409	0.0410	8.9485	168.6917	0.0037
WLC_12-10b	30281A-2	5.03	0.06	0.0226	0.1403	17.2876	51.7627	0.1289	10.0079	0.0401	7.1311	162.4964	0.0034
WLC_12-10b	30281A-3	5.03	0.06	0.0229	0.1633	17.7228	52.0498	0.1040	10.0101	0.0324	8.2268	164.4520	0.0034
WLC_12-10b	30282A-1	5.85	0.06	0.0175	0.1271	9.1993	37.3720	0.1287	4.8693	0.0508	3.1399	109.1255	0.0027
WLC_12-10b	30282A-2	5.85	0.06	0.0175	0.1275	9.3033	37.7825	0.0688	5.0489	0.0492	3.1305	109.9507	0.0025
WLC_12-10b	30282A-3	5.85	0.06	0.0179	0.1128	8.6022	38.6567	0.0120	5.1878	0.0568	3.2303	110.4169	0.0026
WLC_12-10b	30283A-1	7.01	0.09	0.0122	0.2191	7.9588	32.9806	0.1177	6.7283	0.0601	3.8365	98.9361	0.0032
WLC_12-10b	30283A-2	7.01	0.09	0.0122	0.2158	10.2160	32.7811	0.1254	6.9898	0.0525	3.7084	97.8400	0.0031
WLC_12-10b	30284A-1	8.08	0.06	0.0128	0.1348	8.5839	33.5216	0.0460	8.6055	0.0337	3.6965	111.1372	0.0030
WLC_12-10b	30284A-2	8.08	0.06	0.0130	0.1382	8.6809	35.0379	0.0414	6.1861	0.0337	3.7511	116.5091	0.0033
WLC_12-10b	30285A	9.68	0.08	0.0117	0.1899	13.3811	31.2414	0.1448	16.1179	0.0406	32.0061	94.3925	0.0057

ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

Ti ppm	V ppm	Cr ppm	Mn ppm	Fe ppm	Co ppm	Ni ppm	Cu ppm	Zn ppm	Ga ppm	Ge ppm	As ppm	Se ppm	Rb ppm	Sr ppm
0.0077	0.0030	0.0132	0.0937	0.0693	0.0007	0.0065	0.0020	0.2969	0.0000	0.0001	0.0001	0.0018	0.0086	0.3114
0.0083	0.0035	0.0142	0.0917	0.1198	0.0007	0.0065	0.0017	0.2815	0.0000	0.0001	0.0009	0.0003	0.0086	0.3022
0.0096	0.0035	0.0144	0.0941	0.1274	0.0007	0.0065	0.0018	0.2833	0.0000	0.0001	0.0010	0.0029	0.0085	0.3036
0.0059	0.0026	0.0033	0.1147	0.0689	0.0013	0.0203	0.0151	0.0833	0.0000	0.0001	0.0019	0.0111	0.0122	0.4749
0.0148	0.0054	0.0111	0.0884	0.0458	0.0013	0.0181	0.0186	0.1260	0.0000	0.0001	0.0034	0.0145	0.0076	0.3509
0.0152	0.0053	0.0117	0.0869	0.0715	0.0013	0.0175	0.0181	0.1167	0.0000	0.0001	0.0028	0.0159	0.0078	0.3489
0.0044	0.0040	0.0025	0.5171	0.0709	0.0026	0.0233	0.0715	0.2571	0.0000	0.0005	0.0040	0.0265	0.0100	2.7403
0.0048	0.0042	0.0015	0.5921	0.0339	0.0026	0.0195	0.1186	0.3273	0.0000	0.0002	0.0064	0.0383	0.0117	2.8980
0.0045	0.0041	0.0012	0.5883	0.0343	0.0025	0.0187	0.1166	0.3225	0.0000	0.0003	0.0054	0.0355	0.0112	2.8463
0.0059	0.0030	0.0026	0.2112	0.0411	0.0022	0.0235	0.0144	0.0920	0.0000	0.0003	0.0026	0.0003	0.0076	1.5609
0.0061	0.0029	0.0026	0.2143	0.0348	0.0023	0.0234	0.0156	0.0960	0.0000	0.0003	0.0016	0.0003	0.0075	1.5597
0.0053	0.0140	0.0041	0.0095	0.0499	0.0009	0.0103	0.0379	0.0444	0.0000	0.0001	0.0248	0.3569	0.0022	0.2146
0.0053	0.0140	0.0041	0.0095	0.0499	0.0009	0.0103	0.0379	0.0444	0.0000	0.0001	0.0248	0.3569	0.0022	0.2146
0.0244	0.0040	0.0054	2.7499	0.4676	0.0162	0.1152	1.1670	0.5618	0.0000	0.0028	0.0365	0.6187	0.0373	11.2357
0.0026	0.0029	0.0026	0.0752	0.0408	0.0018	0.0174	0.0012	0.1046	0.0000	0.0001	0.0008	0.0089	0.0067	0.3128
0.0024	0.0028	0.0026	0.0729	0.0300	0.0017	0.0178	0.0012	0.1026	0.0000	0.0001	0.0008	0.0094	0.0066	0.3044
0.0027	0.0030	0.0028	0.0751	0.0553	0.0019	0.0171	0.0012	0.0906	0.0000	0.0001	0.0004	0.0075	0.0076	0.3090
0.0024	0.0030	0.0029	0.0772	0.0401	0.0018	0.0177	0.0014	0.1068	0.0000	0.0001	0.0010	0.0098	0.0067	0.3126
0.0020	0.0027	0.0020	0.0896	0.0395	0.0018	0.0217	0.0059	0.1067	0.0000	0.0000	0.0009	0.0139	0.0026	0.1995
0.0020	0.0026	0.0017	0.0898	0.0321	0.0019	0.0213	0.0064	0.1091	0.0000	0.0000	0.0013	0.0130	0.0027	0.2000
0.0016	0.0027	0.0019	0.0906	0.0290	0.0019	0.0219	0.0059	0.0977	0.0000	0.0000	0.0002	0.0140	0.0030	0.1966
0.0023	0.0008	0.0056	0.0930	0.0709	0.0020	0.0167	0.0051	0.1183	0.0000	0.0000	0.0003	0.0135	0.0026	0.2057
0.0021	0.0008	0.0057	0.0943	0.0679	0.0020	0.0169	0.0048	0.1132	0.0000	0.0000	0.0006	0.0140	0.0025	0.2044
0.0019	0.0020	0.0053	0.0932	0.0777	0.0032	0.0196	0.0038	0.1233	0.0000	0.0001	0.0037	0.0622	0.0036	0.2386
0.0021	0.0019	0.0051	0.0922	0.0698	0.0034	0.0202	0.0043	0.1236	0.0000	0.0001	0.0018	0.0589	0.0036	0.2383
0.0040	0.0022	0.0122	0.0572	0.0691	0.0011	0.0115	0.0058	0.1566	0.0000	0.0001	0.0028	0.0674	0.0036	0.3578
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Y ppm	Zr ppm	Nb ppm	Mo ppm	Ag ppm	Cd ppm	Sn ppm	Sb ppm	Cs ppm	Ba ppm	La ppm	Ce ppm	Pr ppm	Nd ppm	Sm ppm
0.0001	0.0000	0.0001	0.0280	0.0001	0.0000	0.0001	0.0007	0.0001	0.0484	0.0000	0.0001	0.0000	0.0001	0.0000
0.0001	0.0000	0.0001	0.0282	0.0004	0.0000	0.0001	0.0008	0.0001	0.0490	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0000	0.0001	0.0282	0.0004	0.0000	0.0001	0.0007	0.0001	0.0497	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0001	0.0001	0.0938	0.0001	0.0006	0.0002	0.0005	0.0001	0.2596	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0001	0.1001	0.0001	0.0000	0.0001	0.0008	0.0000	0.3663	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0001	0.0972	0.0001	0.0000	0.0002	0.0007	0.0000	0.3566	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0001	0.0212	0.0009	0.0013	0.0000	0.0018	0.0001	0.2544	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0016	0.0241	0.0001	0.0013	0.0000	0.0015	0.0000	0.2669	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0002	0.0016	0.0232	0.0001	0.0013	0.0000	0.0014	0.0000	0.2612	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0006	0.0001	0.0261	0.0001	0.0001	0.0001	0.0008	0.0001	0.0807	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0007	0.0001	0.0257	0.0001	0.0002	0.0001	0.0009	0.0001	0.0827	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0001	0.0298	0.0001	0.0002	0.0001	0.0042	0.0000	0.2531	0.0000	0.0001	0.0000	0.0001	0.0000
0.0001	0.0000	0.0001	0.0298	0.0001	0.0002	0.0001	0.0042	0.0000	0.2531	0.0000	0.0001	0.0000	0.0001	0.0000
0.0003	0.0002	0.0001	0.0788	0.1054	0.0032	0.0003	0.0040	0.0006	0.3955	0.0003	0.0002	0.0000	0.0001	0.0001
0.0000	0.0001	0.0000	0.0113	0.0001	0.0001	0.0001	0.0010	0.0001	0.1676	0.0001	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0110	0.0001	0.0001	0.0001	0.0011	0.0001	0.1694	0.0001	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0113	0.0001	0.0000	0.0001	0.0011	0.0001	0.0602	0.0000	0.0001	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0111	0.0001	0.0001	0.0001	0.0010	0.0001	0.1664	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0003	0.0080	0.0001	0.0001	0.0001	0.0006	0.0000	0.2571	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0003	0.0081	0.0001	0.0001	0.0001	0.0006	0.0000	0.2613	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0003	0.0074	0.0001	0.0001	0.0001	0.0006	0.0001	0.2069	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0047	0.0000	0.0002	0.0002	0.0003	0.0000	0.2660	0.0000	0.0001	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0049	0.0000	0.0002	0.0002	0.0003	0.0000	0.2627	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0109	0.0001	0.0001	0.0002	0.0005	0.0001	0.2210	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0105	0.0000	0.0001	0.0002	0.0005	0.0000	0.2231	0.0001	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0126	0.0030	0.0001	0.0001	0.0004	0.0001	0.2774	0.0001	0.0001	0.0000	0.0000	0.0000
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Eu ppm	Gd ppm	Tb ppm	Dy ppm	Ho ppm	Er ppm	Tm ppm	Yb ppm	Lu ppm	Hf ppm	Ta ppm	W ppm	Hg ppm	Tl ppm	Pb ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0001	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0006	0.0001	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0015	0.0008	0.0000	0.0007
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	0.0000	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0069	0.0001	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0004	0.0207	0.0001	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0004	0.0592	0.0001	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0001	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0014	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0014	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0241	0.0003	0.0055
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0008	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0008	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0002	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0008	0.0000	0.0005
ICP-MS	ICP-MS	ICS		ICS	ICS		ICS	ICS		ICS	ICS	ICP-OES	ICP-OES	

Th ppm	U ppm	Flouride as mg/L F	Chloride as mg/L Cl	Nitrite as mg/L N	Bromide as mg/L Br	Nitrate as mg/L N	Phosphate as mg/L P	Sulphate as mg/L SO4	As (mg/L)	Ca (mg/L)
0.0000	0.0025									
0.0000	0.0024									
0.0000	0.0024									
0.0000	0.0057	1.736	208.092	0.025	0.100	0.834	0.025	317.245	0.010	141.253
0.0000	0.0035	0.880	164.984	0.025	0.100	1.403	0.025	192.554		
0.0000	0.0035									
0.0000	0.0095	1.195	244.411	0.025	1.851	1.114	0.025	960.160	0.010	241.552
0.0001	0.0094	1.195	244.411	0.025	1.851	1.114	0.025	960.160	0.010	256.771
0.0002	0.0095	1.195	244.411	0.025	1.851	1.114	0.025	960.160	0.010	256.771
0.0000	0.0072	0.511	133.749	0.025	0.100	0.338	0.025	1037.036	0.010	104.894
0.0000	0.0073	0.511	133.749	0.025	0.100	0.338	0.025	1037.036	0.010	110.433
0.0000	0.0270	1.256	138.983	0.025	1.070	2.170	0.025	66.042	0.010	19.009
0.0000	0.0270	1.256	138.983	0.025	1.070	2.170	0.025	66.042	0.010	20.347
0.0000	0.0075									
0.0000	0.0026		24.170			0.015		432.200	0.010	164.447
0.0000	0.0027		24.480			0.015		433.410	0.010	164.447
0.0000	0.0028		24.480			0.015		433.410	0.010	164.447
0.0000	0.0026		24.480			0.015		433.410	0.010	164.447
0.0000	0.0021		3.250			0.015		192.590	0.010	107.393
0.0000	0.0022		3.010			0.015		192.640	0.010	108.537
0.0000	0.0022		3.010			0.015		192.640		108.537
0.0000	0.0015		5.160			2.780		190.400	0.010	100.265
0.0000	0.0016		4.420			2.680		191.720		
0.0000	0.0019								0.010	115.568
0.0000	0.0020								0.010	122.319
0.0000	0.0021		23.480			0.015		217.540		

ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES Field Alkalinity

Cd (mg/L)	K (mg/L)	Mg (mg/L)	Na (mg/L)	P (mg/L)	S (mg/L)	Se (mg/L)	Lab pH	as CaCO3 mg/L
							8.56	
							8.56	
							8.56	
0.013	32.479	98.484	75.494	0.068	140.085	0.010	8.57	
							8.50	
							8.50	
							8.83	
0.014	20.926	86.126	aboverange		840.923	0.010	8.44	
0.014	19.619	83.141	454.570	0.108	807.101	0.010	8.44	
0.014	19.619	83.141	454.570	0.108	807.101	0.010	8.44	
0.013	14.682	51.040	483.739	0.125	376.789	0.010	8.56	
0.013	13.423	52.006	483.739	0.125	381.520	0.010	8.56	
0.013	42.582	6.210	297.691		46.717	0.397	9.72	
	39.078	8.424	297.691	0.188	43.906	0.385	9.72	
							6.64	
0.013	7.326	43.727	16.109	0.050	141.923	0.010	8.17	
0.013	7.326	43.727	16.109	0.050	141.923	0.010	8.17	
0.013	7.326	43.727	16.109	0.050	141.923	0.010	8.17	
0.013	7.326	43.727	16.109	0.050	141.923	0.010	8.17	
0.012	3.229	32.293	8.027	0.048	70.507	0.010	8.28	
0.013	3.113	32.370	8.398	0.041	70.990	0.010	8.28	
0.013	3.113	32.370	8.398	0.041	70.990	0.010	8.28	
0.013	3.843	28.920	9.680	0.052	70.884	0.010	7.99	
							7.99	
0.013	3.915	30.406	8.095	0.033	76.011	0.076	8.02	
0.013	4.085	31.534	8.271	0.037	78.450	0.066	8.02	
							8.08	

HoleID	Sample Number	Depth	Depth	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

		(mbgs)	Error (mbgs)	Li ppm	B ppm	Na ppm	Mg ppm	Al ppm	Si ppm	P ppm	K ppm	Ca ppm	Sc ppm
WLC_12-10b	30286A-1	10.49	0.12	0.0183	0.4574	11.5334	28.3085	0.0400	7.1339	0.0330	3.0192	97.7067	0.0026
WLC_12-10b	30286A-2	10.49	0.12	0.0176	0.4592	11.8081	28.0704	0.0404	7.1525	0.0306	3.1137	98.7433	0.0026
WLC_12-10b	30286A-3	10.49	0.12	0.0102	0.1654	8.0525	26.2058	0.0431	6.6164	0.0367	2.0456	81.2659	0.0025
WLC_12-10b	30287A	11.17	0.08										
WLC_12-10b	30288A-1	12.44	0.12	0.0102	0.1583	8.7363	27.2080	0.0476	5.2791	0.0325	2.2557	83.1613	0.0025
WLC_12-10b	30288A-2	12.44	0.12	0.0101	0.1579	8.4290	26.8673	0.0659	5.0558	0.0427	2.0870	83.9471	0.0025
WLC_12-10b	30288A-3	12.44	0.12	0.0101	0.1579	8.4290	26.8673	0.0659	5.0558	0.0427	2.0870	83.9471	0.0025
WLC_12-10b	30289A	13.46	0.11	0.0196	0.3205	17.9303	29.9600	0.2057	25.3838	0.0589	8.6326	96.7627	0.0089
WLC_12-10b	30290A-1	14.10	0.08	0.0208	0.1051	8.7686	59.5885	0.1375	6.7165	0.0529	7.5037	195.1166	0.0031
WLC_12-10b	30290A-2	14.10	0.08	0.0236	0.1128	6.9091	60.0256	0.2092	6.7198	0.0538	4.5943	192.8790	0.0030
WLC_12-10b	30291A	15.39	0.15	0.0144	0.1015	9.7074	28.7629	0.0966	7.3523	0.0436	3.1437	71.6529	0.0038
WLC_12-10b	30292A-1	16.31	0.15	0.0211	0.1918	15.5857	28.8447	0.3134	10.5300	0.0721	8.7762	71.1212	0.0048
WLC_12-10b	30292A-2	16.31	0.15	0.0206	0.1887	15.7936	27.9827	0.1860	10.3260	0.0798	10.8584	70.5013	0.0047
WLC_12-10b	30293A-1	17.05	0.08	0.0169	0.1646	16.5653	35.9423	0.2353	16.1196	0.0678	5.4869	120.0405	0.0073
WLC_12-10b	30293A-2	17.05	0.08	0.0170	0.1685	16.1965	36.8512	0.0117	20.3304	0.0355	2.8951	121.2472	0.0072
WLC_12-10b	30294A-Rep	17.88	0.08	0.0507	0.6617	40.5355	142.8389	0.0626	20.9642	0.1180	37.7979	376.1908	0.0107
WLC_12-10b	30294A-Rep	17.88	0.08	0.0487	0.6677	40.6988	143.8926	0.0567	29.1026	0.1227	38.8418	372.4120	0.0105
WLC_12-10b	30295A	18.99	0.09	0.0770	0.4670	30.4590	268.5628	0.1129	24.1059	0.0594	25.0030	890.2654	0.0094
WLC_12-10b	30296A	20.19	0.08	0.1221	1.0587	149.5942	136.2973	0.4625	24.2566	0.1981	60.9259	216.1213	0.0126
WLC_12-10b	30297A	20.94	0.06	0.0977	0.7877	91.9253	135.3216	0.1323	32.5098	0.0699	30.8784	378.2601	0.0131
WLC_12-10b	30298A	21.75	0.05	0.0532	0.3559	47.6039	92.7313	0.1139	23.7250	0.0490	19.4573	222.7906	0.0096
WLC_12-10b	30299A	23.35	0.09	0.0470	0.5026	51.0440	64.6827	0.1644	16.3202	0.0750	16.3119	101.0058	0.0089
WLC_12-10b	30300A	24.52	0.08										
WLC_12-10b	30301A	25.54	0.09										
WLC_12-10b	30302A	26.33	0.09										
WLC_12-10b	30303A	27.20	0.08										
WLC_12-10b	30304A	28.82	0.08	0.0200	1.0769	27.1166	32.4713	0.2006	52.6342	0.0890	7.1985	64.8687	0.0214
WLC_12-10b	30305A	29.78	0.06										
WLC_12-10b	30306A	30.80	0.14										
WLC_12-10b	30307A	31.88	0.09										
WLC_12-10b	30308A	32.37	0.09										
WLC_12-10b	30309A	34.18	0.17										
WLC_12-10b	30310A	34.76	0.11										
WLC_12-10b	30311A	35.81	0.09										
WLC_12-10b	30312A	37.09	0.06										
WLC_12-10b	30313A	37.78	0.14										

ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

Ti ppm	V ppm	Cr ppm	Mn ppm	Fe ppm	Co ppm	Ni ppm	Cu ppm	Zn ppm	Ga ppm	Ge ppm	As ppm	Se ppm	Rb ppm	Sr ppm
0.0017	0.0026	0.0031	0.0824	0.0641	0.0010	0.0048	0.0007	0.3188	0.0000	0.0000	0.0039	0.0827	0.0018	0.1944
0.0016	0.0027	0.0030	0.0831	0.0484	0.0010	0.0045	0.0006	0.3306	0.0000	0.0001	0.0036	0.0812	0.0018	0.1987
0.0018	0.0008	0.0057	0.0682	0.0729	0.0018	0.0126	0.0018	0.0974	0.0000	0.0000	0.0022	0.0585	0.0012	0.1572
0.0024	0.0008	0.0053	0.0689	0.0813	0.0018	0.0125	0.0018	0.0948	0.0000	0.0000	0.0031	0.0555	0.0012	0.1557
0.0020	0.0011	0.0061	0.0684	0.0659	0.0018	0.0121	0.0016	0.0966	0.0000	0.0000	0.0032	0.0585	0.0012	0.1583
0.0020	0.0011	0.0061	0.0684	0.0659	0.0018	0.0121	0.0016	0.0966	0.0000	0.0000	0.0032	0.0585	0.0012	0.1583
0.0057	0.0032	0.0081	0.1066	0.0612	0.0014	0.0131	0.0038	0.2312	0.0000	0.0000	0.0003	0.0049	0.0069	0.3792
0.0021	0.0012	0.0030	0.3234	0.0938	0.0021	0.0179	0.0067	0.1288	0.0000	0.0000	0.0006	0.0051	0.0103	0.4643
0.0025	0.0012	0.0033	0.3344	0.2351	0.0021	0.0174	0.0039	0.1549	0.0000	0.0001	0.0007	0.0041	0.0084	0.3864
0.0026	0.0013	0.0039	0.1304	0.0516	0.0021	0.0118	0.0100	0.1428	0.0000	0.0000	0.0017	0.0444	0.0023	0.2392
0.0034	0.0026	0.0070	0.0538	0.1273	0.0009	0.0119	0.0054	0.1376	0.0000	0.0000	0.0017	0.0396	0.0076	0.2675
0.0033	0.0026	0.0066	0.0520	0.1140	0.0009	0.0108	0.0037	0.1341	0.0000	0.0001	0.0017	0.0361	0.0073	0.2607
0.0048	0.0034	0.0072	0.1061	0.0680	0.0020	0.0142	0.0033	0.1893	0.0000	0.0000	0.0029	0.0304	0.0039	0.3968
0.0045	0.0033	0.0059	0.1067	0.0010	0.0016	0.0131	0.0028	0.1953	0.0000	0.0001	0.0028	0.0336	0.0038	0.4070
0.0069	0.0054	0.0048	0.2690	0.1641	0.0023	0.0374	0.0479	0.1889	0.0000	0.0001	0.0032	0.0752	0.0027	1.8243
0.0070	0.0052	0.0049	0.2703	0.1684	0.0025	0.0375	0.0478	0.1913	0.0000	0.0001	0.0047	0.0918	0.0027	1.8347
0.0059	0.0051	0.0031	1.1768	0.1118	0.0144	0.1065	0.0155	0.6532	0.0000	0.0001	0.0108	0.2055	0.0184	1.9618
0.0103	0.0064	0.0087	0.4430	0.3732	0.0040	0.0436	0.0226	0.2977	0.0000	0.0001	0.0127	0.1951	0.0164	1.4938
0.0075	0.0021	0.0030	0.3476	0.0855	0.0044	0.0421	0.0286	0.2003	0.0000	0.0002	0.0188	0.3960	0.0138	1.5861
0.0062	0.0035	0.0033	0.1178	0.0464	0.0022	0.0257	0.0125	0.1276	0.0000	0.0001	0.0064	0.0840	0.0108	1.4566
0.0055	0.0035	0.0061	0.0987	0.0964	0.0017	0.0221	0.0242	0.0984	0.0000	0.0001	0.0018	0.0149	0.0064	0.4944
0.0126	0.0038	0.0066	0.1109	0.1508	0.0104	0.0194	0.0991	0.1584	0.0000	0.0000	0.0012	0.0138	0.0019	0.3136
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Y ppm	Zr ppm	Nb ppm	Mo ppm	Ag ppm	Cd ppm	Sn ppm	Sb ppm	Cs ppm	Ba ppm	La ppm	Ce ppm	Pr ppm	Nd ppm	Sm ppm
0.0000	0.0001	0.0001	0.0061	0.0001	0.0001	0.0002	0.0004	0.0000	0.1326	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0001	0.0060	0.0001	0.0001	0.0001	0.0003	0.0000	0.1338	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0000	0.0047	0.0001	0.0001	0.0002	0.0003	0.0000	0.2603	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0000	0.0047	0.0001	0.0001	0.0002	0.0003	0.0000	0.2631	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0001	0.0048	0.0001	0.0001	0.0001	0.0003	0.0000	0.2651	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0001	0.0048	0.0001	0.0001	0.0001	0.0003	0.0000	0.2651	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0145	0.0002	0.0001	0.0001	0.0004	0.0000	0.3959	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0002	0.0000	0.0041	0.0001	0.0004	0.0002	0.0005	0.0001	0.0596	0.0000	0.0001	0.0000	0.0000	0.0000
0.0001	0.0005	0.0001	0.0043	0.0001	0.0003	0.0002	0.0004	0.0000	0.1326	0.0000	0.0001	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0073	0.0001	0.0000	0.0002	0.0003	0.0000	0.1750	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0002	0.0001	0.0122	0.0009	0.0000	0.0003	0.0006	0.0001	0.0929	0.0001	0.0002	0.0000	0.0001	0.0000
0.0001	0.0001	0.0001	0.0123	0.0013	0.0000	0.0004	0.0007	0.0001	0.0886	0.0000	0.0001	0.0000	0.0000	0.0000
0.0002	0.0001	0.0001	0.0216	0.0002	0.0002	0.0002	0.0006	0.0000	0.4843	0.0001	0.0001	0.0000	0.0001	0.0000
0.0000	0.0000	0.0001	0.0228	0.0001	0.0002	0.0000	0.0005	0.0000	0.4959	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0004	0.0001	0.0264	0.0040	0.0004	0.0003	0.0011	0.0001	0.8831	0.0002	0.0001	0.0000	0.0001	0.0000
0.0001	0.0003	0.0001	0.0268	0.0034	0.0004	0.0003	0.0011	0.0001	0.8739	0.0002	0.0001	0.0000	0.0000	0.0000
0.0002	0.0004	0.0001	0.0198	0.0001	0.0005	0.0003	0.0012	0.0006	0.3014	0.0001	0.0002	0.0000	0.0001	0.0000
0.0003	0.0004	0.0002	0.1112	0.0016	0.0000	0.0008	0.0011	0.0011	1.6224	0.0003	0.0003	0.0000	0.0001	0.0001
0.0002	0.0001	0.0001	0.0658	0.0004	0.0001	0.0002	0.0008	0.0001	0.7728	0.0001	0.0002	0.0000	0.0001	0.0000
0.0001	0.0001	0.0001	0.0770	0.0005	0.0015	0.0001	0.0011	0.0001	0.3975	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.1188	0.0000	0.0000	0.0002	0.0009	0.0003	0.4129	0.0001	0.0001	0.0000	0.0001	0.0000
0.0002	0.0002	0.0001	0.0463	0.0003	0.0001	0.0007	0.0011	0.0002	0.8270	0.0001	0.0002	0.0000	0.0001	0.0000
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Eu ppm	Gd ppm	Tb ppm	Dy ppm	Ho ppm	Er ppm	Tm ppm	Yb ppm	Lu ppm	Hf ppm	Ta ppm	W ppm	Hg ppm	Tl ppm	Pb ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0002	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0004	0.0001	0.0008
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0001	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0007	0.0000	0.0007
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0001	0.0000	0.0007
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0001	0.0017
0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0009	0.0000	0.0032
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0047	0.0001	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0048	0.0012	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0054	0.0008	0.0000	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0036
ICP-MS	ICP-MS	ICS		ICS	ICS		ICS	ICS		ICS	ICS	ICP-OES	ICP-OES	

Th ppm	U ppm	Flouride as mg/L F	Chloride as mg/L Cl	Nitrite as mg/L N	Bromide as mg/L Br	Nitrate as mg/L N	Phosphate as mg/L P	Sulphate as mg/L SO4	As (mg/L)	Ca (mg/L)
0.0000	0.0020		25.230			9.840		173.610	0.010	101.112
0.0000	0.0020		25.230			9.840		173.610	0.010	101.112
0.0000	0.0013		25.230			9.840		173.610	0.010	101.112
0.0000	0.0013		11.370			6.530		126.910	0.010	82.222
0.0000	0.0013		10.860			6.480		127.740	0.010	80.421
0.0000	0.0013		10.740			6.430		127.030	0.010	80.421
0.0000	0.0029									
0.0000	0.0026		4.240			2.670		537.300	0.010	195.677
0.0000	0.0026		4.500			2.580		534.770	0.010	191.481
0.0000	0.0021		21.450			4.870		90.650	0.010	69.192
0.0000	0.0022		26.890			3.030		90.320	0.010	69.332
0.0000	0.0021		26.890			3.030		90.320	0.010	69.332
0.0000	0.0027									
0.0000	0.0029									
0.0001	0.0092									
0.0000	0.0093									
0.0000	0.0122		52.590			0.015				
0.0000	0.0076									
0.0000	0.0088									
0.0000	0.0056		137.000			0.015				
0.0000	0.0048		161.570			0.015		184.910		
0.0000	0.0023									

ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES Field Alkalinity

Cd (mg/L)	K (mg/L)	Mg (mg/L)	Na (mg/L)	P (mg/L)	S (mg/L)	Se (mg/L)	Lab pH	as CaCO3 mg/L
0.013	3.367	24.485	10.907	0.050	83.638	0.094	8.12	
0.013	3.367	24.485	10.907	0.050	83.638	0.094	8.12	
0.013	3.367	24.485	10.907	0.050	83.638	0.094	8.12	
0.013	2.675	23.066	6.378	0.047	50.717	0.066	8.08	
0.012	2.438	22.515	7.057	0.041	49.840	0.060	8.08	
0.012	2.438	22.515	7.057	0.041	49.840	0.060	8.08	
							8.18	
0.013	4.872	53.833	8.541	0.046	174.998	0.010	8.43	
0.013	6.137	53.063	7.814	0.073	171.993	0.010	8.43	
0.013	3.162	24.025	11.137	0.047	38.063	0.052	8.14	
0.013	9.234	24.556	14.086	0.076	36.467	0.048	7.87	
0.013	9.234	24.556	14.086	0.076	36.467	0.048	7.87	
							8.14	
							8.14	
							8.70	
							8.70	
							7.94	
							8.19	
							8.36	
							8.06	
							8.33	
							8.46	

HoleID	Sample Number	Depth	Depth	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

		(mbgs)	Error (mbgs)	Li ppm	B ppm	Na ppm	Mg ppm	Al ppm	Si ppm	P ppm	K ppm	Ca ppm	Sc ppm
WLC_12-10b	30314A	39.14	0.09	0.0533	0.4765	78.9730	74.4349	0.0114	48.0156	0.1023	18.5415	130.1099	0.0213
WLC_12-10b	30315A	40.40	0.08										
WLC_12-10b	30316A	40.93	0.09										
WLC_12-10b	30317A	41.54	0.09										
WLC_12-10b	30318A	42.98	0.15	0.0581	0.5303	75.2966	64.0541	0.1245	29.6840	0.1119	11.5346	120.9246	0.0143
WLC_12-10b	30319A	44.04	0.09										
WLC_12-10b	30320A	44.61	0.11										
WLC_12-10b	30321A	46.36	0.12	0.0607	0.2668	139.7490	75.3252	0.1768	20.4835	0.0491	40.5114	129.9170	0.0088
WLC_12-10b	30322A	46.97	0.09	0.0586	0.2946	80.5728	69.8937	0.0520	18.3919	0.0543	25.8979	119.2842	0.0076
WLC_12-10b	30322A-Rep	46.97	0.09	0.0590	0.2919	87.1908	67.7993	0.0512	18.5821	0.0524	27.2681	117.9052	0.0076
WLC_12-10b	30323A	50.99	0.09	0.0630	0.4894	77.5217	94.6132	0.1140	24.8484	0.1333	21.6283	123.3654	0.0104
WLC_12-10b	30323A-Rep	50.99	0.09	0.0617	0.4858	78.3687	90.2014	0.0884	27.1509	0.1383	21.9743	122.3705	0.0102
WLC_12-10b	30324A	51.44	0.08	0.0363	0.4199	21.6608	38.5905	0.2552	29.2071	0.1108	5.9934	81.6688	0.0111
WLC_12-10b	30325A	52.90	0.17										
WLC_12-11N	30172A	2.42	0.08	0.0322	0.1263	9.6333	50.9356	0.0642	14.7356	0.1363	4.0252	133.0135	0.0043
WLC_12-11N	30173A	3.35	0.06	0.0280	0.1057	4.9964	45.4071	0.0572	9.8980	0.0750	3.1301	113.2604	0.0030
WLC_12-11N	30173A-MSrep	3.35	0.06	0.0296	0.0999	4.7507	47.9870	0.0838	9.1391	0.0677	2.9234	116.0507	0.0030
WLC_12-11N	30174A	4.27	0.17	0.0403	0.1736	10.8568	48.0810	0.0615	25.3414	0.1197	8.5242	119.4839	0.0083
WLC_12-11N	30175A	5.15	0.12	0.0482	0.1248	13.6806	63.2175	0.0923	23.5580	0.0704	8.3889	139.5701	0.0071
WLC_12-11N	30176A	5.84	0.14	0.0640	0.4331	34.2314	73.2340	0.1147	22.0102	0.1167	6.6024	169.9827	0.0080
WLC_12-11N	30177A	6.66	0.17	0.0646	0.5718	51.3793	58.9267	0.0538	44.0355	0.1327	7.1888	119.6413	0.0122
WLC_12-11N	30178A	8.23	0.09	0.0393	0.1244	30.4741	58.3427	0.1503	16.5150	0.0961	8.4601	116.8880	0.0050
WLC_12-11N	30179A	9.46	0.08	0.0498	0.1714	54.7436	76.7951	0.0789	66.9057	0.1350	53.6696	160.5197	0.0205
WLC_12-11N	30180A	10.35	0.14	0.0608	0.3069	56.7287	66.6053	0.0504	57.3867	0.0873	8.4718	151.9110	0.0168
WLC_12-11N	30181A	10.96	0.14	0.0527	0.1122	41.5548	55.6921	0.0831	19.8393	0.0581	28.6804	130.0881	0.0065
WLC_12-11N	30182A	12.37	0.09	0.2262	0.3726	56.1147	68.9671	0.2480	21.8682	0.0859	13.1216	132.9279	0.0078
WLC_12-11N	30182A-MSrep	12.37	0.09	0.2305	0.3639	58.0461	71.3874	0.2620	21.7877	0.0867	13.5157	132.8564	0.0078
WLC_12-11N	30183A	13.41	0.12	0.0607	0.1637	39.2706	58.9790	0.0429	16.1293	0.0794	9.8905	134.4329	0.0058
WLC_12-11N	30184A	13.98	0.11	0.0535	0.3765	35.5512	62.0751	0.0667	12.1106	0.0621	8.1903	134.5376	0.0044
WLC_12-11N	30185A	14.71	0.11	0.0500	0.2276	23.9006	52.7491	0.1152	21.1875	0.0919	8.7839	121.4939	0.0061
WLC_12-11N	30186A	15.97	0.09	0.0512	0.1763	32.9955	84.1277	0.1086	8.2860	0.0550	10.2818	116.1332	0.0029
WLC_12-11N	30187A	17.25	0.15	0.0564	0.1223	32.6553	54.6433	0.0799	17.9979	0.1050	8.6046	132.0835	0.0060
WLC_12-11N	30188A	18.36	0.08	0.0651	0.1851	40.1332	60.8341	0.0953	15.6168	0.1367	11.7045	119.3638	0.0054
WLC_12-11N	30189A	19.45	0.09	0.0481	0.0913	33.1481	51.0537	0.1047	14.1738	0.1252	6.5141	140.9369	0.0045
WLC_12-11N	30190A	19.96	0.15	0.0430	0.1741	67.3598	60.6384	0.1900	39.7212	0.1144	32.5879	140.5963	0.0105
WLC_12-11N	30191A	22.17	0.08	0.0548	0.2594	83.3147	88.9907	0.1612	52.0557	0.1257	8.1707	203.4866	0.0135
WLC_12-11N	30192A	23.23	0.18	0.0506	0.5662	18.3341	48.6184	0.0569	15.1714	0.0650	7.5965	101.3533	0.0044

ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

Ti ppm	V ppm	Cr ppm	Mn ppm	Fe ppm	Co ppm	Ni ppm	Cu ppm	Zn ppm	Ga ppm	Ge ppm	As ppm	Se ppm	Rb ppm	Sr ppm
0.0118	0.0046	0.0071	0.1902	0.0567	0.0005	0.0088	0.0018	0.3583	0.0000	0.0001	0.0028	0.0139	0.0143	0.9174
0.0080	0.0058	0.0226	0.1185	0.0362	0.0010	0.0229	0.0302	0.1753	0.0000	0.0001	0.0045	0.0405	0.0088	0.9147
0.0055	0.0035	0.0047	0.1673	0.0631	0.0017	0.0106	0.0023	0.1729	0.0000	0.0001	0.0036	0.0269	0.0122	2.3470
0.0053	0.0032	0.0048	0.1128	0.1350	0.0014	0.0080	0.0014	0.2821	0.0000	0.0001	0.0019	0.0086	0.0154	0.8319
0.0050	0.0033	0.0048	0.1120	0.1410	0.0015	0.0082	0.0013	0.2824	0.0000	0.0000	0.0015	0.0119	0.0151	0.8449
0.0069	0.0093	0.0034	0.0491	0.0805	0.0031	0.0482	0.0285	0.0487	0.0000	0.0002	0.0044	0.0240	0.0113	0.6127
0.0064	0.0091	0.0026	0.0478	0.0699	0.0030	0.0471	0.0281	0.0498	0.0000	0.0001	0.0029	0.0227	0.0112	0.5974
0.0072	0.0022	0.0053	0.0299	0.1339	0.0012	0.0136	0.0406	0.0402	0.0000	0.0000	0.0023	0.0524	0.0038	0.3622
0.0039	0.0024	0.0019	0.0913	0.2721	0.0056	0.0425	0.0203	0.0822	0.0000	0.0000	0.0013	0.0042	0.0048	0.3323
0.0027	0.0009	0.0012	0.0706	0.2357	0.0041	0.0253	0.0105	0.0525	0.0000	0.0000	0.0034	0.0515	0.0046	0.2669
0.0074	0.0011	0.0042	0.0690	0.2734	0.0038	0.0238	0.0107	0.0515	0.0000	0.0000	0.0032	0.0490	0.0044	0.2570
0.0063	0.0017	0.0073	0.1067	0.2891	0.0079	0.0461	0.0195	0.0744	0.0000	0.0001	0.0034	0.0249	0.0107	0.3140
0.0045	0.0020	0.0060	0.0975	0.2673	0.0036	0.0379	0.0178	0.0666	0.0000	0.0001	0.0027	0.0395	0.0077	0.3290
0.0051	0.0015	0.0061	0.0879	0.3179	0.0076	0.0582	0.0209	0.0836	0.0000	0.0001	0.0080	0.1225	0.0069	0.4372
0.0079	0.0017	0.0216	0.1071	0.2669	0.0035	0.0345	0.0309	0.0965	0.0000	0.0000	0.0004	0.0025	0.0070	1.2275
0.0042	0.0019	0.0023	0.0595	0.2935	0.0014	0.0149	0.0193	0.0540	0.0000	0.0001	0.0026	0.0138	0.0041	0.7569
0.0121	0.0016	0.0027	1.8864	0.5416	0.0070	0.3200	0.0481	0.0888	0.0000	0.0001	0.0065	0.0919	0.0080	0.5686
0.0100	0.0018	0.0041	0.0769	0.2926	0.0038	0.0410	0.0252	0.0582	0.0000	0.0000	0.0035	0.0459	0.0102	0.4571
0.0042	0.0016	0.0027	0.0791	0.2492	0.0043	0.0300	0.0162	0.0661	0.0000	0.0001	0.0036	0.0490	0.0159	0.9394
0.0063	0.0022	0.0093	0.0727	0.2868	0.0020	0.0258	0.0191	0.0604	0.0000	0.0001	0.0019	0.0019	0.0084	0.4178
0.0094	0.0024	0.0095	0.0746	0.3410	0.0019	0.0261	0.0199	0.0607	0.0000	0.0001	0.0012	0.0149	0.0082	0.4238
0.0044	0.0015	0.0013	0.1437	0.2796	0.0070	0.0429	0.0154	0.0468	0.0000	0.0000	0.0026	0.0347	0.0129	0.4619
0.0032	0.0014	0.0024	0.0693	0.2711	0.0032	0.0287	0.0211	0.0510	0.0000	0.0002	0.0018	0.0231	0.0056	0.3749
0.0043	0.0015	0.0051	0.1295	0.2620	0.0014	0.0189	0.0114	0.0272	0.0000	0.0001	0.0058	0.0848	0.0123	0.7612
0.0022	0.0020	0.0025	0.1209	0.2494	0.0037	0.0257	0.0126	0.0741	0.0000	0.0001	0.0034	0.0629	0.0061	0.3284
0.0044	0.0010	0.0022	0.0827	0.3023	0.0042	0.0319	0.0138	0.0333	0.0000	0.0001	0.0036	0.0564	0.0109	0.6233
0.0036	0.0015	0.0024	0.1376	0.2661	0.0019	0.0257	0.0618	0.0617	0.0000	0.0002	0.0036	0.0020	0.0078	0.3953
0.0065	0.0026	0.0016	0.0856	0.3384	0.0018	0.0182	0.0223	0.0333	0.0000	0.0001	0.0021	0.0230	0.0074	0.3655
0.0075	0.0014	0.0021	0.1282	0.3016	0.0024	0.0274	0.0369	0.0699	0.0000	0.0001	0.0046	0.0528	0.0264	1.1080
0.0086	0.0017	0.0044	0.0831	0.4364	0.0033	0.0262	0.0218	0.0289	0.0000	0.0000	0.0030	0.0495	0.0084	0.7643
0.0030	0.0018	0.0013	0.0366	0.2122	0.0023	0.0142	0.0234	0.0549	0.0000	0.0001	0.0050	0.0685	0.0054	0.2815
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Y ppm	Zr ppm	Nb ppm	Mo ppm	Ag ppm	Cd ppm	Sn ppm	Sb ppm	Cs ppm	Ba ppm	La ppm	Ce ppm	Pr ppm	Nd ppm	Sm ppm
0.0001	0.0001	0.0001	0.1369	0.0001	0.0000	0.0001	0.0010	0.0001	0.6530	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0002	0.0001	0.0612	0.0001	0.0000	0.0001	0.0020	0.0001	0.3055	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.1700	0.0005	0.0000	0.0002	0.0008	0.0001	0.5681	0.0000	0.0000	0.0000	0.0000	0.0000
0.0004	0.0003	0.0001	0.1509	0.0001	0.0000	0.0001	0.0007	0.0002	0.4065	0.0004	0.0009	0.0001	0.0005	0.0001
0.0004	0.0003	0.0001	0.1546	0.0001	0.0000	0.0001	0.0007	0.0002	0.4111	0.0005	0.0009	0.0001	0.0005	0.0001
0.0001	0.0001	0.0001	0.1716	0.0001	0.0000	0.0002	0.0017	0.0004	0.3883	0.0001	0.0001	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.1684	0.0001	0.0000	0.0002	0.0017	0.0004	0.3886	0.0001	0.0001	0.0000	0.0000	0.0000
0.0002	0.0001	0.0001	0.0322	0.0001	0.0001	0.0004	0.0008	0.0000	0.3518	0.0002	0.0003	0.0000	0.0001	0.0000
0.0001	0.0002	0.0004	0.0159	0.0001	0.0002	0.0001	0.0015	0.0000	0.0542	0.0000	0.0000	0.0000	0.0000	0.0001
0.0001	0.0002	0.0003	0.0077	0.0001	0.0004	0.0001	0.0007	0.0000	0.0614	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0004	0.0003	0.0076	0.0001	0.0007	0.0001	0.0007	0.0000	0.0606	0.0001	0.0001	0.0000	0.0000	0.0001
0.0001	0.0001	0.0004	0.0231	0.0001	0.0001	0.0001	0.0038	0.0001	0.1082	0.0000	0.0001	0.0000	0.0001	0.0001
0.0001	0.0001	0.0002	0.0275	0.0001	0.0004	0.0002	0.0031	0.0000	0.0796	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0405	0.0001	0.0002	0.0001	0.0048	0.0000	0.0809	0.0000	0.0000	0.0000	0.0000	0.0001
0.0001	0.0002	0.0006	0.0307	0.0001	0.0002	0.0001	0.0013	0.0000	0.1209	0.0000	0.0000	0.0000	0.0000	0.0001
0.0001	0.0001	0.0004	0.0663	0.0001	0.0001	0.0001	0.0006	0.0000	0.0937	0.0000	0.0001	0.0000	0.0000	0.0001
0.0004	0.0004	0.0003	0.0461	0.0019	0.0002	0.0001	0.0016	0.0001	0.1409	0.0002	0.0003	0.0001	0.0003	0.0001
0.0001	0.0001	0.0003	0.0724	0.0001	0.0007	0.0003	0.0051	0.0000	0.2092	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.0449	0.0003	0.0001	0.0001	0.0026	0.0002	0.1020	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0004	0.0672	0.0001	0.0001	0.0001	0.0021	0.0001	0.0770	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0002	0.0004	0.0668	0.0001	0.0002	0.0001	0.0022	0.0001	0.0762	0.0001	0.0001	0.0000	0.0001	0.0001
0.0000	0.0000	0.0004	0.0538	0.0001	0.0004	0.0001	0.0038	0.0001	0.0946	0.0000	0.0000	0.0000	0.0000	0.0001
0.0001	0.0001	0.0003	0.0365	0.0001	0.0003	0.0002	0.0016	0.0001	0.0691	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0003	0.0002	0.0197	0.0001	0.0008	0.0002	0.0029	0.0001	0.1122	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0001	0.0003	0.0345	0.0000	0.0001	0.0001	0.0018	0.0000	0.0978	0.0000	0.0001	0.0000	0.0000	0.0000
0.0001	0.0001	0.0003	0.0312	0.0001	0.0004	0.0001	0.0014	0.0001	0.1301	0.0000	0.0001	0.0000	0.0000	0.0001
0.0002	0.0001	0.0003	0.0706	0.0001	0.0003	0.0001	0.0008	0.0001	0.0845	0.0001	0.0002	0.0000	0.0001	0.0001
0.0001	0.0002	0.0003	0.0802	0.0001	0.0001	0.0001	0.0025	0.0001	0.1081	0.0000	0.0001	0.0000	0.0001	0.0001
0.0001	0.0001	0.0004	0.1009	0.0001	0.0002	0.0002	0.0038	0.0002	0.1037	0.0000	0.0001	0.0000	0.0000	0.0001
0.0001	0.0001	0.0002	0.0420	0.0001	0.0002	0.0002	0.0014	0.0001	0.2008	0.0001	0.0001	0.0000	0.0001	0.0001
0.0000	0.0001	0.0003	0.0322	0.0001	0.0001	0.0001	0.0008	0.0000	0.0518	0.0000	0.0000	0.0000	0.0000	0.0000
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Eu ppm	Gd ppm	Tb ppm	Dy ppm	Ho ppm	Er ppm	Tm ppm	Yb ppm	Lu ppm	Hf ppm	Ta ppm	W ppm	Hg ppm	Tl ppm	Pb ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0010	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0011	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0041	0.0003	0.0000	0.0005
0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018	0.0014	0.0001	0.0004
0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019	0.0000	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0150	0.0022	0.0000	0.0010
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0157	0.0006	0.0000	0.0010
0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0000	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0022	0.0000	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0001	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0001	0.0001	0.0006
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0021	0.0001	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0030	0.0000	0.0010
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0022	0.0000	0.0003
0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0018	0.0001	0.0010
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0001	0.0001	0.0007
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0005	0.0001	0.0016
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0016	0.0001	0.0008
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0029	0.0001	0.0008
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0014	0.0001	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0013	0.0010	0.0001	0.0009
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0006	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0007	0.0001	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0011	0.0001	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018	0.0008	0.0001	0.0011
0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0030	0.0018	0.0001	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0032	0.0022	0.0002	0.0011
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0024	0.0001	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0002	0.0000	0.0007

ICP-MS ICP-MS ICS ICS ICS ICS ICS ICS ICS ICP-OES ICP-OES

Th ppm	U ppm	Flouride as mg/L F	Chloride as mg/L Cl	Nitrite as mg/L N	Bromide as mg/L Br	Nitrate as mg/L N	Phosphate as mg/L P	Sulphate as mg/L SO4	As (mg/L)	Ca (mg/L)
0.0000	0.0071									
0.0000	0.0051		217.070			4.830		194.480		
0.0000	0.0030									
0.0001	0.0029		218.670			1.590		219.950		
0.0001	0.0030		218.670			1.590		219.950		
0.0000	0.0081									
0.0000	0.0080									
0.0000	0.0059		49.150			6.850		144.630		
0.0000	0.0053	0.690	8.655			4.540		174.733	0.010	121.005
0.0000	0.0037	0.328	3.475			6.958		157.417	0.010	111.783
0.0000	0.0034	0.581	2.896			7.180		158.961	0.010	105.957
0.0000	0.0073									
0.0000	0.0085	0.533	26.071			9.689		266.966		
0.0000	0.0064									
0.0000	0.0080	0.421	52.943			8.588		219.272		
0.0000	0.0039	1.540	111.783		0.713	0.937		202.785		
0.0000	0.0067									
0.0000	0.0078									
0.0000	0.0049	1.012	151.365		1.067	4.728		198.815		
0.0000	0.0062	0.613	147.753			7.819		189.975		
0.0000	0.0065									
0.0000	0.0062	0.408	118.256			12.640		172.315		
0.0000	0.0055	0.916	85.984	0.935	5.023	8.407		222.176	0.010	127.628
0.0000	0.0056	0.871	38.097			8.901		216.700		
0.0000	0.0049	0.273	93.190	1.489		7.642		212.012		
0.0000	0.0043	0.330	73.739	0.319		7.147		213.704		
0.0000	0.0041	0.643	76.851			2.688		209.569		
0.0000	0.0039	0.305	91.371					203.016		
0.0000	0.0097									
0.0000	0.0041									
0.0000	0.0088	0.385	13.006			0.960		217.312	0.010	94.690

ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES Field Alkalinity

Cd (mg/L)	K (mg/L)	Mg (mg/L)	Na (mg/L)	P (mg/L)	S (mg/L)	Se (mg/L)	Lab pH	as CaCO3 mg/L
							8.02	
							8.02	
							8.13	
							8.13	
							8.52	
							8.52	
							8.40	
							8.40	
0.013	3.866	42.801	10.116	0.062	76.089	0.010	7.69	
0.013	3.052	41.410	5.161	0.038	68.287	0.065	7.87	
0.013	2.895	39.027	4.948	0.032	64.306	0.067	7.87	
							8.65	
							8.48	
							8.20	
							8.03	
							8.33	
							8.00	
							8.17	
							7.89	
							8.46	
							8.46	
							8.43	
0.012	9.133	54.617	33.811	0.037	87.604	0.010	8.26	
							8.06	
							8.54	
							8.60	
							8.49	
							8.48	
							8.33	
							8.37	
0.013	7.502	41.966	16.173	0.066	91.158	0.070	8.39	

HoleID Sample Number Depth Depth ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

		(mbgs)	Error (mbgs)	Li ppm	B ppm	Na ppm	Mg ppm	Al ppm	Si ppm	P ppm	K ppm	Ca ppm	Sc ppm
WLC_12-11N	30192A-ICSRep	23.23	0.18	0.0506	0.5662	18.3341	48.6184	0.0569	15.1714	0.0650	7.5965	101.3533	0.0044
WLC_12-11N	30193A	25.24	0.15	0.1599	0.4765	88.0805	286.0204	0.5020	64.9928	0.1578	32.4004	719.1230	0.0168
WLC_12-11N	30194A	25.45	0.15	0.1298	0.6011	122.1977	187.8904	0.1338	11.9347	0.0762	93.4789	327.2888	0.0035
WLC_12-11N	30195A	26.06	0.12	0.3070	0.4595	177.8213	478.6047	0.0602	26.7390	0.0713	109.2865	749.7280	0.0065
WLC_12-11N	30195A-ICSRep	26.06	0.12	0.3070	0.4595	177.8213	478.6047	0.0602	26.7390	0.0713	109.2865	749.7280	0.0065
WLC_12-11N	30196A	26.96	0.11	0.3020	0.3028	207.0597	396.9780	0.0814	43.7343	0.0894	68.8159	805.8431	0.0108
WLC_12-11N	30197A	27.58	0.15	0.3849	0.4738	203.5931	388.5211	0.0946	14.7390	0.0806	96.1411	812.7897	0.0041
WLC_12-11N	30197A-MSrep	27.58	0.15	0.3992	0.4728	208.0071	392.5526	0.1392	14.7418	0.0470	95.5067	856.5615	0.0040
WLC_12-12	30198A	1.14	0.08	0.0167	1.2592	21.9733	34.0427	0.1419	31.8003	0.0601	4.7644	108.8667	0.0080
WLC_12-12	30199A	1.83	0.09	0.0179	0.9066	17.7543	23.4044	0.5469	129.9447	0.2573	13.6827	113.3984	0.0328
WLC_12-12	30200A	2.70	0.11	0.0405	0.1684	5.8317	73.5326	0.0682	6.0047	0.0273	3.3516	217.7732	0.0028
WLC_12-12	30200A-MSRep	2.70	0.11	0.0396	0.1803	6.3425	77.3771	0.1529	6.3088	0.0357	3.7422	233.9524	0.0031
WLC_12-12	30200A-OESRep	2.70	0.11	0.0396	0.1803	6.3425	77.3771	0.1529	6.3088	0.0357	3.7422	233.9524	0.0031
WLC_12-12	30201A	3.67	0.14	0.0470	0.0952	8.0685	82.7246	0.1142	8.5809	0.0704	4.0148	185.8723	0.0039
WLC_12-12	30201A-OESRep	3.67	0.14	0.0470	0.0952	8.0685	82.7246	0.1142	8.5809	0.0704	4.0148	185.8723	0.0039
WLC_12-12	30202A	5.30	0.12	0.0483	0.1525	33.4134	66.3726	0.1341	16.6671	0.0364	6.3530	156.7818	0.0058
WLC_12-12	30203A	6.48	0.11										
WLC_12-12	30204A	7.35	0.12	0.0668	0.6016	39.7585	64.6422	0.2233	23.8146	0.0417	6.5405	133.5589	0.0079
WLC_12-12	30205A	7.71	0.09	0.0559	0.1298	43.3803	61.2071	0.1342	17.9683	0.0368	15.0354	143.5376	0.0062
WLC_12-12	30206A	8.88	0.08	0.0555	0.1486	51.4405	66.7629	0.1941	35.5364	0.1436	16.7187	149.2165	0.0130
WLC_12-12	30207A	10.01	0.11	0.0531	0.6376	26.7805	41.3188	0.1344	27.6659	0.0606	5.6452	115.9020	0.0083
WLC_12-12	30207A-MSRep	10.01	0.11	0.0531	0.6333	26.7327	41.2373	0.1341	27.5148	0.0604	5.6295	115.4083	0.0082
WLC_12-12	30208B	11.22	0.09	0.0640	0.1439	52.2452	54.4683	0.1507	20.1695	0.0555	220.2973	149.2595	0.0083
WLC_12-12	30209B	12.54	0.11	0.1492	0.2716	58.9029	76.1364	0.1288	13.6930	0.0379	15.1362	144.1164	0.0056
WLC_12-12	30210A	13.29	0.09	0.0669	0.9732	38.0570	46.0189	0.1379	62.2085	0.0670	7.7961	111.7732	0.0171
WLC_12-12	30210A-MSRep	13.29	0.09	0.0669	0.9663	38.0782	46.0555	0.1380	62.0385	0.0670	7.8086	111.7705	0.0172
WLC_12-12	30211B	14.48	0.06	0.0500	0.4198	29.9267	41.6763	0.1590	26.2125	0.0444	7.6701	107.8395	0.0107
WLC_12-12	30212B	15.15	0.09										
WLC_12-12	30213B	16.03	0.09	0.0397	0.2050	45.5519	57.6728	0.1998	24.2100	0.1884	22.1923	145.0194	0.0092
WLC_12-12	30214B	17.40	0.06	0.0627	0.3764	42.5525	62.8173	0.1773	16.5084	0.0445	12.5386	129.9968	0.0060
WLC_12-12	30215B	17.92	0.09										
WLC_12-12	30216B	19.20	0.06	0.0513	0.1957	55.5864	41.2732	0.2335	27.6833	0.0570	17.8769	124.6772	0.0098
WLC_12-12	30217B	20.24	0.12	0.0581	0.1696	50.2945	59.4609	0.5433	19.8593	0.1471	12.5152	143.1291	0.0072
WLC_12-12	30218B	21.02	0.05	0.0588	0.3751	39.3742	45.7807	0.1978	34.4364	0.0343	12.4150	121.1067	0.0116
WLC_12-12	30219B	23.16	0.09	0.1193	0.4272	53.9567	139.5392	0.2644	18.0865	0.0401	26.1294	430.7018	0.0079
WLC_12-12	30220B	24.16	0.11	0.2096	0.7893	117.7463	199.2979	0.1507	13.5837	0.2174	66.0961	461.3011	0.0061
WLC_12-12	30220B-MSRep	24.16	0.11	0.2104	0.7983	117.3733	201.7311	0.2261	13.8412	0.2359	64.8460	466.5927	0.0062

ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Rb	Sr
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0030	0.0018	0.0013	0.0366	0.2122	0.0023	0.0142	0.0234	0.0549	0.0000	0.0001	0.0050	0.0685	0.0054	0.2815
0.0134	0.0000	0.3239	2.2020	17.8951	0.1324	4.8507	0.1070	0.1141	0.0000	0.0000	0.4218	11.7579	0.0282	2.8941
0.0040	0.0015	0.0017	0.4149	0.6172	0.0184	0.0854	0.1326	0.0972	0.0000	0.0002	0.0221	0.5227	0.0547	2.4649
0.0053	0.0035	0.0023	1.2241	1.1117	0.0458	0.2083	0.0998	0.1194	0.0000	0.0004	0.0356	1.0212	0.0824	6.8677
0.0053	0.0035	0.0023	1.2241	1.1117	0.0458	0.2083	0.0998	0.1194	0.0000	0.0004	0.0356	1.0212	0.0824	6.8677
0.0067	0.0017	0.0030	0.4587	1.3407	0.0165	0.1862	0.0995	0.1275	0.0000	0.0004	0.0468	1.3316	0.0440	5.5770
0.0057	0.0008	0.0021	0.6709	1.2906	0.0644	0.3190	0.0256	0.0653	0.0000	0.0003	0.0194	0.4005	0.0436	11.3149
0.0028	0.0008	0.0014	0.7856	1.1859	0.0665	0.3240	0.0269	0.0615	0.0000	0.0022	0.0129	0.3919	0.0434	11.1545
0.0073	0.0019	0.0019	0.1538	0.0643	0.0019	0.0228	0.0198	0.1510	ud	0.0000	0.0011	0.0040	0.0035	0.3855
0.0184	0.0030	0.0091	0.0936	0.2631	0.0065	0.0179	0.0797	0.1163	0.0000	0.0000	0.0016	0.0029	0.0033	0.2498
0.0030	0.0015	0.0006	0.1249	0.0160	0.0042	0.0328	0.0171	0.2621	0.0000	0.0001	0.0035	0.0377	0.0018	0.4026
0.0025	0.0018	0.0010	0.1336	0.0197	0.0044	0.0350	0.0183	0.2838	0.0000	0.0001	0.0029	0.0410	0.0020	0.4374
0.0025	0.0018	0.0010	0.1336	0.0197	0.0044	0.0350	0.0183	0.2838	0.0000	0.0001	0.0029	0.0410	0.0020	0.4374
0.0032	0.0018	0.0010	0.4011	0.0629	0.0024	0.0200	0.0072	0.1185	0.0000	0.0001	0.0007	0.0003	0.0035	0.4553
0.0032	0.0018	0.0010	0.4011	0.0629	0.0024	0.0200	0.0072	0.1185	0.0000	0.0001	0.0007	0.0003	0.0035	0.4553
0.0041	0.0026	0.0071	0.0918	0.0402	0.0012	0.0123	0.0124	0.1320	ud	0.0001	0.0044	0.0283	0.0027	0.4482
0.0068	0.0024	0.0061	0.1171	0.1197	0.0043	0.0202	0.0602	0.2897	ud	0.0000	0.0032	0.0678	0.0044	0.6120
0.0047	0.0033	0.0024	0.0823	0.0354	0.0031	0.0153	0.0192	0.0736	ud	0.0002	0.0028	0.0107	0.0053	0.6763
0.0080	0.0038	0.0089	0.1144	0.1896	0.0025	0.0184	0.0797	0.1840	ud	0.0001	0.0032	0.0336	0.0058	0.6181
0.0048	0.0031	0.0040	0.0745	0.0361	0.0024	0.0134	0.0158	0.1106	0.0000	0.0000	0.0068	0.0447	0.0046	0.4046
0.0048	0.0031	0.0039	0.0742	0.0599	0.0024	0.0133	0.0158	0.1102	0.0000	0.0000	0.0068	0.0446	0.0046	0.4035
0.0050	0.0024	0.0031	0.0886	0.0765	0.0031	0.0197	0.0194	0.0863	ud	0.0001	0.0029	0.0050	0.0117	0.6113
0.0034	0.0016	0.0024	0.1189	0.0443	0.0005	0.0069	0.0014	0.1812	ud	0.0001	0.0023	0.0069	0.0050	0.5074
0.0087	0.0028	0.0063	0.1181	0.0353	0.0008	0.0061	0.0027	0.1325	0.0000	0.0001	0.0031	0.0456	0.0019	0.4155
0.0087	0.0028	0.0063	0.1183	0.0607	0.0008	0.0061	0.0027	0.1327	0.0000	0.0001	0.0031	0.0458	0.0019	0.4158
0.0055	0.0015	0.0189	0.1214	0.0317	0.0010	0.0079	0.0017	0.0958	ud	0.0001	0.0030	0.0313	0.0061	0.3168
0.0058	0.0042	0.0060	0.0878	0.1018	0.0017	0.0177	0.0135	0.2501	ud	0.0003	0.0040	0.0411	0.0111	0.5610
0.0038	0.0028	0.0025	0.1419	0.0565	0.0012	0.0071	0.0027	0.1991	ud	0.0001	0.0031	0.0344	0.0052	0.3597
0.0060	0.0038	0.0033	0.1439	0.1766	0.0025	0.0275	0.0070	0.4156	ud	0.0001	0.0023	0.0175	0.0075	0.4388
0.0067	0.0027	0.0070	0.1330	0.5366	0.0016	0.0211	0.0227	0.0942	ud	0.0002	0.0025	0.0082	0.0056	0.4176
0.0066	0.0071	0.0101	0.1121	0.0896	0.0009	0.0059	0.0016	0.6091	ud	0.0001	0.0041	0.0431	0.0083	0.9131
0.0059	0.0034	0.0016	0.9082	0.1223	0.0045	0.0364	0.0138	0.1768	0.0000	0.0002	0.0097	0.1345	0.0129	1.2501
0.0044	0.0025	0.0010	0.5312	0.0302	0.0020	0.0251	0.0083	0.3261	0.0000	0.0002	0.0074	0.0897	0.0249	2.0390
0.0051	0.0029	0.0023	0.5405	0.1344	0.0026	0.0249	0.0124	0.3295	0.0000	0.0002	0.0078	0.0913	0.0255	2.0323
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Y	Zr	Nb	Mo	Ag	Cd	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0001	0.0003	0.0322	0.0001	0.0001	0.0001	0.0008	0.0000	0.0518	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0003	0.0006	0.0458	0.0272	0.0007	0.0006	0.0043	0.0002	0.0870	0.0002	0.0002	0.0000	0.0001	0.0001
0.0001	0.0006	0.0003	0.2658	0.0004	0.0006	0.0023	0.0058	0.0005	0.1450	0.0003	0.0000	0.0000	0.0000	0.0000
0.0002	0.0013	0.0002	0.0554	0.0008	0.0013	0.0001	0.0042	0.0013	0.2213	0.0000	0.0001	0.0000	0.0000	0.0000
0.0002	0.0013	0.0002	0.0554	0.0008	0.0013	0.0001	0.0042	0.0013	0.2213	0.0000	0.0001	0.0000	0.0000	0.0000
0.0002	0.0002	0.0003	0.3981	0.0010	0.0000	0.0002	0.0082	0.0002	0.1572	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0010	0.0003	0.2139	0.0001	0.0027	0.0000	0.0064	0.0003	0.1478	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0003	0.0002	0.2177	0.0001	0.0024	0.0001	0.0063	0.0003	0.1450	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0001	0.0001	0.0214	ud	0.0001	0.0001	0.0007	ud	0.0636	0.0001	0.0001	0.0000	0.0000	ud
0.0004	0.0002	0.0002	0.0243	0.0006	0.0003	0.0004	0.0007	ud	0.0778	0.0002	0.0004	0.0000	0.0002	0.0001
0.0000	0.0029	0.0015	0.0044	0.0001	0.0003	0.0001	0.0004	0.0021	0.1122	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0002	0.0014	0.0046	0.0001	0.0004	0.0001	0.0004	0.0000	0.1216	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0002	0.0014	0.0046	0.0001	0.0004	0.0001	0.0004	0.0000	0.1216	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0003	0.0011	0.0071	0.0001	0.0010	0.0001	0.0005	0.0000	0.1496	0.0001	0.0001	0.0000	0.0001	0.0000
0.0002	0.0003	0.0011	0.0071	0.0001	0.0010	0.0001	0.0005	0.0000	0.1496	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	ud	0.0001	0.0237	ud	0.0002	0.0001	0.0007	ud	0.3180	0.0000	ud	ud	ud	ud
0.0001	0.0001	0.0001	0.0335	ud	0.0006	0.0001	0.0005	0.0000	0.0880	0.0001	0.0001	0.0000	0.0000	ud
0.0001	0.0005	0.0000	0.0286	ud	0.0002	0.0001	0.0006	0.0000	0.0816	0.0000	0.0000	0.0000	ud	ud
0.0006	0.0002	0.0000	0.0387	0.0014	0.0004	0.0002	0.0008	0.0000	0.0894	0.0003	0.0006	0.0001	0.0004	0.0001
0.0000	0.0002	0.0001	0.0114	0.0001	0.0001	0.0001	0.0018	0.0000	0.0715	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.0001	0.0113	0.0001	0.0001	0.0001	0.0018	0.0000	0.0715	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0216	0.0288	0.0002	0.0001	0.0005	0.0004	0.1082	0.0001	0.0001	0.0000	0.0001	0.0000
0.0001	0.0001	0.0000	0.0322	0.0001	ud	0.0001	0.0003	0.0000	0.0947	0.0000	0.0000	0.0000	ud	ud
0.0000	0.0000	0.0002	0.0282	0.0001	0.0000	0.0001	0.0010	0.0000	0.0798	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0002	0.0282	0.0001	0.0000	0.0001	0.0010	0.0000	0.0798	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0000	0.0252	ud	0.0000	0.0001	0.0007	0.0000	0.0621	0.0000	0.0000	ud	ud	ud
0.0002	0.0002	0.0001	0.0212	ud	0.0002	0.0001	0.0008	0.0001	0.1083	0.0001	0.0002	0.0000	0.0001	0.0000
0.0001	0.0002	0.0001	0.0271	0.0001	ud	0.0001	0.0008	0.0000	0.0734	0.0000	0.0000	ud	ud	ud
0.0001	0.0001	0.0001	0.0544	ud	0.0002	0.0001	0.0007	0.0000	0.0867	0.0000	0.0001	0.0000	0.0000	ud
0.0011	0.0003	0.0001	0.0555	ud	0.0003	0.0001	0.0005	0.0001	0.0829	0.0005	0.0011	0.0002	0.0008	0.0002
0.0001	0.0001	0.0001	0.0243	ud	0.0000	0.0001	0.0008	0.0000	0.0819	0.0000	0.0000	0.0000	0.0000	ud
0.0002	0.0004	0.0016	0.0576	0.0001	0.0004	0.0001	0.0020	0.0000	0.1377	0.0001	0.0001	0.0000	0.0001	0.0000
0.0000	0.0002	0.0017	0.1605	0.0001	0.0001	0.0001	0.0018	0.0015	0.1262	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0001	0.0015	0.1641	0.0001	0.0001	0.0001	0.0019	0.0001	0.1231	0.0000	0.0001	0.0000	0.0001	0.0000
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Hg	Tl	Pb
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0002	0.0000	0.0007
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0122	0.0001	0.0018
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0127	0.0004	0.0013
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0097	0.0007	0.0012
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0097	0.0007	0.0012
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0232	0.0003	0.0021
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0011	0.0005	0.0010
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0001	0.0005	0.0002
ud	ud	0.0000	0.0000	ud	0.0000	ud	0.0000	ud	ud	0.0000	0.0009	0.0002	0.0000	0.0004
ud	0.0000	0.0000	0.0001	ud	0.0000	ud	0.0000	0.0000	ud	0.0000	0.0091	ud	ud	0.0013
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0011	0.0000	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0011	0.0000	0.0003
ud	ud	0.0000	ud	ud	0.0000	ud	ud	ud	ud	0.0000	0.0007	ud	ud	0.0002
ud	0.0000	0.0000	0.0000	ud	0.0000	ud	0.0000	0.0000	ud	0.0000	0.0036	0.0005	0.0000	0.0015
ud	ud	0.0000	ud	ud	0.0000	ud	0.0000	0.0000	ud	0.0000	0.0012	0.0006	0.0000	0.0002
0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	ud	0.0000	0.0013	0.0005	0.0001	0.0023
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0036	0.0010	0.0000	0.0004
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0036	0.0010	0.0000	0.0004
ud	0.0000	0.0000	0.0000	ud	0.0000	ud	0.0000	0.0000	ud	0.0000	0.0008	0.0039	0.0001	0.0018
ud	ud	0.0000	0.0000	ud	0.0000	ud	ud	0.0000	ud	0.0000	0.0004	0.0004	0.0001	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018	0.0002	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018	0.0002	0.0000	0.0002
ud	ud	0.0000	ud	ud	0.0000	ud	0.0000	0.0000	ud	ud	0.0012	0.0004	0.0001	0.0001
ud	0.0000	0.0000	0.0000	0.0000	0.0000	ud	0.0000	0.0000	ud	0.0000	0.0013	0.0005	0.0001	0.0004
ud	ud	0.0000	0.0000	ud	ud	ud	ud	0.0000	ud	0.0000	0.0005	ud	0.0001	0.0007
ud	ud	0.0000	0.0000	ud	0.0000	ud	0.0000	ud	ud	ud	0.0039	0.0002	0.0001	0.0006
0.0000	0.0002	0.0000	0.0002	0.0000	0.0001	0.0000	0.0001	ud	ud	0.0000	0.0008	ud	0.0000	0.0013
ud	ud	0.0000	0.0000	ud	0.0000	ud	0.0000	ud	ud	ud	0.0009	0.0007	0.0001	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0018	0.0017	0.0002	0.0047
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0014	0.1068	0.0001	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0014	0.0032	0.0001	0.0004

ICP-MS ICP-MS ICS ICS ICS ICS ICS ICS ICS ICP-OES ICP-OES

Th ppm	U ppm	Flouride as mg/L F	Chloride as mg/L Cl	Nitrite as mg/L N	Bromide as mg/L Br	Nitrate as mg/L N	Phosphate as mg/L P	Sulphate as mg/L SO4	As (mg/L)	Ca (mg/L)
0.0000	0.0088	0.635	13.067			1.016		216.336		
0.0000	0.0151									
0.0000	0.0164	0.606	25.623					1376.149	0.010	282.992
0.0000	0.0237		15.308			0.460		3376.387	0.010	630.883
0.0000	0.0237		15.406			0.305		3341.232		
0.0000	0.0494	0.701	24.837			0.522		3314.170		
0.0000	0.0352		22.422					3034.260	0.010	699.586
0.0000	0.0350	1.167	24.132			0.478		3278.595	0.010	698.964
ud	0.0032	0.025	17.916	0.025	0.100	0.433	0.025	160.110		
ud	0.0022									
0.0001	0.0025	1.563	2.934	0.025	0.100	16.734	0.025	500.831	0.010	211.349
0.0001	0.0026	1.563	2.934	0.025	0.100	16.734	0.025	500.831	0.010	210.553
0.0001	0.0026	1.563	2.934	0.025	0.100	16.734	0.025	500.831	0.010	207.537
0.0000	0.0054	0.025	3.389	0.025	0.100	0.772	0.025	387.957	0.010	182.169
0.0000	0.0054	0.025	3.596	0.025	0.100	1.206	0.025	382.884	0.010	174.261
ud	0.0022	0.581	48.779	0.025	0.100	11.175	0.025	404.498		
		0.592	35.496	0.025	0.100	9.583	0.025	249.338	0.010	108.025
ud	0.0027									
ud	0.0045	0.592	84.382	0.025	0.100	12.222	0.025	233.229		
0.0000	0.0040									
0.0000	0.0032	0.883	45.037	0.025	0.100	9.680	0.025	194.966		
0.0000	0.0032	0.883	45.037	0.025	0.100	9.680	0.025	194.966		
ud	0.0038	1.460	285.998	0.220	0.100	6.340	0.025	189.494		
ud	0.0040	0.588	128.997	0.025	0.100	9.640	0.025	207.509	0.010	143.610
0.0000	0.0031	0.719	75.407	0.426	2.237	12.294	0.025	182.790		
0.0000	0.0031	0.719	75.407	0.426	2.237	12.294	0.025	182.790		
ud	0.0027	0.479	44.689	0.025	0.100	6.316	0.025	216.122	0.010	103.896
0.0000	0.0063	0.507	42.357	0.025	0.100	27.706	0.025	221.520		
ud	0.0045	0.025	70.650	0.025	0.100	5.087	0.025	209.290	0.010	129.132
ud	0.0030									
0.0002	0.0051	0.779	103.651	0.025	0.100	9.770	0.025	206.290	0.010	132.966
ud	0.0043	0.025	61.446	0.025	0.100	10.098	0.025	201.068		
0.0001	0.0108	0.624	21.678	0.025	0.100	0.602	0.025	1352.869	0.010	395.310
0.0001	0.0086	0.025	29.555	0.025	0.100	0.025	0.025	1832.422	0.010	422.334
0.0001	0.0090	0.025	29.555	0.025	0.100	0.025	0.025	1832.422	0.010	422.334

ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES ICP-OES Field Alkalinity

Cd (mg/L)	K (mg/L)	Mg (mg/L)	Na (mg/L)	P (mg/L)	S (mg/L)	Se (mg/L)	Lab pH	as CaCO3 mg/L
							8.39	
							7.35	
0.013	74.585	168.728	104.553	0.032	482.165	0.589	7.89	
0.014	92.564	447.206	152.527	0.077	1225.372	1.154		
							7.98	
0.015	78.944	364.364	163.351	0.037	1154.720	0.436	8.17	
0.015	80.164	368.727	166.084	0.044	1159.477	0.432	8.17	
							8.69	240
							8.78	
0.013	3.268	71.077	6.045	0.031	202.737	0.046	8.39	240
0.013	3.192	71.224	6.125	0.052	201.883	0.045	8.39	240
0.013	3.246	71.587	6.253	0.035	200.710	0.043	8.39	240
0.014	4.754	85.154	8.439	0.115	157.548	0.010	7.88	240
0.014	3.767	80.544	6.768	0.063	157.783	0.010	7.88	240
							8.50	180
0.013	6.121	43.792	19.035	0.050	107.964	0.061	8.02	180
							8.44	240
							8.77	240
							8.32	240
							8.32	240
							8.41	240
0.012	14.336	72.148	47.376	0.036	88.040	0.010	8.40	240
							8.51	240
							8.51	240
0.013	8.027	37.803	24.041	0.215	89.111	0.010	8.46	240
							8.47	240
0.013	12.275	59.945	36.505	0.045	87.399	0.010	8.55	240
							8.65	180
0.013	11.463	54.456	41.182	0.050	86.659	0.010	8.77	240
							8.52	240
0.013	25.556	138.246	49.746	0.036	478.557	0.159	8.48	240
0.013	58.603	195.360	100.453	0.203	647.013	0.102	8.49	240
0.013	58.603	195.360	100.453	0.203	647.013	0.102	8.49	240

HoleID Sample Number Depth Depth ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

		(mbgs)	Error (mbgs)	Li ppm	B ppm	Na ppm	Mg ppm	Al ppm	Si ppm	P ppm	K ppm	Ca ppm	Sc ppm
WLC_12-12	30221B	24.81	0.09										
WLC_12-12	30222B	25.71	0.08										
WLC_12-12	30223B	26.61	0.09	0.2635	0.6328	371.9043	420.8400	0.1504	11.1087	0.0432	138.7435	797.6630	0.0044
WLC_12-12	30223B-OESRep	26.61	0.09	0.2635	0.6328	371.9043	420.8400	0.1504	11.1087	0.0432	138.7435	797.6630	0.0044
WLC_12-12	30224B	27.68	0.06	0.3149	1.0197	191.8161	65.3649	0.1652	8.8137	0.0618	49.6088	140.5214	0.0031
WLC_12-12	30225B	28.53	0.06	0.2318	0.8517	238.8559	94.0760	0.0955	12.4568	0.0376	43.2217	210.5183	0.0044
WLC_12-12	30225B-OESRep	28.53	0.06	0.2334	0.8465	285.1579	93.8445	0.0936	12.5602	0.0337	49.5054	204.2231	0.0044
WLC_12-12	30226B	29.43	0.11										
WLC_12-12	30227B	31.01	0.08										
WLC_12-12	30228B	31.64	0.09										

ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm	ICP-MS Ga ppm	ICP-MS Ge ppm	ICP-MS As ppm	ICP-MS Se ppm	ICP-MS Rb ppm	ICP-MS Sr ppm
0.0033	0.0032	0.0034	1.1641	0.1114	0.0053	0.0695	0.0430	0.1452	ud	0.0007	0.0509	0.8618	0.0969	8.3555
0.0033	0.0032	0.0034	1.1641	0.1114	0.0053	0.0695	0.0430	0.1452	ud	0.0007	0.0509	0.8618	0.0969	8.3555
0.0029	0.0034	0.0023	0.2414	0.1297	0.0152	0.0153	0.0091	0.1595	ud	0.0002	0.0028	0.0079	0.0265	2.5054
0.0027	0.0018	0.0011	0.2933	0.0039	0.0030	0.0157	0.0070	0.1013	ud	0.0002	0.0013	0.0085	0.0232	3.6803
0.0029	0.0017	0.0016	0.2876	0.0171	0.0030	0.0159	0.0066	0.1034	ud	0.0002	0.0023	0.0098	0.0234	3.6628

ICP-MS Y ppm	ICP-MS Zr ppm	ICP-MS Nb ppm	ICP-MS Mo ppm	ICP-MS Ag ppm	ICP-MS Cd ppm	ICP-MS Sn ppm	ICP-MS Sb ppm	ICP-MS Cs ppm	ICP-MS Ba ppm	ICP-MS La ppm	ICP-MS Ce ppm	ICP-MS Pr ppm	ICP-MS Nd ppm	ICP-MS Sm ppm
0.0002	0.0001	0.0002	0.2558	0.0144	0.0005	0.0001	0.0046	0.0008	0.1026	0.0000	0.0000	ud	0.0000	ud
0.0002	0.0001	0.0002	0.2558	0.0144	0.0005	0.0001	0.0046	0.0008	0.1026	0.0000	0.0000	ud	0.0000	ud
0.0001	ud	0.0001	0.0227	ud	0.0001	0.0001	0.0028	0.0002	0.0749	0.0000	0.0001	0.0000	0.0000	ud
0.0001	0.0000	0.0001	0.0764	ud	0.0001	ud	0.0021	0.0001	0.1295	ud	ud	ud	ud	ud
0.0001	0.0000	0.0001	0.0730	ud	0.0001	0.0000	0.0022	0.0001	0.1285	ud	ud	ud	ud	ud

ICP-MS Eu	ICP-MS Gd	ICP-MS Tb	ICP-MS Dy	ICP-MS Ho	ICP-MS Er	ICP-MS Tm	ICP-MS Yb	ICP-MS Lu	ICP-MS Hf	ICP-MS Ta	ICP-MS W	ICP-MS Hg	ICP-MS Tl	ICP-MS Pb

ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
ud	ud	0.0000	ud	ud	0.0000	ud	ud	ud	ud	0.0000	0.0013	0.0122	0.0002	0.0003
ud	ud	0.0000	ud	ud	0.0000	ud	ud	ud	ud	0.0000	0.0013	0.0122	0.0002	0.0003
ud	ud	0.0000	0.0000	ud	ud	ud	ud	ud	ud	ud	0.0030	ud	0.0000	0.0007
ud	ud	0.0000	ud	ud	ud	ud	ud	ud	ud	ud	0.0013	ud	0.0001	0.0000
ud	ud	0.0000	ud	ud	ud	ud	ud	ud	ud	0.0000	0.0013	0.0004	0.0001	0.0000

ICP-MS Th ppm	ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)
ud	0.0140	0.771	35.989	0.025	0.100	0.304	0.025	3659.532	0.010	616.487
ud	0.0140	0.771	35.989	0.025	0.100	0.304	0.025	3659.532	0.010	655.122
ud	0.0007	0.929	23.980	0.025	0.100	0.025	0.025	727.780		
ud	0.0022	0.760	24.179	0.025	0.100	0.244	0.025	1105.620	0.010	206.979
ud	0.0022	0.760	24.179	0.025	0.100	0.244	0.025	1105.620	0.010	211.944

ICP-OES Cd (mg/L)	ICP-OES K (mg/L)	ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Lab pH	Field Alkalinity as CaCO3 mg/L
0.013	123.135	427.646			1645.325	0.821	8.13	80
	121.821	399.789	280.823	0.041	1515.313	0.791	8.73	240
							8.73	240
0.013	41.945	90.729	179.103	0.045	393.458	0.010	8.56	180
0.013	45.019	92.421	182.188	0.034	400.246	0.010	8.56	180

D4 Leached Water Data

Hole ID	Sample Number	Depth	Depth		ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

		(mbgs)	Error (m)	GWC (%)	Mean GWC (%)	Li mg/L	B mg/L	Na mg/L	Mg mg/L	Al mg/L	Si mg/L
WLC_12-06c	L32159A	6.10	0.30	3.74	10.56	0.8855	0.9300	125.2741	686.5280	1.1183	144.6099
WLC_12-06c	L32159A-Dup	6.10	0.30	3.74	10.56	0.9089	0.9649	115.4381	705.7509	0.6971	144.0627
WLC_12-06c	L32160A	12.19	0.30	11.5	10.56						
WLC_12-06c	L32160A-D	12.19	0.30	11.5	10.56						
WLC_12-06c	L32161A	18.59	0.30	7	10.56	0.9269	1.5981	444.6284	3848.1529	0.1830	177.9769
WLC_12-06c	L32161A-Rep	18.59	0.30	7	10.56	0.9105	1.6069	456.2839	3838.0374	0.3033	182.5965
WLC_12-06c	L32161A-Dup	18.59	0.30	7	10.56	0.0286	0.0043	14.6783	95.1198	1.3169	23.2431
WLC_12-06c	L32161A-Dup Rep	18.59	0.30	7	10.56	0.0505	0.0410	25.4934	142.1173	0.8754	33.3653
WLC_12-06c	L32162A	24.38	0.30	5.58	10.56	1.1194	2.0956	670.6672	5191.3002	0.2776	209.1370
WLC_12-06c	L32162A-Dup	24.38	0.30	5.58	10.56	0.1136	0.2221	54.8566	242.9289	0.8291	62.5854
WLC_12-06c	L32162A-Dup Rep	24.38	0.30	5.58	10.56	0.1394	0.1433	56.6729	279.3523	0.7979	62.8656
WLC_12-06c	L32163A	30.78	0.30	12.89	10.56	0.4794	0.8930	126.7710	2030.8453	0.1651	94.5555
WLC_12-06c	L32163A	30.78	0.30	12.89	10.56	0.0993	0.1041	14.0222	96.1163	0.3626	35.0814
WLC_12-06c	L32164A	33.53	0.30	14.53	10.56	0.3198	0.2950	46.7060	114.5597	0.1631	43.4526
WLC_12-06c	L32165A	36.58	0.30	16.7	10.56						
WLC_12-06c	L32166A	39.62	0.30	23.52	10.56						
WLC_12-06c	L32167A	42.67	0.30	12.44	10.56						
WLC_12-06c	L32168A	42.67	0.30	12.44	10.56						
WLC_12-06c	L32169A	45.72	0.30		10.56						
WLC_12-06c	L32170A	48.77	0.30		10.56						
WLC_12-06c	L32171A	48.77	0.30		10.56						
WLC_12-06c	L32172A	49.68	0.30		10.56						
WLC_12-06c	L32173A	54.86	0.30		10.56						
WLC_12-06c	L32174A	57.91	0.30		10.56						
WLC_12-06c	L32175A	60.96	0.30		10.56						
WLC_12-06c	L32176A	64.01	0.30		10.56						
WLC_12-06c	L32177A	67.06	0.30		10.56						
WLC_12-06c	L32177A	67.06	0.30		10.56						
WLC_12-06c	L32178A	70.10	0.30		10.56						
WLC_12-06c	L32179A	73.15	0.30		10.56						
WLC_12-06c	L32180A	76.20	0.30		10.56						
WLC_12-06c	L32181A	76.20	0.30		10.56						
WLC_12-07b	L32021A	2.67	0.23	6.46	4.56	0.1204	0.4351	57.0326	86.1361	2.5874	66.8182
WLC_12-07b	L32022A	6.10	0.30		4.56						
WLC_12-07b	L32022A	6.10	0.30		4.56						
WLC_12-07b	L32023A	9.45	0.30	2.68	4.56	2.9039	5.2679	442.6218	801.9891	0.8952	286.6169
WLC_12-07b	L32024A	12.19	0.30		4.56						

ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

P mg/L	K mg/L	Ca mg/L	Sc mg/L	Ti mg/L	V mg/L	Cr mg/L	Mn mg/L	Fe mg/L	Co mg/L	Ni mg/L	Cu mg/L	Zn mg/L	Ga mg/L
2.5087	367.8791	5527.5707	0.0260	0.0307	0.0255	0.2516	1.6887	0.5205	0.0110	0.1743	0.0656	0.4280	0.0004
2.2441	358.2651	5628.3311	0.0283	0.0353	0.0150	0.2635	2.0897	0.4239	0.0095	0.1818	0.0574	0.7263	0.0063
1.1575	119.0723	6677.3661	0.0392	0.0245	0.0143	0.0653	0.0426	2.9350	0.0077	0.2643	0.0302	0.3776	0.0002
1.0471	113.8968	7019.6399	0.0428	0.0305	0.0102	0.0932	0.0311	2.5526	0.0082	0.2550	0.0461	0.9215	0.0002
1.1118	20.6558	406.8261	0.0032	0.0132	0.0096	0.0729	0.0060	0.1738	0.0006	0.0112	0.0074	0.0415	0.0008
0.8393	29.4243	559.6355	0.0062	0.0081	0.0074	0.0671	0.0073	0.1006	0.0002	0.0226	0.0250	0.7091	0.0002
1.5689	174.5192	9024.8729	0.0470	0.0359	0.0165	0.0920	0.0417	3.1047	0.0101	0.4124	0.0477	1.1941	0.0003
1.6561	52.0735	905.1400	0.0117	0.0130	0.0080	0.1854	0.0300	0.2507	0.0003	0.0409	0.0345	3.0800	0.0003
1.8261	54.1569	950.1298	0.0102	0.0196	0.0065	0.1967	0.0196	0.1979	0.0009	0.0332	0.0384	0.5202	0.0005
0.7926	58.3742	4073.6253	0.0210	0.0094	0.0063	0.0352	0.0164	1.4752	0.0043	0.1813	0.0110	0.3996	0.0001
0.7619	22.9417	380.5326	0.0063	0.0071	0.0032	0.0685	0.0036	0.0806	0.0004	0.0142	0.0061	0.3571	0.0001
0.8351	56.7714	722.5012	0.0105	0.0062	0.0022	0.1805	0.0502	0.7711	0.0018	0.0320	0.0090	0.0322	0.0046
2.9396	57.4208	566.6405	0.0180	0.0311	0.0296	0.1401	0.0183	4.9627	0.0020	0.0356	0.0273	0.7862	0.0002
3.4929	675.8933	3146.9526	0.0867	0.0689	0.0465	0.1108	0.7002	8.8437	0.0242	0.2255	0.0292	3.6568	0.0006
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Ge mg/L	As mg/L	Se mg/L	Rb mg/L	Sr mg/L	Y mg/L	Zr mg/L	Nb mg/L	Mo mg/L	Ag mg/L	Cd mg/L	Sn mg/L	Sb mg/L	Cs mg/L
0.0008	0.0214	0.5640	0.1027	6.4500	0.0003	0.0015	0.0094	1.2532	0.0040	0.0051	0.0052	0.0261	0.0002
0.0018	0.0545	0.7696	0.1157	6.9711	0.0005	0.0008	0.0071	1.4542	0.0040	0.0094	0.0038	0.0253	0.0004
0.0009	0.4128	6.3865	0.0732	15.6131	0.0002	0.0013	0.0030	0.3578	0.0021	0.0004	0.0028	0.0033	0.0001
0.0023	0.3249	5.8750	0.0742	17.8375	0.0002	0.0060	0.0030	0.3144	0.0021	0.0002	0.0063	0.0026	0.0001
0.0004	0.0024	0.1188	0.0118	0.9363	0.0002	0.0013	0.0040	0.1795	0.0021	0.0001	0.0022	0.0001	0.0001
0.0004	0.0074	0.1879	0.0140	1.3700	0.0002	0.0004	0.0031	0.2203	0.0021	0.0001	0.0014	0.0012	0.0001
0.0023	0.0991	1.4767	0.1226	16.9106	0.0003	0.0105	0.0063	0.5390	0.0027	0.0010	0.0076	0.0027	0.0001
0.0005	0.0082	0.1710	0.0206	1.7283	0.0002	0.0005	0.0034	0.5896	0.0027	0.0014	0.0023	0.0022	0.0001
0.0005	0.0192	0.0780	0.0222	1.7882	0.0003	0.0005	0.0066	0.6106	0.0027	0.0010	0.0025	0.0021	0.0001
0.0007	0.1204	2.0888	0.0357	6.9429	0.0001	0.0031	0.0027	0.1836	0.0012	0.0001	0.0017	0.0007	0.0001
0.0002	0.0096	0.0902	0.0076	0.7204	0.0001	0.0002	0.0034	0.2529	0.0012	0.0004	0.0012	0.0013	0.0001
0.0002	0.0108	0.0373	0.0073	1.5721	0.0001	0.0006	0.0020	0.1211	0.0010	0.0002	0.0010	0.0018	0.0001
0.0005	0.0120	0.0839	0.0141	0.8572	0.0015	0.0027	0.0017	0.4246	0.0023	0.0002	0.0077	0.0122	0.0001
0.0011	0.1266	2.4727	0.3976	29.8376	0.0007	0.0111	0.0042	1.5405	0.0056	0.0006	0.0230	0.0765	0.0146
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Ba mg/L	La mg/L	Ce mg/L	Pr mg/L	Nd mg/L	Sm mg/L	Eu mg/L	Gd mg/L	Tb mg/L	Dy mg/L	Ho mg/L	Er mg/L	Tm mg/L	Yb mg/L
3.8640	0.0002	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
3.4292	0.0002	0.0006	0.0001	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
1.2964	0.0001	0.0000	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
1.4157	0.0001	0.0000	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.5316	0.0002	0.0002	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.8792	0.0001	0.0000	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
1.3874	0.0001	0.0001	0.0001	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.8519	0.0001	0.0001	0.0001	0.0003	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.8498	0.0001	0.0001	0.0001	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.7247	0.0001	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.3950	0.0001	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
1.6708	0.0001	0.0009	0.0000	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001
1.1217	0.0013	0.0023	0.0006	0.0016	0.0001	0.0001	0.0001	0.0001	0.0003	0.0001	0.0001	0.0001	0.0001
8.5313	0.0003	0.0001	0.0001	0.0006	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-OES	ICP-OES	ICP-OES	ICP-OES	ICP-OES

Lu mg/L	Hf mg/L	Ta mg/L	W mg/L	Hg mg/L	Tl mg/L	Pb mg/L	Th mg/L	U mg/L	As mg/L	Ca mg/L	Cd mg/L	K mg/L	Mg mg/L
0.0008	0.0008	0.0000	0.0076	0.0020	0.0036	0.0418	0.0008	0.0252					
0.0002	0.0008	0.0008	0.0172	0.0020	0.0035	0.0350	0.0008	0.0249					
0.0001	0.0004	0.0004	0.0135	0.0011	0.0016	0.0179	0.0004	0.1981					
0.0001	0.0004	0.0004	0.0107	0.0011	0.0020	0.0263	0.0004	0.2108					
0.0001	0.0004	0.0004	0.0207	0.0011	0.0002	0.0073	0.0004	0.0051					
0.0003	0.0004	0.0000	0.0210	0.0011	0.0003	0.0047	0.0004	0.0065					
0.0001	0.0005	0.0005	0.0183	0.0013	0.0019	0.0273	0.0005	0.1606					
0.0003	0.0005	0.0005	0.0115	0.0013	0.0001	0.0098	0.0005	0.0061					
0.0002	0.0005	0.0005	0.0128	0.0013	0.0001	0.0104	0.0005	0.0069					
0.0001	0.0002	0.0002	0.0165	0.0006	0.0001	0.0136	0.0002	0.1020					
0.0002	0.0002	0.0002	0.0087	0.0006	0.0001	0.0036	0.0002	0.0050					
0.0001	0.0002	0.0002	0.0041	0.0005	0.0001	0.0060	0.0002	0.0074					
0.0002	0.0005	0.0000	0.0676	0.0012	0.0005	0.0122	0.0005	0.0071					
0.0003	0.0011	0.0000	0.0445	0.0961	0.0015	0.0305	0.0057	0.0135					

ICP-OES ICP-OES ICP-OES ICP-OES ICS ICS ICS ICS ICS ICS ICS

Na mg/L	P mg/L	S mg/L	Se mg/L	Fluoride as mg/L F	Chloride as mg/L Cl	Nitrite as mg/L N	Bromide as mg/L Br	Nitrate as mg/L N	Phosphate as mg/L P	Sulphate as mg/L SO4
				26.09	323.07	2.00	7.99	4.08	2.00	15560.95
				29.17	136.47	2.00	8.01	5.25	2.00	16070.33
				6.45	222.75	0.66	2.64	1.87	0.66	598.65
				8.32	136.71	0.65	2.61	1.02	0.65	758.95
				15.49	70.45	1.07	4.28	23.96	1.07	660.55
				28.16	50.75	1.07	4.28	22.20	1.07	1088.24
				33.17	93.42	1.34	5.38	26.98	1.34	1862.96
				33.27	92.05	1.34	5.38	25.89	1.34	1866.60
				40.22	85.47	1.34	5.38	33.39	1.34	1677.66
				14.00	43.32	0.58	2.33	12.33	0.58	928.94
				12.39	39.12	0.52	2.06	63.99	0.52	1060.71
				13.40	44.40	0.46	1.83	3.36	0.46	49.86
				11.81	27.08	0.32	1.28	1.11	0.32	49.55
				12.82	102.77	0.60	2.41	0.36	0.60	77.74
				16.27	118.72	0.64	2.55	0.38	0.64	78.81
				26.50	44.12	1.16	4.64	34.68	1.16	522.79
				81.11	109.79	2.80	11.21	23.19	2.80	6951.62

Hole ID Sample Number Depth Depth ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

		(mbgs)	Error (m)	GWC (%)	Mean GWC (%)	Li mg/L	B mg/L	Na mg/L	Mg mg/L	Al mg/L	Si mg/L
WLC_12-07b	L32025A	16.15	0.30		4.56						
WLC_12-07c	L32026A	1.83	0.30	15.34	4.56						
WLC_12-07c	L32027A	3.96	0.30	9.31	4.56	0.2460	0.3312	89.0814	91.5043	0.8244	57.3657
WLC_12-07c	L32028A	6.32	0.23		4.56						
WLC_12-07c	L32029A	8.84	0.30	4.21	4.56	0.5832	1.1204	138.3570	145.2678	1.3929	116.7848
WLC_12-09c	L32000A	3.35	0.30	4.19	7.21	0.1362	0.6170	183.4128	110.9691	2.9338	65.3153
WLC_12-09c	L32000A-REP	3.35	0.30	4.19	7.21	0.1342	0.6144	182.2846	108.0433	3.4909	64.4993
WLC_12-09c	L32001A	6.10	0.30	3.46	7.21	0.2368	0.5879	140.5755	144.9029	3.0562	98.3048
WLC_12-09c	L32002A	8.84	0.30	3.60	7.21	0.3670	0.6296	87.4300	143.7387	1.2526	152.0077
WLC_12-09c	L32003A	12.95	0.76	19.67	7.21	0.1835	0.1353	25.1476	58.0338	0.1432	28.9585
WLC_12-09c	L32004A	15.54	0.30	8.00	7.21	0.1194	0.1761	46.3109	97.5391	0.8495	38.9691
WLC_12-09c	L32005A	18.29	0.30	5.74	7.21	0.1421	0.5651	53.0573	96.4017	1.7195	61.3394
WLC_12-09c	L32006A	21.03	0.30	4.12	7.21	0.1341	0.3380	72.1323	149.2415	1.9999	76.0166
WLC_12-09c	L32007A	23.77	0.30	5.50	7.21	0.1393	0.4907	79.7290	135.2153	1.4032	61.8872
WLC_12-09c	L32008A	27.43	0.30	6.46	7.21	0.1502	0.3386	81.1059	122.6494	1.8178	51.7511
WLC_12-09c	L32010A	30.48	0.30	4.89	7.21	0.1762	0.2720	113.5514	140.0357	1.8958	63.3136
WLC_12-09c	L32011A	33.53	0.30	7.19	7.21	0.1362	0.2973	74.4420	108.5291	1.0912	39.1781
WLC_12-09c	L32012A	35.51	0.15	9.01	7.21	1.3472	8.5551	832.8403	1792.6074	0.1279	173.3559
WLC_12-09c	L32012A	35.51	0.15	9.01	7.21	0.1015	0.4118	47.8175	80.1896	0.5466	32.3671
WLC_12-09c	L32013A	39.62	0.30	10.35	7.21	0.4600	1.7357	279.7857	142.9236	0.3447	33.1251
WLC_12-09c	C32013A	39.62	0.30	10.35	7.21	7.8761	20.4391	4377.2371	2173.6442	0.2322	150.8968
WLC_12-09c	L32014A	42.82	0.46	5.06	7.21	10.3249	14.2935	5917.5851	221.1881	1.4780	86.3974
WLC_12-09c	L32015A	45.57	0.46	8.66	7.21	4.4265	7.8907	4567.7968	398.2754	0.3008	54.2387
WLC_12-09c	L32016A	47.40	0.15		7.21						
WLC_12-09d	L32017A	3.20	0.46	4.19	7.21	0.0923	0.4955	161.9604	161.9482	2.4606	80.0829
WLC_12-09d	L32017A - REP	3.20	0.46	4.19	7.21	0.0983	0.5125	159.7796	162.0666	2.3831	80.7022
WLC_12-09d	L32018A	6.10	0.30	3.46	7.21	0.1733	0.4249	140.8340	164.8940	3.2683	107.5719
WLC_12-09d	L32019A	7.62	0.30	4.08	7.21	0.2157	0.4205	100.5147	97.3993	3.0785	127.9960
WLC_12-09d	L32020A	10.06	0.30	6.67	7.21	0.1986	0.3210	97.1284	92.0059	1.3773	91.3214
WLC_12-10c	L32030A	3.35	0.30	2.99	8.45	0.4399	1.0498	254.1984	118.7342	3.7341	194.2256
WLC_12-10c	L32031A	6.10	0.30	28.04	8.45	0.0803	0.1120	41.4882	17.6183	0.2931	19.4794
WLC_12-10c	L32032A	9.75	0.61	11.55	8.45	0.0692	0.1448	33.2820	34.4242	1.0686	30.6526
WLC_12-10c	L32033A	12.34	0.46	23.91	8.45	0.0610	0.0897	15.9721	26.2215	0.2531	17.4460
WLC_12-10c	L32034A	15.39	0.46	14.5	8.45	0.1891	0.2249	37.9619	87.4316	0.4597	29.9308
WLC_12-10c	L32035A	18.29	0.30	11.04	8.45	0.1835	0.5591	54.5790	36.8181	0.6974	45.6405
WLC_12-10c	L32036A	21.34	0.30	8.17	8.45	0.1349	0.3718	59.5926	58.5526	1.2323	42.8675
WLC_12-10c	L32036A	21.34	0.30	8.17	8.45	0.1430	0.3409	58.1968	58.7547	1.4990	42.0403

ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

P mg/L	K mg/L	Ca mg/L	Sc mg/L	Ti mg/L	V mg/L	Cr mg/L	Mn mg/L	Fe mg/L	Co mg/L	Ni mg/L	Cu mg/L	Zn mg/L	Ga mg/L
1.4905	78.7463	770.1337	0.0186	0.0871	0.0153	0.0621	0.0990	3.4131	0.0021	0.0478	0.0359	0.1846	0.0041
2.0591	140.3578	1064.8186	0.0356	0.0258	0.0131	0.1576	0.0841	6.0812	0.0018	0.0682	0.0214	0.0795	0.0004
1.7584	78.1571	733.9701	0.0127	0.0434	0.0188	0.2946	0.0233	0.1010	0.0017	0.0255	0.0512	0.0331	0.0004
1.5977	75.7790	724.2128	0.0130	0.1456	0.0121	0.2767	0.0314	0.7432	0.0017	0.0310	0.0521	0.0249	0.0011
1.9147	116.4525	906.5608	0.0187	0.0294	0.0220	0.4380	0.0242	0.7831	0.0017	0.0425	0.0493	0.0502	0.0017
1.9311	109.0048	1675.1620	0.0298	0.0265	0.0079	0.4466	0.1126	0.5973	0.0031	0.1050	0.1593	0.2792	0.0004
0.5589	60.0459	564.9225	0.0075	0.0091	0.0068	0.0835	0.5437	0.5480	0.0010	0.0213	0.0170	0.0153	0.0001
0.9424	73.6546	568.8750	0.0075	0.0068	0.0084	0.1093	0.1135	0.2709	0.0009	0.0222	0.0844	0.0375	0.0008
2.2373	100.0140	598.4468	0.0129	0.0168	0.0185	0.1714	0.0396	0.5147	0.0007	0.0492	0.0792	0.1726	0.0003
1.8831	97.9861	663.3050	0.0133	0.0146	0.0239	0.2617	0.0547	0.4124	0.0004	0.0237	0.0460	0.0317	0.0004
0.9128	80.3147	613.5213	0.0112	0.0099	0.0155	0.1116	0.0653	0.1910	0.0007	0.0434	0.0284	0.0606	0.0003
0.9823	102.7466	605.5071	0.0097	0.0430	0.0107	0.2141	0.0558	0.9642	0.0012	0.0326	0.0269	0.0510	0.0002
2.5109	102.3939	718.2096	0.0075	0.0609	0.0125	0.2357	0.0534	0.2871	0.0016	0.0340	0.0187	0.0202	0.0003
1.0143	68.4325	566.6996	0.0053	0.0145	0.0074	0.1911	0.0917	0.3740	0.0008	0.0195	0.0174	0.0487	0.0048
1.1085	265.8276	2979.9432	0.0292	0.0220	0.0073	0.0307	0.0510	0.2005	0.0045	0.1347	0.0536	0.2064	0.0002
1.4142	49.6273	561.9209	0.0073	0.0164	0.0021	0.2155	0.1552	1.0910	0.0018	0.0291	0.0125	0.0256	0.0002
0.9931	65.9662	831.0597	0.0077	0.0100	0.0044	0.1322	1.2184	1.0667	0.0026	0.0475	0.0291	0.0645	0.0016
2.2695	164.3292	4453.7522	0.0275	0.0300	0.0103	0.0219	18.8258	0.1672	0.0485	0.5062	0.1605	0.3640	0.0001
1.4974	307.4203	672.0636	0.0137	0.0373	0.0880	0.0763	1.0322	0.2512	0.0050	0.0555	0.2628	0.0670	0.0131
0.6624	208.2607	1025.9516	0.0083	0.0149	0.0366	0.0226	0.9183	0.1326	0.0074	0.1009	0.1619	0.0428	0.0019
3.2034	65.5917	993.7908	0.0135	0.0452	0.0356	0.0710	0.3345	0.9308	0.0046	0.1158	0.1790	0.0867	0.0026
3.0708	67.8637	1027.9541	0.0133	0.0676	0.0330	0.0674	0.3361	2.1092	0.0056	0.1076	0.1731	0.0773	0.0023
2.6558	100.6808	885.6640	0.0157	0.0235	0.0219	0.2072	0.0631	0.7307	0.0022	0.0376	0.0368	0.0944	0.0004
2.5746	93.4206	956.7500	0.0193	0.0219	0.0291	0.2086	0.0224	0.4757	0.0015	0.0349	0.0207	0.0472	0.0021
1.6232	97.5835	952.4673	0.0140	0.0213	0.0223	0.1910	0.2350	0.9537	0.0028	0.0648	0.0544	0.0674	0.0002
4.3346	112.7789	1542.0802	0.0621	0.0595	0.0559	0.3350	0.0401	8.8579	0.0030	0.0987	0.0442	0.0544	0.0037
0.4519	18.4148	210.9550	0.0046	0.0035	0.0043	0.1191	0.1591	0.4240	0.0006	0.0146	0.0116	0.0092	0.0019
1.2249	32.8460	359.7488	0.0090	0.0133	0.0139	0.0956	0.0133	2.4442	0.0007	0.0242	0.0102	0.0136	0.0017
0.4226	17.9808	235.6043	0.0042	0.0027	0.0017	0.1032	0.0258	0.4663	0.0005	0.0095	0.0076	0.0104	0.0016
1.0518	62.8781	651.9818	0.0089	0.0118	0.0124	0.1509	0.2032	1.9633	0.0020	0.0465	0.0156	0.0129	0.0003
1.2793	63.0824	593.8471	0.0143	0.0169	0.0174	0.3097	0.0617	2.1636	0.0014	0.0381	0.0251	0.0027	0.0007
1.3495	65.3555	598.4568	0.0121	0.0296	0.0162	0.2413	0.0420	2.6960	0.0014	0.0500	0.0167	0.0039	0.0002
1.5008	63.3225	587.1068	0.0133	0.0957	0.0131	0.2324	0.0497	3.2602	0.0016	0.0527	0.0143	0.0065	0.0002
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Ge mg/L	As mg/L	Se mg/L	Rb mg/L	Sr mg/L	Y mg/L	Zr mg/L	Nb mg/L	Mo mg/L	Ag mg/L	Cd mg/L	Sn mg/L	Sb mg/L	Cs mg/L
0.0003	0.0248	0.8010	0.0182	1.4500	0.0004	0.0012	0.0009	0.5863	0.0016	0.0002	0.0044	0.0110	0.0001
0.0007	0.0058	0.7430	0.0449	4.9892	0.0006	0.0016	0.0032	0.5192	0.0036	0.0004	0.0099	0.0041	0.0002
0.0007	0.0506	0.1056	0.0168	1.6206	0.0003	0.0010	0.0076	0.2927	0.0036	0.0002	0.0050	0.0069	0.0002
0.0007	0.0375	0.0963	0.0189	1.5943	0.0006	0.0047	0.0065	0.2921	0.0036	0.0002	0.0051	0.0063	0.0002
0.0009	0.0516	0.0437	0.0308	1.7014	0.0004	0.0017	0.0086	0.6750	0.0043	0.0009	0.0080	0.0072	0.0002
0.0008	0.0496	0.1287	0.0159	1.9840	0.0008	0.0008	0.0060	0.3968	0.0042	0.0026	0.0076	0.0097	0.0002
0.0002	0.0004	0.0934	0.0112	0.5243	0.0000	0.0002	0.0017	0.1404	0.0008	0.0000	0.0015	0.0083	0.0000
0.0004	0.0196	0.0363	0.0187	1.1924	0.0002	0.0004	0.0034	0.2602	0.0019	0.0001	0.0033	0.0034	0.0001
0.0005	0.0150	0.0363	0.0215	1.3430	0.0009	0.0006	0.0037	0.3182	0.0026	0.0042	0.0061	0.0039	0.0001
0.0007	0.0549	0.0842	0.0333	1.7878	0.0004	0.0006	0.0060	0.4836	0.0035	0.0002	0.0055	0.0035	0.0002
0.0005	0.0084	0.0232	0.0218	1.6007	0.0003	0.0015	0.0039	0.4608	0.0027	0.0002	0.0039	0.0047	0.0001
0.0005	0.0213	0.0569	0.0265	1.5341	0.0002	0.0023	0.0030	0.4126	0.0023	0.0013	0.0047	0.0021	0.0001
0.0006	0.0239	0.0237	0.0329	3.2982	0.0003	0.0011	0.0096	0.4324	0.0031	0.0002	0.0061	0.0031	0.0002
0.0004	0.0180	0.0761	0.0217	2.2614	0.0002	0.0014	0.0041	0.6939	0.0021	0.0001	0.0051	0.0030	0.0001
0.0024	0.0158	0.0362	0.0816	9.4680	0.0002	0.0014	0.0027	0.8857	0.0017	0.0026	0.0039	0.0035	0.0004
0.0003	0.0103	0.0279	0.0121	1.5798	0.0001	0.0003	0.0034	0.3948	0.0017	0.0000	0.0027	0.0025	0.0001
0.0003	0.0148	0.1636	0.0173	4.1023	0.0001	0.0003	0.0019	0.6566	0.0014	0.0000	0.0024	0.0080	0.0001
0.0059	0.0499	0.1255	0.0461	33.6679	0.0004	0.0007	0.0044	1.4149	0.0014	0.0129	0.0031	0.0117	0.0004
0.0159	0.0261	0.4240	0.1169	33.1239	0.0004	0.0006	0.0055	0.5465	0.0030	0.0002	0.0031	0.1181	0.0001
0.0017	0.0769	0.7181	0.2276	96.6490	0.0005	0.0003	0.0027	3.3569	0.0017	0.0027	0.0019	0.0904	0.0088
0.0007	0.0352	0.0276	0.0175	4.1495	0.0030	0.0139	0.0054	0.7709	0.0036	0.0005	0.0055	0.0214	0.0002
0.0007	0.0453	0.0276	0.0173	4.1375	0.0031	0.0161	0.0055	0.7723	0.0036	0.0020	0.0042	0.0188	0.0002
0.0009	0.0164	0.0580	0.0327	2.0339	0.0004	0.0073	0.0066	0.6165	0.0043	0.0021	0.0071	0.0151	0.0002
0.0007	0.0230	0.0372	0.0211	1.8048	0.0010	0.0120	0.0048	0.6054	0.0037	0.0002	0.0031	0.0087	0.0002
0.0004	0.0196	0.2201	0.0194	1.1859	0.0005	0.0054	0.0041	0.4479	0.0022	0.0020	0.0039	0.0108	0.0001
0.0010	0.0477	0.1177	0.0262	2.6144	0.0039	0.0035	0.0045	0.9693	0.0049	0.0005	0.0112	0.0204	0.0002
0.0001	0.0003	0.0182	0.0036	0.4490	0.0011	0.0005	0.0007	0.1590	0.0005	0.0000	0.0009	0.0028	0.0000
0.0003	0.0161	0.1735	0.0077	0.6600	0.0003	0.0006	0.0013	0.1857	0.0013	0.0001	0.0034	0.0035	0.0001
0.0001	0.0037	0.0124	0.0037	0.3504	0.0001	0.0001	0.0007	0.0671	0.0006	0.0003	0.0010	0.0022	0.0000
0.0002	0.0093	0.1977	0.0168	1.0394	0.0001	0.0001	0.0013	0.3159	0.0011	0.0001	0.0026	0.0066	0.0001
0.0003	0.0116	0.4290	0.0158	1.0503	0.0002	0.0003	0.0012	0.3721	0.0014	0.0008	0.0027	0.0069	0.0001
0.0004	0.0213	0.4345	0.0191	1.4905	0.0001	0.0024	0.0018	0.3717	0.0018	0.0005	0.0042	0.0051	0.0001
0.0004	0.0183	0.4144	0.0191	1.4986	0.0003	0.0039	0.0015	0.3640	0.0018	0.0002	0.0039	0.0044	0.0001
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Ba mg/L	La mg/L	Ce mg/L	Pr mg/L	Nd mg/L	Sm mg/L	Eu mg/L	Gd mg/L	Tb mg/L	Dy mg/L	Ho mg/L	Er mg/L	Tm mg/L	Yb mg/L
2.3415	0.0003	0.0003	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0000
5.4534	0.0007	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
0.9258	0.0002	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
0.9444	0.0005	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
1.8635	0.0002	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
4.6189	0.0002	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
0.9166	0.0000	0.0009	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6534	0.0001	0.0000	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
2.7200	0.0095	0.0011	0.0001	0.0008	0.0001	0.0001	0.0001	0.0000	0.0004	0.0001	0.0001	0.0001	0.0001
3.0569	0.0002	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
3.0559	0.0001	0.0001	0.0001	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
2.1464	0.0001	0.0000	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
2.6378	0.0002	0.0001	0.0001	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
10.2460	0.0001	0.0000	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
1.5420	0.0001	0.0000	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
4.5157	0.0001	0.0017	0.0000	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001
1.6269	0.0001	0.0010	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.9342	0.0003	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
13.5243	0.0001	0.0001	0.0001	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
1.3952	0.0001	0.0000	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
2.8493	0.0009	0.0022	0.0002	0.0011	0.0002	0.0002	0.0010	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002
2.8138	0.0010	0.0018	0.0006	0.0010	0.0002	0.0002	0.0005	0.0001	0.0006	0.0002	0.0004	0.0002	0.0002
2.3515	0.0002	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
3.0324	0.0004	0.0012	0.0001	0.0004	0.0007	0.0002	0.0002	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002
2.9486	0.0018	0.0009	0.0002	0.0002	0.0001	0.0001	0.0001	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001
4.0337	0.0025	0.0034	0.0007	0.0022	0.0002	0.0002	0.0002	0.0002	0.0004	0.0002	0.0004	0.0002	0.0004
1.1469	0.0001	0.0005	0.0000	0.0001	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.1931	0.0002	0.0002	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001
0.6855	0.0001	0.0005	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2465	0.0001	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001
2.2423	0.0001	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0000	0.0001	0.0001
2.4846	0.0000	0.0000	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
2.5013	0.0002	0.0000	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-OES	ICP-OES	ICP-OES	ICP-OES	ICP-OES

Lu mg/L	Hf mg/L	Ta mg/L	W mg/L	Hg mg/L	Tl mg/L	Pb mg/L	Th mg/L	U mg/L	As mg/L	Ca mg/L	Cd mg/L	K mg/L	Mg mg/L
0.0001	0.0003	0.0000	0.0308	0.0058	0.0001	0.0076	0.0003	0.0074					
0.0006	0.0007	0.0007	0.0243	0.0018	0.0002	0.0318	0.0007	0.0797	0.145	1121.248	0.011	137.307	130.027
0.0002	0.0007	0.0000	0.0686	0.0018	0.0002	0.0137	0.0007	0.0126	0.142	821.169	0.011	80.977	107.832
0.0002	0.0007	0.0000	0.0644	0.0018	0.0002	0.0131	0.0007	0.0110	0.142	821.169	0.011	80.977	107.832
0.0002	0.0009	0.0000	0.0646	0.0022	0.0002	0.0192	0.0009	0.0124	0.173	1033.352	0.013	120.839	144.161
0.0002	0.0008	0.0000	0.0283	0.0021	0.0002	0.0188	0.0008	0.0161	0.166	1937.497	0.012	130.660	143.872
0.0000	0.0002	0.0002	0.0032	0.0004	0.0002	0.0046	0.0002	0.0061	0.030	643.268	0.002	59.674	61.388
0.0001	0.0004	0.0000	0.0265	0.0009	0.0001	0.0095	0.0004	0.0058	0.066	598.328	0.005	70.756	88.277
0.0001	0.0005	0.0001	0.0864	0.0013	0.0001	0.1042	0.0005	0.0237	0.104	672.842	0.008	83.931	98.092
0.0002	0.0007	0.0000	0.0853	0.0018	0.0002	0.0150	0.0007	0.0089	0.141	754.329	0.011	107.429	148.328
0.0001	0.0005	0.0000	0.0731	0.0014	0.0001	0.0126	0.0005	0.0106	0.109	701.272	0.008	89.450	135.718
0.0001	0.0005	0.0000	0.0429	0.0012	0.0008	0.0153	0.0005	0.0068	0.092	678.194	0.007	100.404	123.865
0.0002	0.0006	0.0000	0.0315	0.0015	0.0005	0.0131	0.0006	0.0114	0.123	836.399	0.009	105.866	140.316
0.0001	0.0004	0.0000	0.0316	0.0010	0.0010	0.0092	0.0004	0.0093	0.083	639.888	0.006	68.450	106.757
0.0001	0.0003	0.0000	0.0256	0.0008	0.0067	0.0227	0.0003	0.0908	0.067	634.851	0.005	53.029	82.250
0.0001	0.0003	0.0003	0.0233	0.0008	0.0004	0.0104	0.0003	0.0084	0.067	634.851	0.005	53.029	82.250
0.0001	0.0003	0.0003	0.0355	0.0007	0.0009	0.0110	0.0003	0.0266	0.058	884.055	0.004	77.529	146.473
0.0005	0.0003	0.0003	0.0182	0.0007	0.0039	0.3896	0.0003	0.2080	0.058	884.055	0.004	77.529	146.473
0.0001	0.0006	0.0000	0.0649	0.5122	0.0037	0.0140	0.0006	0.0240	0.119	728.796	0.009	387.261	219.870
0.0001	0.0003	0.0000	0.0077	0.0497	0.0101	0.0120	0.0003	0.0408	0.069	1091.533	0.005	271.916	411.741
									0.963	137.516	0.011	205.499	70.367
0.0002	0.0007	0.0000	0.1053	0.0018	0.0005	0.0228	0.0007	0.0131	0.143	1121.892	0.011	64.974	156.342
0.0002	0.0007	0.0000	0.1008	0.0018	0.0008	0.0215	0.0007	0.0121	0.143	1121.892	0.011	64.974	156.342
0.0002	0.0009	0.0000	0.0781	0.0022	0.0002	0.0196	0.0009	0.0077	0.173	1017.171	0.013	99.135	158.877
0.0002	0.0007	0.0007	0.0687	0.0018	0.0002	0.0161	0.0007	0.0074	0.147	1084.414	0.011	90.238	95.382
0.0001	0.0004	0.0000	0.0077	0.0011	0.0001	0.0123	0.0004	0.0068	0.090	1075.871	0.007	92.627	92.555
0.0017	0.0010	0.0010	0.0368	0.0025	0.0007	0.0256	0.0010	0.0260	0.197	1667.007	0.015	113.561	105.192
0.0000	0.0001	0.0001	0.0021	0.0003	0.0002	0.0033	0.0001	0.0028	0.021	233.233	0.002	19.738	17.504
0.0001	0.0003	0.0000	0.0068	0.0006	0.0004	0.0063	0.0003	0.0030	0.052	382.444	0.004	32.328	30.599
0.0000	0.0001	0.0001	0.0023	0.0003	0.0002	0.0036	0.0001	0.0030	0.025	263.005	0.002	18.957	26.599
0.0001	0.0002	0.0002	0.0060	0.0019	0.0008	0.0054	0.0002	0.0077	0.044	695.511	0.003	65.124	82.341
0.0001	0.0003	0.0003	0.0113	0.0007	0.0005	0.0062	0.0003	0.0061	0.055	625.667	0.004	57.004	34.294
0.0001	0.0004	0.0004	0.0465	0.0009	0.0005	0.3975	0.0004	0.0049	0.073	634.267	0.005	66.121	53.092
0.0003	0.0004	0.0000	0.0463	0.0009	0.0005	0.3931	0.0004	0.0048	0.073	634.267	0.005	66.121	53.092

ICP-OES ICP-OES ICP-OES ICP-OES ICS ICS ICS ICS ICS ICS ICS

Na mg/L	P mg/L	S mg/L	Se mg/L	Fluoride as mg/L F	Chloride as mg/L Cl	Nitrite as mg/L N	Bromide as mg/L Br	Nitrate as mg/L N	Phosphate as mg/L P	Sulphate as mg/L SO4
				5.90	53.28	0.49	1.97	2.35	0.49	235.22
				24.70	62.79	0.81	3.23	1.68	0.81	1182.93
121.769	0.382	321.970	0.396	56.21	118.54	1.81	7.24	12.47	1.81	1039.27
207.117	0.753	180.313	0.142	45.08	589.84	1.78	7.11	14.06	1.78	316.81
207.117	0.753	180.313	0.142	61.63	173.64	2.16	8.65	8.60	2.16	327.16
151.272	0.950	172.062	0.173	51.46	114.24	2.08	8.32	28.38	2.08	1079.63
111.399	0.642	362.503	0.166	10.01	132.70	0.38	1.52	2.17	0.38	1042.23
27.034	0.186	372.126	0.110	21.54	80.57	0.94	3.76	3.62	0.94	1053.10
46.564	0.379	332.245	0.066	29.33	77.93	1.30	5.20	9.59	1.30	733.96
57.871	0.609	245.239	0.104	41.52	177.63	1.76	7.03	8.62	1.76	792.49
81.578	0.593	249.499	0.141	30.44	662.76	1.36	5.45	6.84	1.36	794.80
92.471	0.493	268.414	0.109	34.60	133.73	1.15	4.62	6.28	1.15	914.36
85.884	0.531	326.445	0.092	42.62	192.82	1.53	6.13	8.45	1.53	912.38
123.120	1.091	316.482	0.123	43.03	194.18	1.53	6.13	8.15	1.53	916.74
78.038	0.304	301.733	0.083	26.28	153.75	1.04	4.17	2.76	1.04	848.63
52.656	0.347	164.858	0.067	23.66	83.74	0.83	3.33	4.90	0.83	543.11
52.656	0.347	164.858	0.067	20.35	126.58	0.72	2.90	4.66	0.72	1949.39
308.789	0.316	713.166	0.180	42.48	295.63	1.48	5.93	5.30	1.48	11688.21
308.789	0.316	713.166	0.180	19.22	56.79	0.87	3.46	2.33	0.87	12948.91
5526.687	0.666	4335.932	0.583							
4220.933	0.360	4427.056	0.825							
6756.354	1.103	3730.111	2.275	26.35	97.33	1.79	7.16	8.75	1.79	1113.15
165.300	2.090	352.260	0.143	19.71	95.76	1.79	7.16	8.24	1.79	960.17
165.300	2.090	352.260	0.143	19.43	98.59	1.79	7.16	7.17	1.79	946.00
137.680	0.840	189.034	0.173	53.15	160.92	2.17	8.67	40.76	2.17	364.36
102.510	1.014	182.575	0.147	58.23	183.83	1.84	7.35	78.17	1.84	338.81
94.645	0.674	420.352	0.090	37.90	63.06	1.12	4.49	5.62	1.12	1111.18
229.389	2.092	228.452	0.197	70.22	181.35	2.46	9.86	27.52	2.46	415.61
46.515	0.152	46.157	0.021	6.54	21.79	0.27	1.07	0.96	0.27	133.30
30.229	0.280	148.726	0.052	7.27	47.98	0.65	2.60	7.16	0.65	438.66
17.457	0.142	60.986	0.025	3.10	15.06	0.31	1.25	5.40	0.31	186.32
36.036	0.281	445.610	0.100	6.38	106.65	0.55	2.20	1.08	0.55	1197.87
42.698	0.499	197.931	0.350	6.22	109.80	0.55	2.20	0.90	0.55	1202.54
55.395	0.363	278.960	0.285	14.46	62.91	0.68	2.71	1.39	0.68	533.71
55.395	0.363	278.960	0.285	23.95	207.72	0.91	3.66	4.38	0.91	784.61

Hole ID Sample Number Depth Depth ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS ICP-MS

		(mbgs)	Error (m)	GWC (%)	Mean GWC (%)	Li mg/L	B mg/L	Na mg/L	Mg mg/L	Al mg/L	Si mg/L
WLC_12-10c	L32037A	24.38	0.30	4.41	8.45	0.2292	0.6230	101.9303	124.6228	2.5362	70.6154
WLC_12-10c	L32038A	27.28	0.15	4.26	8.45	0.2241	0.7171	114.0313	169.0190	3.0022	87.6507
WLC_12-10c	L32039A	30.33	0.15	1.63	8.45	0.5060	1.4456	191.5228	365.8944	9.0761	196.4116
WLC_12-10c	L32039A	30.33	0.15	1.63	8.45	0.5060	1.4456	191.5228	365.8944	9.0761	196.4116
WLC_12-10c	L32040A	33.38	0.15	4.08	8.45	0.1594	0.4611	67.2324	122.0054	3.2047	64.6219
WLC_12-10c	L32041A	36.12	0.15	0.76	8.45	1.5089	4.0286	472.5931	795.1131	111.1270	581.6378
WLC_12-10c	L32041A-Rep	36.12	0.15	0.76	8.45	1.5588	4.4121	487.3665	820.4320	111.0419	621.1399
WLC_12-10c	L32042A	39.47	0.15	7.37	8.45	0.2260	0.2893	44.3500	61.4243	1.9706	42.0256
WLC_12-10c	L32043A	42.82	0.30	5.31	8.45	0.1376	0.2425	36.0314	68.3386	2.6370	46.2956
WLC_12-10c	L32044A	45.57	0.15	7.37	8.45	0.6435	1.3040	168.4556	1433.4879	0.1863	209.5214
WLC_12-10c	L32044A	45.57	0.15	7.37	8.45	0.1549	0.1919	29.5951	113.3660	0.6791	58.4420
WLC_12-10c	L32044A-Rep	45.57	0.15	7.37	8.45	0.6536	1.3906	161.3902	1444.2728	0.1730	214.2899
WLC_12-10c	L32045A	48.62	0.15	8.7	8.45	0.5055	1.2103	126.3026	1843.6360	0.1980	180.8527
WLC_12-10c	L32045A	48.62	0.15	8.7	8.45	0.0998	0.0750	19.8575	114.8417	0.8737	31.4204
WLC_12-10c	L32046A	51.97	0.15	14.38	8.45	0.4681	1.1240	73.5708	828.2274	0.1112	103.2135
WLC_12-10c	L32046A	51.97	0.15	14.38	8.45	0.1000	0.0972	18.0735	48.9870	0.3553	22.6032
WLC_12-10c	L32047A	55.02	0.15		8.45						
WLC_12-10c	L32048A	58.67	0.15		8.45						
WLC_12-10c	L32048A	58.67	0.15		8.45						
WLC_12-10c	L32049A	61.26	0.30		8.45						
WLC_12-10c	L32050A	64.16	0.46		8.45						

ICP-MS P	ICP-MS K	ICP-MS Ca	ICP-MS Sc	ICP-MS Ti	ICP-MS V	ICP-MS Cr	ICP-MS Mn	ICP-MS Fe	ICP-MS Co	ICP-MS Ni	ICP-MS Cu	ICP-MS Zn	ICP-MS Ga

mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
2.9325	87.5451	696.2095	0.0199	0.0191	0.0222	0.4920	0.0268	5.9649	0.0014	0.0543	0.0199	0.0074	0.0003
2.8366	104.4332	710.8904	0.0237	0.0246	0.0248	0.2291	0.0242	5.4322	0.0017	0.0525	0.0173	0.0071	0.0004
6.8883	178.5508	1635.2521	0.0545	0.0801	0.0246	1.6276	0.0736	13.9796	0.0044	0.1245	0.0504	0.0358	0.0009
6.8883	178.5508	1635.2521	0.0545	0.0801	0.0246	1.6276	0.0736	13.9796	0.0044	0.1245	0.0504	0.0358	0.0009
2.4527	60.7177	764.4224	0.0176	0.0185	0.0171	0.2614	0.0355	5.1521	0.0029	0.0574	0.0737	0.1873	0.0009
20.4639	517.9574	5083.4481	0.1546	2.3558	0.3412	3.2221	1.1212	53.0035	0.0280	0.3904	0.1934	0.5689	0.0234
20.9157	525.5829	5147.4089	0.1586	1.7000	0.3404	3.0584	1.2092	52.1456	0.0254	0.3583	0.2045	0.5811	0.0531
1.3192	48.7167	423.1316	0.0125	0.0166	0.0120	0.4100	0.0149	2.9902	0.0010	0.0268	0.0091	0.0139	0.0022
1.6907	41.2251	597.3174	0.0137	0.0253	0.0130	0.3188	0.0116	3.7314	0.0029	0.0524	0.0198	0.0428	0.0003
1.0401	95.5127	3639.6655	0.0412	0.0407	0.0065	0.0526	0.0058	0.1784	0.0032	0.0975	0.0178	0.0626	0.0002
1.9149	47.9240	605.7467	0.0128	0.0195	0.0057	0.2290	0.0228	1.3185	0.0014	0.0237	0.0177	0.0445	0.0010
0.9649	93.4590	3693.3458	0.0393	0.0355	0.0069	0.0578	0.0059	0.1945	0.0031	0.1019	0.0176	0.0639	0.0023
1.3106	56.1786	3083.3988	0.0359	0.0274	0.0140	0.0244	10.4064	0.1085	0.0227	0.2063	0.0150	0.0809	0.0002
1.7452	35.1521	450.0267	0.0079	0.0108	0.0063	0.1682	0.7115	1.2845	0.0020	0.0286	0.0220	0.0314	0.0012
1.2802	35.5554	2074.3926	0.0208	0.0132	0.0042	0.0298	0.0150	0.1277	0.0017	0.0932	0.0142	0.0429	0.0073
1.2321	23.1062	286.3964	0.0059	0.0074	0.0003	0.2163	0.0275	0.7497	0.0002	0.0121	0.0045	0.0183	0.0001

ICP-MS Ge mg/L	ICP-MS As mg/L	ICP-MS Se mg/L	ICP-MS Rb mg/L	ICP-MS Sr mg/L	ICP-MS Y mg/L	ICP-MS Zr mg/L	ICP-MS Nb mg/L	ICP-MS Mo mg/L	ICP-MS Ag mg/L	ICP-MS Cd mg/L	ICP-MS Sn mg/L	ICP-MS Sb mg/L	ICP-MS Cs mg/L
0.0007	0.0405	0.1229	0.0274	1.9439	0.0006	0.0022	0.0026	0.7705	0.0034	0.0002	0.0091	0.0043	0.0002
0.0007	0.0242	0.1275	0.0249	2.7315	0.0002	0.0016	0.0041	1.0058	0.0035	0.0004	0.0085	0.0059	0.0002
0.0019	0.0000	0.3939	0.0470	4.6114	0.0010	0.0058	0.0102	1.3872	0.0093	0.0009	0.0224	0.0085	0.0005
0.0019	0.0000	0.3939	0.0470	4.6114	0.0010	0.0058	0.0102	1.3872	0.0093	0.0009	0.0224	0.0085	0.0005
0.0007	0.0301	0.2714	0.0230	2.2546	0.0005	0.0013	0.0031	0.3000	0.0037	0.0040	0.0101	0.0051	0.0002
0.0039	0.0100	0.3322	0.2840	14.0156	0.0485	0.1163	0.0504	2.7537	0.0197	0.0000	0.0344	0.0329	0.0155
0.0039	0.0591	1.0381	0.3075	14.2797	0.0340	0.2760	0.0546	2.6452	0.0197	0.0029	0.0443	0.0336	0.0130
0.0004	0.0140	0.1814	0.0158	0.9219	0.0004	0.0009	0.0013	0.2114	0.0020	0.0013	0.0066	0.0026	0.0001
0.0006	0.0288	0.1039	0.0164	1.5106	0.0008	0.0023	0.0024	0.4925	0.0029	0.0003	0.0054	0.0035	0.0001

0.0015	0.0166	0.8819	0.0565	6.8773	0.0003	0.0057	0.0040	0.1225	0.0020	0.0030	0.0026	0.0005	0.0009
0.0004	0.0010	0.0264	0.0138	1.1359	0.0003	0.0004	0.0043	0.1749	0.0020	0.0000	0.0036	0.0036	0.0001
0.0049	0.0157	0.9287	0.0557	7.0534	0.0002	0.0057	0.0037	0.1204	0.0020	0.0028	0.0034	0.0005	0.0007
0.0018	0.0277	0.0360	0.0242	5.6566	0.0006	0.0023	0.0031	0.4664	0.0017	0.0004	0.0017	0.0040	0.0001
0.0007	0.0009	0.0314	0.0173	0.7027	0.0003	0.0009	0.0032	0.2283	0.0017	0.0004	0.0023	0.0042	0.0001
0.0036	0.0128	0.0359	0.0259	4.3749	0.0005	0.0082	0.0020	0.4345	0.0010	0.0016	0.0021	0.0010	0.0001
0.0002	0.0005	0.0180	0.0047	0.5775	0.0002	0.0002	0.0017	0.2073	0.0010	0.0000	0.0016	0.0016	0.0001

ICP-MS Ba mg/L	ICP-MS La mg/L	ICP-MS Ce mg/L	ICP-MS Pr mg/L	ICP-MS Nd mg/L	ICP-MS Sm mg/L	ICP-MS Eu mg/L	ICP-MS Gd mg/L	ICP-MS Tb mg/L	ICP-MS Dy mg/L	ICP-MS Ho mg/L	ICP-MS Er mg/L	ICP-MS Tm mg/L	ICP-MS Yb mg/L
2.6612	0.0003	0.0001	0.0001	0.0003	0.0002	0.0002	0.0001	0.0000	0.0002	0.0002	0.0001	0.0002	0.0002
2.4038	0.0004	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
5.4515	0.0005	0.0004	0.0002	0.0009	0.0005	0.0005	0.0005	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005
5.4515	0.0005	0.0004	0.0002	0.0009	0.0005	0.0005	0.0005	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005
1.9087	0.0027	0.0001	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
13.6827	0.0275	0.0962	0.0080	0.0365	0.0081	0.0010	0.0044	0.0009	0.0075	0.0010	0.0030	0.0005	0.0033
13.5773	0.0353	0.0860	0.0113	0.0340	0.0076	0.0010	0.0097	0.0012	0.0058	0.0006	0.0030	0.0010	0.0012
1.0292	0.0002	0.0001	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001
1.1606	0.0005	0.0002	0.0001	0.0005	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0000	0.0001	0.0001
3.6989	0.0004	0.0012	0.0000	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
1.6244	0.0003	0.0025	0.0000	0.0003	0.0002	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
3.6906	0.0004	0.0003	0.0000	0.0002	0.0001	0.0001	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
4.2136	0.0001	0.0007	0.0000	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.8880	0.0001	0.0016	0.0000	0.0006	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
11.2273	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.6708	0.0001	0.0011	0.0000	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

ICP-MS Lu mg/L	ICP-MS Hf mg/L	ICP-MS Ta mg/L	ICP-MS W mg/L	ICP-MS Hg mg/L	ICP-MS Tl mg/L	ICP-MS Pb mg/L	ICP-MS Th mg/L	ICP-MS U mg/L	ICP-OES As mg/L	ICP-OES Ca mg/L	ICP-OES Cd mg/L	ICP-OES K mg/L	ICP-OES Mg mg/L
0.0002	0.0007	0.0000	0.0872	0.0017	0.0009	0.0190	0.0007	0.0084	0.136	754.060	0.010	90.985	114.190
0.0000	0.0007	0.0007	0.1370	0.0018	0.0007	0.0155	0.0007	0.0121	0.141	761.023	0.011	110.072	151.852
0.0013	0.0019	0.0019	0.3776	0.0047	0.0011	0.0408	0.0019	0.0259	0.372	1708.100	0.028	184.120	324.759
0.0013	0.0019	0.0019	0.3776	0.0047	0.0011	0.0408	0.0019	0.0259	0.372	1708.100	0.028	184.120	324.759
0.0002	0.0007	0.0007	0.0998	0.0018	0.0003	0.0271	0.0007	0.0100	0.150	844.833	0.011	64.702	111.686
0.0010	0.0039	0.0008	0.4351	0.0099	0.0047	0.1572	0.0055	0.0857	0.789	5439.490	0.059	509.887	790.263
0.0010	0.0039	0.0004	0.4443	0.0099	0.0046	0.1611	0.0222	0.0922	0.789	5439.490	0.059	509.887	790.263
0.0001	0.0004	0.0000	0.0274	0.0010	0.0001	0.0096	0.0004	0.0050	0.082	448.162	0.006	50.820	55.424
0.0001	0.0006	0.0000	0.0718	0.0014	0.0001	0.0180	0.0006	0.0069	0.115	619.177	0.009	41.670	59.338
0.0001	0.0004	0.0004	0.0105	0.0010	0.0004	0.0178	0.0004	0.0769	0.100	840.705	0.007	57.645	138.704
0.0001	0.0004	0.0004	0.0117	0.0010	0.0001	0.0142	0.0004	0.0083	0.100	840.705	0.007	57.645	138.704
0.0001	0.0004	0.0004	0.0088	0.0010	0.0006	0.0179	0.0004	0.0770	0.100	840.705	0.007	57.645	138.704
0.0002	0.0003	0.0003	0.0123	0.0009	0.0004	0.0387	0.0003	0.0871	0.069	519.691	0.005	34.134	115.859
0.0001	0.0003	0.0003	0.0146	0.0009	0.0002	0.0167	0.0003	0.0066	0.069	519.691	0.005	34.134	115.859
0.0001	0.0002	0.0002	0.0110	0.0005	0.0005	0.0190	0.0002	0.0443	0.042	324.977	0.003	21.727	47.587
0.0001	0.0002	0.0002	0.0133	0.0005	0.0001	0.0061	0.0002	0.0041	0.042	324.977	0.003	21.727	47.587

ICP-OES Na mg/L	ICP-OES P mg/L	ICP-OES S mg/L	ICP-OES Se mg/L	ICS Fluoride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4
96.636	0.511	173.457	0.136	52.29	224.30	1.70	6.80	3.90	1.70	313.82
109.712	0.469	221.088	0.141	68.02	212.14	1.76	7.06	1.06	1.76	381.67
183.693	2.363	257.850	0.372	130.07	629.45	4.65	18.60	8.15	4.65	515.30
183.693	2.363	257.850	0.372	36.79	217.86	1.84	7.35	3.92	1.84	894.54
59.983	0.507	315.819	0.150	255.81	1575.10	9.86	39.46	58.78	9.86	1943.95
529.244	5.396	1017.515	0.789	28.07	98.53	1.02	4.08	3.76	1.02	148.60
529.244	5.396	1017.515	0.789	37.29	119.87	1.44	5.75	7.05	1.44	654.81
42.652	0.418	82.136	0.082	29.09	40.18	1.02	4.07	8.20	1.02	243.61
60.323	0.561	210.602	0.115	9.28	20.27	0.86	3.44	0.59	0.86	366.10
37.136	0.563	167.999	0.100	9.57	21.57	0.86	3.44	0.57	0.86	366.88
37.136	0.563	167.999	0.100	10.32	20.23	0.52	2.08	0.71	0.52	106.65
37.136	0.563	167.999	0.100							
20.888	0.569	117.040	0.069							
20.888	0.569	117.040	0.069							
16.796	0.316	55.872	0.042							
16.796	0.316	55.872	0.042							

D5 Solid Digestion Data

HoleID	Sample Number	Depth (mgbs)	Depth Error (m)	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
				Li	Na	Mg	Al	P	K	Ca
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WLC_12-06a	30000B	1.14	0.08	16.7212	1756.1793	34158.7665	18685.8457	732.1798	9857.0530	239984.2351
WLC_12-06a	30001B	2.06	0.08	12.7731	1617.9182	25688.6960	13827.5883	654.7377	8476.9652	282487.7965
WLC_12-06a	30002 B	2.60	0.09	25.4313	2898.0952	28139.6085	34354.2375	1149.0433	17509.0293	171049.9995
WLC_12-06a	30003B	3.79	0.11	11.4784	1125.9998	30521.0297	12652.4802	703.3122	6863.1753	278363.3167
WLC_12-06a	30004B	5.49	0.15	16.5562	1284.5553	38876.6290	14433.1597	667.9271	8136.5309	257320.2823
WLC_12-06a	30005B	10.36	0.30	24.4572	4450.0059	27058.3563	32685.0630	1138.0228	16121.9720	129966.9494
WLC_12-06a	30006B	8.15	0.23	18.5326	4846.6815	23419.8911	23730.9469	1077.5876	13114.8669	101533.0694
WLC_12-06a	30007B	9.30	0.15	20.6683	4660.4839	26788.4741	26538.7217	1077.1668	13902.1048	102746.9270
WLC_12-06a	30008B	10.97	0.30	13.8989	1619.4419	22423.2781	16838.2552	755.6678	8923.1309	183752.2791
WLC_12-06a	30009 B	12.50	0.30	21.4822	1893.4952	23508.2785	25605.7225	1063.8881	12512.0218	151441.9270
WLC_12-06a	30010 B	13.41	0.15	14.5130	1073.8624	33820.6569	12582.3210	774.1312	7192.1965	193131.6083
WLC_12-06a	30011B	14.40	0.38	11.0035	833.9769	29617.8867	8676.6227	527.9638	5798.1460	223408.6236
WLC_12-06a	30012 B	15.74	0.11	12.4916	1175.1687	28927.7109	12400.0832	787.8648	8707.9016	166876.4083
WLC_12-06a	30012 B - Rep	15.74	0.11	12.4513	1162.9586	29465.0340	12585.5358	789.8698	8640.2072	169079.4406
WLC_12-06a	30013B	16.46	0.15	12.4841	1122.4018	24576.6425	13161.6777	702.8148	7571.2344	173111.0852
WLC_12-06a	30014 B	17.82	0.17	13.9779	1141.7150	29109.7759	12470.3309	1003.3415	7946.5688	161218.5784
WLC_12-06a	30015 B	18.59	0.30	12.3826	1178.1607	30025.7721	12518.1307	734.2388	8067.7898	170179.4909
WLC_12-06a	30016 B	19.43	0.23	13.6758	1124.1415	26801.6892	10633.9591	628.8138	6741.3688	189010.6196
WLC_12-06a	30017B	20.19	0.23	14.8947	1328.0588	36636.8971	11519.8537	784.7807	7822.6530	160530.5927
WLC_12-06a	30018 B	21.61	0.12	14.9243	1026.5518	23857.7337	10898.0428	798.6022	7721.5850	147953.6018
WLC_12-06a	30019 B	22.45	0.20	12.6613	1091.2917	28467.2816	12750.1274	932.8996	6772.4429	181407.8925
WLC_12-06a	30020 B	23.10	0.15	12.6107	1062.2019	34084.8400	12583.9113	756.8003	7264.5542	180259.7904
WLC_12-06a	30021 B	24.96	0.18	11.2887	812.2901	28639.9055	10635.0958	626.4784	5835.6734	186664.5444
WLC_12-06a	30022B	26.87	0.20	13.9595	1075.9865	29352.2744	12378.6769	751.8019	6871.9485	190148.1873
WLC_12-06a	30023B	27.98	0.06	12.2973	1290.4791	31187.2378	12756.6883	753.0995	7508.7470	182672.9006
WLC_12-06a	30024B	29.98	0.20	50.7296	3462.3420	8075.7961	62783.8897	1541.6308	23528.8133	17513.6582
WLC_12-06a	30025B	30.71	0.08	57.7531	4043.8160	5110.9278	48086.2345	1520.0888	21268.1434	22918.3176
WLC_12-06a	30026B	31.59	0.11	57.9243	4276.7514	8595.3101	55802.0354	1561.6918	24379.4562	14861.1988
WLC_12-06a	30027B	32.81	0.11	55.5222	4033.6785	9113.9427	66202.2849	1481.5655	24617.1704	24577.3793
WLC_12-06a	30028B	33.97	0.05	55.9869	3578.4795	5783.8755	39241.2536	1512.4920	19823.4835	17611.0187
WLC_12-06a	30029B	34.67	0.05	58.1315	4093.1620	8355.1310	60656.7509	1550.3531	24631.7372	23804.9363
WLC_12-06a	30030B	35.39	0.11	54.4745	3875.3110	8006.1953	50670.4849	1463.3746	22895.9646	34642.4668
WLC_12-06a	30031B	36.97	0.06	61.4747	4251.6147	9124.4448	67374.8187	1529.3183	27361.1589	24088.8755
WLC_12-06a	30032B	37.72	0.08	55.9250	4328.4154	9389.6578	65002.1528	1517.3232	28138.8992	21720.8204
WLC_12-06a	30033B	38.82	0.04	58.0520	4207.3291	6979.1359	48273.6355	1534.8467	26045.8020	20802.1714
WLC_12-06a	30033B - Rep	38.82	0.04	62.4432	4447.8861	7445.8732	52007.9333	1644.8546	27869.5591	22702.4218
WLC_12-06a	30034B	39.78	0.06	55.5531	5845.5153	9737.4686	59963.2841	1283.2182	28053.5759	26681.2742

ICP-MS Sc mg/kg	ICP-MS Ti mg/kg	ICP-MS V mg/kg	ICP-MS Cr mg/kg	ICP-MS Mn mg/kg	ICP-MS Fe mg/kg	ICP-MS Co mg/kg	ICP-MS Ni mg/kg	ICP-MS Cu mg/kg	ICP-MS Zn mg/kg	ICP-MS Ga mg/kg
4.5328	1420.6220	47.3079	37.3724	226.5971	9786.4338	13.9266	15.7381	6.6696	28.3368	5.0006
3.7723	1204.8796	38.6900	23.6191	288.8768	8021.6291	16.1255	15.0673	6.0482	46.7921	3.4848
7.4742	2634.7599	90.0009	48.2964	509.3856	17298.7416	10.7888	25.6661	12.7024	49.1605	9.4080
4.0171	1002.5095	34.3836	22.7691	215.8791	7319.8672	9.4758	14.4141	4.7506	22.0939	3.0939
4.2582	1194.3007	36.1806	31.8798	241.7804	7952.5922	13.9761	14.0378	7.3401	30.3686	3.1161
6.5179	2751.9691	72.1827	40.2249	484.4925	16545.1856	10.7147	22.4948	12.8759	49.7139	7.4173
4.7625	2150.2032	54.0927	28.4184	319.1171	11392.3279	14.0139	15.5986	8.8707	40.4118	4.9960
5.1775	2363.0373	56.7537	32.1544	348.4529	12782.1809	16.0759	16.8448	9.0441	38.9304	5.8923
3.8806	1340.9704	41.1518	25.3612	255.0792	8991.8968	17.0718	15.1127	5.9628	28.9523	3.8141
5.5342	1902.1873	64.0564	36.5175	251.5111	13306.4133	11.0676	20.0229	9.2547	41.3761	6.7519
3.2752	975.1332	30.6340	23.7303	291.0812	6410.3289	11.3124	14.4661	4.5460	22.3571	3.2937
2.7297	725.0345	22.7104	21.3160	197.0133	4721.6027	9.3209	13.4909	3.7848	23.9672	2.0969
3.7048	1122.3791	36.0803	25.5321	298.7780	7260.6289	16.5679	15.1827	5.3284	26.9412	3.6770
3.7338	1119.7165	35.9829	24.9154	290.3761	7113.4785	16.5258	15.6731	5.1494	27.4923	3.7324
3.9122	1053.8100	32.7222	24.0344	249.3645	6791.8120	10.5787	13.7211	4.5334	21.9574	2.8902
4.2894	1125.5986	32.5652	31.1087	280.0604	7739.2160	11.4356	14.6931	5.9610	30.5689	3.4005
3.7038	1123.7932	31.4098	23.8081	277.8983	6956.6416	12.5282	13.6708	4.3821	21.2962	3.1008
3.8646	880.8072	25.7090	21.5100	251.4476	5554.8041	18.3982	13.8049	3.4911	18.9527	2.5267
3.5277	1028.5607	30.2371	44.9289	311.3265	7278.1064	9.4228	14.2765	4.9163	25.7055	2.8760
4.4159	1129.4261	32.7535	23.6041	248.8684	6671.2360	13.0451	13.9617	4.7030	24.2210	3.2305
4.0178	1029.3837	31.5683	23.3930	255.6883	10284.5031	16.2705	14.4444	4.7755	26.0697	3.2890
16.4336	1138.4281	30.9689	115.3463	256.3761	7456.5800	8.7011	13.0338	4.4219	18.5462	2.7410
9.4580	1066.2009	26.1994	22.2052	144.7132	5777.5968	23.4164	11.6784	3.7792	18.8231	2.3258
4.6318	1088.0577	30.2786	76.7294	301.4028	9124.2645	16.1792	14.9416	9.0930	28.3406	3.4307
5.4388	1173.1949	29.3738	69.1780	394.0350	10750.4885	11.7728	16.2494	9.0605	25.3123	3.3362
12.9188	4430.2573	159.1834	75.9022	255.8214	31190.7296	17.5669	34.1524	19.5900	79.8433	18.7309
4.8449	4567.0098	161.4295	75.9246	305.2341	37655.6549	17.8136	34.5493	19.9818	76.3814	19.4784
13.0852	5743.4165	187.4301	88.1286	225.9666	33113.0196	16.6240	37.6490	22.2762	81.2439	20.8157
12.3966	4773.8856	173.5432	85.1595	226.8633	32447.7160	12.6766	34.7775	21.0201	79.4765	19.2303
13.6325	5067.0839	180.8394	85.7546	217.6285	30098.4107	13.9742	35.3957	20.9739	77.5228	19.8230
14.2434	4996.3321	175.9328	86.0232	197.9525	33700.0511	11.8665	35.5738	21.6259	81.2300	20.9600
11.6736	4700.2916	168.2976	85.5755	221.7456	29743.5588	15.4470	33.3836	21.0282	73.9790	19.0208
14.7130	4961.9330	179.9557	84.4772	299.3150	36790.8017	12.7582	36.1656	21.6974	81.8349	20.0669
12.6292	4862.2975	173.3498	87.0381	807.9864	33846.6875	17.9719	45.4444	22.2168	87.3768	20.6437
13.0997	5078.8113	185.7748	87.7211	165.2249	32089.1897	15.9728	36.2774	22.2601	82.6415	20.3716
14.1855	5402.9221	197.2215	92.8418	173.6376	33904.1827	17.0267	38.5598	23.9119	87.8257	22.8937
12.5564	4697.8860	148.8497	71.9809	177.8008	33430.1272	15.0565	30.5016	18.6592	72.1527	20.0561

ICP-MS Ge mg/kg	ICP-MS As mg/kg	ICP-MS Se mg/kg	ICP-MS Rb mg/kg	ICP-MS Sr mg/kg	ICP-MS Y mg/kg	ICP-MS Zr mg/kg	ICP-MS Nb mg/kg	ICP-MS Mo mg/kg	ICP-MS Ag mg/kg	ICP-MS Cd mg/kg
0.7332	3.3281	0.0013	31.5988	160.1510	10.5347	54.9369	5.4641	1.5103	0.0783	0.6215
0.6161	2.9834	0.4854	18.8513	185.3458	8.7410	43.7702	4.6001	1.1173	0.0843	0.5075
1.2241	5.8505	0.0013	58.3101	149.8207	17.6202	103.5312	10.5284	2.1009	0.1821	1.1187
0.5256	2.5722	0.0013	20.6582	165.1479	9.0747	40.0851	3.9169	1.2178	0.0902	0.5302
0.6330	2.5877	0.0013	23.8264	183.3391	9.8421	46.1170	4.5476	1.3196	0.6590	0.4390
1.2550	4.6249	0.1717	48.3219	162.3565	17.8082	115.4393	10.6114	2.3007	0.1756	1.1452
1.0926	3.5899	0.0013	34.5769	130.8444	15.0674	117.4070	7.8344	1.9015	0.1518	0.9963
1.1864	3.1952	0.1653	37.2200	135.2795	16.4148	123.5055	8.8568	1.9273	0.1550	0.9302
0.8014	3.3818	0.0013	25.2715	182.1998	10.2699	62.7317	5.1720	0.9942	0.1076	0.6879
1.0425	4.8507	0.8298	39.9197	165.6212	14.0953	75.3919	7.7714	1.5861	0.1613	0.8213
0.5894	2.6846	0.0013	20.0073	175.6007	9.3081	46.6749	3.7415	1.1625	0.0939	0.5405
0.4251	1.8651	0.0013	14.2591	218.1337	7.2290	33.2209	2.6775	0.9548	0.0731	0.5482
0.5936	2.8431	0.0013	13.7928	217.4996	9.6729	44.8325	4.2320	1.1523	0.0959	0.5873
0.6740	3.0039	0.0013	13.8306	218.6152	9.6225	44.7560	4.1299	1.1704	0.2420	0.6739
0.6055	2.4219	0.0013	18.5914	180.6206	9.1213	41.0702	4.1245	1.4313	0.0954	0.4443
0.7661	2.7790	0.0013	16.0128	170.1720	10.1483	43.4776	3.9698	1.5810	0.0723	0.6401
0.6286	2.4655	0.0013	17.8854	175.7155	9.2910	49.9258	3.7864	1.0453	0.0871	0.5266
0.5610	2.3452	0.0013	16.5990	195.0175	8.2267	38.2679	3.1086	1.3016	0.0723	0.4169
0.6328	2.4203	0.0013	20.4110	154.8007	9.2949	42.0166	3.4948	1.8714	0.1061	0.5266
0.7553	2.7044	0.0013	13.0910	183.5241	9.2549	38.4495	3.8626	1.0412	0.0964	0.5403
0.7514	2.6550	0.0674	20.8140	176.8996	10.5094	40.6880	3.9346	1.3841	0.0681	0.6221
0.6562	2.6454	0.3726	20.8735	153.0195	9.6678	46.0846	4.2916	3.2055	0.0975	0.4478
0.6009	2.1603	0.1093	18.0295	171.6961	7.8708	55.6389	3.9836	0.8038	0.0836	0.4224
0.7490	2.9940	0.1203	20.6973	171.3846	9.8123	64.8902	4.1942	3.0939	0.1235	0.5497
0.7690	2.8890	0.0013	21.6126	166.6951	9.7139	59.4678	4.2995	3.1068	0.1026	0.5553
2.2440	8.4988	0.8141	104.2950	115.6556	26.9682	151.6552	24.2156	1.8049	0.3105	0.6074
2.1469	8.5175	0.5523	43.1876	134.3682	19.9911	142.9906	27.0631	1.9553	0.4133	0.6089
2.4361	9.7308	0.1993	82.9971	111.0335	26.7009	161.3512	29.4706	2.3864	0.3921	0.5290
2.2741	12.5918	0.0013	107.3471	132.0549	27.7926	153.6814	28.3319	2.2662	0.4320	0.5896
2.2336	9.4692	0.0013	15.0469	96.1606	18.2469	171.6733	30.3741	1.9947	0.3503	0.5630
2.3307	9.4756	0.6501	98.4357	138.1046	27.5806	168.9710	30.6637	1.9293	0.3267	0.5564
2.2783	8.6804	0.2723	22.4303	114.5683	23.2094	164.9587	29.0528	2.2140	0.3844	0.5229
2.4091	9.8588	0.2579	115.7567	143.8006	27.8984	157.5797	30.4157	1.9982	0.3402	0.4539
2.4681	8.8981	0.0013	101.6506	130.3399	27.9459	165.0572	28.6609	2.5151	0.3603	0.8198
2.3505	10.3549	1.4773	23.4555	102.3485	22.4796	172.6373	29.4021	2.0242	0.3384	0.6433
2.5166	10.7032	0.9134	25.5401	107.8854	24.0424	183.3367	31.5900	2.3665	0.3903	0.6992
2.3297	8.3287	0.5802	61.7419	121.6313	24.4292	177.5348	27.5942	1.5082	0.2414	0.5053

ICP-MS Sn mg/kg	ICP-MS Sb mg/kg	ICP-MS Cs mg/kg	ICP-MS Ba mg/kg	ICP-MS La mg/kg	ICP-MS Ce mg/kg	ICP-MS Pr mg/kg	ICP-MS Nd mg/kg	ICP-MS Sm mg/kg	ICP-MS Eu mg/kg	ICP-MS Gd mg/kg
15.6922	0.8096	1.6038	132.5421	10.6976	19.0011	2.6231	11.9905	2.4786	0.4782	2.1186
0.8176	0.5990	0.7516	133.9245	9.2375	16.6042	2.2127	10.2007	2.0403	0.4007	1.7915
2.0439	1.0309	3.4109	271.0287	19.2496	35.1778	4.6166	21.4379	4.2531	0.8484	3.8708
1.4279	0.7249	0.9785	90.9604	8.1149	13.8796	1.9880	9.2918	1.9220	0.3852	1.7192
0.7377	0.8955	1.1558	143.0819	9.0306	15.2289	2.1508	9.9064	1.9560	0.3839	1.7869
2.5557	1.0533	2.5287	344.2980	18.7067	34.7234	4.6673	21.9317	4.3824	0.8682	3.9238
1.3376	0.9274	1.4233	299.8678	13.2155	24.3335	3.3925	16.4796	3.5006	0.6983	3.2791
1.0962	0.8586	1.6570	314.6991	16.1246	30.5900	4.1261	20.1151	3.9800	0.7503	3.4564
1.5368	0.5979	1.1244	136.0391	10.0649	17.8451	2.4185	11.7839	2.1947	0.4395	2.0820
1.2720	0.8038	2.3139	222.9057	14.7816	26.8486	3.5831	16.9193	3.3024	0.6468	2.9744
1.7556	0.4881	1.0529	113.6308	8.6457	14.5489	2.0650	9.8431	1.8971	0.3753	1.7790
0.6806	0.3941	0.7332	69.1000	7.1471	11.0957	1.5909	7.8226	1.4069	0.2686	1.2753
0.7706	0.5145	0.5163	115.6424	9.5388	16.2090	2.2584	10.8500	2.0791	0.4233	1.9811
0.7394	0.4534	0.5134	115.8549	9.4846	16.1803	2.2366	11.1312	2.2132	0.4192	1.8513
0.7911	0.5235	0.7663	223.5944	9.6421	16.3973	2.2699	10.8897	2.0666	0.4222	1.8017
6.6003	0.5179	0.5931	122.4945	9.8423	15.7937	2.2882	11.0543	2.1553	0.3967	1.9123
0.6249	0.4324	0.6977	104.6055	8.5829	14.6593	2.0313	10.0994	1.9300	0.3945	1.7604
1.1637	0.4698	0.7905	82.4363	7.4330	12.0170	1.7829	8.4228	1.6803	0.3239	1.4619
1.2302	0.4642	0.9561	115.6442	8.5820	13.9301	2.0041	9.8051	1.8919	0.3730	1.7304
0.6118	0.4324	0.5402	129.9247	8.6781	14.9349	2.1234	10.1946	1.9799	0.3868	1.7903
0.9864	0.3915	0.9123	124.1515	9.4895	15.5422	2.2279	10.5903	2.0567	0.4162	2.0432
0.7261	0.3650	0.8223	169.4095	9.6285	15.7940	2.2491	10.8364	2.0964	0.4012	1.8304
0.5287	0.3528	0.8172	96.6481	7.6539	13.4056	1.8419	8.9195	1.7352	0.3251	1.4610
1.0585	0.6654	1.0191	123.9880	9.2106	15.5183	2.1502	10.4532	2.0106	0.4256	1.7649
1.3984	0.6328	0.9873	126.0838	10.0415	17.4456	2.3918	11.2531	2.2095	0.4062	2.0245
2.4622	1.5797	6.0966	527.5253	35.8498	71.2277	8.7535	40.2704	7.4004	1.5231	6.3985
2.2314	1.4265	4.6774	902.6631	25.2413	56.3008	7.0264	33.5747	6.7884	1.4068	5.7351
2.4430	1.6132	4.4179	598.1119	34.5362	69.5317	8.6342	39.3884	7.5765	1.5228	6.3549
3.3088	1.4991	6.3109	597.9154	37.7002	75.1027	9.1057	41.8824	7.8495	1.6061	6.8589
2.3574	1.5084	3.4812	569.0420	19.8853	43.8533	5.7644	27.2965	5.4331	1.1717	5.1674
3.8332	1.4966	6.1489	603.6228	37.4930	76.6152	9.2776	42.0885	8.0394	1.5640	6.7878
2.3665	1.5299	3.5789	566.9152	26.8526	56.1779	7.3067	33.6339	6.8196	1.3810	5.8836
2.7822	1.5733	6.6929	664.3192	39.4210	79.3693	9.5824	42.9031	8.0674	1.6075	6.7960
2.3936	1.5811	6.3547	591.1545	37.1776	73.9080	9.0841	40.2493	7.6577	1.5937	6.6193
5.1179	1.6916	4.6195	615.0402	25.1292	54.3731	6.7555	30.8279	6.3586	1.2707	5.5458
5.4359	1.9118	4.9386	640.9240	26.3504	57.0139	7.0982	33.3680	6.6705	1.3593	5.6768
2.5392	1.3437	5.6133	637.4120	32.4111	66.8872	8.1129	36.5021	7.3501	1.4226	5.9169

ICP-MS Tb mg/kg	ICP-MS Dy mg/kg	ICP-MS Ho mg/kg	ICP-MS Er mg/kg	ICP-MS Tm mg/kg	ICP-MS Yb mg/kg	ICP-MS Lu mg/kg	ICP-MS Hf mg/kg	ICP-MS Ta mg/kg	ICP-MS Hg mg/kg	ICP-MS Tl mg/kg
0.3087	1.5402	0.3288	0.8766	0.1381	0.8657	0.1602	2.1202	0.4324	0.0001	0.2903
0.2694	1.3871	0.2625	0.7969	0.1140	0.6841	0.1294	1.7393	0.3569	0.0001	0.2590
0.5557	2.7315	0.5676	1.6516	0.2463	1.5788	0.2754	3.9772	0.6528	0.0001	0.5746
0.2528	1.2726	0.2779	0.7452	0.1061	0.6928	0.1240	1.5228	0.3314	0.0001	0.1854
0.2652	1.3474	0.2829	0.8129	0.1133	0.7325	0.1287	1.8338	0.3832	0.0001	0.1991
0.5678	2.8129	0.5644	1.6369	0.2475	1.7272	0.3044	4.8173	0.6970	0.0001	0.5368
0.4674	2.2806	0.4863	1.4658	0.2120	1.3728	0.2648	4.6207	0.6234	0.0001	0.3888
0.5073	2.5490	0.5147	1.4966	0.2196	1.4602	0.2812	4.7173	0.6115	0.0001	0.3891
0.3115	1.5951	0.3016	0.9564	0.1410	0.9040	0.1639	2.3889	0.4090	0.0001	0.2426
0.4317	2.1453	0.4553	1.3259	0.1887	1.2391	0.2344	2.8712	0.4945	0.0001	0.3814
0.2549	1.2504	0.2617	0.7757	0.1146	0.7120	0.1235	1.6903	0.3139	0.0001	0.1977
0.1879	0.9481	0.2071	0.5781	0.0775	0.5081	0.0885	1.3352	0.2150	0.0001	0.1301
0.2852	1.4059	0.2997	0.8494	0.1102	0.8104	0.1433	1.8183	0.3138	0.0001	0.2207
0.2802	1.4524	0.3005	0.8334	0.1044	0.7456	0.1567	1.9851	0.3026	0.0001	0.2183
0.2607	1.2917	0.2627	0.7749	0.1019	0.6712	0.1325	1.6918	0.3629	0.0001	0.1864
0.2893	1.4985	0.3146	0.8807	0.1184	0.7671	0.1301	1.7541	0.3362	0.0001	0.1864
0.2567	1.2814	0.2717	0.7820	0.1178	0.7385	0.1442	1.8915	0.3497	0.0001	0.1911
0.2157	1.0894	0.2290	0.6569	0.1070	0.6394	0.0819	1.3524	0.2856	0.0001	0.1713
0.2498	1.2347	0.2670	0.7557	0.1065	0.7060	0.1318	1.6132	0.2936	0.0001	0.1824
0.2604	1.2968	0.2636	0.7855	0.1058	0.6783	0.1311	1.4407	0.3158	0.0001	0.1885
0.2984	1.4919	0.3122	0.8531	0.1109	0.7188	0.1639	2.0666	0.3117	0.0001	0.1963
0.2725	1.3891	0.2732	0.8321	0.1190	0.7674	0.1416	1.8429	0.2840	0.0001	0.1914
0.2182	1.1156	0.2315	0.6733	0.0943	0.6021	0.1294	2.0575	0.3572	0.0001	0.1420
0.2693	1.4073	0.2784	0.8587	0.1254	0.8258	0.1293	2.3170	0.3056	0.0001	0.1982
0.2812	1.3369	0.3086	0.8809	0.1376	0.8205	0.1754	2.1553	0.3009	0.0001	0.1765
0.9351	4.6790	0.9251	2.7637	0.3869	2.5295	0.4849	5.6203	1.3425	0.0001	0.7207
0.8439	4.2516	0.8521	2.4207	0.3642	2.4397	0.4406	5.3913	1.4308	0.0001	0.6535
0.9179	4.5387	0.9622	2.7365	0.3872	2.6024	0.4861	6.2347	1.6035	0.0001	0.7551
0.9647	4.6453	0.9605	2.7692	0.4123	2.4751	0.5067	5.8104	1.5416	0.0001	0.7117
0.7481	3.7076	0.8059	2.2390	0.3321	2.2278	0.4062	6.2895	1.6604	0.0001	0.6606
0.9695	4.7410	0.9967	2.8685	0.4140	2.6821	0.4922	6.5283	1.6149	0.0001	0.7107
0.8628	4.3312	0.8768	2.5765	0.3764	2.4423	0.4514	6.1179	1.5914	0.0001	0.6646
0.9880	4.9174	0.9776	2.8189	0.4036	2.6279	0.4649	5.8709	1.6235	0.0001	0.6812
0.9563	4.7298	0.9559	2.8170	0.3895	2.7334	0.5639	6.0704	1.5363	0.0001	0.7596
0.8275	4.2269	0.8603	2.4961	0.3621	2.5897	0.4873	6.3576	1.6181	0.0001	0.7419
0.8472	4.3284	0.8980	2.6643	0.3870	2.6316	0.5046	7.2145	1.6957	0.0001	0.8259
0.8719	4.3986	0.8775	2.6039	0.3809	2.4975	0.4851	6.7194	1.5472	0.0001	0.7194

ICP-MS Pb mg/kg	ICP-MS Th mg/kg	ICP-MS U mg/kg
4.2632	2.4140	1.3264
3.4206	1.7710	1.1581
8.2218	4.4723	1.7891
3.0639	0.9943	1.1985
3.2888	1.8917	1.2630
8.5077	4.6548	2.0419
6.1663	3.2878	1.8088
6.6222	4.0768	1.8339
4.2608	2.1895	1.4548
6.2873	3.1654	1.5744
2.8950	1.6676	1.1526
2.2821	1.2422	1.2750
3.5782	1.1096	1.3218
3.5672	1.2284	1.3382
3.1537	1.6606	1.1778
3.5453	1.5794	1.2836
3.0858	1.5704	1.3361
2.7782	1.3291	1.4303
2.9158	1.6988	1.3152
3.4115	1.4980	1.3215
3.1940	2.0041	1.3916
3.1445	1.8891	1.2547
2.5575	1.6725	1.1661
3.2693	1.8003	1.3134
3.2743	1.9398	1.2494
14.9580	7.9122	2.1641
14.8420	3.8689	2.0532
16.4133	8.1168	2.2468
15.3260	8.1671	2.2286
14.7881	4.1180	1.4737
15.5747	7.9827	2.2082
13.6594	5.6125	1.7027
16.4347	8.7390	2.2718
16.2628	8.4402	2.2334
15.1722	5.2613	1.8220
15.8723	5.7303	1.9311
15.6805	7.9536	1.9254

HoleID	Sample Number	Depth (mgbs)	Depth Error (m)	ICP-MS Li mg/kg	ICP-MS Na mg/kg	ICP-MS Mg mg/kg	ICP-MS Al mg/kg	ICP-MS P mg/kg	ICP-MS K mg/kg
WLC_12-06a	30035B	40.71	0.14	54.7911	5649.5557	9400.1246	56031.9852	1332.0708	25990.8284
WLC_12-06a	30036B	42.28	0.15	43.3716	2951.3830	9731.5441	54006.4375	1577.2549	23535.6879
WLC_12-06a	30037B	42.96	0.08	28.1482	1845.3152	17479.9840	38227.5085	1223.3470	15700.7540
WLC_12-06a	30038B	43.49	0.18	48.7382	4477.4908	11293.6506	62047.9224	1512.9583	24289.8850
WLC_12-06c	32160A	12.19	0.30	15.8092	1183.4208	27158.3968	20009.0881	941.3793	8457.4166
WLC_12-06c	32166A	39.62	0.30	59.6499	3769.9981	9169.4706	80831.9462	1573.9211	26890.2833
WLC_12-06c	32169A	45.72	0.30	27.1288	1922.8739	12110.5994	37197.3333	1205.0686	12053.5972
WLC_12-06c	32172A	49.68	0.30	69.4100	4389.9754	16809.8002	107454.5121	1106.5058	35031.9296
WLC_12-06c	32175A	60.96	0.30	63.3393	6447.6169	19834.5246	78440.9541	1043.9911	25460.2210
WLC_12-06c	32178A	70.10	0.30	72.6984	8577.5918	19113.6578	114536.2888	771.9567	38917.0345
WLC_12-06c	32181A	76.20	0.30	85.9643	8680.7176	19459.1824	92019.8796	1023.2195	41173.1060
WLC_12-06c	32181A-REP	76.20	0.30	84.4121	7159.1933	18905.6501	89654.3445	914.6920	40791.0338
WLC_12-07a	30326A	0.62	0.08	31.5733	3626.4068	5085.1378	51171.7541	1192.7043	17034.3793
WLC_12-07a	30327A	1.91	0.08	38.3140	4020.7655	15904.1611	58354.5668	1317.9211	26449.4427
WLC_12-07a	30328A	2.56	0.09	40.2815	4041.0373	20118.8851	59112.5119	1433.7164	23006.2099
WLC_12-07a	30329A	3.60	0.06	43.9447	3823.1968	17725.8829	58630.1255	1494.6260	22579.2100
WLC_12-07a	30330A	8.11	0.06	63.1531	4780.4886	10088.1309	78069.9251	1426.7454	28500.6467
WLC_12-07a	30331A	9.53	0.05	79.5349	5215.8706	9162.0409	84258.2105	1113.9377	28587.9511
WLC_12-07a	30332A	10.27	0.06	74.9819	5121.8896	7598.1965	77345.4445	981.3661	24279.2718
WLC_12-07a	30333A	11.11	0.08	62.3986	4231.7836	11262.0952	77943.9022	1661.3401	28716.9498
WLC_12-09b	30229A	0.40	0.09	16.9990	2159.7293	13729.1164	25474.9956	1021.3061	12383.5616
WLC_12-09b	30229A-REP	0.40	0.09	16.9191	2189.5023	13697.0737	25630.9016	1003.4655	12638.7180
WLC_12-09b	30230A	1.20	0.14	18.2587	1912.4112	32866.4344	27984.6904	929.2889	11139.8580
WLC_12-09b	30231A	1.95	0.12	13.1319	1753.6613	33930.1625	15801.5639	786.0511	9186.1896
WLC_12-09b	30232A	3.47	0.12	20.9795	2032.3218	25374.9169	20284.1787	653.4217	10463.0719
WLC_12-09b	30234A	5.15	0.12	7.8313	674.9953	33780.6763	7389.8520	487.8584	3437.3863
WLC_12-09b	30233A	4.24	0.09	12.3114	1339.8678	40316.5195	15307.5024	708.2509	8498.5376
WLC_12-09b	30235A	6.54	0.08	30.5485	1444.3236	39389.8136	14763.7869	498.7295	8565.1506
WLC_12-09b	30236A	7.18	0.08	17.8086	1052.1412	25847.5621	16393.3200	651.6544	6347.9622
WLC_12-09b	30237A	8.14	0.09	15.2538	1553.3257	34300.7601	16602.0468	723.5125	7320.7314
WLC_12-09b	30238A	9.54	0.12	10.7746	1152.8476	35129.1151	11751.6360	611.3836	5636.0899
WLC_12-09b	30239A	10.38	0.08	17.0228	2172.5902	23978.5761	21101.3637	800.4777	8958.9072
WLC_12-09b	30240A	8.00	0.08	27.1950	3738.7846	24289.4720	38781.1656	1229.3057	17454.2710
WLC_12-09b	30241A	12.13	0.06	31.0530	3769.8828	25950.6734	46011.0044	1234.4810	19552.1406
WLC_12-09b	30242A	12.80	0.06	25.4919	4174.2128	24501.6054	37750.9173	1134.8757	16501.4034
WLC_12-09b	30243A	14.04	0.08	12.6187	1246.8949	24904.9974	12651.2789	725.3956	6324.2202
WLC_12-09b	30243A-REP	14.04	0.08	11.7646	1239.3254	27962.9644	12501.9645	743.9536	6128.3822

ICP-MS Ca mg/kg	ICP-MS Sc mg/kg	ICP-MS Ti mg/kg	ICP-MS V mg/kg	ICP-MS Cr mg/kg	ICP-MS Mn mg/kg	ICP-MS Fe mg/kg	ICP-MS Co mg/kg	ICP-MS Ni mg/kg	ICP-MS Cu mg/kg	ICP-MS Zn mg/kg
36506.5254	10.5690	4558.8777	139.2190	67.8107	246.7787	33174.6094	16.1793	30.3100	17.6508	69.7042
45709.8203	9.2477	4223.0973	156.4374	76.0189	368.8916	31520.9704	16.6693	32.5704	18.0753	77.4268
127313.2697	7.3694	2715.5682	108.7313	61.0991	278.9893	22389.0839	19.0515	23.8680	13.1100	57.7913
47796.8017	11.1909	4397.5044	154.9852	75.7116	249.4369	33125.1990	16.1447	31.7122	19.0810	84.3379
122080.5327	4.0109	1442.1800	41.9356	38.5674	313.3953	8716.8576	18.0170	14.0314	7.3009	131.8984
25741.8224	12.8283	4399.7601	167.0769	90.6176	298.5482	32452.0861	13.3064	37.0602	27.8032	86.3548
71292.4908	7.2420	2002.5331	86.0069	47.5508	311.7823	20124.2007	25.0503	33.8563	12.7746	77.9706
25731.6707	15.4837	4643.8785	122.7207	78.7805	407.6131	40434.0088	14.6023	31.0310	23.3497	71.9605
109360.6300	12.9512	3583.8353	101.5011	63.5915	919.1205	33593.9916	14.5141	26.8348	17.7915	55.3246
20962.6897	17.4152	5981.8786	125.7170	80.9015	458.3760	40859.0741	15.5386	30.6760	25.3263	75.7359
20037.2260	19.0918	6185.6452	151.4009	101.2295	429.0944	46398.8993	18.2970	37.5553	29.3549	104.1117
24845.2356	18.9506	5298.7180	151.6299	100.9736	467.7590	45927.0953	17.8607	38.0622	32.3527	81.6138
6146.7899	9.7447	3057.6625	118.3663	79.2314	278.6015	22787.4699	15.1311	20.5909	14.6062	40.4289
95828.5689	10.3456	3262.9210	127.5289	73.4743	753.5476	25709.1532	12.8437	34.8988	16.5109	55.6185
71724.0488	9.5070	3205.8900	125.1344	69.2329	414.3281	23077.3840	14.9133	32.4424	19.0648	55.4274
58894.6807	12.5793	3506.9126	122.1770	71.3094	607.3662	32874.6923	11.0182	29.3318	16.4701	51.5640
23013.7996	15.6863	4643.0131	191.3250	98.9568	268.1892	34406.7455	13.2301	33.7153	22.6054	71.8269
15852.8077	17.4241	5611.2776	152.5623	89.3157	197.0237	27445.7610	11.8712	30.9132	20.0924	50.6968
12975.8467	12.0760	5303.0211	128.1817	78.3962	182.5516	27325.3064	13.6943	28.6402	16.9200	49.4744
22215.8941	15.7146	4662.9629	194.5586	106.3580	297.6072	38431.4633	11.4758	25.1344	20.9438	56.2514
108982.6519	8.4742	1640.5301	57.1800	47.3306	296.8388	10691.8756	9.1321	16.4912	7.2019	19.9137
108088.2626	8.4941	1655.9988	57.3678	47.5610	300.4314	10837.4609	8.9621	16.6403	7.6071	19.6311
156823.6628	7.9871	1801.7087	65.4677	47.1535	320.7137	13190.5089	7.2570	21.2464	9.3030	28.0223
210500.7163	5.7505	1016.2401	34.6648	31.4868	353.8097	7038.6070	6.0014	17.1635	5.1961	19.1354
206030.2028	5.5082	1231.9014	43.3592	35.3009	324.1530	8882.8603	10.1740	18.8416	7.0864	26.9052
237749.3027	3.5764	526.8324	18.8417	44.3208	127.9336	6104.5081	6.7408	16.5398	6.2718	11.0136
177731.7128	17.8533	1043.8593	33.2934	32.9115	210.6218	6756.1428	8.1011	16.8755	7.0035	19.5213
216508.3636	5.6763	905.7013	31.3498	25.2210	238.4995	6506.0622	5.4962	16.7095	4.5002	17.4118
217832.8243	6.2917	902.8097	44.2423	40.4514	149.2767	5781.8928	8.3241	14.3662	4.4089	18.6758
201799.4091	4.1770	1057.8521	38.5578	47.8971	301.0090	10816.9578	9.3673	18.5187	9.7513	34.3803
222644.8971	4.4509	811.4270	27.9916	36.1153	225.0304	7406.2910	6.2450	17.3239	6.1149	26.7424
197164.8671	7.5679	1460.3869	46.6679	49.0423	297.5721	11596.2442	8.7271	19.1467	8.9732	25.3700
120810.3577	8.3968	2638.3485	84.1487	56.3892	455.3483	16020.3208	10.5279	26.6137	12.1330	43.6412
122026.3131	9.5443	3078.2973	102.1573	62.9481	544.5349	19973.7413	14.0349	32.2761	14.8421	51.4897
120999.0073	6.9637	2688.4611	80.4389	53.6845	494.4353	16126.7393	11.7953	26.9345	13.5539	41.5463
224577.2780	6.6891	906.9134	28.3697	26.9301	1073.4394	8841.2579	9.1718	17.3812	4.9537	21.5872
222686.8564	3.0379	899.0083	27.5328	25.3410	1168.6949	9263.1817	9.0727	18.1592	4.8767	24.1733

ICP-MS Ga mg/kg	ICP-MS Ge mg/kg	ICP-MS As mg/kg	ICP-MS Se mg/kg	ICP-MS Rb mg/kg	ICP-MS Sr mg/kg	ICP-MS Y mg/kg	ICP-MS Zr mg/kg	ICP-MS Nb mg/kg	ICP-MS Mo mg/kg	ICP-MS Ag mg/kg
19.1763	2.1651	7.9494	0.6265	36.4855	119.2914	22.2209	170.1973	25.2822	1.5647	0.2287
18.0396	2.0484	8.7826	0.1174	61.7639	122.0205	23.9251	139.7538	20.8511	1.9897	0.3711
11.7417	1.5331	8.6676	0.0013	59.2499	161.3492	19.3472	91.7432	11.9804	2.3456	0.2402
18.8518	2.2943	8.1102	0.0013	95.8139	140.1924	27.2387	159.2336	22.9661	2.2756	0.3125
2.0053	0.7323	3.8124	0.0013	22.4931	129.3770	12.4676	87.3884	5.0563	1.0632	0.0003
16.8098	1.8376	7.9560	1.4128	98.8423	139.5322	27.8003	140.5070	24.5228	2.0598	0.0003
6.5714	1.0916	8.3927	0.3819	37.6814	108.3057	15.9345	82.9417	8.3845	1.9977	0.0003
21.0898	1.8925	5.9741	3.2430	145.1287	147.3365	26.4126	163.9020	24.3170	1.1786	0.0003
4.7396	1.3783	5.6955	0.0013	104.9227	565.4496	23.1131	112.5082	17.4380	1.1656	0.0003
21.9770	2.1288	5.1895	1.3550	164.0501	329.3575	24.3987	178.5505	25.9586	1.7234	0.0003
23.0923	2.0561	6.1497	0.2711	174.3786	307.0103	22.4149	141.6381	26.7590	1.7544	0.0003
22.0146	2.0690	5.2456	1.3643	178.5162	335.3579	22.6539	146.1071	27.0198	1.4740	0.0003
10.9082	0.0001	7.0904	0.2245	63.3742	69.3998	23.0963	110.0981	14.0070	2.2178	0.5907
12.5015	0.0001	8.1791	0.0851	82.2124	156.9995	22.7429	104.8488	15.4533	2.9860	0.6172
12.0467	0.0001	7.3631	2.7529	78.4985	194.8866	22.3821	110.1527	14.5143	2.4912	0.5805
12.8724	0.0001	5.8286	0.0013	78.5340	130.7838	23.0502	129.3082	18.3568	2.0771	0.7456
17.2935	0.0001	7.8030	1.9291	109.7483	153.1642	29.2875	163.3820	31.0589	1.8371	0.8740
18.4829	0.0001	5.9221	0.0013	106.0938	155.5497	26.1208	175.3791	40.7961	1.3818	0.7974
16.7232	0.0001	4.3135	0.0013	92.9672	157.2001	24.1838	168.0237	40.5973	1.8564	0.8175
18.5113	0.0001	2.6337	0.3190	112.6608	162.8797	27.8022	151.3089	30.1290	1.0772	0.7542
5.6211	0.9454	3.9111	0.0013	37.6589	91.8900	14.4956	104.9526	6.5331	1.5324	0.0239
5.5264	0.9032	4.1429	0.0013	38.5401	92.3009	14.6275	105.9271	6.1027	1.5613	0.5158
5.8597	0.8589	6.8013	0.4106	38.8703	127.7301	13.7381	85.0534	7.3181	1.8133	0.0459
3.2948	0.5550	3.3167	0.6230	23.8050	164.2795	10.4399	63.6264	4.0290	1.2817	0.0890
4.1300	0.5617	3.6103	0.0013	30.1899	223.1546	9.9182	58.0545	4.9310	1.4347	0.1419
1.4784	0.2595	2.0433	0.3423	10.9904	163.2956	5.7896	29.6748	2.3145	4.0684	0.1434
3.3686	0.5466	3.1402	1.2946	23.7949	127.2693	9.6942	65.6767	4.3554	1.0598	0.0598
3.0240	0.4448	3.3165	0.4297	24.7005	187.1769	8.6055	52.1765	3.6910	0.9610	0.0392
3.8146	0.6112	2.6743	0.9788	22.2336	212.6187	10.1484	49.0449	3.8151	1.0959	0.1246
3.4669	0.5263	3.6984	0.1184	24.0097	163.9688	9.8121	49.7866	4.7678	3.0252	0.1870
2.4243	0.4430	2.5640	0.0013	17.2579	164.2081	8.4237	45.8545	3.6029	2.6575	0.1775
5.0212	0.6426	4.3059	0.0013	29.9794	184.1533	12.3089	75.6887	6.5780	2.7496	0.3137
8.1828	1.1128	4.3321	0.1629	53.9486	142.6230	18.9111	103.6423	10.4363	2.5436	0.1375
9.6581	1.2097	7.1266	0.0013	65.3910	159.5911	20.8572	105.0033	12.3253	2.9749	0.2400
8.2043	1.0359	5.2300	1.0789	52.0975	147.7712	19.0074	114.4830	10.8213	1.9586	0.2663
2.8274	0.4645	16.7541	0.2719	18.6755	178.4349	8.4926	48.5596	3.4020	2.2277	0.1351
2.6661	0.3980	16.7897	0.0013	17.8726	181.8429	8.7213	47.8794	3.4880	2.1091	0.0795

ICP-MS Cd mg/kg	ICP-MS Sn mg/kg	ICP-MS Sb mg/kg	ICP-MS Cs mg/kg	ICP-MS Ba mg/kg	ICP-MS La mg/kg	ICP-MS Ce mg/kg	ICP-MS Pr mg/kg	ICP-MS Nd mg/kg	ICP-MS Sm mg/kg	ICP-MS Eu mg/kg
0.5644	2.7873	1.4178	4.7504	616.2994	26.4508	55.8780	7.0312	32.4656	6.7984	1.2925
0.7673	2.0245	1.5369	4.9851	495.7679	28.3169	55.6093	7.2506	33.7240	6.7490	1.3673
0.7563	1.8246	1.0883	3.3172	329.2176	23.2627	43.5063	5.4928	25.4686	4.7149	0.9846
1.0198	2.6607	1.3903	5.5670	472.9092	34.6749	69.7611	8.5713	38.6963	7.6080	1.4856
0.4603	0.6550	0.4069	0.9251	529.4145	12.9463	22.7327	3.1590	11.7787	2.2526	0.5084
0.4090	2.0001	1.1051	5.9689	593.4133	36.9438	73.6298	8.9120	33.1462	6.2789	1.4295
0.8279	0.9067	0.6735	1.8943	314.7708	18.6920	35.0959	4.6516	17.3960	3.4459	0.7712
0.2814	2.7011	0.7189	8.6443	1087.0559	39.5336	79.2375	9.1427	33.0704	6.6064	1.4426
0.3359	1.8518	0.4377	5.7148	1774.2710	29.8546	54.9048	6.7467	25.2214	5.0023	1.2670
0.1987	2.7500	0.7625	9.5889	697.7395	38.3850	75.8611	8.7881	30.9207	5.7587	1.2412
0.2677	2.7206	0.6729	10.5507	750.5968	37.9667	75.5995	8.6712	30.9117	5.8670	1.3137
0.1737	2.7240	0.6619	10.5098	767.4460	37.7810	75.3008	8.6558	31.3969	5.8570	1.3071
0.4807	1.7360	0.7547	3.4853	330.2130	28.7185	58.9214	7.3851	27.6347	5.6881	1.2395
1.5670	2.2063	1.0454	5.3105	487.7506	29.4016	55.0528	6.7946	25.5692	4.7251	1.0694
1.0007	2.5227	1.4600	4.9696	817.9088	28.2876	55.4148	6.9748	25.2746	4.8875	1.1716
0.7235	18.5132	1.2465	4.8712	468.1669	31.7843	61.7385	7.3845	25.9818	5.2941	1.1177
0.7162	5.7434	0.7449	6.8211	733.3625	42.4838	85.3869	9.9919	36.2923	7.0946	1.5600
0.4070	2.9362	0.6826	6.7995	543.5512	43.4243	86.4138	9.8726	33.7857	6.2661	1.2242
0.3503	3.1031	0.6267	5.7040	656.0896	41.9385	84.6323	9.4967	32.3228	5.9427	1.3305
0.3275	3.1291	0.6434	7.4837	575.0552	40.1568	82.5851	9.8781	35.1855	6.5968	1.3972
0.5825	1.8653	0.4336	1.8409	161.8672	14.9036	26.9734	3.7019	14.4363	2.7027	0.5309
0.5921	1.8843	0.5131	1.9259	162.0937	15.0224	27.5017	3.6328	14.2417	2.6658	0.5711
0.5669	5.5985	0.9900	2.1418	172.7299	15.7311	29.2710	3.7570	14.3139	2.6979	0.5546
0.4616	9.2362	0.3883	1.1786	135.0383	9.7154	16.9385	2.3632	9.0247	1.7485	0.3842
0.6076	43.3686	0.4969	1.5760	123.6186	11.0486	20.1249	2.6058	9.4468	1.9033	0.4131
0.1961	26.2871	0.3164	0.5437	58.4399	5.7759	9.2210	1.2541	4.7094	0.9684	0.2116
0.5145	1.6123	0.4428	1.2269	99.7717	10.1314	17.5325	2.3904	8.5435	1.6874	0.3532
0.3939	1.1248	0.3068	1.2763	98.5737	8.2856	15.2314	1.9997	7.4946	1.4845	0.3346
0.4280	1.3579	0.3311	1.2049	182.4849	11.2135	18.6678	2.4911	9.6062	1.6295	0.3926
1.1094	0.9358	0.6449	1.2265	125.1917	10.6971	18.5393	2.5543	9.6844	1.8601	0.3756
0.6261	6.5666	0.4274	0.8589	96.7957	8.6881	14.0891	1.9703	7.6830	1.4204	0.2905
0.6647	1.0794	0.5469	1.6795	160.4370	13.1783	23.2471	3.0491	11.7187	2.3176	0.4963
2.3017	3.2410	0.9195	3.3821	363.8789	22.0977	41.4770	5.3656	19.8891	3.8712	0.7764
1.0856	9.1070	3.1196	4.0427	396.2499	25.2584	47.0637	6.0398	23.3708	4.6405	0.9854
0.8622	1.5207	0.9710	3.0104	348.3744	21.5945	41.2305	5.2541	20.6098	4.0010	0.8168
0.5939	1.1747	0.3302	0.9151	230.5886	9.0942	15.4298	2.0943	8.4990	1.7094	0.3226
0.4935	1.3268	0.3798	0.9014	231.5772	9.1623	15.4748	2.1009	7.8202	1.8159	0.3270

ICP-MS Gd mg/kg	ICP-MS Tb mg/kg	ICP-MS Dy mg/kg	ICP-MS Ho mg/kg	ICP-MS Er mg/kg	ICP-MS Tm mg/kg	ICP-MS Yb mg/kg	ICP-MS Lu mg/kg	ICP-MS Hf mg/kg	ICP-MS Ta mg/kg	ICP-MS Hg mg/kg
5.8951	0.8573	4.2684	0.8540	2.4258	0.3487	2.4637	0.4542	6.4104	1.4150	0.0001
5.8713	0.8437	4.1504	0.8584	2.5463	0.3594	2.2985	0.4441	5.2321	1.2252	0.0001
4.4629	0.6462	3.2028	0.6377	1.7778	0.2711	1.7668	0.3431	3.3802	0.8276	0.0001
6.7576	0.9428	4.5035	0.9144	2.6854	0.3899	2.5565	0.4798	5.7740	1.2978	0.0001
3.2986	0.4161	1.9762	0.4113	1.1999	0.1685	1.1850	0.1576	2.5664	0.4599	191.0684
6.1255	0.8990	4.9685	0.9907	2.7972	0.4132	2.6841	0.3974	3.9834	1.4069	36.8624
3.3432	0.4927	2.7340	0.5521	1.5591	0.2354	1.4445	0.2392	2.5060	0.6684	205.3104
6.3568	0.9012	4.8114	0.9890	2.8178	0.4134	2.7408	0.4500	4.8402	1.3282	16.3133
4.9370	0.7280	4.0428	0.7909	2.2632	0.3335	2.2269	0.3164	3.3571	0.9676	23.0379
5.4533	0.8239	4.6873	0.9726	2.8846	0.4335	2.8548	0.4218	5.6496	1.4435	5.3042
5.6284	0.8105	4.3948	0.8734	2.4639	0.3678	2.4450	0.3502	4.7259	1.3973	4.8659
5.5840	0.8058	4.3791	0.8438	2.6864	0.3707	2.4164	0.3544	4.4298	1.4133	4.6745
4.9649	0.7487	4.2514	0.7817	2.2618	0.3149	2.1401	0.2703	3.0228	0.9242	148.8627
4.4772	0.6620	3.6861	0.7379	2.2813	0.3045	2.1249	0.2915	3.1157	0.9583	57.2995
5.1385	0.7300	3.9053	0.7842	2.3915	0.3055	2.2405	0.2992	3.0402	0.9518	107.0427
4.6777	0.6938	3.8755	0.7836	2.3350	0.3215	2.1393	0.2953	3.7878	1.1091	41.5526
6.8489	0.9549	5.0138	1.0556	2.9151	0.4454	2.6249	0.3910	4.1194	1.5955	62.8336
5.3901	0.8362	4.8856	0.9959	2.9877	0.3982	2.6908	0.4119	4.9234	2.1512	41.5373
5.0988	0.7661	4.3350	0.8540	2.5810	0.3984	2.3854	0.3279	4.6105	2.1701	90.3124
6.4181	0.9134	4.8949	0.9945	2.9357	0.4587	2.9141	0.3672	4.3236	1.7031	73.0570
2.5848	0.3861	2.1715	0.4623	1.4864	0.1796	1.2636	0.1759	3.0950	0.4118	109.0723
2.9155	0.4305	2.3935	0.4758	1.2745	0.2165	1.2234	0.1785	3.1747	0.4066	108.8706
2.4198	0.3860	2.3187	0.4429	1.3618	0.1986	1.3079	0.1787	2.5029	0.4338	44.4484
1.8843	0.2744	1.5044	0.3169	0.9307	0.1394	0.9190	0.1120	1.7144	0.2568	65.4673
1.8373	0.2793	1.5994	0.2963	0.8700	0.1314	0.9375	0.1353	1.6255	0.3486	88.1080
0.8762	0.1345	0.7778	0.1826	0.4902	0.0744	0.3977	0.0561	0.8632	0.1824	78.0812
1.6852	0.2463	1.3554	0.2817	0.8907	0.1319	0.8308	0.0833	1.8587	0.3093	108.5295
1.5208	0.2297	1.3068	0.2647	0.7799	0.1013	0.7820	0.0842	1.4997	0.2132	55.5834
1.6686	0.2473	1.3801	0.3049	0.8461	0.1351	0.7880	0.1115	1.6097	0.2686	76.6533
1.7430	0.2631	1.4954	0.3267	0.8769	0.1234	0.8582	0.0787	1.3023	0.2805	68.6600
1.6032	0.2251	1.1901	0.2419	0.7194	0.1028	0.7122	0.0903	1.3900	0.2279	75.3980
2.1840	0.3207	1.7732	0.4077	1.3005	0.1730	0.9479	0.1466	2.2313	0.4166	67.0068
3.7617	0.5579	3.1165	0.6406	1.8000	0.2685	1.8088	0.2342	3.2450	0.7307	78.9142
4.2777	0.6234	3.4210	0.7445	2.0058	0.2880	1.8265	0.2699	2.8970	0.7661	37.8622
3.8451	0.5616	3.0887	0.6780	2.0265	0.2372	1.8192	0.2500	3.0849	0.6901	89.1843
1.4674	0.2337	1.4013	0.2691	0.7715	0.1251	0.7049	0.1486	1.7219	0.2399	65.8017
1.7789	0.2478	1.2995	0.2755	0.7561	0.1181	0.7933	0.0827	1.3899	0.2478	63.6658

ICP-MS Tl mg/kg	ICP-MS Pb mg/kg	ICP-MS Th mg/kg	ICP-MS U mg/kg
0.6326	15.0727	6.2772	1.8164
0.7112	13.7473	5.8338	2.0080
0.4614	9.0972	4.4417	1.9044
0.7655	13.1071	7.6867	2.1433
0.1704	4.4384	3.1513	2.1791
0.6445	15.7463	9.4761	3.1701
0.3878	6.9398	4.6799	2.5460
0.8952	20.6304	15.3226	3.2891
0.6269	13.7947	9.7004	2.2934
0.9890	22.1419	15.7125	3.2291
1.1491	21.6488	14.9191	2.6060
1.0879	21.2440	14.4995	2.5927
0.5436	9.5738	3.7688	2.4837
0.8011	11.0063	4.5908	2.9827
0.7433	11.0610	4.5518	3.0794
0.6228	11.0407	4.6280	3.0268
0.6127	12.2730	5.8879	3.1941
0.7074	10.8563	6.1020	2.9332
0.4532	11.3605	5.9524	2.7764
0.6678	6.4793	6.1337	3.0380
0.3984	4.5892	2.2448	1.9393
0.4020	4.5703	2.2456	1.9159
0.4074	5.3794	2.3423	1.9819
0.2265	3.1458	1.3535	2.2021
0.3217	36.3849	1.6038	2.0543
0.1253	11.3067	0.6767	1.2423
0.2065	4.5585	1.4144	1.7842
0.2074	3.1003	1.2506	1.7415
0.2513	3.4379	1.3171	1.9110
0.2977	3.5751	1.4269	1.7849
0.1488	6.2469	1.0377	1.6010
0.2891	4.4726	1.8304	1.9945
0.5307	8.3917	3.3068	2.7570
0.6424	11.1768	3.9243	2.8825
0.5663	8.4445	3.3917	2.7342
0.2267	2.8373	1.3068	1.8889
0.2026	3.0760	1.1729	1.8255

HoleID	Sample Number	Depth (mgbs)	Depth Error (m)	ICP-MS Li mg/kg	ICP-MS Na mg/kg	ICP-MS Mg mg/kg	ICP-MS Al mg/kg	ICP-MS P mg/kg	ICP-MS K mg/kg
WLC_12-09b	30244A	14.04	0.08	11.2869	1434.9485	30855.7618	14128.0404	965.1524	8015.5725
WLC_12-09b	30245A	16.57	0.08	12.4174	1115.2430	24854.7779	11736.7146	907.4880	6792.7814
WLC_12-09b	30246A	17.19	0.09	9.2731	577.6898	31131.4986	7725.9321	667.3062	4528.5086
WLC_12-09b	30247A	18.64	0.11	11.5092	1166.2509	26989.0169	11127.0086	678.0245	6145.4968
WLC_12-09b	30248A	19.60	0.09	9.6439	726.5122	31139.7569	8751.1740	631.9231	4790.9946
WLC_12-09b	30250A	21.72	0.11	4.8873	442.0613	12004.6859	5108.1012	337.0662	2609.7155
WLC_12-09b	30251A	22.60	0.11	8.2840	1012.7213	39484.0404	9681.9179	787.7926	5140.1376
WLC_12-09b	30252A	23.56	0.09	18.0229	1366.6508	29730.5132	13894.8541	723.5574	7300.2163
WLC_12-09b	30256A	27.20	0.11	12.5636	954.6298	37727.2311	12841.9353	834.0270	6871.2105
WLC_12-09b	30258A	29.61	0.08	17.9391	1008.4282	33584.9879	12856.6858	682.7451	7908.9434
WLC_12-09b	30253A	24.54	0.12	12.7077	1282.1697	30428.9000	14521.0803	798.1776	8820.7750
WLC_12-09b	30254A	25.45	0.06	10.3089	1190.6331	24009.2771	14685.4814	1047.2748	8374.2796
WLC_12-09b	30255A	26.41	0.11	12.3238	1123.2295	38360.5646	13368.0230	842.8198	7214.9084
WLC_12-09b	30255A-REP	26.41	0.11	12.3530	1104.2958	37851.7470	13280.5983	851.9196	7049.6588
WLC_12-09b	30257A	27.92	0.06	15.1196	1044.0213	26942.6063	13234.4928	785.3166	7227.7536
WLC_12-09b	30259A	30.91	0.09	11.8472	698.8591	29016.4467	9292.7374	574.3578	5427.4093
WLC_12-09b	30260A	31.64	0.09	13.0163	1545.9899	33324.3472	13371.2864	812.8421	7310.5076
WLC_12-09b	30261A	32.58	0.12	11.5649	784.6032	28047.5330	11409.2890	667.5285	6670.2242
WLC_12-09b	30261A-REP	32.58	0.12	11.4097	776.4795	28554.2550	11652.2843	700.7121	5710.2268
WLC_12-09b	30262A	33.68	0.12	11.3808	785.4403	34913.5144	9974.0584	462.8407	6425.3272
WLC_12-09b	30263A	34.66	0.09	36.4220	1369.0106	31577.1714	12104.8988	793.5822	7651.2821
WLC_12-09b	30264A	35.49	0.11	14.1329	1064.1303	43630.6759	13137.6986	616.7213	6213.0510
WLC_12-09b	30265A	36.35	0.08	9.9899	790.1817	41539.9596	10013.3762	472.0118	4723.7999
WLC_12-09b	30266A	37.57	0.11	19.1372	1220.1478	32255.5529	15443.2371	925.4815	8801.9589
WLC_12-09b	30267A	38.54	0.14	8.7606	502.3194	8428.1216	8494.4833	379.7109	4748.0535
WLC_12-09b	30268A	39.97	0.08	27.1023	1601.5268	11826.8678	33121.3393	1006.7397	12610.3396
WLC_12-09b	30269A	40.89	0.05	26.0542	2081.9911	13461.1507	33815.8452	1365.1651	15274.8313
WLC_12-09b	30270A	41.45	0.03	74.9605	11934.4342	12500.6832	84379.7654	1376.8679	28997.9594
WLC_12-09b	30271A	42.89	0.09	65.0855	16904.4814	12088.0491	87411.9153	919.4276	28902.2722
WLC_12-09b	30272A	43.89	0.06	81.0442	20891.7500	14012.4364	98102.4261	880.3393	31190.3828
WLC_12-09b	30273A	46.06	0.15	61.0612	9587.8474	17904.7826	84158.7188	1131.5077	30576.7027
WLC_12-09b	30274A	44.55	0.20	60.4244	10417.0443	19495.2328	83873.9793	994.0335	30102.2168
WLC_12-09b	30275A	45.31	0.11	57.4566	15646.4431	18701.3525	85739.0085	775.6568	30879.3792
WLC_12-10b	30276A	0.53	0.11	13.4767	948.8848	22616.2571	14451.0186	693.8169	6093.1254
WLC_12-10b	30277A	1.36	0.14	9.6141	963.4125	24990.2798	6984.8974	565.8566	4807.2838
WLC_12-10b	30280A	3.60	0.12	15.4029	1313.6129	29749.2052	19459.5745	881.7675	7799.2114
WLC_12-10b	30283A	7.01	0.09	17.8369	4069.4150	22176.8165	24267.1649	1098.7718	14265.3228

ICP-MS Ca mg/kg	ICP-MS Sc mg/kg	ICP-MS Ti mg/kg	ICP-MS V mg/kg	ICP-MS Cr mg/kg	ICP-MS Mn mg/kg	ICP-MS Fe mg/kg	ICP-MS Co mg/kg	ICP-MS Ni mg/kg	ICP-MS Cu mg/kg	ICP-MS Zn mg/kg
223902.4273	3.7568	986.9823	30.0224	27.0176	439.7001	6174.9037	6.6365	16.9965	4.8703	20.7094
271468.5734	4.7606	812.5726	25.4282	22.3228	265.8956	5122.0695	4.7729	15.2044	3.8141	15.8009
282898.8478	3.3165	592.3601	19.2568	21.4962	160.4129	3559.3275	6.8666	17.3493	3.0701	19.5596
252071.6871	3.6894	770.4913	25.0885	28.1091	226.1269	4959.1585	8.5825	15.4010	4.9700	19.7446
237632.0530	4.8217	619.8355	19.4908	21.5115	177.1365	3916.3775	9.9768	14.0378	3.0666	17.3444
348270.2026	2.3035	318.8745	12.1001	12.1642	106.8880	2212.7925	8.0599	14.6333	2.3736	17.2891
259602.8845	2.8742	653.6399	19.5901	21.1943	243.8415	4262.0108	6.4291	14.6790	3.8964	18.2876
196664.3292	4.3740	1012.5647	28.1374	33.4194	318.2657	6291.3435	8.4350	15.9236	4.8755	20.4097
190455.2095	5.5354	935.8857	26.9505	32.1616	219.8537	5560.3194	5.2944	15.2417	5.1253	16.3801
228445.1420	4.9006	920.0872	28.9201	30.9276	238.2841	6290.6329	4.8499	15.6094	3.9057	18.3664
180849.2954	5.2956	1019.9294	31.5310	33.8016	338.2988	6601.4078	18.7039	14.3803	4.4572	18.9724
216385.2840	6.8549	927.8063	38.1625	28.1491	324.6167	5058.6328	7.8106	14.9874	4.5976	30.4870
208879.5678	4.2466	890.2259	29.7357	33.9924	297.4143	6553.8095	6.7428	15.5000	6.4697	20.3641
211858.0267	4.3821	891.4054	30.3649	34.1275	297.0152	6397.3051	6.8116	14.9976	6.3729	20.4748
223231.8166	6.9735	850.0364	30.3440	28.5015	225.1371	5533.8080	6.6772	15.3558	6.5815	21.9289
230516.3615	3.5511	601.9939	21.4711	22.5339	156.8863	3919.0644	7.4595	14.1418	3.4057	15.6637
236686.8517	5.3713	878.2402	24.4497	26.4076	380.4000	6069.9525	5.0399	15.4357	4.6382	22.7415
212900.7215	7.0208	814.1934	25.9138	29.4171	168.8088	4682.2659	7.6532	14.2537	4.0427	16.2237
216122.4303	4.4477	814.8335	25.9542	28.1322	174.3875	4698.3865	7.7060	14.5474	4.5638	17.3788
248985.4245	4.1326	658.9041	23.6388	24.8614	215.2675	4324.6048	9.6735	15.5429	3.4113	15.8677
190994.2072	3.5990	762.5340	24.3459	23.6900	349.7810	5516.4230	7.1300	14.4352	3.6611	15.8492
225031.4984	4.2260	829.2681	30.7123	27.2402	184.6525	6460.3307	7.6786	15.3957	4.2663	22.5048
254374.3275	4.6424	662.4100	23.7951	20.8120	205.4943	4921.7324	6.8770	15.3278	3.6044	19.2113
239161.4894	4.6030	985.5432	33.3875	31.1809	290.6283	6532.5324	7.7856	20.2741	4.7831	21.6678
350683.7527	3.5209	495.7863	18.6858	22.0239	132.5098	3679.7620	4.3028	18.8784	2.5382	13.1367
62453.8476	12.2336	1876.2558	77.5680	54.4738	323.1932	13158.6485	11.2263	19.0961	12.5733	31.4483
95984.5919	6.1263	2013.9790	76.2417	49.3349	419.9674	14567.1561	12.6011	23.9551	10.6751	35.7701
42402.8414	15.7928	3963.1916	155.5123	87.3493	316.0169	38516.7811	14.2207	36.1238	24.1702	64.3195
22952.9015	19.1725	4129.0731	188.9380	90.9913	334.3055	33501.2421	10.1597	35.0471	25.2852	64.2408
10506.4802	18.8179	4155.6762	253.3945	70.6322	190.4397	43665.8547	9.0091	41.7136	29.9032	111.0991
43364.5112	16.7452	4298.6330	216.0728	93.2817	311.1487	34435.4901	11.9635	39.4384	26.6273	74.3182
60832.8072	21.0653	4423.0687	195.2631	92.0308	337.9050	33720.5621	11.2411	37.2524	25.1520	72.4819
37668.7594	15.8089	4002.4171	266.5573	91.3944	304.0236	34845.6699	10.3099	42.6198	27.3128	89.0727
181534.5699	4.2312	1017.9985	35.5783	28.3739	121.4077	4681.3339	7.7141	11.9575	8.8892	24.2035
227428.2992	3.2590	676.7775	20.3085	19.7505	244.5023	4403.5784	5.8982	12.5755	6.4489	37.2448
150916.8955	7.3959	1307.8620	45.1686	36.2703	295.8017	8559.8790	20.3130	16.6395	16.5395	39.2411
102308.6777	14.0057	1889.0575	54.2824	35.1896	309.9355	11049.0921	9.8957	16.8056	14.2919	50.8703

ICP-MS Ga mg/kg	ICP-MS Ge mg/kg	ICP-MS As mg/kg	ICP-MS Se mg/kg	ICP-MS Rb mg/kg	ICP-MS Sr mg/kg	ICP-MS Y mg/kg	ICP-MS Zr mg/kg	ICP-MS Nb mg/kg	ICP-MS Mo mg/kg	ICP-MS Ag mg/kg
2.8604	0.5751	2.9973	0.0013	21.4188	182.7764	9.5946	51.3404	3.8220	1.1056	0.0907
2.3750	0.3410	3.2189	0.5620	18.3368	223.8521	8.8270	44.3682	2.8881	0.8223	0.0395
1.7241	0.3129	3.4775	0.7123	12.8744	238.4000	7.7109	39.5422	2.1920	1.4784	0.0264
2.4598	0.4711	2.1583	0.4411	17.1135	178.5261	8.2770	51.9423	2.9009	1.0118	0.1044
1.9325	0.3660	1.7899	0.2738	13.5570	193.8351	7.3531	33.0007	2.5109	0.8727	0.0596
1.1342	0.2504	1.6213	0.3992	7.9053	145.2730	4.3758	15.6227	1.3660	0.5822	0.0041
1.9126	0.3639	1.6552	0.0013	14.4669	162.0070	7.6402	40.3044	2.6765	0.7362	0.0446
2.9195	0.5637	1.6074	0.1940	21.6854	160.2767	9.4058	53.0129	3.8566	1.8193	0.0469
2.5844	0.5753	2.5613	0.0013	20.6175	142.4294	9.2467	64.3458	3.2509	0.8026	0.0523
2.6421	0.4411	2.5020	0.8875	20.0596	185.0556	8.5130	43.9921	3.8825	1.4038	0.0952
2.7779	0.6254	2.9531	1.0326	22.0406	181.7821	10.1454	62.6298	4.0818	1.3490	0.0651
2.6439	0.5309	3.4875	0.1668	20.0449	196.4886	11.2499	57.0425	3.6950	0.8886	0.0238
2.7115	0.5076	2.7579	0.0013	20.3465	180.4107	9.7878	48.4420	3.6080	1.6376	0.1246
2.6418	0.4571	2.2902	0.0013	20.6569	183.2072	9.3767	48.2234	3.5013	1.5240	0.2561
2.6147	0.4095	2.7240	1.6427	20.8609	196.5382	8.7387	44.0193	3.6274	1.0856	0.0152
1.6722	0.2827	2.7777	0.6862	14.2691	197.4885	6.9082	31.6133	2.3425	1.1589	0.0810
2.3299	0.4423	2.8579	0.0013	20.2264	221.5735	9.3875	49.1123	3.5441	1.5048	0.0823
2.4162	0.5091	2.4119	0.0013	18.2302	169.5199	7.8828	44.3381	3.3082	1.1049	0.1368
2.4767	0.5148	2.4566	0.1579	18.2479	172.9834	8.1566	48.3420	3.1424	1.0523	0.1513
1.9543	0.3669	2.5856	0.6780	16.2476	232.6533	7.0628	44.1854	2.5034	1.2533	0.0729
2.3357	0.4375	2.2253	0.1305	17.5647	174.5507	8.9825	36.4098	2.9993	0.9030	0.0477
2.5532	0.3515	2.8002	1.2832	18.6223	147.1427	7.7576	36.1408	4.3942	1.4018	0.1305
2.0294	0.3842	1.6462	1.0123	15.2570	166.7840	6.7941	43.1931	2.8755	0.7268	0.0563
3.0720	0.4524	2.7019	0.2906	23.7941	177.4368	10.6356	55.1934	3.8195	1.0429	0.0929
1.7000	0.2045	2.6349	1.0118	12.9998	322.2363	4.9173	26.6980	2.2521	1.2769	0.0619
7.5010	1.6196	4.0056	1.6447	44.3340	109.9150	15.1498	78.0065	9.5225	0.8328	0.2548
6.8461	1.7652	7.2916	0.5685	48.8567	164.5250	17.8416	91.6782	9.3145	1.2890	0.1835
17.1144	0.0001	9.2432	0.0013	121.0893	253.6255	27.4983	137.0508	16.9986	0.8557	0.6986
16.3235	0.0001	8.3037	0.0013	120.2740	261.3750	21.9675	131.2866	16.0702	0.7032	0.6577
21.0132	0.0001	10.2677	0.8964	118.1199	244.8510	25.4665	169.1721	15.5568	2.3603	0.9905
19.1805	0.0001	2.9318	1.6311	135.2343	292.3790	29.9364	132.6684	20.0503	2.6779	0.7947
17.7318	0.0001	6.2084	1.0377	136.2586	324.2098	30.7814	135.3360	20.5496	2.0438	0.6895
19.1513	0.0001	7.8275	0.8479	124.4867	283.3646	23.8676	124.9859	16.2979	3.9905	0.9183
2.4699	0.4977	2.2473	0.6802	18.8643	153.5433	10.8651	56.1278	3.8790	1.0576	0.0181
1.3180	0.3338	1.9275	0.5836	11.7012	102.5995	6.1396	32.5118	2.5466	0.6285	0.0273
ud	0.6113	3.2865	0.6005	26.9365	147.7184	11.4957	66.4305	5.5252	1.2565	0.0282
3.3728	0.8302	4.5210	1.7262	34.9351	126.7831	14.7427	97.7622	7.4469	1.4311	0.0193

ICP-MS Ga mg/kg	ICP-MS Ge mg/kg	ICP-MS As mg/kg	ICP-MS Se mg/kg	ICP-MS Rb mg/kg	ICP-MS Sr mg/kg	ICP-MS Y mg/kg	ICP-MS Zr mg/kg	ICP-MS Nb mg/kg	ICP-MS Mo mg/kg	ICP-MS Ag mg/kg
2.8604	0.5751	2.9973	0.0013	21.4188	182.7764	9.5946	51.3404	3.8220	1.1056	0.0907
2.3750	0.3410	3.2189	0.5620	18.3368	223.8521	8.8270	44.3682	2.8881	0.8223	0.0395
1.7241	0.3129	3.4775	0.7123	12.8744	238.4000	7.7109	39.5422	2.1920	1.4784	0.0264
2.4598	0.4711	2.1583	0.4411	17.1135	178.5261	8.2770	51.9423	2.9009	1.0118	0.1044
1.9325	0.3660	1.7899	0.2738	13.5570	193.8351	7.3531	33.0007	2.5109	0.8727	0.0596
1.1342	0.2504	1.6213	0.3992	7.9053	145.2730	4.3758	15.6227	1.3660	0.5822	0.0041
1.9126	0.3639	1.6552	0.0013	14.4669	162.0070	7.6402	40.3044	2.6765	0.7362	0.0446
2.9195	0.5637	1.6074	0.1940	21.6854	160.2767	9.4058	53.0129	3.8566	1.8193	0.0469
2.5844	0.5753	2.5613	0.0013	20.6175	142.4294	9.2467	64.3458	3.2509	0.8026	0.0523
2.6421	0.4411	2.5020	0.8875	20.0596	185.0556	8.5130	43.9921	3.8825	1.4038	0.0952
2.7779	0.6254	2.9531	1.0326	22.0406	181.7821	10.1454	62.6298	4.0818	1.3490	0.0651
2.6439	0.5309	3.4875	0.1668	20.0449	196.4886	11.2499	57.0425	3.6950	0.8886	0.0238
2.7115	0.5076	2.7579	0.0013	20.3465	180.4107	9.7878	48.4420	3.6080	1.6376	0.1246
2.6418	0.4571	2.2902	0.0013	20.6569	183.2072	9.3767	48.2234	3.5013	1.5240	0.2561
2.6147	0.4095	2.7240	1.6427	20.8609	196.5382	8.7387	44.0193	3.6274	1.0856	0.0152
1.6722	0.2827	2.7777	0.6862	14.2691	197.4885	6.9082	31.6133	2.3425	1.1589	0.0810
2.3299	0.4423	2.8579	0.0013	20.2264	221.5735	9.3875	49.1123	3.5441	1.5048	0.0823
2.4162	0.5091	2.4119	0.0013	18.2302	169.5199	7.8828	44.3381	3.3082	1.1049	0.1368
2.4767	0.5148	2.4566	0.1579	18.2479	172.9834	8.1566	48.3420	3.1424	1.0523	0.1513
1.9543	0.3669	2.5856	0.6780	16.2476	232.6533	7.0628	44.1854	2.5034	1.2533	0.0729
2.3357	0.4375	2.2253	0.1305	17.5647	174.5507	8.9825	36.4098	2.9993	0.9030	0.0477
2.5532	0.3515	2.8002	1.2832	18.6223	147.1427	7.7576	36.1408	4.3942	1.4018	0.1305
2.0294	0.3842	1.6462	1.0123	15.2570	166.7840	6.7941	43.1931	2.8755	0.7268	0.0563
3.0720	0.4524	2.7019	0.2906	23.7941	177.4368	10.6356	55.1934	3.8195	1.0429	0.0929
1.7000	0.2045	2.6349	1.0118	12.9998	322.2363	4.9173	26.6980	2.2521	1.2769	0.0619
7.5010	1.6196	4.0056	1.6447	44.3340	109.9150	15.1498	78.0065	9.5225	0.8328	0.2548
6.8461	1.7652	7.2916	0.5685	48.8567	164.5250	17.8416	91.6782	9.3145	1.2890	0.1835
17.1144	0.0001	9.2432	0.0013	121.0893	253.6255	27.4983	137.0508	16.9986	0.8557	0.6986
16.3235	0.0001	8.3037	0.0013	120.2740	261.3750	21.9675	131.2866	16.0702	0.7032	0.6577
21.0132	0.0001	10.2677	0.8964	118.1199	244.8510	25.4665	169.1721	15.5568	2.3603	0.9905
19.1805	0.0001	2.9318	1.6311	135.2343	292.3790	29.9364	132.6684	20.0503	2.6779	0.7947
17.7318	0.0001	6.2084	1.0377	136.2586	324.2098	30.7814	135.3360	20.5496	2.0438	0.6895
19.1513	0.0001	7.8275	0.8479	124.4867	283.3646	23.8676	124.9859	16.2979	3.9905	0.9183
2.4699	0.4977	2.2473	0.6802	18.8643	153.5433	10.8651	56.1278	3.8790	1.0576	0.0181
1.3180	0.3338	1.9275	0.5836	11.7012	102.5995	6.1396	32.5118	2.5466	0.6285	0.0273
ud	0.6113	3.2865	0.6005	26.9365	147.7184	11.4957	66.4305	5.5252	1.2565	0.0282
3.3728	0.8302	4.5210	1.7262	34.9351	126.7831	14.7427	97.7622	7.4469	1.4311	0.0193

ICP-MS Cd mg/kg	ICP-MS Sn mg/kg	ICP-MS Sb mg/kg	ICP-MS Cs mg/kg	ICP-MS Ba mg/kg	ICP-MS La mg/kg	ICP-MS Ce mg/kg	ICP-MS Pr mg/kg	ICP-MS Nd mg/kg	ICP-MS Sm mg/kg	ICP-MS Eu mg/kg
0.4965	2.3600	0.3422	1.0558	129.3113	9.5192	16.9565	2.2455	8.7723	1.8488	0.3869
0.3776	0.7698	0.2789	0.9032	83.2224	8.2277	14.4810	2.0197	8.1410	1.6273	0.3280
0.5249	1.0832	0.2988	0.6439	58.4741	6.8101	10.5177	1.5090	6.1069	1.1831	0.2563
0.6136	3.3983	0.4341	0.8886	86.2876	8.2445	14.0774	1.9345	7.4077	1.3219	0.3012
0.5457	1.0876	0.2575	0.6914	65.7038	7.0091	11.1580	1.5702	6.3015	1.2005	0.2259
0.3380	1.2877	0.2174	0.4709	39.1306	3.5127	5.4750	0.8072	3.4134	0.5792	0.1422
0.8613	1.1728	0.2333	0.7340	67.0527	7.0331	11.4924	1.6185	6.6383	1.2303	0.2391
0.5508	1.9133	0.3279	1.0622	103.7148	9.7594	16.2460	2.1973	8.3632	1.7596	0.3652
0.5414	0.9183	0.3186	1.0296	108.6015	9.9196	16.4338	2.2042	8.5743	1.5780	0.3336
0.4093	0.7249	0.3651	1.0748	113.7926	9.3170	15.4678	2.1880	7.9979	1.6995	0.3247
0.5727	1.4545	0.2550	1.0687	111.5553	10.1409	17.2979	2.3913	9.1063	1.6054	0.3968
0.5465	1.7942	0.3214	0.9323	129.4708	10.3819	17.8237	2.5705	9.7945	2.0006	0.4096
0.4674	0.9672	0.4346	1.0148	117.8034	9.3648	15.3274	2.2023	8.6319	1.5890	0.3584
0.5771	1.0122	0.4450	1.0971	119.7073	9.5860	15.0715	2.2005	8.2574	1.7787	0.3600
0.5146	1.4490	0.4269	1.1227	99.8057	8.4508	14.3391	2.0299	7.6140	1.5189	0.2945
0.3827	33.0167	0.5709	0.7773	89.0219	6.5609	10.1711	1.5160	5.9099	1.1715	0.2265
0.5596	1.0489	0.3749	1.0931	94.4751	8.9299	16.0292	2.1743	8.4965	1.7300	0.3461
0.4349	3.2459	0.2860	0.9921	90.2411	7.9670	13.2670	1.8674	6.8590	1.2455	0.2899
0.4621	0.9349	0.2832	1.0317	90.2731	8.0758	13.4458	1.8749	6.6820	1.2126	0.2711
0.3845	1.1283	0.3162	0.7666	92.6841	7.1176	11.0856	1.6261	5.9693	1.1888	0.2536
0.6499	0.5705	0.2661	0.9336	116.7115	8.5234	13.8018	2.0498	7.5977	1.5558	0.3102
0.3989	1.5745	0.3788	1.1079	101.9064	9.0201	15.9738	2.0504	7.4267	1.4780	0.3118
0.5347	0.8871	0.2159	0.8873	72.6984	6.7910	11.8114	1.5408	6.1041	1.1162	0.2450
0.5130	1.4739	0.3140	1.4175	109.2171	9.6205	16.4616	2.2559	8.6757	1.7565	0.3643
0.5573	4.2363	0.2258	0.8079	50.5362	5.5054	10.1511	1.2997	4.7762	0.9474	0.1847
0.2341	1.6968	0.8998	2.9563	501.8618	19.2130	36.4725	4.5958	17.4229	3.4721	0.7185
0.3149	1.8114	0.7901	3.3126	531.2223	20.7288	38.5145	5.0310	18.5971	3.6346	0.8228
0.6164	3.2002	1.3233	7.5920	1054.7647	35.4538	67.1681	9.5113	36.6800	7.4204	1.5214
0.8184	7.2502	1.0215	7.4563	1784.9985	29.9962	53.7863	7.1009	26.7763	5.1595	1.1301
2.7377	3.4466	1.6497	7.0341	1040.2638	29.4326	56.3316	7.4610	28.1218	5.4233	1.0542
1.4214	2.8770	1.6061	8.4463	773.2173	33.8920	61.9341	8.2687	30.8113	6.1564	1.4786
1.0959	3.7777	1.5056	8.6685	763.4712	33.7398	61.3335	7.9048	29.7780	6.1660	1.4663
3.0097	3.7623	1.9339	7.9114	730.0321	27.7908	53.3109	7.2803	26.9139	5.4887	1.1202
0.3830	0.4494	0.3239	0.9085	119.2596	10.9959	17.9074	2.5957	10.0134	1.9506	0.4470
0.4522	0.4100	0.1856	0.4218	85.4793	7.4128	11.7874	1.7157	6.6191	1.2365	0.2702
0.5854	0.6708	0.6592	1.2629	1411.5760	12.4011	21.7329	3.0043	11.6432	2.1336	0.5817
0.7568	0.7142	0.5797	1.5221	303.4607	14.3962	26.4120	3.6052	14.0818	2.7997	0.6358

ICP-MS Gd mg/kg	ICP-MS Tb mg/kg	ICP-MS Dy mg/kg	ICP-MS Ho mg/kg	ICP-MS Er mg/kg	ICP-MS Tm mg/kg	ICP-MS Yb mg/kg	ICP-MS Lu mg/kg	ICP-MS Hf mg/kg	ICP-MS Ta mg/kg	ICP-MS Hg mg/kg
1.7116	0.2560	1.4417	0.2638	0.7827	0.1172	0.8752	0.1102	1.4446	0.2703	59.7791
1.5826	0.2353	1.3174	0.2636	0.8087	0.1160	0.6178	0.1049	1.4227	0.2023	38.7979
1.1277	0.1739	1.0105	0.2167	0.6255	0.0967	0.6643	0.0915	1.0804	0.1929	79.5973
1.4240	0.2168	1.2432	0.2568	0.6643	0.1204	0.6051	0.0713	1.5402	0.2708	126.3010
1.0764	0.1702	1.0131	0.1983	0.5755	0.0934	0.5757	0.0895	0.9172	0.2248	142.4830
0.5313	0.0887	0.5572	0.1142	0.3262	0.0458	0.2845	0.0224	0.6818	0.1276	97.8034
1.2899	0.1899	1.0525	0.2368	0.5704	0.0820	0.5524	0.0427	1.1147	0.1835	74.7541
1.5867	0.2381	1.3452	0.2799	0.8096	0.1166	0.8734	0.1080	1.6037	0.3126	103.5067
1.6683	0.2380	1.2790	0.2879	0.8003	0.1219	0.8180	0.1257	1.8379	0.2110	47.0497
1.5227	0.2224	1.2238	0.2575	0.7006	0.1105	0.7234	0.0839	1.2447	0.2313	48.6993
1.8291	0.2736	1.5412	0.3162	0.8656	0.1381	0.8714	0.1140	1.7593	0.3100	100.3373
2.0114	0.3015	1.7014	0.3423	0.9640	0.1494	0.9855	0.1176	1.7097	0.2578	66.5407
1.5966	0.2361	1.3145	0.2909	0.8489	0.1149	0.8759	0.1197	1.4424	0.2137	53.0903
1.5951	0.2502	1.4782	0.2781	0.8243	0.1102	0.8182	0.1183	1.5278	0.2398	53.4660
1.5400	0.2268	1.2578	0.2581	0.8322	0.0958	0.5875	0.0981	1.2635	0.2646	83.5990
1.2274	0.1806	1.0009	0.2014	0.5461	0.0808	0.4983	0.0801	0.8946	0.1976	65.3170
1.6814	0.2551	1.4577	0.2572	0.7714	0.1155	0.6566	0.1042	1.4880	0.2101	41.6987
1.3286	0.1960	1.0890	0.2472	0.7148	0.1056	0.7167	0.1050	1.2713	0.2727	99.3891
1.3930	0.2016	1.0988	0.2474	0.6449	0.1025	0.7033	0.0913	1.3668	0.2544	93.7706
1.1526	0.1704	0.9490	0.1852	0.6237	0.0803	0.5663	0.0626	1.2414	0.2064	79.5671
1.5527	0.2310	1.2937	0.2825	0.7907	0.1082	0.7138	0.0803	1.1419	0.2430	69.9058
1.3577	0.2125	1.2523	0.2524	0.6978	0.1056	0.8151	0.0701	1.0037	0.2659	59.4673
1.1576	0.1757	1.0042	0.1966	0.6113	0.0897	0.5381	0.0614	1.2357	0.1692	32.6486
1.6589	0.2515	1.4364	0.2981	0.9501	0.1384	0.8690	0.1266	1.5947	0.2609	45.5795
0.9168	0.1426	0.8356	0.1476	0.4065	0.0615	0.4079	0.0689	0.7528	0.1467	17.9321
3.0490	0.4734	2.7681	0.5144	1.5200	0.1988	1.4644	0.1955	2.2970	0.6364	124.6526
3.8120	0.5542	3.0344	0.6033	1.7670	0.2427	1.6107	0.2440	2.4720	0.6136	108.2199
6.7141	0.9550	5.1159	0.9673	2.9682	0.3997	2.5247	0.3820	4.0236	0.9782	21.1951
4.6722	0.6890	3.8259	0.7994	2.3531	0.3606	2.0225	0.3166	4.1146	1.0589	28.0728
4.9350	0.7761	4.5961	0.9646	3.1548	0.4474	3.0473	0.4012	4.9533	0.8480	17.6996
6.1299	0.9132	5.1229	0.9536	2.8785	0.4329	2.6981	0.4084	3.7960	1.0914	13.4460
5.9229	0.8897	5.0328	1.0314	2.9300	0.4263	2.6156	0.3590	3.8047	1.0553	6.4810
4.9924	0.7549	4.2992	0.8403	2.6174	0.4108	2.3806	0.3814	4.1240	1.0576	12.7313
1.9934	0.2935	1.6278	0.3332	0.9641	0.1275	0.8940	0.1510	1.5940	0.3232	132.3538
1.2928	0.1908	1.0609	0.2046	0.6200	0.0784	0.5315	0.0901	1.2405	0.2260	97.2251
2.3043	0.3467	1.9646	0.3862	1.0999	0.1553	1.0716	0.1812	1.8191	0.4399	168.1633
2.7049	0.4113	2.3548	0.4984	1.4062	0.2149	1.4313	0.2189	2.9017	0.5597	123.0533

ICP-MS Tl mg/kg	ICP-MS Pb mg/kg	ICP-MS Th mg/kg	ICP-MS U mg/kg
0.2523	3.6331	1.2889	1.9306
0.2014	2.5627	1.0615	2.1112
0.1247	2.2346	0.8280	3.1547
0.1631	4.0251	1.1026	1.7085
0.1164	2.0471	0.7996	1.5186
0.0765	1.6315	0.5153	0.8422
0.1415	2.4103	0.8860	1.5242
0.1816	3.3674	1.3034	2.0502
0.1631	2.5349	1.2900	1.7819
0.1748	2.5492	1.2703	1.9480
0.2152	3.0170	1.4083	1.9624
0.2112	3.4444	1.3360	2.1130
0.1691	2.7892	1.2399	2.0483
0.2193	2.8736	1.3187	2.0216
0.2128	2.8672	1.1606	1.8222
0.1242	2.5322	0.8152	1.7656
0.2009	3.9195	1.5200	1.7224
0.1457	2.3464	1.0612	1.5447
0.1518	2.3172	1.0777	1.6120
0.1490	2.4167	0.9245	2.2533
0.1529	2.6118	1.1279	2.0007
0.1971	3.6025	1.1012	1.8232
0.1207	2.3435	0.8696	1.7394
0.1946	3.3933	1.2684	1.9618
0.1091	2.3563	0.6912	1.5036
0.4861	6.3695	2.4910	1.9794
0.4908	6.6575	2.9491	2.5523
0.9047	16.3066	6.3750	3.1099
0.9544	11.6268	6.2258	3.1358
1.6295	14.3645	6.7323	5.1044
1.1256	15.1743	6.1184	3.1297
1.1021	17.2236	6.1104	2.8411
1.2436	14.8471	6.5509	3.8448
0.1532	3.6922	2.4377	2.3938
0.1138	2.4191	0.3882	1.3910
0.2024	5.0671	3.1144	2.1798
0.3586	6.8937	4.2944	2.5124

HoleID	Sample Number	Depth (mgbs)	Depth Error (m)	ICP-MS Li mg/kg	ICP-MS Na mg/kg	ICP-MS Mg mg/kg	ICP-MS Al mg/kg	ICP-MS P mg/kg	ICP-MS K mg/kg
WLC_12-10b	30286A	10.49	0.12	21.6042	2548.5541	17851.5247	21300.6590	1232.4376	10860.3564
WLC_12-10b	30289A	13.46	0.11	18.0144	2123.8428	16141.1963	9243.4213	1081.4340	8818.5113
WLC_12-10b	30292A	16.31	0.15	17.7298	2196.0963	19425.3086	18913.3354	1239.7425	8558.0171
WLC_12-10b	30295A	18.99	0.09	26.8776	2923.5498	23488.0469	36062.5702	1037.1337	16661.2608
WLC_12-10b	30298A	21.75	0.05	16.6560	923.8782	25353.2305	16238.0218	746.2467	7363.7323
WLC_12-10b	30298A-R	21.75	0.05	16.5994	982.3143	25241.6200	16293.7951	736.9958	7685.7973
WLC_12-10b	30301A	25.54	0.09	9.7962	1064.4611	26501.0093	9469.5906	632.8583	5418.8450
WLC_12-10b	30304A	28.82	0.08	17.2152	731.4323	14798.3137	23617.1650	1351.4473	7796.5546
WLC_12-10b	30304A	28.82	0.08	18.6083	759.4666	15519.7944	24553.5500	1352.6667	8421.0933
WLC_12-10b	30307A	31.88	0.09	13.4259	2487.7005	20968.6981	18992.6386	871.8601	12359.8503
WLC_12-10b	30310A	34.76	0.11	28.9803	733.4819	28049.3290	16685.6183	695.5055	10743.2802
WLC_12-10b	30313A	37.78	0.14	11.3000	615.7220	27323.0006	6358.0153	444.1061	4293.3384
WLC_12-10b	30316A	40.93	0.09	13.2797	450.6987	48801.8068	7861.7438	346.3615	5532.7716
WLC_12-10b	30319A	44.04	0.09	8.4888	939.2486	33639.0197	7843.0743	460.9708	4847.7815
WLC_12-10b	30322A	46.97	0.09	10.6171	2251.8600	28958.6031	15781.3840	1096.1129	10463.9562
WLC_12-10b	30325A	52.90	0.17	105.3089	3792.6044	8526.8896	83462.1996	973.0742	36472.3662
WLC_12-11N	30172A	2.42	0.08	16.8090	2336.9970	26343.6653	20608.5362	930.2826	11440.3443
WLC_12-11N	30173A	3.35	0.06	17.5380	2731.6045	25491.6492	18720.2968	1226.8387	11544.8006
WLC_12-11N	30174A	4.27	0.17	16.5071	1015.8974	22793.8257	21440.4874	956.6473	10043.4091
WLC_12-11N	30175A	5.15	0.12	34.6038	2230.3143	16665.3495	47213.1625	1270.3663	19679.2772
WLC_12-11N	30176A	5.84	0.14	18.4552	985.0863	38055.8832	24996.8503	992.3804	11587.5450
WLC_12-11N	30177A	6.66	0.17	16.2303	729.1860	17118.7428	24683.9128	935.2275	8711.0920
WLC_12-11N	30178A	8.23	0.09	20.2873	1721.9145	21884.5776	27888.3975	829.5436	12535.2265
WLC_12-11N	30179A	9.46	0.08	17.6341	830.1380	31586.9776	22099.6593	1034.0176	9750.3285
WLC_12-11N	30180A	10.35	0.14	15.8799	601.3732	35166.1509	21108.6883	816.7823	10558.7860
WLC_12-11N	30181A	10.96	0.14	14.1468	519.7305	22815.8035	8346.9672	738.3781	7656.3270
WLC_12-11N	30182A	12.37	0.09	10.6683	466.1201	45987.9451	12215.2642	1385.6165	6879.2923
WLC_12-11N	30183A	13.41	0.12	18.0688	1223.2352	18588.1358	31949.0461	874.2597	13797.6620
WLC_12-11N	30184A	13.98	0.11	20.3329	1335.1887	20900.5935	34277.9405	1155.8883	15942.6318
WLC_12-11N	30184A - Rep	13.98	0.11	20.8016	1321.2953	21462.0435	35444.5524	1171.4445	15816.5797
WLC_12-11N	30185A	14.71	0.11	23.7839	1336.0193	23865.9985	39173.8987	1138.9181	15904.0210
WLC_12-11N	30186A	15.97	0.09	21.0159	787.1826	23020.9879	34057.2033	993.6614	14116.6922
WLC_12-11N	30187A	17.25	0.15	22.0796	931.1704	11471.7878	36606.1300	1151.8416	14730.7889
WLC_12-11N	30188A	18.36	0.08	16.4167	984.7372	23812.9897	23734.1628	908.1638	10558.3048
WLC_12-11N	30189A	19.45	0.09	27.3589	1450.9020	23276.1174	39496.7845	1532.7689	17749.5121
WLC_12-11N	30190A	19.96	0.15	18.1341	785.8629	31209.6439	31172.3280	1191.0963	12186.2925
WLC_12-11N	30191A	22.17	0.08	16.9821	964.0235	42532.6964	19540.6717	742.6203	9328.2448

ICP-MS Ca mg/kg	ICP-MS Sc mg/kg	ICP-MS Ti mg/kg	ICP-MS V mg/kg	ICP-MS Cr mg/kg	ICP-MS Mn mg/kg	ICP-MS Fe mg/kg	ICP-MS Co mg/kg	ICP-MS Ni mg/kg	ICP-MS Cu mg/kg	ICP-MS Zn mg/kg
143837.7523	4.7822	1290.6386	49.0364	34.4137	302.3267	9687.4428	11.6085	15.8478	13.2804	41.9282
143547.8841	3.9767	1208.5632	47.3349	31.4660	286.1047	9440.2493	17.9337	16.2013	13.2203	42.0599
141533.1398	4.5979	1123.5585	44.3356	29.5862	265.5137	9070.6884	22.7332	16.6291	10.3270	41.7758
107531.7490	7.0883	2392.1468	76.6470	50.1909	351.1571	14995.2184	20.7593	22.6895	19.9563	54.1015
201997.0551	3.9867	1055.7812	41.5505	32.8009	193.1823	6890.9788	16.4643	17.9929	12.1236	33.8069
200921.7571	4.0149	1051.5409	41.5115	32.1571	192.5551	6885.2177	16.2528	18.6079	12.3511	33.6337
236584.3789	2.9197	654.2457	20.7190	20.8591	279.4775	4292.5420	4.7998	14.0455	6.9035	21.4822
133093.0469	4.9231	1630.2838	57.5115	45.1951	165.0243	8755.1630	16.7374	16.0133	8.7266	44.2522
138006.0060	4.9819	1729.1396	59.5152	44.9505	177.1146	9309.4531	17.4389	17.0618	17.2305	49.4874
193310.3110	7.2857	1456.2065	31.6018	32.2771	553.1148	8020.2252	21.5478	13.3494	10.1590	24.0972
184575.0774	5.0891	1146.9822	36.6182	57.9877	201.1398	8128.2850	19.6992	23.3333	20.7087	26.2782
271378.9993	1.9617	617.2020	22.3109	18.8998	123.1154	4087.0083	5.5877	14.0616	6.1140	21.8262
213678.8252	2.8020	735.4264	18.5399	22.8063	105.7528	3555.1455	7.0810	16.7190	7.7732	16.7745
237132.6949	2.5683	569.3456	16.3404	17.0215	224.5990	3218.7913	10.4610	12.2622	7.0041	18.3929
209674.5629	3.6025	1254.9442	24.8959	27.4928	540.1585	5768.5750	13.5632	13.0285	10.0016	22.6304
3875.5685	15.3159	5785.0672	182.4619	104.3914	219.2340	40161.4232	17.1219	33.3322	35.7451	108.3127
164031.7519	7.5436	1540.2719	48.7934	34.5560	355.9556	12769.6880	14.3871	20.4345	7.4544	42.5664
132841.2560	5.9883	1779.1398	51.6405	29.5536	310.9589	9813.9641	12.8231	19.2238	7.5812	40.5427
187238.8908	6.4405	1344.1346	63.9426	33.6662	256.8077	11327.7880	13.8361	22.1432	7.6354	45.8932
92611.6030	8.9441	2880.5679	144.4804	65.8668	239.1350	22343.7201	18.9472	31.2926	16.6807	100.4690
146540.9830	7.0789	1535.0372	73.5909	38.6724	362.7159	9653.4108	13.7950	24.3770	9.4106	50.0948
139665.9592	6.4084	1531.5273	65.6181	39.6344	366.1921	10020.6803	18.2550	23.4483	7.9076	52.8910
170154.0057	5.8687	1445.9260	77.0842	43.3168	364.0018	14177.9988	11.1550	25.6056	8.7865	57.1374
159021.4051	5.0789	1246.1111	64.0778	35.5611	186.2511	10372.4842	9.1722	20.9709	7.6849	51.8860
153023.4779	5.4494	1283.5212	67.0515	36.0624	191.9437	12823.0872	18.5591	22.3681	8.0570	51.6895
199621.7797	2.7952	932.9659	48.2712	28.4223	187.7726	7756.0505	15.6150	20.9044	5.4696	37.9140
140006.4092	12.2592	860.4156	40.2809	36.4313	660.9234	8757.6459	12.2012	19.3556	5.3051	32.3041
128202.0157	7.7681	1890.5477	81.1686	42.9307	279.1165	13640.8615	8.9110	21.4161	9.6659	54.1846
125938.3030	10.4934	1859.5644	97.1081	50.9958	392.6820	18806.6200	14.1383	26.9144	10.8708	66.1606
126239.4711	10.6158	1882.1800	97.2233	50.8756	397.8606	18795.2662	14.6145	27.3238	11.2382	66.5382
123443.1034	9.7577	2080.2433	104.6264	51.5609	252.2083	18300.8279	12.4795	28.1636	12.7330	71.8829
131421.4504	7.3539	1882.6224	90.3814	51.3945	320.0616	19260.0874	12.8679	27.7897	10.8069	71.3659
117949.8181	6.0448	2104.6245	86.8732	56.6201	196.3318	16489.0495	16.1667	26.0494	11.5179	78.9137
156476.7394	7.6318	1263.9481	63.9270	36.9080	284.4833	11050.6130	12.5442	23.2717	7.7064	49.4953
86762.9072	9.4420	2208.2855	107.8138	71.4447	408.1769	19567.5993	15.5850	30.6117	14.6500	74.7972
93365.6962	5.2831	1696.2889	83.2709	49.2384	281.9453	18416.7329	18.6889	23.1748	9.5789	59.7807
206786.0041	4.6611	1152.5943	57.8789	27.8798	142.3486	8375.1273	12.6346	27.7151	7.2360	37.7688

ICP-MS Ga mg/kg	ICP-MS Ge mg/kg	ICP-MS As mg/kg	ICP-MS Se mg/kg	ICP-MS Rb mg/kg	ICP-MS Sr mg/kg	ICP-MS Y mg/kg	ICP-MS Zr mg/kg	ICP-MS Nb mg/kg	ICP-MS Mo mg/kg	ICP-MS Ag mg/kg
2.5622	0.6984	3.9929	0.3352	28.9958	175.5704	13.0284	62.6472	4.8755	1.7729	0.0504
2.7219	0.7248	3.9141	0.4108	19.5271	172.3077	10.7104	47.5896	4.5964	1.6177	0.0901
2.3343	0.6666	3.3539	0.2171	25.4873	172.1859	12.7625	52.4157	4.3117	1.6706	0.0361
6.3621	0.9412	2.6610	1.1025	50.5418	133.7078	15.3369	77.1892	9.7017	1.5855	0.0339
2.9021	0.5135	3.6248	0.4491	24.2561	177.2159	9.2176	39.4237	4.2198	1.8941	0.0490
3.1224	0.4952	3.4607	0.0013	24.5810	180.4837	9.1711	39.3510	4.2000	1.9254	0.2294
1.4492	0.3530	1.9530	0.2465	13.1707	221.5495	6.8356	34.6676	2.5596	1.3630	0.0003
4.2008	0.6665	2.9344	0.6654	27.7169	121.8791	13.3646	58.4468	7.2008	1.1954	0.0185
4.5662	0.7677	2.9905	0.2415	28.9897	127.2742	13.3809	58.7361	7.5783	1.1944	0.0003
2.9708	0.7434	2.5195	0.6260	25.4034	127.3260	10.3413	71.6212	5.0481	1.1931	0.0003
2.7372	0.5619	8.6388	1.1777	26.9575	172.8088	10.7465	51.4842	3.9278	10.5516	0.1069
1.5752	0.3321	1.5637	0.5448	12.3841	163.8870	4.9574	18.4039	2.4431	0.7947	0.0242
1.2822	0.3104	2.1529	0.9610	13.6448	176.3504	5.8615	34.2433	2.4067	1.9427	0.3016
1.1187	0.2169	1.4270	0.8615	11.5233	230.5705	6.0774	25.8193	2.3132	0.8720	0.0752
2.5579	0.3433	2.0301	0.8476	20.9081	155.5004	11.4742	64.4495	4.6969	1.3973	0.0936
21.1199	2.3364	8.6481	0.5275	118.9723	109.5727	24.8972	157.0099	45.5770	1.4122	0.0020
3.9633	0.7037	3.5801	0.3615	29.8622	163.4902	13.1811	77.5938	6.0447	1.4999	0.0850
3.3306	0.8678	4.2480	0.6031	28.4548	141.8932	15.1524	96.0284	7.2359	1.4110	0.0590
4.0203	0.7082	4.4036	0.0013	30.7960	189.6325	13.5018	54.1449	5.6410	1.1098	0.1832
9.2851	1.2985	6.4396	0.0013	69.6245	168.5868	20.9109	98.3489	14.4077	2.1404	0.2944
5.3799	0.6814	2.8262	0.1018	38.5615	139.2345	13.4701	58.7502	6.2531	1.1921	0.2035
4.5049	0.8279	3.1466	0.0013	33.1936	184.6237	13.2832	55.7126	6.4594	1.4593	0.1832
5.6314	0.7507	4.4497	0.5265	40.9081	234.5862	13.7144	61.2220	6.1910	2.0567	0.2082
3.9537	0.6205	2.8913	0.0013	31.8247	182.4635	13.7034	58.0793	4.9122	1.2881	0.1678
3.8844	0.6705	3.3226	0.3288	33.8563	142.0396	13.2307	61.6673	4.9763	1.6216	0.2116
3.1446	0.4931	2.4993	0.8475	24.6652	195.0668	10.8232	36.3577	3.7555	0.9158	0.1625
2.2400	0.6144	3.3356	0.1610	19.1155	110.9428	11.8185	46.6208	3.2579	2.2477	0.1391
6.3046	0.9060	3.7799	0.0013	41.4709	172.6182	15.5992	77.8971	7.1798	2.1388	0.2101
5.3953	0.9481	5.3161	0.0044	48.7514	164.1286	17.9716	78.4556	7.6455	1.9131	0.2139
5.5103	0.9687	4.9849	0.0051	49.7572	165.1781	18.2498	79.1833	7.6889	1.9021	0.5463
7.3197	1.1094	5.1242	0.0432	54.4437	197.4473	17.9876	83.5042	8.4292	1.9234	0.2263
5.7847	0.9243	4.1379	0.4738	47.9805	216.4882	17.5603	87.5801	7.2362	1.5819	0.2165
6.3486	1.0656	4.4911	0.0013	45.8019	172.1343	18.5840	128.2941	8.4071	1.6762	0.2035
3.8870	0.6656	3.3420	0.0013	34.3781	207.1981	13.1153	62.9723	5.6012	1.5805	0.2527
7.6084	1.1844	6.5297	0.4556	55.9586	130.7385	20.4156	114.8133	9.5420	3.2386	0.5147
5.0862	0.9927	5.3355	0.0991	39.8282	127.2078	17.7274	80.7563	7.2384	2.8052	0.2432
3.7988	0.5346	3.1130	0.5143	27.8343	151.0061	11.3757	47.9622	5.1794	1.1843	0.1154

ICP-MS Cd mg/kg	ICP-MS Sn mg/kg	ICP-MS Sb mg/kg	ICP-MS Cs mg/kg	ICP-MS Ba mg/kg	ICP-MS La mg/kg	ICP-MS Ce mg/kg	ICP-MS Pr mg/kg	ICP-MS Nd mg/kg	ICP-MS Sm mg/kg	ICP-MS Eu mg/kg
0.7746	0.7309	0.4574	1.2304	229.6060	13.0889	22.3700	3.1325	12.5099	2.4028	0.5726
0.8284	0.6735	0.4217	0.6754	223.9698	12.1268	20.7109	2.9556	11.3072	2.1573	0.5011
0.7907	0.5525	0.4162	1.1051	243.3537	12.5015	20.7865	2.9876	11.7843	2.3253	0.5156
0.7068	1.0914	0.6717	3.0332	271.8325	18.9075	35.7847	4.5740	17.2217	3.2051	0.7346
0.7520	0.6921	0.4062	1.5235	144.9251	10.0671	17.8796	2.3835	9.0262	1.7294	0.4018
0.8351	0.6772	0.4008	1.5168	143.0121	9.9956	17.6910	2.3843	8.9507	1.7582	0.3668
0.3752	3.9296	0.2802	0.5671	86.4608	6.1400	10.7253	1.5120	5.9261	1.1485	0.2461
0.4107	3.1139	0.3921	1.1835	141.9196	14.6880	26.1965	3.6284	13.6332	2.7096	0.6346
0.4379	0.6699	0.3805	1.2183	149.0799	15.9887	28.5758	3.8991	14.7048	2.7556	0.6337
0.3315	0.7281	0.3171	0.9929	142.5744	10.4188	19.3493	2.6132	10.1505	2.0165	0.4412
0.3643	0.7660	1.1013	1.2488	136.7378	11.9672	17.1125	2.6759	10.2301	1.8586	0.3952
0.3926	0.4636	0.1659	0.6121	73.9829	6.0632	10.0229	1.3800	5.1672	0.9241	0.1900
0.3363	0.2952	0.3719	0.6164	60.1225	6.4952	10.8927	1.4693	5.4232	1.0482	0.1958
0.2925	0.4162	0.1568	0.4902	62.1568	5.9164	9.9662	1.3454	5.1058	1.0582	0.2200
0.3247	0.6823	0.2516	0.7437	126.4027	10.3685	19.4127	2.6834	10.4440	2.1085	0.4739
0.3931	5.3028	0.7634	4.8262	753.9673	49.7649	111.3692	11.6515	41.2685	7.3175	1.6502
0.6151	2.0706	0.5204	1.4853	202.2680	13.0315	23.3554	3.1923	11.9260	2.4593	0.5132
0.6302	0.8778	0.5733	1.2950	250.8278	13.3875	23.5934	3.2960	12.8066	2.6243	0.5613
0.7463	1.0710	0.6387	1.6235	247.4235	13.2182	21.8331	3.0176	11.8729	2.1339	0.4930
1.1765	2.7663	1.0540	3.9781	612.2298	26.5730	50.0756	6.3360	23.8679	4.4854	0.9594
0.7969	2.8518	0.7245	2.4349	353.2805	14.7680	25.7360	3.5237	13.4223	2.5261	0.5157
0.7920	2.2469	0.6836	2.0300	454.7135	15.5874	26.5781	3.5913	13.1974	2.2944	0.5200
0.8895	1.4708	0.8433	2.8131	342.8155	14.1832	24.2132	3.2916	13.0944	2.3793	0.5503
1.2452	1.5362	0.6403	1.8739	555.6009	12.8891	20.5900	3.0267	11.9020	2.0946	0.4738
0.7936	1.4601	0.7514	2.1404	336.2026	12.8299	21.2072	3.0525	11.0448	2.2393	0.4557
0.6021	0.8497	0.5046	1.5673	192.9738	10.8090	17.1642	2.4703	9.4437	1.7733	0.3699
1.0766	1.7947	0.5381	0.9572	245.1377	10.5920	15.9975	2.4183	9.0794	1.7698	0.4079
0.9523	1.1936	0.9357	2.1810	338.5598	16.7331	29.7383	4.0542	15.4568	3.0303	0.6692
1.1136	1.1058	0.8464	2.8702	365.2820	18.5273	32.0322	4.3912	16.6838	3.3698	0.7072
1.0119	1.0840	0.8528	2.8716	369.3350	18.5548	32.3388	4.4280	16.7309	3.3398	0.7291
1.2910	1.2296	0.9163	3.1807	373.2527	19.5767	35.1931	4.7514	18.2982	3.5256	0.7636
1.0392	3.3955	0.8617	3.0088	464.0133	19.6044	33.5408	4.6212	17.5337	3.3112	0.7340
1.0553	1.1284	0.9225	2.3016	279.5474	18.5801	33.2767	4.6007	17.7029	3.6982	0.7999
0.9128	1.7307	0.5935	2.1700	206.8811	13.2262	22.3499	3.1326	11.6145	2.3010	0.5132
1.0948	1.5691	1.0574	3.5054	375.9382	22.2757	40.8980	5.4769	21.1900	4.0311	0.9290
0.7689	1.1620	0.9286	2.1914	384.7494	18.1669	30.9321	4.3570	16.8281	3.2630	0.7249
0.5114	0.9941	0.5358	1.6638	240.2283	11.7115	20.2274	2.7501	10.5693	2.1268	0.4614

ICP-MS Gd mg/kg	ICP-MS Tb mg/kg	ICP-MS Dy mg/kg	ICP-MS Ho mg/kg	ICP-MS Er mg/kg	ICP-MS Tm mg/kg	ICP-MS Yb mg/kg	ICP-MS Lu mg/kg	ICP-MS Hf mg/kg	ICP-MS Ta mg/kg	ICP-MS Hg mg/kg
2.4517	0.3716	2.1208	0.4182	1.1826	0.1718	1.1530	0.1769	1.8573	0.4412	191.0630
2.2233	0.3277	1.8184	0.3828	1.1054	0.1467	1.0312	0.1671	1.2690	0.4076	190.2602
2.2904	0.3481	1.9920	0.3900	1.1699	0.1518	1.1173	0.1868	1.4720	0.4507	265.3483
3.2010	0.4778	2.6862	0.5412	1.5808	0.2242	1.5108	0.2538	2.2680	0.7507	197.4381
1.7765	0.2640	1.4778	0.2933	0.8495	0.1131	0.8421	0.1279	1.3009	0.3864	174.4862
1.6474	0.2491	1.4184	0.2978	0.8903	0.1246	0.8324	0.0976	1.6612	0.3741	171.6765
1.1919	0.1821	1.0473	0.2161	0.6441	0.0877	0.6126	0.0736	0.9653	0.2026	67.4028
2.6271	0.3878	2.1561	0.4417	1.2318	0.1874	1.0943	0.1541	1.6275	0.5282	156.2997
2.7558	0.3975	2.1591	0.4506	1.2418	0.1786	1.1752	0.1837	1.5009	0.5656	164.5826
1.9961	0.3097	1.8091	0.3491	1.0299	0.1564	1.0226	0.1570	2.1782	0.4759	218.4385
1.8380	0.2787	1.5917	0.3309	0.9030	0.1345	0.9197	0.1388	1.4419	0.3830	180.3986
1.0127	0.1535	0.8762	0.1591	0.4813	0.0672	0.4668	0.0889	0.4068	0.2088	87.6553
1.0684	0.1615	0.9196	0.1909	0.5228	0.0793	0.5468	0.1159	1.2658	0.2267	98.8718
1.1099	0.1643	0.9155	0.1876	0.5330	0.0797	0.4749	0.0843	0.6661	0.2080	100.7160
2.2211	0.3336	1.8873	0.3857	1.1445	0.1568	0.9980	0.1905	1.8076	0.3596	124.9013
6.4867	0.9216	4.9313	0.9313	2.7771	0.4125	2.7906	0.3973	4.3575	2.4073	24.8184
2.3466	0.3513	1.9804	0.4285	1.1974	0.1770	1.1751	0.1890	2.2484	0.4508	0.0001
2.4978	0.3968	2.3742	0.4838	1.3669	0.1963	1.3561	0.1950	2.6626	0.4826	0.0001
2.3680	0.3509	1.9585	0.4092	1.2019	0.1811	1.1375	0.1922	1.5828	0.4184	0.0001
4.3187	0.6345	3.5108	0.6954	2.0382	0.2985	1.9679	0.3003	2.8034	0.9479	0.0001
2.5441	0.3696	2.0224	0.3988	1.2118	0.1958	1.2073	0.1852	1.5782	0.4491	0.0001
2.4196	0.3537	1.9474	0.3816	1.2051	0.1765	1.1336	0.1853	1.6324	0.5295	0.0001
2.4068	0.3586	2.0116	0.4114	1.2682	0.1910	1.2229	0.2154	1.8135	0.4325	0.0001
2.4049	0.3617	2.0487	0.4035	1.2153	0.1656	1.2334	0.1875	1.7088	0.3547	0.0001
2.3149	0.3408	1.8892	0.4053	1.1771	0.1666	1.1357	0.1785	1.7420	0.4552	0.0001
1.8829	0.2770	1.5341	0.3035	0.8578	0.1324	0.7757	0.1548	1.0395	0.3115	0.0001
1.8712	0.2760	1.5335	0.3259	0.9644	0.1355	0.8720	0.1243	1.3948	0.2993	0.0001
3.0352	0.4507	2.5202	0.4877	1.5202	0.2165	1.5025	0.2211	2.3233	0.5075	0.0001
3.1918	0.4731	2.6404	0.5600	1.6584	0.2382	1.4985	0.2400	2.2955	0.5762	0.0001
3.2283	0.4807	2.6958	0.5505	1.6635	0.2325	1.6543	0.2353	2.3911	0.5722	0.0001
3.1684	0.4880	2.8303	0.5924	1.6625	0.2361	1.6629	0.2631	2.3563	0.5809	0.0001
3.3135	0.4857	2.6815	0.5443	1.6115	0.2402	1.4867	0.2439	2.4255	0.5301	0.0001
3.7074	0.5394	2.9559	0.5884	1.7320	0.2566	1.6759	0.2510	3.5209	0.6247	0.0001
2.2272	0.3322	1.8657	0.3901	1.1682	0.1631	1.1337	0.1753	1.7602	0.4179	0.0001
4.0973	0.6022	3.3332	0.6646	1.9026	0.2516	1.7602	0.2892	3.1829	0.6746	0.0001
3.1396	0.4704	2.6545	0.5489	1.5246	0.2231	1.4487	0.1991	2.2323	0.5372	0.0001
1.9228	0.2953	1.7084	0.3314	0.9813	0.1403	0.9111	0.1692	1.4124	0.3714	0.0001

ICP-MS Tl mg/kg	ICP-MS Pb mg/kg	ICP-MS Th mg/kg	ICP-MS U mg/kg
0.3185	5.1517	3.2511	2.5595
0.3090	5.0997	1.5874	2.1905
0.3110	5.0714	2.8729	2.1916
0.4671	8.8133	5.3354	2.4985
0.2743	4.5593	2.5934	1.9821
0.2674	4.5409	2.7854	1.9563
0.1278	5.9166	1.5605	1.6170
0.2247	4.8977	3.1189	1.8671
0.2316	5.1923	3.2443	1.9288
0.1982	3.8285	2.8233	1.7474
0.3159	5.0595	2.5058	3.8152
0.1150	2.5792	0.2392	1.3043
0.1228	2.7366	1.0951	1.9786
0.0966	2.4183	0.9780	1.5059
0.1417	3.7207	2.5446	1.8475
0.7528	13.0263	11.8093	2.7676
0.2960	5.4351	3.3997	2.2265
0.2928	5.7961	3.2082	2.3202
0.3296	5.1791	2.7881	1.9423
0.6743	10.4815	5.5846	3.0393
0.5219	6.0550	3.4289	2.0736
0.4621	6.0094	3.4648	1.8573
0.4335	6.5242	3.7012	2.3992
0.3089	5.2217	2.8919	2.2011
0.3390	5.6695	3.1891	2.0058
0.2583	3.8053	2.1970	1.6801
0.3818	3.5759	1.7883	1.7736
0.4128	6.9773	4.1945	2.5169
0.6079	7.5588	4.4691	2.4689
0.6359	7.5225	4.5120	2.5124
0.6178	8.0452	5.1358	2.7178
0.5487	6.9039	4.5781	2.5061
0.4371	7.7628	4.5375	2.6249
0.4452	5.1257	3.0544	2.8213
0.6627	8.2701	5.2898	2.6884
0.3932	6.6832	4.0033	2.6763
0.3229	5.2452	2.6767	1.8627

HoleID	Sample Number	Depth (mgbs)	Depth Error (m)	ICP-MS Li mg/kg	ICP-MS Na mg/kg	ICP-MS Mg mg/kg	ICP-MS Al mg/kg	ICP-MS P mg/kg	ICP-MS K mg/kg
WLC_12-11N	30192A	23.23	0.18	38.6771	3480.9010	8049.2440	64210.3773	1407.9883	27404.7550
WLC_12-11N	30193A	25.24	0.15	36.9990	4911.1971	19116.2545	64227.8610	1423.7690	28160.3207
WLC_12-11N	30194A	25.45	0.15	38.0090	3954.0587	19592.0681	61871.2260	1525.8693	26481.2355
WLC_12-11N	30195A	26.06	0.12	38.2324	4415.2902	18710.6787	62375.7778	1966.3233	26227.8580
WLC_12-11N	30197A	27.58	0.15	45.8460	4725.3091	14077.6253	66772.4871	1629.0759	28399.3749
WLC_12-12	30198A	1.14	0.08	21.7932	2736.5698	22322.4636	27759.5878	1087.1693	14637.0560
WLC_12-12	30198A	1.14	0.08	22.1297	2702.4174	22205.4151	28067.9915	1075.5067	14514.8180
WLC_12-12	30199A	1.83	0.09	22.1309	1510.3813	18550.3010	30423.6676	935.2038	12602.9612
WLC_12-12	30200A	2.70	0.11	69.2807	4959.6008	5599.0394	53230.4350	1422.1264	29467.1682
WLC_12-12	30201A	3.67	0.14	50.1100	3765.1202	15133.6785	55711.5124	1435.0841	23361.8969
WLC_12-12	30202A	5.30	0.12	16.0026	792.6857	21683.5606	10239.4957	803.4019	7334.7632
WLC_12-12	30203A	6.48	0.11	23.8768	1079.2940	19021.0419	22086.4562	1154.1694	14785.6366
WLC_12-12	30204A	7.35	0.12	19.1113	606.1624	15817.8403	22281.2976	1131.4023	14334.5830
WLC_12-12	30205A	7.71	0.09	21.7324	753.6677	19165.3824	33902.1186	1196.1554	12896.4205
WLC_12-12	30206A	8.88	0.08	20.2477	1124.4394	25005.2686	30269.2784	902.2625	12127.8636
WLC_12-12	30207A	10.01	0.11	17.7629	794.3302	20610.9880	18460.8514	628.8545	7604.3539
WLC_12-12	30208A	11.22	0.09	19.6564	876.9693	17439.1102	30553.5717	865.3721	12914.3375
WLC_12-12	30209A	12.54	0.11	21.0798	795.1873	27736.1828	24353.0642	841.9393	9932.7319
WLC_12-12	30210A	13.29	0.09	12.1207	584.8725	24583.0026	7331.8516	862.3048	9865.9664
WLC_12-12	30211A	14.48	0.06	20.7926	999.7682	14695.2286	37753.6326	1232.0155	15283.8548
WLC_12-12	30213A	16.03	0.09	20.0378	1326.2888	11282.9564	39236.9099	1435.9431	15608.3282
WLC_12-12	30213A	16.03	0.09	20.6940	1288.9022	11447.2033	39146.5341	1439.5670	15397.3663
WLC_12-12	30214A	17.40	0.06	20.0209	731.7326	11807.7517	41303.6827	1838.0706	15912.9006
WLC_12-12	30215A	17.92	0.09	24.6698	1214.6098	12723.0948	48923.9901	1367.5083	19150.5321
WLC_12-12	30216A	19.20	0.06	17.3583	934.5846	12851.4570	28845.7820	1026.3760	12030.0122
WLC_12-12	30217A	20.24	0.12	20.5732	949.9285	18486.3399	32273.6782	1295.9576	14131.0898
WLC_12-12	30218A	21.02	0.05	25.6198	1304.2857	14456.9476	41045.7477	1382.0038	15851.0653
WLC_12-12	30219A	23.16	0.09	27.0470	2387.2132	16463.3230	16138.7703	1016.6509	16318.3563
WLC_12-12	30220A	24.16	0.11	42.7741	3867.9412	14802.6855	58970.2562	1687.3156	24729.0914
WLC_12-12	30221A	24.81	0.09	46.0750	4709.7668	13136.6938	69609.8581	1610.4753	28870.1681
WLC_12-12	30222A	25.71	0.08	45.4449	4476.7689	12514.5965	67317.3050	1624.7165	27247.6827
WLC_12-12	30223A	26.61	0.09	60.1586	5020.0753	13463.0177	63305.9994	1637.2429	26671.1468
WLC_12-12	30224A	27.68	0.06	62.8366	3927.4854	14768.2117	66017.5574	1658.1766	25926.5789
WLC_12-12	30225A	28.53	0.06	68.1867	4216.4211	12926.3423	69195.0167	1609.6529	27158.6756
WLC_12-12	30226A	29.43	0.11	52.8353	4658.3972	9247.0247	50528.1070	1359.4377	24564.6108
WLC_12-12	30227A	31.01	0.08	58.1361	4810.6525	5969.0127	45966.8329	1343.2024	28397.9771
WLC_12-12	30227A	31.01	0.08	58.6500	4849.0098	6037.6098	46580.3829	1368.3262	28629.5959
WLC_12-12	30228A	31.64	0.09	54.6248	4606.8884	783.7474	6151.1653	1254.1456	21648.4706

ICP-MS Ca mg/kg	ICP-MS Sc mg/kg	ICP-MS Ti mg/kg	ICP-MS V mg/kg	ICP-MS Cr mg/kg	ICP-MS Mn mg/kg	ICP-MS Fe mg/kg	ICP-MS Co mg/kg	ICP-MS Ni mg/kg	ICP-MS Cu mg/kg	ICP-MS Zn mg/kg
23539.4698	11.9248	3721.3582	175.6213	81.8710	200.3585	28308.9437	10.9080	31.3887	21.8322	93.4653
54644.8906	12.6721	3624.5687	163.7417	80.0542	293.0815	28433.5431	19.7874	29.7528	20.2867	86.9128
59373.3325	10.9533	3449.7625	168.3137	83.9965	314.2681	30249.1751	12.2501	31.3096	22.4629	95.4442
54175.5850	16.4893	3737.9712	181.1560	82.7094	342.8565	40296.2719	15.1312	34.6135	20.2391	88.7061
36620.1503	10.7092	3880.2542	179.8123	83.5369	191.0671	23886.7022	15.5412	26.2828	22.6902	101.7703
129437.4652	15.9212	1986.9719	71.2999	40.1955	379.7188	13651.2040	15.4600	23.8068	11.1327	57.8209
131005.4562	16.1255	1966.2083	72.1054	40.0107	381.6644	13591.9260	15.4181	24.0616	10.8930	58.3688
148190.8282	5.8800	1682.3870	76.7940	39.6390	301.7271	12004.1813	11.9838	21.8331	8.7585	55.8483
9912.4813	9.1020	4802.5909	194.9215	95.3059	318.4471	38540.8933	13.3172	40.7635	27.1997	110.7161
77178.4892	7.8596	3497.2935	141.6328	70.0888	361.9042	29013.3250	11.1672	37.8422	18.3140	92.9919
159733.9693	2.9326	1099.2269	58.4672	28.3595	141.1477	7504.0286	5.3245	19.0654	6.8124	43.6966
133768.7117	4.2135	2047.8378	101.7640	50.1848	256.9034	19392.7376	11.0823	25.2371	12.2677	65.6804
130873.6128	5.0577	2004.9834	92.9615	44.5561	204.6560	13723.1207	9.6495	20.3622	11.2273	78.5669
105877.1954	6.7623	1703.3095	100.6242	51.2406	219.9347	14299.6722	15.6382	24.3459	10.6728	64.6181
166150.8480	5.6435	1546.6210	76.5682	39.4830	218.3579	15404.4896	13.4290	23.6703	9.1965	63.9064
178149.4754	5.3089	993.2794	52.6863	28.4238	187.6612	8588.4987	5.5009	19.9564	6.9703	40.9080
134865.9758	7.1612	1575.7475	86.3334	43.0186	244.8127	13943.6058	10.5367	21.4418	8.9318	54.1446
178525.2111	5.7577	1289.7887	65.8382	38.2980	455.3393	16286.0467	9.0322	22.7986	7.9406	50.8188
160569.9429	7.6875	1326.4055	72.2486	32.8101	257.0023	9758.7059	7.4883	20.7906	8.2221	51.1987
131546.0052	7.7743	2019.6823	110.6978	53.2215	299.8409	20267.5891	10.8911	25.0145	12.3027	75.9446
58779.4743	9.7404	2231.3774	103.4759	56.1194	299.6024	14370.3362	11.9008	20.1654	10.7332	58.6208
57641.6146	9.6394	2215.3903	102.7582	56.0279	287.8188	14302.7467	11.7228	19.8829	10.4471	59.9103
59558.0830	7.8932	2286.3010	122.3355	57.1277	245.6216	19582.0783	14.7109	31.3380	13.5114	90.9727
105450.2815	10.2429	2731.8137	133.0069	74.6302	634.5907	21777.3754	24.3723	29.7452	17.5292	88.3099
85635.1115	8.8911	1527.9031	86.8344	43.5814	173.4399	13897.8039	22.8365	20.0303	9.4723	51.5797
111239.6855	10.7623	2036.2858	105.1673	53.4242	210.9554	16676.4628	8.7967	25.6654	11.8078	67.6083
94599.3914	7.6811	2444.0776	116.9894	57.5260	219.9766	20446.1514	10.3822	26.4709	13.9375	82.9228
136343.4355	2.8716	2447.4297	107.3050	50.3310	188.4337	17563.9361	7.9427	27.7031	12.9479	52.8400
45993.5002	9.6295	3634.8228	165.8857	95.3383	364.6474	37057.1390	11.5866	36.0137	23.0529	90.5101
31153.5299	11.3922	4081.2025	182.3413	87.2320	206.5721	27289.3486	15.4031	40.9880	19.9976	81.5441
29837.0403	12.4442	4030.1631	180.0367	88.3585	179.9081	27228.4698	16.7518	32.4903	21.9454	97.6877
44448.0495	7.7612	3975.9547	155.1683	77.7904	245.4013	29121.7012	11.8801	31.5447	22.2464	83.3322
43525.1034	9.9413	3940.6985	148.6346	73.4152	264.1940	30100.9107	11.1954	30.6622	20.9544	88.3354
40492.2897	10.8156	4072.7970	146.8449	73.7561	253.2403	31259.5842	12.8907	31.1761	20.6928	86.9690
38429.6935	4.3250	3980.7599	146.7921	79.1861	223.1885	27523.3533	8.8942	32.8950	18.2117	84.2069
31682.4864	4.1332	4718.0475	162.1671	79.4902	201.0840	27062.9464	14.6257	34.1374	20.2271	98.0301
32317.5712	4.4497	4842.3265	162.8488	80.8661	201.1921	27338.6855	14.8958	35.6262	20.6404	99.9723
28741.5666	0.8110	4456.8443	155.9740	79.8722	198.0697	26697.3713	12.6220	37.7510	19.9416	89.3073

ICP-MS Ga mg/kg	ICP-MS Ge mg/kg	ICP-MS As mg/kg	ICP-MS Se mg/kg	ICP-MS Rb mg/kg	ICP-MS Sr mg/kg	ICP-MS Y mg/kg	ICP-MS Zr mg/kg	ICP-MS Nb mg/kg	ICP-MS Mo mg/kg	ICP-MS Ag mg/kg
13.0001	1.5124	8.7442	0.5185	94.8758	105.7435	26.0031	137.2681	17.8792	2.4807	0.3689
11.2428	1.4768	8.3990	6.0279	94.5339	176.1160	28.0120	136.0193	17.4170	2.5650	0.3051
12.0867	1.5712	5.0012	2.3170	91.3963	175.1109	27.9130	125.7796	16.9821	2.2299	0.3394
11.9122	1.4802	8.2802	1.4717	92.7426	194.8966	29.5569	143.0546	17.0842	2.2856	0.4206
13.8462	1.6829	2.6058	1.4433	99.9712	174.2515	26.9367	121.1054	18.9707	1.8678	0.3319
5.4971	0.8776	5.5899	0.5740	41.1291	157.4307	15.7280	83.2393	8.2749	1.9961	0.0984
5.8328	0.9575	5.2767	0.6051	41.0797	158.0225	15.6777	83.7983	8.2133	1.8347	0.4769
6.6534	0.8481	6.7198	0.0013	41.6532	156.3189	15.2469	62.0532	8.4762	1.4159	0.2118
19.5230	2.0417	10.5309	1.7626	28.6755	89.8378	10.7308	147.2830	28.1180	2.7899	0.1891
13.0788	1.5409	8.2940	0.9163	87.2358	157.9462	22.7364	112.1129	19.7870	1.9724	0.2226
4.1627	0.6856	3.6840	0.0350	28.6012	124.1895	10.9322	34.7466	5.0255	0.9703	0.2015
6.4527	0.9915	4.9462	0.4446	49.4524	170.4138	16.4041	66.5403	8.5265	1.6834	0.2424
5.3726	0.8536	3.9869	0.3468	31.9356	171.2183	12.7465	81.8169	7.9710	1.3644	0.2989
6.1357	1.1777	6.7256	0.1963	45.2463	157.0899	17.2939	71.4459	7.0345	2.1056	0.2800
5.1253	0.8244	3.7204	0.0013	41.3096	202.7316	15.3122	61.5329	6.8676	1.9028	0.2097
3.3084	0.4541	2.6971	0.2792	25.9300	250.5802	13.2353	41.3206	4.1486	1.0988	0.2564
5.4786	0.8316	4.1095	0.0013	42.4114	160.2698	14.5882	61.1013	6.7105	1.5731	0.2399
4.1639	0.6600	4.4352	0.4358	32.3266	173.3148	13.3096	63.2532	5.2095	2.2053	0.2734
3.8436	0.6044	3.0834	0.3845	16.6199	132.9584	12.5411	54.3273	5.3761	1.1974	0.2182
7.1228	0.9500	4.7933	0.1690	50.6905	191.3401	19.1542	79.6144	8.1422	1.8446	0.2353
7.8532	1.0755	4.5371	0.6572	47.5654	125.5719	20.5827	85.8528	9.2767	1.4117	0.2773
8.1019	1.0566	4.0603	0.0000	47.3848	123.0571	20.4771	85.4986	9.2168	1.5193	0.6169
8.3241	1.1629	8.1823	0.8516	53.5655	142.9503	22.9901	88.6416	8.7950	2.4244	0.3581
10.0035	1.1519	6.3887	0.2491	65.0419	180.3886	22.2435	104.3082	10.8079	2.6821	0.3722
5.8637	1.1185	4.2903	0.0013	38.1201	122.7138	15.0653	64.2182	6.4671	1.4512	0.3889
6.8560	0.9775	5.5955	0.0013	46.8159	158.9348	19.1954	78.7277	8.2331	2.2487	0.2819
9.1769	1.1278	5.1486	0.0013	53.5696	186.3934	20.7012	88.0417	10.6230	1.7052	0.3390
7.4026	1.0491	4.9852	2.3225	39.0755	347.5059	12.3075	79.4262	13.1164	1.5643	0.2833
12.6209	1.5713	6.3193	4.3930	87.8137	141.9775	27.8385	127.5267	18.1599	4.9546	0.4681
14.9766	1.7206	7.0009	1.9548	102.2245	145.9409	29.6653	155.7217	20.4398	2.0656	0.4086
14.0070	1.5467	6.1206	7.5202	74.1960	142.9405	28.9906	153.4042	19.4290	2.0881	0.3759
11.9739	1.6060	5.9315	0.9754	56.4754	168.9482	26.4832	142.0852	20.5864	2.6178	0.3930
12.1335	1.5640	3.7636	0.9656	78.7866	170.1145	27.1642	131.3464	19.8037	2.6404	0.3431
13.2279	1.5309	1.3948	0.5523	88.5218	179.2976	27.4143	140.0055	20.7161	2.5572	0.3244
12.7657	1.5699	3.7864	1.0984	64.1381	187.0632	22.5930	144.9417	22.7046	3.1780	0.4124
15.0717	1.8108	2.1032	1.6850	47.5610	195.3823	19.4311	155.2260	27.7819	1.7124	0.3489
15.8048	1.8013	2.4809	1.6970	48.0199	198.4433	19.6121	157.9104	28.1634	1.7341	0.9887
15.1678	1.6458	2.4430	3.0856	7.7499	196.2471	8.5535	155.0945	26.0511	1.9410	0.3375

ICP-MS Cd mg/kg	ICP-MS Sn mg/kg	ICP-MS Sb mg/kg	ICP-MS Cs mg/kg	ICP-MS Ba mg/kg	ICP-MS La mg/kg	ICP-MS Ce mg/kg	ICP-MS Pr mg/kg	ICP-MS Nd mg/kg	ICP-MS Sm mg/kg	ICP-MS Eu mg/kg
0.4917	2.3070	1.5382	6.1704	587.2139	30.2215	60.8457	7.2793	27.0960	5.2315	1.1948
0.4504	2.0068	1.4312	5.7896	641.4518	31.3135	62.3148	7.6375	28.7055	5.4712	1.2416
0.5954	2.1773	1.0737	5.8806	595.4950	31.3857	62.5761	7.6544	28.6233	5.5487	1.2592
0.4751	1.8141	1.2084	5.6764	1097.9427	30.1730	62.5438	7.5748	29.1097	5.5176	1.3004
0.5252	2.0888	0.9865	6.5517	975.9059	32.7546	67.3095	8.0438	29.8441	5.6367	1.2156
0.8658	1.4197	0.6869	2.1617	287.3526	17.2601	31.2475	4.2650	15.8951	3.1038	0.7209
0.8054	1.3938	0.7324	2.1581	287.8661	17.2964	31.7119	4.2415	16.1323	3.2567	0.6391
0.6377	2.1153	0.6173	2.2738	247.2395	17.7117	30.8731	4.0963	15.0968	3.0250	0.5919
0.7777	3.6113	1.0605	4.2927	516.3924	11.9071	30.2308	4.1172	16.4662	3.5668	0.7428
0.7339	3.2321	1.0474	5.0628	389.9510	30.6132	60.5751	7.3892	26.5615	5.1941	1.1422
0.5629	0.9985	0.5784	1.7326	235.8152	12.2788	20.5297	2.9065	10.3975	1.9970	0.4168
1.0761	2.6648	1.0138	2.8486	415.2807	18.8773	33.4047	4.5927	17.1789	3.4391	0.7825
1.1840	1.0890	0.9036	1.5373	425.3333	17.2587	29.3404	4.1467	15.0698	3.1341	0.6590
0.9781	1.8672	0.9584	2.7456	486.1152	18.4261	31.5669	4.4019	16.5710	3.2604	0.7455
0.9946	2.0935	0.7869	2.5475	420.3849	15.2474	26.2526	3.5882	13.3970	2.6582	0.6314
0.6528	0.8029	0.5326	1.6437	225.2766	12.1686	16.3050	2.7244	10.0319	2.0121	0.4221
0.8143	1.7579	0.8255	2.6213	298.2032	15.5110	26.9918	3.7933	13.5512	2.5085	0.6128
0.8182	2.9674	0.7560	1.9454	301.5436	13.4062	22.2550	3.1916	11.5313	2.4069	0.5335
0.8483	2.8046	0.7491	0.7809	256.6960	13.2051	22.4874	3.2115	12.5789	2.4532	0.5443
1.3454	1.4378	1.1091	2.8425	476.6414	19.7094	33.8133	4.7292	17.0348	3.4752	0.7869
0.7703	1.5005	0.8455	2.4255	418.7976	22.8836	41.3148	5.5143	21.4303	4.2121	1.0029
0.7967	1.3127	0.9855	2.3278	415.1635	22.7894	41.0020	5.5889	20.8009	4.1113	0.9372
1.4054	4.2090	1.3406	2.7131	417.1728	23.8975	41.9574	6.0400	22.6553	3.9676	0.9796
1.4810	5.4300	1.3482	3.6441	418.5952	24.2801	42.6381	5.9055	22.4005	4.3059	1.0012
0.6285	1.2192	0.7931	1.8560	377.4389	17.4921	31.0664	4.1608	15.8504	3.0476	0.7131
1.0000	1.6576	1.0871	2.5481	404.9399	19.7308	33.4714	4.7932	18.3632	3.4894	0.7831
1.1926	1.9878	1.2157	3.0618	440.5347	22.8819	41.3513	5.5783	21.5599	4.1061	0.8524
0.4155	1.2825	0.7225	1.9165	380.4585	21.8824	41.9105	5.1832	19.1821	3.5409	0.7837
0.5623	4.4783	1.3098	5.3340	498.1132	32.0601	64.2416	7.9653	29.9495	5.9224	1.2625
0.4584	5.3286	1.6801	6.5693	522.5764	35.1087	69.6751	8.5976	32.1696	6.2458	1.3608
0.4755	2.0427	1.3855	5.9570	830.0421	29.4318	59.4714	7.6163	29.1914	5.8034	1.3017
0.4549	2.2890	1.4611	4.8631	652.6530	30.0955	61.3115	7.5980	29.1525	5.7032	1.2555
0.5836	1.9986	1.2992	5.1964	565.7687	33.5650	66.6482	8.2362	31.1111	5.9972	1.2863
0.4279	2.2886	1.2900	5.5045	594.1659	36.2420	71.6391	8.8309	32.3496	6.1333	1.3280
0.5309	1.9359	1.1650	5.0725	522.8458	29.6641	61.3659	7.4993	28.2203	5.3284	1.1733
0.4090	2.5269	1.1575	5.5294	534.4426	28.9215	60.1253	7.4228	27.7977	5.3177	1.1383
0.5351	2.5667	1.1575	5.5052	534.9658	28.9386	60.4005	7.3217	28.2784	5.3822	1.1882
0.4630	2.1975	1.2092	2.9738	555.6959	12.1261	33.3468	4.4656	17.9225	3.6700	0.8141

ICP-MS Gd mg/kg	ICP-MS Tb mg/kg	ICP-MS Dy mg/kg	ICP-MS Ho mg/kg	ICP-MS Er mg/kg	ICP-MS Tm mg/kg	ICP-MS Yb mg/kg	ICP-MS Lu mg/kg	ICP-MS Hf mg/kg	ICP-MS Ta mg/kg	ICP-MS Hg mg/kg
5.1113	0.7605	4.2610	0.8947	2.6093	0.3819	2.4442	0.4146	3.7508	1.0522	0.0001
5.4533	0.8034	4.4576	0.9431	2.7619	0.4052	2.7146	0.4026	3.7913	1.0093	0.0001
5.4565	0.8117	4.5474	0.9204	2.5975	0.3925	2.5600	0.4050	3.4294	0.9898	0.0001
5.5704	0.8368	4.7334	0.9665	2.8690	0.4231	2.8584	0.4601	4.0464	0.9989	0.0001
5.3325	0.7793	4.2883	0.8603	2.7498	0.3924	2.4958	0.3798	3.3843	1.0810	0.0625
2.9369	0.4386	2.4669	0.4942	1.4503	0.2097	1.3832	0.2648	2.7161	0.5545	0.0001
2.9637	0.4393	2.4526	0.4938	1.4769	0.2169	1.2788	0.2175	3.0803	0.5757	0.0001
2.8262	0.4135	2.2782	0.4717	1.4473	0.1954	1.3049	0.2148	1.9169	0.5427	0.0001
3.1856	0.5121	3.1005	0.6346	1.8317	0.2834	1.9879	0.2759	4.3182	1.5621	0.0001
4.9321	0.7020	3.7625	0.8072	2.2841	0.3300	2.2278	0.3362	3.1179	1.1233	0.0001
1.9845	0.2910	1.6067	0.3511	0.8800	0.1363	0.9933	0.1572	1.1371	0.3174	0.0001
3.1461	0.4715	2.6611	0.5469	1.5692	0.2238	1.5396	0.2441	2.0110	0.5368	0.0001
3.0070	0.4558	2.6013	0.4982	1.5071	0.1970	1.4055	0.2119	2.3662	0.5586	0.0001
3.3762	0.4846	2.6193	0.5536	1.5509	0.2026	1.3568	0.2176	2.0678	0.5331	0.0001
2.6710	0.4020	2.2780	0.4827	1.3576	0.1836	1.2373	0.1848	1.7742	0.4756	0.0001
1.9936	0.3020	1.7229	0.3455	1.0165	0.1447	0.8793	0.1438	1.2174	0.2708	0.0001
2.6207	0.3920	2.2083	0.4531	1.2858	0.1898	1.1954	0.1975	1.8619	0.4664	0.0001
2.4384	0.3564	1.9619	0.4055	1.1391	0.1648	1.0853	0.1691	1.7693	0.3815	0.0001
2.3638	0.3625	2.0934	0.4123	1.1828	0.1555	1.0663	0.1543	1.6218	0.3791	0.0001
3.5346	0.5156	2.8321	0.6040	1.7011	0.2654	1.6703	0.2299	2.2475	0.5754	0.0001
4.2441	0.6183	3.3926	0.6281	1.9497	0.2821	1.7619	0.2949	2.5701	0.7024	0.0001
4.1977	0.6061	3.2953	0.6643	1.9358	0.2609	1.9308	0.2709	2.4920	0.6678	0.0001
4.5231	0.6445	3.4585	0.6804	2.0612	0.2979	1.8867	0.3086	2.5449	0.6284	0.0001
4.3010	0.6264	3.4355	0.6979	2.0209	0.3134	1.9616	0.3087	2.9975	0.8229	0.0001
3.0460	0.4326	2.3134	0.4665	1.3915	0.1972	1.2055	0.2028	1.7239	0.5648	0.0001
3.3641	0.5063	2.8698	0.6060	1.7037	0.2328	1.5782	0.2434	2.2790	0.5451	0.0001
3.9776	0.6008	3.4174	0.6147	1.8551	0.2621	1.7131	0.2964	2.5094	0.6827	0.0001
3.5945	0.5022	2.6428	0.5091	1.4743	0.2127	1.3776	0.2074	2.2476	0.7164	0.0001
5.6009	0.8103	4.4148	0.9406	2.7205	0.3478	2.5532	0.4319	3.7543	1.0694	0.0001
5.7805	0.8678	4.9064	0.9845	2.9537	0.4148	2.8049	0.4528	4.2065	1.2056	0.0001
6.0123	0.8779	4.8272	0.9862	2.9383	0.4297	2.7074	0.4644	4.4177	1.1822	0.0001
5.4588	0.8170	4.6048	0.9051	2.6741	0.3971	2.5313	0.4003	4.1883	1.1013	0.0001
5.6026	0.8267	4.5940	0.9407	2.6985	0.3966	2.5704	0.4097	3.8656	1.0775	0.0001
5.7410	0.8626	4.8804	0.9481	2.8120	0.4167	2.7913	0.3892	3.9491	1.1305	0.0001
4.9528	0.7590	4.3807	0.8293	2.4755	0.3623	2.4454	0.3938	4.0460	1.2086	0.6905
4.8349	0.7187	4.0236	0.8145	2.4821	0.3396	2.4122	0.3664	4.3443	1.6443	0.0001
4.9211	0.7399	4.1888	0.8091	2.4253	0.3394	2.3290	0.3939	4.3067	1.5638	0.0001
3.3586	0.5222	3.0580	0.6291	1.9027	0.2897	1.8662	0.2896	4.1481	1.5032	0.0001

ICP-MS Tl mg/kg	ICP-MS Pb mg/kg	ICP-MS Th mg/kg	ICP-MS U mg/kg
0.8655	14.0516	7.8428	3.0266
0.6664	13.6299	7.6938	3.2697
0.6379	12.6191	7.8568	3.0602
0.6145	14.7939	7.8542	3.1349
0.6580	10.3786	8.6159	3.3599
0.4912	8.3563	4.4929	2.7552
0.5161	8.4750	4.7515	2.8333
0.3708	7.9581	3.8351	2.2891
0.8545	15.6500	2.2183	3.6249
0.6815	12.8752	7.0726	3.1491
0.3019	4.6329	2.5066	1.6080
0.4890	7.5568	3.4982	2.4509
0.4032	8.0194	3.0446	2.5182
0.5246	7.7750	4.4463	2.6150
0.4186	6.3724	3.7538	2.3900
0.2860	4.1782	2.3746	1.5600
0.4405	6.5381	4.0479	2.1603
0.3676	5.3623	3.1015	2.0425
0.3216	5.2951	2.4242	1.9768
0.5462	7.7337	4.7808	2.5236
0.5450	7.4847	5.2668	2.5749
0.5354	7.6223	5.2804	2.5459
0.6561	9.1120	5.4883	2.9463
0.6903	10.3710	6.5014	3.1116
0.3773	7.6157	3.5758	2.2184
0.5359	7.4060	4.1369	2.6809
0.5777	8.8320	5.5022	2.7623
0.4364	9.1988	3.1914	2.4599
0.6772	13.3544	7.6025	3.1221
0.7321	17.2440	8.6833	3.3061
0.7288	13.8897	8.4415	3.3456
0.7105	14.5092	6.7205	3.2822
0.7265	14.4194	7.8498	3.3403
0.7426	14.7532	8.3595	3.3330
0.7098	14.0754	5.4769	3.0811
0.7518	14.7955	3.6641	2.9642
0.7432	14.7843	3.6618	3.0064
0.6769	15.9906	0.3707	2.9085

D6 Groundwater Sample Data

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
LC_Harp_1	13/06/2014	10877	0.0304	0.0214	4.5163	32.4660	0.0111	1.9433	0.0232
LC_Harp_1	13/06/2014	10877-MS Rep	0.0301	0.0222	4.4876	32.8717	0.0115	1.9815	0.0214
LC_Harp_2	09/07/2014	10936	0.0139	0.0263	2.2814	47.1763	0.0019	2.4971	0.0241
LC_Harp_2	09/07/2014	10936-ICS Rep	0.0139	0.0263	2.2814	47.1763	0.0019	2.4971	0.0241
LC_Harp_2	13/06/2014	10878	0.0179	0.0168	2.7348	51.4653	0.0031	2.9199	0.0164
LC_Harp_2	16/07/2014	10979	0.0149	0.0231	2.5270	49.1937	0.0021	7.0426	0.1743
LC_Harp_2	16/07/2014	10979-ICS Rep	0.0149	0.0231	2.5270	49.1937	0.0021	7.0426	0.1743
LC_Harp_2	11/08/2014	13060	0.0260	0.0147	4.8961	68.3778	0.0031	2.8492	0.0106
LC_Harp_2	28/07/2014	13014	0.0178	0.0173	3.2486	52.0662	0.0242	5.0532	0.0528
LC_Harp_2	27/08/2014	13094	0.0304	0.0176	5.2960	73.7618	0.0151	2.8578	0.0355
LC_Harp_3	09/07/2014	10937	0.0151	0.0290	2.3881	49.5762	0.0030	2.3514	0.0316
LC_Harp_3	13/06/2014	10879	0.0193	0.0149	2.8393	52.0533	0.0037	2.8729	0.0105
LC_Harp_3	21/07/2014	10996	0.0176	0.0136	3.0419	52.3857	0.0044	2.9529	0.2194
LC_Harp_3	05/08/2014	13040	0.0225	0.0110	3.9309	59.8958	0.0049	4.8622	0.0559
LC_Harp_3	20/08/2014	13074	0.0288	0.0187	4.9371	70.2796	0.0041	2.9036	0.0284
LC_Harp_3	27/08/2014	13095	0.0311	0.0176	5.3901	73.8883	0.0155	2.7894	0.0344
LC_Harp_3	23/09/2014	13113	0.0350	0.0155	5.5843	83.6145	0.0203	2.6222	0.0445
LC_Harp_4	09/07/2014	10938	0.0173	0.0251	2.7305	49.8690	0.0016	3.1785	0.0036
LC_Harp_4	13/06/2014	10880	0.0199	0.0181	3.1027	51.0839	0.0033	2.7903	0.0180
LC_Harp_4	16/07/2014	10980	0.0177	0.0186	3.2832	52.7004	0.0022	7.8949	0.1731
LC_Harp_4	16/07/2014	10980-ICS Rep	0.0177	0.0186	3.2832	52.7004	0.0022	7.8949	0.1731
LC_Harp_4	11/08/2014	13061	0.0301	0.0168	5.4351	71.0581	0.0032	2.9401	0.0184
LC_Harp_4	28/07/2014	13015	0.0209	0.0101	3.5346	54.4861	0.0052	4.5778	0.0390
LC_Harp_4	23/09/2014	13114	0.0358	0.0157	5.6742	84.6468	0.0262	2.6172	0.0568
LC_Harp_5	13/06/2014	10881	0.0202	0.0159	3.0895	52.0415	0.0026	2.7863	0.0159
LC_Harp_5	09/07/2014	10939	0.0169	0.0230	2.6752	53.0671	0.0023	2.2562	0.0212
LC_Harp_5	21/07/2014	10997	0.0198	0.0166	3.9854	55.0301	0.0085	8.2116	0.2352
LC_Harp_5b	11/07/2014	10958	0.0347	0.0208	5.5186	50.7638	0.0018	3.0700	0.0268
LC_Harp_6	13/06/2014	10882	0.0336	0.0136	5.0556	38.0463	0.0023	1.9575	0.0178
WLC_12-01	14/09/2013	10670	0.0102	0.0114	3.3513	14.3505	0.0125	5.3652	0.0144
WLC_12-01	03/07/2013	10528	0.0051	0.0034	4.1273	13.6943	0.0118	4.4541	0.0289
WLC_12-03	10/07/2013	10550	0.0065	0.0391	87.3997	8.9014	0.0059	4.3788	0.0310
WLC_12-04	03/07/2013	10529	0.0060	0.0068	2.1032	12.7749	0.0047	3.8770	0.0300
WLC_12-05	04/07/2013	10546	0.0049	ud	1.3726	12.7142	0.0021	4.0084	0.0384
WLC_12-07c	15/05/2014	10784	0.0046	0.0069	1.7272	21.8694	0.0026	3.5739	0.0424
WLC_12-07c	27/05/2014	10804	0.0053	0.0090	1.9429	24.9637	0.0043	3.8903	0.0440
WLC_12-07c	07/05/2014	10762	0.0055	0.0088	2.2609	26.7625	0.0036	4.4686	0.0286

ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
1.2997	69.5854	0.0020	0.0017	0.0003	0.0003	0.0007	0.0116	0.0002	0.0079	0.0004	0.0198
1.3117	71.7478	0.0021	0.0029	0.0001	0.0002	0.0007	0.0089	0.0002	0.0083	0.0004	0.0201
0.8855	106.4210	0.0011	0.0007	0.0003	0.0012	0.0001	0.0177	0.0002	0.0064	0.0004	0.0201
0.8855	106.4210	0.0011	0.0007	0.0003	0.0012	0.0001	0.0177	0.0002	0.0064	0.0004	0.0201
1.1198	103.8995	0.0026	0.0018	0.0003	0.0003	0.0005	0.0052	0.0003	0.0037	0.0001	0.0112
0.9722	112.9676	0.0012	0.0007	0.0001	0.0002	0.0003	0.0040	0.0003	0.0064	0.0000	0.0132
0.9722	112.9676	0.0012	0.0007	0.0001	0.0002	0.0003	0.0040	0.0003	0.0064	0.0000	0.0132
1.2170	145.8210	0.0014	0.0007	0.0002	0.0004	0.0003	0.0060	0.0002	0.0057	0.0007	0.0001
1.0753	115.7273	0.0012	0.0014	0.0002	0.0012	0.0012	0.0446	0.0003	0.0045	0.0022	0.0089
1.2893	163.9267	0.0012	0.0010	0.0002	0.0003	0.0002	0.0076	0.0003	0.0045	0.0005	0.0030
0.8641	110.1409	0.0011	0.0012	0.0003	0.0010	0.0003	0.0145	0.0003	0.0061	0.0006	0.0205
1.1254	102.3157	0.0024	0.0017	0.0003	0.0003	0.0031	0.0172	0.0003	0.0041	0.0002	0.0097
1.0448	116.0022	0.0011	0.0009	0.0001	0.0002	0.0004	0.0120	0.0003	0.0061	0.0001	0.0023
1.0827	126.6856	0.0012	0.0012	0.0002	0.0008	0.0002	0.0166	0.0002	0.0048	0.0010	0.0091
1.2030	159.2208	0.0013	0.0011	0.0002	0.0001	0.0003	0.0059	0.0003	0.0045	0.0000	0.0035
1.3025	162.8980	0.0011	0.0010	0.0002	0.0004	0.0004	0.0018	0.0003	0.0046	0.0006	0.0028
1.4060	181.8441	0.0012	0.0013	0.0001	0.0006	0.0000	0.0098	0.0002	0.0064	0.0003	0.0027
1.1310	116.8638	0.0014	0.0009	0.0004	0.0004	0.0002	0.0010	0.0002	0.0044	0.0002	0.0020
1.1469	102.3771	0.0023	0.0016	0.0004	0.0005	0.0002	0.0111	0.0003	0.0044	0.0001	0.0149
1.2028	118.9174	0.0012	0.0006	0.0001	0.0003	0.0006	0.0052	0.0004	0.0061	0.0000	0.0853
1.2028	118.9174	0.0012	0.0006	0.0001	0.0003	0.0006	0.0052	0.0004	0.0061	0.0000	0.0853
1.3223	151.9639	0.0014	0.0008	0.0002	0.0003	0.0001	0.0053	0.0003	0.0062	0.0005	0.0001
1.1060	121.1161	0.0011	0.0011	0.0003	0.0012	0.0006	0.0120	0.0002	0.0041	0.0012	0.0050
1.4435	186.3017	0.0012	0.0013	0.0002	0.0009	0.0006	0.0211	0.0003	0.0065	0.0004	0.0035
1.2245	104.0725	0.0023	0.0018	0.0004	0.0004	0.0018	0.0105	0.0003	0.0045	0.0002	0.0105
1.0013	116.6102	0.0011	0.0008	0.0003	0.0010	0.0003	0.0156	0.0002	0.0066	0.0006	0.1166
1.1790	120.3593	0.0011	0.0011	0.0002	0.0005	0.0023	0.0915	0.0004	0.0074	0.0007	0.0029
1.1805	104.4279	0.0009	0.0005	0.0001	0.0003	0.0002	0.0116	0.0003	0.0073	0.0005	0.0170
1.2527	78.0605	0.0015	0.0012	0.0004	0.0002	0.0003	0.0093	0.0002	0.0053	0.0001	0.0539
0.7907	70.0117	0.0017	0.0013	0.0000	0.0001	0.0678	0.0039	0.0003	0.0035	0.0007	0.1233
0.8383	75.5124	0.0017	0.0012	0.0003	0.0008	0.0086	0.0152	0.0002	0.0028	0.0007	0.0382
0.0001	36.9902	0.0016	0.0010	0.0003	0.0008	0.0207	0.0083	0.0001	0.0030	0.0036	0.0109
0.5249	64.0578	0.0014	0.0011	0.0002	0.0008	0.0007	0.0060	0.0001	0.0020	0.0002	0.0097
0.0601	78.1006	0.0015	0.0007	0.0001	0.0007	0.0026	0.0036	0.0003	0.0026	0.0005	0.0585
1.0383	91.1776	0.0021	0.0014	0.0000	0.0005	0.0075	0.0010	0.0002	0.0033	0.0012	0.0219
0.8808	102.7141	0.0011	0.0012	0.0000	0.0005	0.0226	0.0046	0.0002	0.0053	0.0005	0.0422
1.0069	111.1977	0.0024	0.0017	0.0000	0.0003	0.0178	0.0033	0.0002	0.0035	0.0008	0.0177

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Ga	Ge	As	Se	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0000	0.0029	0.0351	0.0007	0.1462	0.0000	0.0000	0.0001	0.0019	0.0001	0.0002
0.0000	0.0002	0.0038	0.0339	0.0006	0.1493	0.0000	0.0001	0.0001	0.0020	0.0001	0.0002
0.0000	0.0000	0.0131	0.1016	0.0003	0.1759	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0131	0.1016	0.0003	0.1759	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0099	0.1158	0.0005	0.1716	0.0000	0.0000	0.0001	0.0013	0.0001	0.0000
0.0000	0.0000	0.0141	0.1128	0.0004	0.1931	0.0000	0.0000	0.0000	0.0012	0.0001	0.0000
0.0000	0.0000	0.0141	0.1128	0.0004	0.1931	0.0000	0.0000	0.0000	0.0012	0.0001	0.0000
0.0000	0.0000	0.0183	0.1590	0.0006	0.2759	0.0000	0.0000	0.0000	0.0013	0.0001	0.0001
0.0000	0.0000	0.0112	0.1128	0.0005	0.2111	0.0000	0.0001	0.0001	0.0014	0.0001	0.0001
0.0000	0.0001	0.0132	0.1649	0.0006	0.2658	0.0000	0.0000	0.0000	0.0014	0.0001	0.0001
0.0000	0.0000	0.0107	0.1016	0.0003	0.1693	0.0000	0.0000	0.0001	0.0018	0.0001	0.0000
0.0000	0.0000	0.0095	0.1188	0.0005	0.1756	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0115	0.1035	0.0005	0.1901	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0114	0.1246	0.0005	0.2363	0.0000	0.0001	0.0001	0.0011	0.0001	0.0001
0.0000	0.0000	0.0133	0.1606	0.0006	0.2525	0.0000	0.0000	0.0000	0.0014	0.0001	0.0000
0.0000	0.0000	0.0147	0.1660	0.0006	0.2670	0.0000	0.0000	0.0000	0.0014	0.0001	0.0000
0.0000	0.0000	0.0188	0.1660	0.0006	0.2821	0.0000	0.0000	0.0000	0.0015	0.0001	0.0000
0.0000	0.0000	0.0146	0.1262	0.0004	0.1910	0.0000	0.0000	0.0000	0.0016	0.0001	0.0000
0.0000	0.0000	0.0102	0.1106	0.0004	0.1752	0.0000	0.0000	0.0001	0.0013	0.0001	0.0001
0.0000	0.0000	0.0145	0.1179	0.0005	0.2031	0.0000	0.0000	0.0001	0.0014	0.0001	0.0000
0.0000	0.0000	0.0145	0.1179	0.0005	0.2031	0.0000	0.0000	0.0001	0.0014	0.0001	0.0000
0.0000	0.0000	0.0205	0.1567	0.0007	0.2589	0.0000	0.0000	0.0000	0.0015	0.0001	0.0001
0.0000	0.0000	0.0092	0.1108	0.0005	0.2088	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0188	0.1675	0.0007	0.2901	0.0000	0.0001	0.0000	0.0015	0.0001	0.0002
0.0000	0.0000	0.0072	0.1071	0.0005	0.1759	0.0000	0.0000	0.0001	0.0013	0.0001	0.0000
0.0000	0.0000	0.0118	0.0961	0.0003	0.1759	0.0000	0.0000	0.0000	0.0016	0.0001	0.0000
0.0000	0.0000	0.0121	0.1025	0.0006	0.1931	0.0000	0.0000	0.0000	0.0014	0.0001	0.0001
0.0000	0.0000	0.0067	0.0581	0.0005	0.1859	0.0000	0.0000	0.0000	0.0017	0.0001	0.0001
0.0000	0.0000	0.0026	0.0420	0.0007	0.1598	0.0000	0.0000	0.0001	0.0017	0.0001	0.0000
ud	ud	0.0008	ud	0.0004	0.0894	0.0000	0.0003	0.0000	0.0024	ud	0.0001
0.0001	ud	0.0002	ud	0.0006	0.0816	0.0001	0.0001	0.0010	0.0029	ud	0.0000
ud	0.0000	0.0042	0.0011	0.0010	0.0940	0.0000	0.0001	0.0006	0.0651	ud	ud
ud	ud	0.0004	0.0004	0.0003	0.1476	0.0000	0.0001	0.0007	0.0009	ud	0.0000
0.0000	0.0000	0.0002	0.0005	0.0003	0.1021	0.0000	0.0000	0.0009	0.0013	ud	0.0000
0.0000	0.0000	0.0007	0.0047	0.0005	0.1001	0.0000	0.0001	0.0001	0.0004	0.0001	0.0000
0.0000	0.0000	0.0007	0.0057	0.0004	0.1190	0.0000	0.0001	0.0001	0.0006	0.0001	0.0000
0.0000	0.0000	0.0008	0.0075	0.0004	0.1279	0.0000	0.0001	0.0001	0.0007	0.0001	0.0000

ICP-MS Sn ppm	ICP-MS Sb ppm	ICP-MS Cs ppm	ICP-MS Ba ppm	ICP-MS La ppm	ICP-MS Ce ppm	ICP-MS Pr ppm	ICP-MS Nd ppm	ICP-MS Sm ppm	ICP-MS Eu ppm	ICP-MS Gd ppm	ICP-MS Tb ppm
0.0000	0.0004	0.0002	0.0780	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0002	0.0791	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0616	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0616	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.0586	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0571	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0571	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0000	0.0593	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0047	0.0001	0.0005	0.0455	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.0000	0.0571	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0709	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0002	0.0562	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0004	0.0477	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0005	0.0493	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.0000	0.0569	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0605	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.0000	0.0577	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000
0.0000	0.0001	0.0000	0.0704	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.0645	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0627	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0627	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.0000	0.0741	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0006	0.0548	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0002	0.0001	0.0632	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.0885	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.0747	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0861	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0002	0.0729	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0002	0.0515	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.2395	0.0000	0.0000	0.0000	0.0000	0.0000	ud	0.0000	0.0000
0.0002	0.0000	0.1866	0.2171	0.0000	0.0001	ud	0.0000	0.0000	0.0000	0.0000	ud
0.0002	0.0019	0.1103	0.1065	0.0000	0.0000	ud	ud	ud	ud	0.0000	ud
0.0014	0.0000	0.1356	0.1262	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0001	0.0002	0.1678	0.2014	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0001	0.0000	0.0001	0.0548	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0002	0.0633	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0004	0.0000	0.0001	0.0674	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS Dy ppm	ICP-MS Ho ppm	ICP-MS Er ppm	ICP-MS Tm ppm	ICP-MS Yb ppm	ICP-MS Lu ppm	ICP-MS Hf ppm	ICP-MS Ta ppm	ICP-MS W ppm	ICP-MS Hg ppm	ICP-MS Tl ppm	ICP-MS Pb ppm	ICP-MS Th ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	ud	0.0004	0.0000	0.0002	0.0000
ud	ud	ud	ud	ud	0.0000	0.0002	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0002	ud	0.0001	ud	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	0.0000	#VALUE!	0.0000
ud	ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0023	0.09	0.56	0.03	0.03	4.22	0.03	49.72	0.002	77.679	0.000	1.482
0.0023	0.09	0.56	0.03	0.03	4.22	0.03	49.72	0.002	77.679	0.000	1.482
0.0024	0.15	0.92	0.03	0.03	4.96	0.03	159.79	0.002	113.849	0.000	1.132
0.0024	0.24	1.26	0.03	0.03	7.90	0.03	262.29	0.002	113.849	0.000	1.132
0.0025	0.20	2.40	0.03	0.03	9.38	0.03	263.35	0.002	114.418	0.000	1.276
0.0033	0.24	1.48	0.03	0.03	8.25	0.03	279.96	0.004	118.920	0.000	1.108
0.0033	0.24	1.56	0.03	0.03	8.24	0.03	279.41	0.004	118.920	0.000	1.108
0.0060	0.21	2.57	0.03	0.03	11.45	0.03	396.62	0.002	128.310	0.000	1.436
0.0026	0.21	2.15	0.03	0.03	9.58	0.03	322.35	0.002	133.994	0.000	1.167
0.0048	0.16	2.99	0.03	0.03	13.42	0.03	449.35	0.002	165.052	0.000	1.467
0.0024	0.21	1.50	0.03	0.03	7.87	0.03	268.33	0.002	112.391	0.000	1.168
0.0033	0.21	2.46	0.03	0.03	9.23	0.03	264.26	0.006	117.088	0.000	1.410
0.0027	0.20	1.74	0.03	0.03	8.81	0.03	301.67	0.002	118.511	0.000	1.147
0.0032	0.20	2.43	0.03	0.03	11.17	0.03	388.03	0.002	145.596	0.000	1.254
0.0045	0.20	2.87	0.03	0.03	11.82	0.03	393.71	0.002	163.463	0.000	1.512
0.0048	0.18	2.82	0.03	0.03	13.64	0.03	457.50	0.002	166.555	0.000	1.513
0.0054								0.002	181.719	0.000	1.591
0.0043	0.24	1.95	0.03	0.03	8.62	0.03	263.10	0.002	90.744	0.000	1.219
0.0027	0.21	2.50	0.03	0.03	9.15	0.03	264.60	0.002	114.187	0.000	1.356
0.0035	0.23	1.64	0.03	0.03	9.28	0.03	300.13	0.005	126.499	0.000	1.221
0.0035	0.22	1.51	0.03	0.03	9.25	0.03	300.77	0.005	126.499	0.000	1.221
0.0059	0.22	2.55	0.03	0.03	12.36	0.03	407.35	0.002	136.419	0.000	1.485
0.0031	0.18	2.30	0.03	0.03	10.66	0.03	350.34	0.002	139.197	0.000	1.294
0.0055								0.002	178.164	0.000	1.569
0.0025	0.20	2.39	0.03	0.03	9.17	0.03	264.77	0.002	115.019	0.000	1.469
0.0024	0.25	1.56	0.03	0.03	9.00	0.03	281.98	0.002	121.351	0.000	1.158
0.0027	0.18	1.61	0.03	0.03	10.72	0.03	327.80	0.002	126.072	0.000	1.215
0.0028	0.22	1.80	0.03	0.03	14.77	0.03	258.32	0.002	111.868	0.000	1.529
0.0026	0.16	2.13	0.03	0.03	10.38	0.03	176.84	0.002	86.655	0.000	1.613
0.0007	0.19	0.61	0.03	0.10	0.02	0.03	7.54	0.002	82.546	0.000	1.014
0.0007	0.15	0.49	0.03	0.10	0.02	0.03	12.80				
0.0034	0.52	1.31	0.27	0.10	0.30	0.03	32.50	0.005	37.911	ud	1.209
0.0006	0.34	0.65	0.03	0.10	0.15	0.03	6.84				
0.0006	0.50	0.38	0.03	0.10	0.28	0.03	3.10	ud	76.503	ud	0.619
0.0007	0.13	1.40	0.03	0.10	0.75	0.03	78.88	0.006	107.892	0.000	1.126
0.0010								0.006	115.606	0.000	0.999
0.0012	0.12	1.32	0.03	0.10	0.70	0.03	87.56	0.020	116.540	0.000	1.069

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
31.653	5.000	0.025	49.521	0.056							7.61	134
31.653	5.000	0.025	49.521	0.056							7.61	134
46.515	2.476	0.019	82.956	0.138							7.60	160
46.515	2.476	0.019	82.956	0.138							7.60	160
51.065	3.157	0.028	89.449	0.163	7.27	4.4	198				7.88	163
46.562	2.660	0.038	85.354	0.170	7.20	4.9		903			7.46	162
46.562	2.660	0.038	85.354	0.170							7.46	162
67.112	4.984	0.027	136.541	0.222	7.34	17.6	231				7.63	189
53.530	3.445	0.006	102.596	0.142	7.28		273				7.49	141
76.161	5.683	0.020	152.542	0.207	7.13	5.6					7.57	244
47.747	2.658	0.017	85.897	0.139							7.76	158
52.949	3.384	0.048	95.025	0.206	7.31	4.2	195				7.88	159
49.808	3.108	0.023	93.131	0.153	7.30	12.9	190				7.93	164
62.004	4.467	0.015	124.120	0.159	7.25	16.2	216				7.61	145
74.969	5.858	0.008	146.189	0.177	7.47	10.7	229				7.70	111
76.990	5.904	0.011	155.464	0.184							7.68	208
81.093	6.085	0.021	160.765	0.208							7.54	208
49.721	3.298	0.022	91.979	0.171							7.94	171
50.776	3.552	0.025	87.336	0.152							7.82	160
50.294	3.099	0.039	92.858	0.175	7.21			950			7.59	164
50.294	3.099	0.039	92.858	0.175							7.59	164
70.918	5.702	0.030	145.127	0.229	7.41	20.4	248				7.73	188
58.110	4.227	0.007	112.136	0.146	7.49		219				7.64	185
83.286	6.077	0.022	161.221	0.211							7.61	212
51.704	3.546	0.023	90.313	0.158							7.80	167
49.449	2.867	0.002	87.166	0.118							7.92	274
52.610	3.604	0.020	98.199	0.146							7.94	301
45.921	6.270	0.016	77.611	0.086	7.45	5.8	188				7.59	151
37.941	6.047	0.022	60.994	0.067							7.94	139
15.166	3.888	0.002	3.743	0.002	7.31	5.9		460	174	1.74	7.64	185
					7.33	7.7		459	140	9.76	7.76	187
9.451	82.259	0.005	ud	13.477	7.40	5.7		545	201	2.68	7.79	193
					7.29	5.6		403	91	8.08	7.57	154
13.322	1.443	ud	ud	1.431	6.86	13.8		464	185	8.90	7.65	182
24.053	1.958	0.036	26.407	0.026	6.92	5.9	297	703	279		7.57	348
25.166	1.652	0.041	28.500	0.036							7.59	132
25.525	2.325	0.024	30.709	0.020	6.95	6.1	308	721	251		7.68	244

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_12-07c	31/05/2014	10826	0.0055	0.0180	1.5955	25.8977	0.0012	3.8561	0.0528
WLC_12-07c	12/06/2014	10869	0.0057	0.0102	1.6705	25.5444	0.0036	8.3404	0.0469
WLC_12-07c	12/06/2014	10868	0.0057	0.0102	1.6705	25.5444	0.0036	8.3404	0.0469
WLC_12-07c	05/06/2014	10846	0.0056	0.0167	1.5337	24.9837	0.0029	6.4983	0.0359
WLC_12-07c	02/06/2014	10836	0.0056	0.0214	1.5714	25.3890	0.0052	5.7380	0.0319
WLC_12-07c	04/07/2013	10530	0.0054	0.0057	1.5669	25.6322	0.0030	4.6519	0.0286
WLC_12-07c	09/07/2013	10540	0.0055	0.0069	1.7386	26.2307	0.0113	4.4224	0.0342
WLC_12-07c	13/07/2013	10566	0.0056	0.0057	2.1105	26.3271	0.3439	4.6738	0.0781
WLC_12-07c	11/07/2013	10569	0.0057	0.0053	2.0651	27.6582	0.0210	4.4020	0.0474
WLC_12-07c	09/07/2013	10540	0.0055	0.0069	1.7386	26.2307	0.0113	4.4224	0.0342
WLC_12-07c	11/07/2013	10569	0.0057	0.0053	2.0651	27.6582	0.0210	4.4020	0.0474
WLC_12-09b	05/09/2013	10659	0.4198	0.3715	222.9169	2.8306	0.0287	2.4065	0.0536
WLC_12-09b	05/09/2013	10659	0.4198	0.3715	222.9169	2.8306	0.0287	2.4065	0.0536
WLC_12-09b	14/09/2013	10674	0.4073	0.3296	199.6932	3.5057	0.0247	2.5236	0.0276
WLC_12-09b	11/08/2013	10614	0.3299	0.2761	188.0281	4.2096	0.0152	2.0502	0.0513
WLC_12-09b	07/05/2014	10757	0.2874	0.2903	147.8541	7.6371	0.0176	2.0626	0.0236
WLC_12-09b	27/05/2014	10800							
WLC_12-09b	19/06/2013	10502	0.3398	0.2949	171.2254	3.3550	0.1120	2.2174	0.0383
WLC_12-09b	15/07/2013	10558	0.3297	0.2845	191.7588	3.5216	0.0736	2.0495	0.0454
WLC_12-09b	15/07/2013	10558R	0.3353	0.2854	188.9450	3.6064	0.0850	2.0667	0.0476
WLC_12-09c	09/07/2014	10935	0.0055	0.0084	1.2677	27.4910	0.0030	2.5485	0.0297
WLC_12-09c	24/07/2013	10590	0.0056	0.0016	1.6075	25.3648	0.0051	2.5358	0.0425
WLC_12-09c	11/03/2014	10735	0.0057	0.0111	1.8579	29.5423	0.0046	2.6364	0.0220
WLC_12-09c	11/06/2014	10865	0.0068	0.0288	1.9005	29.5311	0.0024	2.7527	0.0597
WLC_12-09c	17/09/2013	10681	0.0063	0.0107	1.5412	29.5319	0.0017	2.7785	0.0329
WLC_12-09c	07/05/2014	10758	0.0076	0.0144	2.2804	34.9712	0.0024	2.7513	0.0381
WLC_12-09c	26/05/2014	10799	0.0079	0.0146	1.7556	40.0152	0.0001	2.8359	0.0397
WLC_12-09c	16/07/2013	10570	0.0055	0.0048	1.4572	21.3952	0.0071	2.5646	0.0417
WLC_12-09c	18/06/2013	10501	0.0053	0.0064	1.4648	22.3844	0.0017	2.3862	0.0135
WLC_12-09c	11/07/2013	10554	0.0052	0.0057	1.4948	23.4038	0.0034	2.4713	0.0273
WLC_12-09c	26/08/2013	10636	0.0062	0.0061	1.6892	30.1641	0.0027	2.6620	0.0453
WLC_12-10b	11/03/2014	10736	0.0053	0.0504	3.3288	35.5962	0.0272	2.5409	0.0506
WLC_12-10b	31/05/2014	10827	0.0055	0.0091	2.0008	34.1710	0.0001	2.3283	0.0434
WLC_12-10b	16/07/2014	10982	0.0054	0.0111	1.1346	34.4883	0.0035	2.5054	0.2365
WLC_12-10b	16/07/2014	10982-MS Rep	0.0055	0.0105	1.1824	34.5276	0.0038	2.2199	0.2392
WLC_12-10b	16/07/2014	10981	0.0054	0.0112	1.2267	34.2420	0.0040	2.7335	0.2651
WLC_12-10b	27/05/2014	10802	0.0055	0.0138	1.4131	36.7502	0.0001	2.4461	0.0231

ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
0.8901	114.7853	0.0012	0.0012	0.0001	0.0003	0.0038	0.0004	0.0002	0.0046	0.0007	0.0215
0.9439	108.4422	0.0017	0.0012	0.0001	0.0002	0.0203	0.0099	0.0003	0.0128	0.0070	0.0117
0.9439	108.4422	0.0017	0.0012	0.0001	0.0002	0.0203	0.0099	0.0003	0.0128	0.0070	0.0117
0.8585	113.3792	0.0018	0.0013	0.0002	0.0007	0.0040	0.0118	0.0003	0.0086	0.0004	0.0241
0.9066	110.9806	0.0018	0.0013	0.0002	0.0008	0.0055	0.0096	0.0003	0.0084	0.0004	0.0274
0.9068	115.2216	0.0017	0.0010	0.0002	0.0006	0.0016	0.0058	0.0002	0.0038	0.0004	0.0026
1.0003	121.6531	0.0017	0.0015	0.0003	0.0008	0.0162	0.0155	0.0003	0.0042	0.0005	0.0529
1.1139	121.9125	0.0020	0.0122	0.0012	0.0014	0.0421	0.2784	0.0006	0.0051	0.0014	0.0383
0.9735	126.5124	0.0018	0.0017	0.0001	0.0004	0.0167	0.0261	0.0003	0.0044	0.0005	0.0360
1.0003	121.6531	0.0017	0.0015	0.0003	0.0008	0.0162	0.0155	0.0003	0.0042	0.0005	0.0529
0.9735	126.5124	0.0018	0.0017	0.0001	0.0004	0.0167	0.0261	0.0003	0.0044	0.0005	0.0360
0.0001	4.2869	0.0014	0.0014	0.0001	0.0001	0.0333	0.0130	0.0004	0.0005	0.0038	0.4149
0.0001	4.2869	0.0014	0.0014	0.0001	0.0001	0.0333	0.0130	0.0004	0.0005	0.0038	0.4149
ud	4.8300	0.0008	0.0015	0.0002	ud	0.0271	0.0135	0.0001	0.0004	0.0042	0.0113
0.0001	7.0310	0.0009	0.0013	0.0002	0.0003	0.0219	0.0141	0.0000	0.0005	0.0030	0.0012
0.0008	13.0451	0.0009	0.0016	0.0002	0.0031	0.0280	0.0250	0.0001	0.0005	0.0008	0.0058
0.0001	5.4983	0.0008	0.0027	0.0004	0.0011	0.0242	0.0629	0.0000	0.0005	0.0051	0.0044
0.0001	7.4689	0.0008	0.0023	0.0002	0.0003	0.0191	0.0637	0.0000	0.0003	0.0127	0.0012
0.0001	7.7073	0.0008	0.0047	0.0003	0.0003	0.0204	0.0794	0.0001	0.0003	0.0134	0.0014
0.3882	61.4888	0.0009	0.0009	0.0004	0.0017	0.0001	0.0067	0.0001	0.0035	0.0003	0.2983
0.4892	66.9635	0.0011	ud	0.0002	0.0008	0.0005	0.0023	0.0001	0.0025	ud	0.0016
0.4453	76.5099	0.0009	0.0008	0.0002	0.0005	0.0006	0.0195	0.0001	0.0032	0.0004	0.0053
0.4896	71.5375	0.0010	0.0008	0.0001	0.0006	0.0002	0.0139	0.0002	0.0059	0.0004	0.0188
0.5239	77.5257	0.0008	0.0005	0.0001	0.0007	0.0006	0.0014	0.0002	0.0031	0.0007	0.0033
0.5024	82.7735	0.0015	0.0010	0.0002	0.0006	0.0005	0.0091	0.0001	0.0044	0.0004	0.0100
0.4849	93.8048	0.0008	0.0008	0.0001	0.0004	0.0003	0.0010	0.0001	0.0039	0.0004	0.0139
0.4420	65.2177	0.0011	0.0011	0.0002	0.0013	0.0024	0.0170	0.0002	0.0056	0.0020	0.0016
0.4321	58.7696	0.0009	0.0006	0.0001	0.0007	0.0005	0.0056	0.0001	0.0019	0.0003	0.0035
0.4258	61.3501	0.0010	0.0006	0.0001	0.0006	0.0010	0.0037	0.0001	0.0021	0.0002	0.0024
0.4812	78.6627	0.0012	0.0007	0.0001	0.0007	0.0004	0.0038	0.0002	0.0033	0.0018	0.0018
0.8874	88.1470	0.0009	0.0012	0.0003	0.0009	0.0029	0.0491	0.0002	0.0043	0.0025	0.1402
0.4946	85.5114	0.0007	0.0006	0.0000	0.0010	0.0002	0.0046	0.0001	0.0032	0.0001	0.0063
0.4781	81.2747	0.0010	0.0010	0.0001	0.0004	0.0005	0.0056	0.0003	0.0026	0.0000	0.0514
0.4966	80.1404	0.0011	0.0010	0.0001	0.0004	0.0005	0.0050	0.0003	0.0025	0.0000	0.0511
0.5053	80.7067	0.0011	0.0009	0.0001	0.0004	0.0005	0.0040	0.0002	0.0033	0.0000	0.0031
0.4879	87.2118	0.0007	0.0006	0.0000	0.0009	0.0023	0.0069	0.0002	0.0034	0.0005	0.2698

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Ga	Ge	As	Se	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0000	0.0001	0.0066	0.0002	0.1238	0.0000	0.0000	0.0001	0.0005	0.0001	0.0000
0.0000	0.0000	0.0002	0.0085	0.0004	0.1307	0.0000	0.0000	0.0001	0.0005	0.0001	0.0000
0.0000	0.0000	0.0002	0.0085	0.0004	0.1307	0.0000	0.0000	0.0001	0.0005	0.0001	0.0000
0.0002	0.0000	0.0008	0.0090	0.0003	0.1279	0.0000	0.0000	0.0001	0.0004	0.0001	0.0000
0.0000	0.0000	0.0004	0.0078	0.0003	0.1311	0.0000	0.0000	0.0001	0.0005	0.0001	0.0000
ud	0.0000	ud	0.0066	0.0004	0.1072	0.0000	0.0000	0.0006	0.0005	ud	0.0000
ud	0.0000	0.0005	0.0074	0.0005	0.1146	0.0001	0.0001	0.0006	0.0005	ud	0.0000
0.0000	ud	0.0012	0.0084	0.0012	0.1108	0.0003	0.0005	0.0011	0.0010	ud	0.0000
ud	ud	0.0005	0.0076	0.0005	0.1111	0.0001	0.0001	0.0008	0.0006	ud	0.0000
ud	0.0000	0.0005	0.0074	0.0005	0.1146	0.0001	0.0001	0.0006	0.0005	ud	0.0000
ud	ud	0.0005	0.0076	0.0005	0.1111	0.0001	0.0001	0.0008	0.0006	ud	0.0000
ud	0.0016	0.0016	0.0091	0.0006	0.4895	0.0000	0.0000	0.0014	0.0060	ud	ud
ud	0.0016	0.0016	0.0091	0.0006	0.4895	0.0000	0.0000	0.0014	0.0060	ud	ud
ud	0.0013	0.0020	0.0116	0.0006	0.4714	0.0000	0.0002	0.0000	0.0039	ud	0.0000
ud	0.0009	0.0022	0.0098	0.0003	0.4631	0.0000	0.0001	0.0012	0.0038	ud	ud
0.0000	0.0009	0.0010	0.0111	0.0004	0.7279	0.0000	0.0001	0.0001	0.0024	0.0001	0.0000
ud	0.0009	0.0019	0.0063	0.0007	0.3369	0.0001	0.0002	0.0006	0.0100	ud	ud
ud	0.0009	0.0019	0.0057	0.0005	0.4370	0.0001	0.0001	0.0005	0.0053	ud	ud
ud	0.0009	0.0021	0.0053	0.0005	0.4421	0.0001	0.0002	0.0005	0.0055	ud	ud
0.0000	0.0000	0.0076	0.0533	0.0002	0.0959	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
ud	ud	0.0035	0.0505	0.0002	0.0877	0.0000	0.0001	0.0011	0.0010	ud	0.0000
0.0000	0.0000	0.0040	0.0788	0.0002	0.1251	0.0000	0.0000	0.0000	0.0010	0.0001	0.0001
0.0000	0.0000	0.0024	0.0575	0.0001	0.1129	0.0000	0.0000	0.0000	0.0011	0.0001	0.0000
ud	ud	0.0042	0.0729	0.0003	0.1217	0.0000	0.0000	0.0000	0.0011	ud	0.0000
0.0000	0.0000	0.0063	0.0895	0.0001	0.1419	0.0000	0.0000	0.0000	0.0008	0.0001	0.0000
0.0000	0.0000	0.0049	0.1143	0.0001	0.1514	0.0000	0.0000	0.0001	0.0008	0.0001	0.0000
ud	0.0001	0.0029	0.0488	0.0002	0.0908	ud	0.0000	0.0009	0.0019	ud	0.0000
0.0000	ud	0.0019	0.0398	0.0002	0.0865	ud	0.0000	0.0008	0.0011	ud	0.0000
ud	ud	0.0017	0.0409	0.0002	0.0864	0.0000	0.0000	0.0006	0.0011	ud	ud
ud	ud	0.0045	0.0690	0.0002	0.1089	ud	0.0000	0.0021	0.0011	ud	ud
0.0001	0.0000	0.0047	0.0879	0.0008	0.2769	0.0001	0.0001	0.0000	0.0009	0.0001	0.0000
0.0000	0.0000	0.0023	0.0747	0.0002	0.1193	0.0000	0.0000	0.0001	0.0008	0.0001	0.0000
0.0000	0.0000	0.0073	0.0631	0.0002	0.1079	0.0000	0.0000	0.0001	0.0006	0.0001	0.0000
0.0000	0.0003	0.0085	0.0620	0.0002	0.1090	0.0000	0.0000	0.0001	0.0007	0.0001	0.0000
0.0000	0.0000	0.0082	0.0704	0.0003	0.1174	0.0000	0.0000	0.0001	0.0007	0.0001	0.0000
0.0000	0.0000	0.0051	0.0879	0.0001	0.1353	0.0000	0.0000	0.0001	0.0008	0.0001	0.0000

ICP-MS Sn ppm	ICP-MS Sb ppm	ICP-MS Cs ppm	ICP-MS Ba ppm	ICP-MS La ppm	ICP-MS Ce ppm	ICP-MS Pr ppm	ICP-MS Nd ppm	ICP-MS Sm ppm	ICP-MS Eu ppm	ICP-MS Gd ppm	ICP-MS Tb ppm
0.0001	0.0000	0.0003	0.0808	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0003	0.0677	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0003	0.0677	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.0813	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0002	0.0846	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	ud	0.1116	0.0601	0.0000	0.0000	ud	0.0000	0.0000	ud	ud	ud
0.0001	0.0000	0.1086	0.0647	0.0000	0.0001	0.0000	0.0000	0.0000	ud	0.0000	0.0000
0.0001	0.0001	0.2045	0.0675	0.0004	0.0008	0.0001	0.0004	0.0001	0.0000	0.0001	0.0000
0.0001	0.0000	0.1505	0.0641	0.0000	0.0001	0.0000	0.0001	0.0000	ud	ud	ud
0.0001	0.0000	0.1086	0.0647	0.0000	0.0001	0.0000	0.0000	0.0000	ud	0.0000	0.0000
0.0001	0.0000	0.1505	0.0641	0.0000	0.0001	0.0000	0.0001	0.0000	ud	ud	ud
0.0001	0.0013	ud	0.7281	0.0000	0.0000	ud	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0013	ud	0.7281	0.0000	0.0000	ud	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0007	0.0001	0.6646	0.0000	0.0000	0.0000	0.0000	0.0000	ud	0.0000	0.0000
ud	0.0006	0.0015	0.5713	0.0000	ud	ud	ud	0.0000	0.0000	0.0000	ud
0.0005	0.0004	0.0002	0.5501	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0015	0.1088	0.5288	0.0000	0.0002	0.0000	0.0001	ud	0.0000	ud	ud
0.0001	0.0008	0.0984	0.5408	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0008	0.0990	0.5374	0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.0430	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1799	0.0467	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0007	0.0000	0.0003	0.0747	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0002	0.0714	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0604	0.0000	0.0000	0.0000	ud	0.0000	ud	ud	ud
0.0003	0.0000	0.0001	0.0879	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0003	0.0832	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.1409	0.0463	ud	0.0000	ud	0.0000	ud	ud	ud	ud
0.0001	0.0000	0.1503	0.0408	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0000	0.1180	0.0437	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0000	0.0025	0.0576	ud	ud	ud	ud	ud	ud	ud	ud
0.0006	0.0003	0.0001	0.1764	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0002	0.0602	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0004	0.0606	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0004	0.0608	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0004	0.0585	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0002	0.0752	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS Dy ppm	ICP-MS Ho ppm	ICP-MS Er ppm	ICP-MS Tm ppm	ICP-MS Yb ppm	ICP-MS Lu ppm	ICP-MS Hf ppm	ICP-MS Ta ppm	ICP-MS W ppm	ICP-MS Hg ppm	ICP-MS Tl ppm	ICP-MS Pb ppm	ICP-MS Th ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0001	0.0000	ud	0.0007	ud	0.0001	0.0000
0.0000	ud	0.0000	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
0.0001	0.0000	0.0000	ud	0.0000	0.0000	ud	0.0000	ud	0.0007	ud	0.0003	0.0000
0.0000	ud	ud	ud	0.0000	ud	ud	0.0000	ud	ud	ud	0.0001	0.0000
0.0000	ud	0.0000	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
0.0000	ud	ud	ud	0.0000	ud	ud	0.0000	ud	ud	ud	0.0001	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	0.0005	ud	ud	0.0003	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	0.0005	ud	ud	0.0003	ud
0.0000	0.0000	0.0000	0.0000	ud	0.0000	0.0001	0.0000	0.0004	0.0049	ud	0.0002	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	0.0003	0.0016	ud	0.0001	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0013	0.0000	0.0001	0.0000
0.0000	ud	ud	ud	ud	ud	ud	0.0000	0.0003	0.0021	ud	0.0003	ud
0.0000	ud	0.0000	ud	0.0000	ud	ud	0.0000	0.0003	0.0022	ud	0.0002	0.0000
0.0000	ud	0.0000	ud	0.0000	ud	ud	0.0000	0.0003	0.0040	ud	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	ud	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	ud	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	ud	ud	ud	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0001	ud
ud	ud	ud	ud	ud	0.0000	0.0001	ud	ud	ud	ud	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	ud	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0004	0.0000	0.0003	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0011								0.006	118.033	0.000	0.763
0.0013	0.19	1.30	0.03	0.03	0.69	0.03	106.00	0.004	121.286	0.000	1.063
0.0013	0.22	1.33	0.03	0.03	0.66	0.03	105.88	0.005	121.384	0.000	1.043
0.0013	0.19	1.33	0.03	0.03	0.75	0.03	100.33	0.004	122.389	0.000	1.081
0.0012	0.14	1.55	0.03	0.03	0.74	0.03	88.20	0.004	124.343	0.000	1.030
0.0009	0.03	0.48	0.03	0.10	0.51	0.03	71.62				
0.0010	0.31	0.47	0.03	0.10	0.57	0.03	74.28	ud	119.165	ud	1.013
0.0011	0.03	0.44	0.03	0.10	0.46	0.03	75.80	ud	114.133	ud	1.106
0.0011	0.12	0.44	0.03	0.10	0.39	0.03	75.93	ud	117.789	ud	0.997
0.0010	0.03	0.42	0.03	0.10	0.57	0.03	75.87	ud	119.165	ud	1.013
0.0011	0.12	0.44	0.03	0.10	0.39	0.03	75.93	ud	117.789	ud	0.997
0.0002	0.88	81.49	0.15	0.52	0.11	0.03	32.36	0.002	4.063	0.000	0.798
0.0002	0.88	81.49	0.15	0.52	0.11	0.03	32.36	0.002	4.063	0.000	0.798
0.0002	0.85	70.76	0.06	0.21	0.30	0.03	37.08	0.002	5.197	0.000	0.837
0.0002	0.81	37.11	0.03	0.10	0.31	0.03	52.86	0.002	7.372	0.000	0.692
0.0004	0.62	49.86	0.08	0.11	7.51	0.03	81.74	0.004	12.444	0.000	0.829
								0.002	14.053	0.000	0.829
0.0002	0.88	31.44	0.03	0.10	0.17	0.03	53.69				
0.0002	0.81	31.47	0.17	0.10	0.72	0.03	41.76	ud	5.644	ud	0.687
0.0002	0.81	31.47	0.17	0.10	0.72	0.03	41.76	ud	5.644	ud	0.687
0.0016	0.31	0.53	0.03	0.03	3.15	0.03	127.59	0.002	68.916	0.000	0.488
0.0014	0.27	0.30	0.03	0.10	2.20	0.03	92.82	0.002	70.495	0.000	0.461
0.0016	0.28	0.63	n.a.	n.a.	5.52	n.a.	156.34	0.002	72.682	0.000	0.488
0.0015	0.33	0.79	0.03	0.03	7.79	0.03	152.75	0.002	78.084	0.000	0.551
0.0019	0.38	0.70	0.03	0.10	4.65	0.03	129.96	0.002	81.502	0.000	0.657
0.0021	0.43	1.43	0.03	0.10	5.85	0.03	188.20	0.002	88.736	0.000	0.526
0.0019								0.002	99.535	0.000	0.602
0.0013	0.31	0.23	0.29	0.10	2.19	0.03	77.79	0.002	100.966	0.000	0.477
0.0014	0.43	0.25	0.03	0.10	1.88	0.03	67.01				
0.0015	0.29	0.39	0.03	0.10	1.97	0.03	76.48	ud	64.120	ud	0.466
0.0015	0.29	0.28	0.03	0.10	2.65	0.03	114.40	ud	77.472	ud	0.495
0.0021	0.45	2.96	0.03	0.10	7.05	0.03	158.21	0.006	84.655	0.000	0.277
0.0015								0.002	85.648	0.000	0.411
0.0021	0.21	1.14	0.03	0.03	4.91	0.03	177.10	0.005	86.074	0.000	0.580
0.0020	0.21	1.14	0.03	0.03	4.91	0.03	177.10	0.005	86.074	0.000	0.580
0.0021	0.17	1.17	0.03	0.03	4.82	0.03	174.93	0.005	86.128	0.000	0.577
0.0017								0.002	90.307	0.000	0.534

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
25.599	1.943	0.039	28.720	0.034	7.04	5.8	300	727	234		7.44	247
27.005	1.741	0.023	35.985	0.025							7.68	242
26.773	1.773	0.021	35.730	0.023	7.17	7.1	307	735	307		7.61	243
26.863	1.795	0.037	34.093	0.024	7.16		309				7.76	253
26.296	1.629	0.020	31.346	0.022	7.20		311				7.69	263
					7.00	9.5		709	154	4.25	7.37	240
26.227	1.729	0.003	0.007	31.527	6.83	10.2		700	183	5.32	7.40	234
25.524	2.239	0.025	0.009	34.690	6.67	7.8		733	180	6.29	7.20	216
26.959	2.090	0.005	0.008	36.856	6.75	7.7		726	221	5.99	7.69	244
26.227	1.729	0.003	0.007	31.527	6.83			700	183	5.32	7.40	234
26.959	2.090	0.005	0.008	36.856	6.75	7.7		726	221	5.99	7.54	244
2.961	185.842	0.016	15.333	0.010	8.95	3.3	333	832	-35	0.14	8.45	236
2.961	185.842	0.016	15.333	0.010	8.95	3.3	333	832	-35	0.14	8.45	235
3.664	187.388	0.019	18.521	0.014	8.65	3.1		842	-221	0.01	8.34	227
4.275	157.389	0.026	22.026	0.012	8.74	4.5		766	26	0.00	8.28	196
7.053	146.976	0.035	28.415	0.026	8.51	3.8	243	1112	-50		8.21	191
8.040	137.436	0.043	30.000	0.043	8.45	3.7		785	235		8.21	193
					9.10	3.4		909	-107	0.00	8.18	191
3.580	163.958	0.020	0.005	20.118	8.70	3.6		837	-142	0.00	8.05	195
3.580	163.958	0.020	0.005	20.118	8.70	3.6		837	-142	0.00	8.09	194
25.260	1.409	0.020	36.805	0.073	7.21	4.0	162	525	81		7.83	121
23.985	1.519	0.002	38.555	0.059	6.99	3.3		518	115	12.33	7.78	111
27.974	1.973	0.024	46.364	0.096	7.76	2.9	156	596		10.61	7.39	113
30.638	1.555	0.010	50.080	0.085	7.42	3.3	151	612	282		7.87	126
31.466	1.823	0.006	54.382	0.091	8.65	3.1		842	-221	0.01	7.87	117
33.249	2.262	0.015	58.326	0.115	7.26	3.0	169	691	235		7.53	133
40.550	1.911	0.023	74.723	0.152	7.57	3.2	148	787	228		7.65	137
25.825	1.788	0.064	38.414	0.065	6.78	4.1		535	207	12.48	7.68	113
					7.69	4.5		459	180	10.15	7.67	107
23.139	1.572	ud	0.055	34.555	5.53	3.9		474	227	10.42	7.68	107
29.714	1.812	ud	0.080	49.999	7.41	3.0		594	187	9.96	7.79	123
33.899	3.807	0.027	58.037	0.109	7.83	3.4	250	688	241	10.45	7.54	131
32.291	2.336	0.020	56.797	0.106	7.46	5.2	150	739			7.65	140
33.556	1.290	0.037	54.029	0.119							7.59	141
33.556	1.290	0.037	54.029	0.119							7.59	141
33.662	1.272	0.036	54.544	0.125	7.33	4.9		665			7.85	141
33.897	1.381	0.025	69.263	0.133							7.32	139

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_12-10b	29/05/2014	10818	0.0053	0.0167	1.3404	35.9132	0.0006	2.6615	0.0467
WLC_12-10b	09/07/2014	10943	0.0057	0.0096	1.2833	36.4198	0.0034	1.8144	0.0241
WLC_12-10b	29/05/2014	10819	0.0055	0.0169	1.4687	36.1754	0.0001	2.7683	0.0288
WLC_12-10b	23/06/2014	10907	0.0062	0.0080	1.3132	38.1444	0.0021	2.8414	0.0487
WLC_12-10b	23/06/2014	10908	0.0064	0.0184	1.3960	38.5932	0.0045	3.0119	0.0704
WLC_12-10b	12/07/2013	10557	0.0058	0.0051	1.2520	27.0398	0.0105	2.6178	0.0523
WLC_12-10b	02/06/2014	10837	0.0059	0.0089	1.6944	38.6853	0.0056	3.5777	0.0240
WLC_12-10b	10/06/2014	10861	0.0064	0.0182	1.7333	44.7976	0.0032	2.8512	0.0497
WLC_12-10b	05/06/2014	10849	0.0063	0.0112	1.5854	43.9646	0.0022	5.5796	0.0416
WLC_12-10b	26/06/2013	10509	0.0057	0.0078	2.3309	31.2604	0.0068	2.4531	0.0326
WLC_12-10b	05/07/2013	10533	0.0056	0.0083	1.4419	32.4001	0.0074	2.7282	0.0259
WLC_12-11N	26/08/2013	10635	0.0301	0.0118	5.0841	72.3411	0.0089	2.6767	0.0791
WLC_12-11N	15/01/2014	10722	0.0499	0.0204	9.0926	94.9896	0.0035	2.2633	0.1453
WLC_12-11N	15/01/2014	10722-MS Rep	0.0501	0.0207	7.5252	95.2376	0.0033	2.2345	0.1386
WLC_12-11N	16/09/2013	10677R	0.0378	0.0214	5.7097	99.3079	0.0109	3.0208	0.0232
WLC_12-11N	16/09/2013	10677R	0.0378	0.0214	5.7097	99.3079	0.0109	3.0208	0.0232
WLC_12-11N	17/06/2013	10499	0.0108	0.0088	1.9480	39.5413	0.0068	2.7848	0.0303
WLC_12-11N	17/06/2013	10500	0.0111	0.0087	1.9719	39.4956	0.0055	2.8072	0.0205
WLC_12-11N	17/06/2013	10499R	0.0109	0.0107	2.0401	39.7886	0.0229	2.9131	0.0284
WLC_12-11S	14/01/2014	10719	0.0487	0.0360	8.0236	94.3124	0.0087	2.1536	0.2356
WLC_12-11S	05/06/2013	10478	0.0173	0.0122	3.0243	48.2914	0.0030	2.9564	0.0120
WLC_12-11S	27/06/2013	10510	0.0128	0.0098	2.2540	35.9167	0.0041	2.6298	0.0363
WLC_12-12	16/09/2013	10677	0.0323	0.0121	7.4587	35.4382	0.0020	2.8259	0.0143
WLC_12-12	15/09/2013	10677	0.0323	0.0121	7.4587	35.4382	0.0020	2.8259	0.0143
WLC_12-12	16/09/2013	10678	0.0324	0.0103	7.3568	33.9398	0.0021	2.8433	0.0131
WLC_12-12	25/07/2013	10591	0.0354	0.0055	8.5960	39.0331	0.0067	2.4750	0.0395
WLC_12-12	25/07/2013	10591	0.0354	0.0055	8.5960	39.0331	0.0067	2.4750	0.0395
WLC_12-12	27/08/2014	13092	0.0345	0.0128	8.8665	44.4969	0.0152	2.5134	0.0391
WLC_12-12	27/08/2014	13092-MS Rep	0.0351	0.0125	8.6672	44.7465	0.0151	2.5484	0.0380
WLC_12-12	10/03/2014	10732	0.0308	0.0157	7.4907	60.2897	0.0059	2.4513	0.0218
WLC_12-12	14/01/2014	10717	0.0308	0.0188	7.1033	50.3074	0.0047	2.2572	0.1337
WLC_12-12	31/05/2014	10831	0.0363	0.0171	8.4702	51.9883	0.0004	2.2156	0.0396
WLC_12-12	21/07/2014	10995	0.0376	0.0175	8.6474	52.9653	0.0051	2.5018	0.2464
WLC_12-12	05/05/2014	10754	0.0343	0.0109	8.3639	65.3561	0.0019	2.4500	0.0200
WLC_12-12	05/05/2014	10754-ICS Rep	0.0343	0.0109	8.3639	65.3561	0.0019	2.4500	0.0200
WLC_12-12	16/06/2014	10894	0.0385	0.0228	10.2080	50.9471	0.0036	2.7308	0.0495
WLC_12-12	10/07/2014	10950	0.0362	0.0210	8.7101	54.2118	0.0025	2.4375	0.0403

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.4433	85.3931	0.0007	0.0006	0.0000	0.0012	0.0003	0.0067	0.0001	0.0034	0.0006	0.0146
0.5353	87.9022	0.0010	0.0008	0.0002	0.0009	0.0001	0.0092	0.0002	0.0048	0.0004	0.0063
0.2987	88.7538	0.0007	0.0006	0.0000	0.0010	0.0003	0.0052	0.0001	0.0034	0.0006	0.0218
0.5479	92.1116	0.0010	0.0007	0.0000	0.0004	0.0002	0.0151	0.0002	0.0080	0.0006	0.0719
0.3633	94.8352	0.0011	0.0005	0.0000	0.0005	0.0028	0.0047	0.0003	0.0083	0.0006	0.0527
0.6181	79.1734	0.0011	0.0015	0.0001	0.0009	0.0017	0.0121	0.0002	0.0032	0.0004	0.0070
0.5076	100.7628	0.0011	0.0007	0.0001	0.0010	0.0001	0.0047	0.0002	0.0073	0.0003	0.0086
0.5175	114.1187	0.0011	0.0011	0.0001	0.0008	0.0001	0.0078	0.0003	0.0093	0.0002	0.0162
0.5344	112.5100	0.0011	0.0009	0.0002	0.0007	0.0002	0.0068	0.0003	0.0085	0.0004	0.0191
0.6084	90.5771	0.0010	0.0010	0.0002	0.0016	0.0019	0.0110	0.0002	0.0031	0.0012	0.0499
0.6333	83.7119	0.0010	0.0006	0.0002	0.0018	0.0022	0.0025	0.0002	0.0035	0.0037	0.0296
1.3008	161.5612	0.0013	0.0013	0.0002	0.0007	0.0007	0.0049	0.0003	0.0077	0.0008	0.0043
1.6796	192.1620	0.0008	0.0008	0.0002	0.0005	0.0005	0.0109	0.0004	0.0093	0.0008	0.0089
1.5697	191.7847	0.0008	0.0009	0.0001	0.0007	0.0006	0.0105	0.0003	0.0093	0.0008	0.0088
1.6137	206.9234	0.0010	0.0023	0.0002	0.0003	0.0013	0.0057	0.0004	0.0092	0.0001	0.0076
1.6137	206.9234	0.0010	0.0023	0.0002	0.0003	0.0013	0.0057	0.0004	0.0092	0.0001	0.0076
0.9288	103.2909	0.0010	0.0015	0.0002	0.0009	0.0011	0.0178	0.0002	0.0036	0.0006	0.0030
0.9445	103.0311	0.0010	0.0011	0.0002	0.0009	0.0014	0.0063	0.0002	0.0035	0.0006	0.0035
0.9637	104.7975	0.0010	0.0044	0.0004	0.0012	0.0015	0.0308	0.0002	0.0036	0.0005	0.0029
1.7624	183.0942	0.0008	0.0011	0.0002	0.0010	0.0030	0.0091	0.0004	0.0090	0.0007	0.0215
1.2988	122.2217	0.0008	0.0006	0.0003	0.0006	0.0006	0.0030	0.0002	0.0049	0.0008	0.0413
0.9523	104.9062	0.0010	0.0010	0.0003	0.0011	0.0003	0.0058	0.0002	0.0036	0.0004	0.0026
0.7455	111.9982	0.0008	0.0008	0.0001	0.0004	0.0027	0.0009	0.0002	0.0051	0.0005	0.0023
0.7455	111.9982	0.0008	0.0008	0.0001	0.0004	0.0027	0.0009	0.0002	0.0051	0.0005	0.0023
0.6884	109.1586	0.0008	0.0007	0.0001	0.0004	0.0052	0.0005	0.0003	0.0049	0.0009	0.0083
0.7382	130.4655	0.0011	ud	0.0002	0.0007	0.0152	0.0092	0.0003	0.0057	ud	0.0037
0.7382	130.4655	0.0011	ud	0.0002	0.0007	0.0152	0.0092	0.0003	0.0057	ud	0.0037
0.8725	134.3648	0.0010	0.0010	0.0002	0.0003	0.0004	0.0067	0.0003	0.0041	0.0010	0.0047
0.8212	136.5567	0.0011	0.0009	0.0002	0.0005	0.0003	0.0068	0.0003	0.0043	0.0010	0.0044
1.0653	146.2209	0.0008	0.0012	0.0003	0.0004	0.0009	0.0110	0.0003	0.0082	0.0004	0.0151
0.8921	130.4216	0.0009	0.0010	0.0002	0.0009	0.0061	0.0052	0.0003	0.0070	0.0005	0.0127
0.9517	147.4344	0.0007	0.0007	0.0001	0.0005	0.0002	0.0024	0.0002	0.0075	0.0003	0.0163
0.8491	145.2722	0.0010	0.0013	0.0001	0.0007	0.0007	0.0168	0.0004	0.0087	0.0004	0.0806
0.9760	153.1545	0.0014	0.0014	0.0002	0.0003	0.0002	0.0069	0.0003	0.0073	0.0003	0.0047
0.9760	153.1545	0.0014	0.0014	0.0002	0.0003	0.0002	0.0069	0.0003	0.0073	0.0003	0.0047
0.6808	153.9627	0.0011	0.0007	0.0001	0.0003	0.0023	0.0116	0.0004	0.0143	0.0007	0.0165
0.8105	158.9027	0.0010	0.0009	0.0001	0.0006	0.0001	0.0118	0.0004	0.0093	0.0011	0.0739
ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS

Ga ppm	Ge ppm	As ppm	Se ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Mo ppm	Ag ppm	Cd ppm
0.0000	0.0000	0.0040	0.0813	0.0001	0.1232	0.0000	0.0000	0.0001	0.0007	0.0001	0.0000
0.0000	0.0000	0.0088	0.0669	0.0001	0.1122	0.0000	0.0000	0.0000	0.0009	0.0001	0.0000
0.0000	0.0000	0.0028	0.0880	0.0001	0.1256	0.0000	0.0000	0.0000	0.0007	0.0001	0.0000
0.0000	0.0000	0.0054	0.0847	0.0002	0.1287	0.0000	0.0000	0.0001	0.0008	0.0001	0.0000
0.0000	0.0000	0.0054	0.0816	0.0001	0.1301	0.0000	0.0000	0.0001	0.0008	0.0001	0.0000
0.0000	0.0001	0.0031	0.0568	0.0004	0.0977	0.0000	0.0000	0.0015	0.0017	ud	0.0000
0.0000	0.0000	0.0065	0.1113	0.0002	0.1414	0.0000	0.0000	0.0000	0.0007	0.0001	0.0000
0.0004	0.0000	0.0058	0.1262	0.0001	0.1562	0.0000	0.0000	0.0001	0.0006	0.0001	0.0000
0.0001	0.0000	0.0080	0.1330	0.0002	0.1546	0.0000	0.0000	0.0001	0.0006	0.0001	0.0000
0.0000	ud	0.0034	0.0711	0.0003	0.1066	0.0000	0.0000	0.0006	0.0008	ud	0.0000
ud	ud	0.0034	0.0632	0.0003	0.1022	0.0000	0.0001	0.0007	0.0012	ud	0.0001
ud	0.0000	0.0106	0.1496	0.0005	0.2856	0.0000	0.0000	0.0018	0.0012	ud	0.0001
0.0000	0.0000	0.0099	0.1755	0.0006	0.2773	0.0000	0.0001	0.0001	0.0026	0.0001	0.0001
0.0000	0.0007	0.0079	0.1803	0.0006	0.2719	0.0000	0.0001	0.0000	0.0025	0.0001	0.0000
ud	ud	0.0159	0.2222	0.0008	0.3899	0.0000	0.0001	0.0001	0.0015	ud	0.0000
ud	ud	0.0159	0.2222	0.0008	0.3899	0.0000	0.0001	0.0001	0.0015	ud	0.0000
0.0001	ud	0.0050	0.0991	0.0005	0.1743	0.0000	0.0001	0.0010	0.0012	ud	0.0000
0.0000	ud	0.0051	0.0963	0.0005	0.1704	0.0000	0.0001	0.0007	0.0012	ud	0.0000
0.0000	0.0004	0.0054	0.1073	0.0005	0.1763	0.0000	0.0001	0.0010	0.0014	ud	0.0000
0.0000	0.0000	0.0114	0.1956	0.0006	0.2798	0.0000	0.0001	0.0001	0.0027	0.0001	0.0001
ud	ud	0.0064	0.1173	0.0006	0.1871	0.0000	0.0000	0.0004	0.0022	ud	0.0000
0.0000	0.0000	0.0047	0.0864	0.0004	0.1685	0.0000	0.0001	0.0006	0.0012	ud	0.0001
0.0000	ud	0.0033	0.0533	0.0005	0.2579	0.0000	0.0000	0.0000	0.0008	ud	0.0001
0.0000	ud	0.0033	0.0533	0.0005	0.2579	0.0000	0.0000	0.0000	0.0008	ud	0.0001
ud	0.0000	0.0034	0.0486	0.0004	0.2549	0.0000	0.0000	0.0000	0.0006	ud	0.0001
ud	ud	0.0035	0.0633	0.0005	0.2838	0.0000	0.0001	0.0009	0.0007	ud	0.0000
ud	ud	0.0035	0.0633	0.0005	0.2838	0.0000	0.0001	0.0009	0.0007	ud	0.0000
0.0000	0.0000	0.0053	0.0699	0.0005	0.2612	0.0000	0.0000	0.0000	0.0006	0.0001	0.0001
0.0000	0.0003	0.0066	0.0731	0.0004	0.2599	0.0000	0.0000	0.0000	0.0006	0.0001	0.0001
0.0000	0.0000	0.0082	0.1257	0.0004	0.2550	0.0000	0.0000	0.0000	0.0013	0.0001	0.0001
0.0000	0.0000	0.0046	0.0846	0.0004	0.2358	0.0000	0.0000	0.0000	0.0009	0.0001	0.0001
0.0000	0.0000	0.0033	0.0847	0.0004	0.2888	0.0000	0.0000	0.0000	0.0008	0.0001	0.0001
0.0000	0.0000	0.0097	0.0761	0.0004	0.2951	0.0000	0.0000	0.0001	0.0006	0.0001	0.0001
0.0000	0.0000	0.0111	0.1322	0.0005	0.2842	0.0000	0.0000	0.0001	0.0015	0.0001	0.0001
0.0000	0.0000	0.0111	0.1322	0.0005	0.2842	0.0000	0.0000	0.0001	0.0015	0.0001	0.0001
0.0000	0.0000	0.0041	0.0845	0.0004	0.3323	0.0000	0.0000	0.0000	0.0006	0.0001	0.0001
0.0000	0.0000	0.0103	0.0838	0.0004	0.3445	0.0000	0.0000	0.0001	0.0006	0.0001	0.0001

ICP-MS Sn ppm	ICP-MS Sb ppm	ICP-MS Cs ppm	ICP-MS Ba ppm	ICP-MS La ppm	ICP-MS Ce ppm	ICP-MS Pr ppm	ICP-MS Nd ppm	ICP-MS Sm ppm	ICP-MS Eu ppm	ICP-MS Gd ppm	ICP-MS Tb ppm
0.0001	0.0000	0.0002	0.0719	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.0626	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0002	0.0868	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.0680	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0002	0.0871	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.2236	0.0528	ud	0.0000	ud	ud	0.0000	ud	ud	ud
0.0000	0.0000	0.0002	0.0671	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.0924	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0004	0.0865	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.1077	0.0552	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0002	0.0001	0.1311	0.0559	ud	0.0000	ud	ud	0.0000	ud	ud	ud
0.0001	0.0001	0.0022	0.0574	ud	ud	ud	ud	ud	ud	ud	ud
0.0002	0.0003	0.0000	0.0731	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0003	0.0000	0.0718	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.0001	0.0787	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.0001	0.0787	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.1791	0.0364	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0001	0.0001	0.1282	0.0353	0.0000	0.0000	0.0000	ud	ud	ud	ud	ud
0.0001	0.0001	0.1809	0.0363	0.0000	0.0001	0.0000	ud	ud	ud	ud	ud
0.0003	0.0003	0.0001	0.0843	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0002	ud	0.0360	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0001	0.1176	0.0350	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0001	0.0001	0.0732	0.0000	0.0000	0.0000	ud	0.0000	0.0000	ud	ud
0.0000	0.0001	0.0001	0.0732	0.0000	0.0000	0.0000	ud	0.0000	0.0000	ud	ud
0.0001	0.0001	0.0001	0.0837	0.0001	0.0000	0.0000	ud	0.0000	ud	ud	ud
0.0001	0.0000	0.1382	0.0928	0.0000	0.0000	ud	0.0000	0.0000	ud	ud	ud
0.0001	0.0000	0.1382	0.0928	0.0000	0.0000	ud	0.0000	0.0000	ud	ud	ud
0.0001	0.0001	0.0000	0.0691	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0672	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0022	0.0001	0.0001	0.0680	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0006	0.0001	0.0000	0.0743	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
0.0000	0.0001	0.0002	0.0716	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0004	0.0869	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0698	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0698	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.1004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.1322	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS Dy ppm	ICP-MS Ho ppm	ICP-MS Er ppm	ICP-MS Tm ppm	ICP-MS Yb ppm	ICP-MS Lu ppm	ICP-MS Hf ppm	ICP-MS Ta ppm	ICP-MS W ppm	ICP-MS Hg ppm	ICP-MS Tl ppm	ICP-MS Pb ppm	ICP-MS Th ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0002	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0007	ud
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	ud	0.0003	0.0000
ud	ud	ud	ud	ud	ud	ud	ud	ud	ud	ud	0.0000	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	ud	0.0008	ud	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	ud	0.0008	ud	0.0000	0.0002
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	0.0001	ud	ud	0.0001	ud
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0001	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	ud	ud	ud	ud	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	ud	ud	ud	ud	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0002	ud	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0002	ud	ud	ud	ud	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0014								0.002	91.338	0.000	0.252
0.0018	0.17	1.10	0.03	0.03	5.20	0.03	185.26	0.002	91.435	0.000	0.547
0.0018								0.002	91.707	0.000	0.589
0.0019	0.21	1.33	0.03	0.03	7.35	0.03	208.33	0.002	101.310	0.000	0.601
0.0017	0.21	1.34	0.03	0.03	7.35	0.03	208.34	0.002	102.277	0.000	0.605
0.0016	0.20	0.46	0.03	0.10	2.76	0.03	101.58	0.002	106.699	0.000	0.570
0.0019	0.28	2.34	0.03	0.03	10.70	0.03	237.18	0.002	110.983	0.000	0.555
0.0022	0.18	2.63	0.03	0.03	9.44	0.03	275.52	0.002	119.424	0.000	0.700
0.0023	0.25	2.40	0.03	0.03	11.64	0.03	277.36	0.002	120.956	0.000	0.677
0.0016	0.18	1.20	0.03	0.10	3.83	0.03	138.34				
0.0015	0.27	0.77	0.03	0.10	3.20	0.03	110.41				
0.0041	0.03	1.53	0.03	0.10	9.07	0.03	369.41	0.004	159.158	0.000	1.323
0.0074	1.00	3.54	0.50	1.00	40.33	1.00	531.67	0.002	189.809	0.000	2.040
0.0076	1.00	3.54	0.50	1.00	40.33	1.00	531.67	0.002	189.809	0.000	2.040
0.0081	0.19	1.58	0.03	0.10	14.78	0.03	597.94	0.002	220.719	0.000	1.871
0.0081	0.19	1.58	0.03	0.10	14.78	0.03	597.94	0.002	220.719	0.000	1.871
0.0020	0.25	1.23	0.03	0.10	4.71	0.03	178.69				
0.0018	0.03	1.41	0.03	0.10	4.77	0.03	178.43				
0.0019	0.25	1.23	0.03	0.10	4.71	0.03	178.69				
0.0080	0.03	3.48	0.05	0.10	40.88	0.03	552.08	0.002	193.778	0.000	1.953
0.0025	0.43	1.66	0.03	0.10	5.63	0.03	211.41				
0.0019	0.03	1.03	0.03	0.10	4.33	0.03	170.27				
0.0016	0.29	2.46	0.03	0.10	9.76	0.03	182.11	0.002	113.012	0.000	0.983
0.0016	0.29	2.46	0.03	0.10	9.76	0.03	182.11	0.002	113.012	0.000	0.983
0.0014	0.23	2.85	0.03	0.10	9.47	0.03	168.70	0.002	117.269	0.000	0.992
0.0014	0.93	1.78	0.03	0.10	10.25	0.03	210.97	0.002	136.180	0.000	0.919
0.0014	0.93	1.78	0.03	0.10	10.25	0.03	210.97	0.002	136.180	0.000	0.919
0.0018	0.14	2.79	0.03	0.03	20.33	0.03	295.28	0.002	138.982	0.000	1.041
0.0017	0.14	2.79	0.03	0.03	20.33	0.03	295.28	0.002	138.982	0.000	1.041
0.0035	0.25	3.46	0.03	0.10	21.70	0.03	304.78	0.005	139.800	0.000	1.243
0.0028	0.15	2.75	0.03	0.10	32.31	0.03	313.44	0.002	140.666	0.000	1.202
0.0018								0.002	144.796	0.000	1.177
0.0020	0.13	2.54	0.03	0.03	27.26	0.03	352.02	0.002	149.496	0.000	1.076
0.0038	0.06	3.25	0.03	0.10	23.58	0.03	401.80	0.002	154.838	0.000	1.284
0.0038	0.06	3.26	0.03	0.10	23.52	0.03	401.80	0.002	154.838	0.000	1.284
0.0018	0.13	3.82	0.03	0.03	26.11	0.03	344.29	0.002	155.090	0.000	1.195
0.0018	0.11	2.67	0.03	0.03	28.06	0.03	359.63	0.002	162.568	0.000	1.051

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
35.002	1.765	0.021	61.263	0.111	7.62	3.5	156	719	231		7.82	134
33.991	1.193	0.014	54.501	0.092	7.00	4.9	177	677			7.81	141
35.637	1.451	0.019	61.958	0.111							7.85	133
39.484	1.466	0.009	68.211	0.103	7.30		181				7.90	143
39.431	1.298	0.008	67.951	0.101							5.92	49
31.718	1.456	0.033	46.357	0.066	7.22	3.3		593	220	13.25	7.82	115
41.326	1.942	0.013	77.036	0.139	7.39		169				7.79	143
47.390	1.916	0.013	93.392	0.161	7.90	4.7		902	269		7.79	152
46.394	1.703	0.015	91.940	0.165	7.46		169				7.77	144
					7.17	3.7		637	157	12.47	7.52	127
					7.10	4.7		611	168	11.66	7.65	126
71.120	5.049	0.021	140.511	0.176	7.44	4.6		1381	258	7.44	7.65	188
97.040	9.870	0.013	197.376	0.224							7.78	164
97.040	9.870	0.013	197.376	0.224							7.78	164
108.251	6.482	0.005	223.023	0.262	6.97	5.6		1569	282	8.36	7.76	143
108.251	6.482	0.005	223.023	0.262	6.97	5.6		1569	282	8.36	7.76	143
					7.39	5.3		774	150	10.71	7.65	136
					7.39	5.3		774	150	10.71	7.56	132
					7.39	5.3		774	150	10.71	7.65	136
102.604	9.807	0.009	207.930	0.232	7.68	2.8	267	1514	234	9.85	7.54	210
					6.98			832	159	10.71	7.66	141
					7.51	3.8		739	148	10.48	7.41	135
35.966	8.231	0.002	71.985	0.061	7.22	4.8	201	831	262	6.51	7.80	142
35.966	8.231	0.002	71.985	0.061	7.22	4.8	201	831	262	6.51	7.76	143
36.373	8.456	0.002	72.670	0.062	7.22	4.8		831	262	6.51	7.58	203
38.311	8.315	0.005	83.625	0.071	6.99	5.1		904	195	7.37	7.54	148
38.311	8.315	0.005	83.625	0.071	6.99	5.1		904	195	7.37	7.59	151
45.538	9.049	0.017	95.160	0.097	7.14	4.9	200	1376	323	3.20	7.73	170
45.538	9.049	0.017	95.160	0.097							7.73	170
58.337	8.079	0.032	117.579	0.154	7.78	4.5	197	939		4.90	7.59	152
53.495	8.749	0.010	105.470	0.108	7.73	4.4	193	886	148	5.10	7.81	156
50.486	8.729	0.017	102.675	0.108							7.61	158
48.932	9.218	0.022	107.291	0.112	7.43	4.6	174	1093	254	7.38	7.89	154
62.959	8.142	0.018	127.899	0.154	7.36	4.6	195	1013	299	4.43	7.72	157
62.959	8.142	0.018	127.899	0.154							7.72	157
52.732	9.472	0.012	115.981	0.115	7.37	8.2	188				7.75	143
50.775	8.883	0.017	110.836	0.113	7.46	4.7	191	1121	85			

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_12-12	17/06/2013	10497	0.0358	0.0112	8.3894	41.2134	0.0083	2.6287	0.0190
WLC_12-12	17/06/2013	10498	0.0350	0.0107	8.6736	41.1960	0.0116	2.4783	0.0170
WLC_12-12	10/07/2013	10547	0.0347	0.0074	8.5016	40.5616	0.0105	2.4573	0.0423
WLC_12-12	10/07/2013	10547	0.0347	0.0074	8.5016	40.5616	0.0105	2.4573	0.0423
WLC_MW_11-06b	19/09/2013	10684	0.0008	0.0010	0.7122	8.5990	0.0330	2.2410	0.0177
WLC_West_Pro_Sump	02/07/2013	10524	0.0299	0.0101	4.6362	27.4308	0.0021	1.9571	0.0338
WLC_Above_Culvert	23/05/2013	10461	0.0233	0.0221	1.7368	90.1733	ud	2.0461	0.0195
WLC_Above_Culvert	03/06/2013	10476	0.0220	0.0189	1.9575	98.1976	0.0140		0.0278
WLC_Above_Culvert	27/05/2013	10469	0.0232	0.0205	2.1440	95.2639	0.0023	2.1639	0.0315
WLC_Above_Culvert	29/08/2013	10640	0.0455	0.0290	8.5388	131.5767	0.0044	1.6485	0.0651
WLC_Above_Culvert	23/08/2013	10630	0.0441	0.0284	7.8104	135.0446	0.0041	1.7019	0.0507
WLC_Above_Culvert	11/08/2013	10612R	0.0413	0.0278	7.1421	121.7964	0.0048	2.2125	0.0450
WLC_Above_Culvert	11/08/2013	10612	0.0413	0.0278	7.1421	121.7964	0.0048	2.2125	0.0450
WLC_Above_Culvert	06/08/2013	10601	0.0405	0.0279	6.5588	125.5576	0.0013	2.0982	0.0243
WLC_Above_Culvert	22/07/2013	10578	0.0372	0.0213	5.2319	120.7974	0.0057	2.4277	0.0261
WLC_Below_Culvert	10/07/2014	10952	0.0479	0.0285	7.1629	51.7169	0.0024	2.2815	0.0534
WLC_Below_Culvert	10/07/2014	10952-MS Rep	0.0479	0.0277	7.1458	51.9635	0.0025	2.2312	0.0526
WLC_Below_Culvert	28/07/2014	13022	0.0493	0.0155	6.9291	53.1078	0.0033	2.5470	0.0259
WLC_Below_Culvert	30/05/2014	10821	0.0525	0.0256	7.4083	58.8225	0.0004	2.0867	0.0360
WLC_Below_Culvert	03/09/2013	10656	0.0553	0.0168	9.9923	45.8623	0.0025	2.3689	0.0384
WLC_Below_Culvert	21/07/2014	10994	0.0474	0.0133	6.8727	52.8335	0.0024	4.1194	0.0294
WLC_Below_Culvert	16/06/2014	10889	0.0491	0.0219	7.4672	63.5404	0.0048	2.3156	0.0382
WLC_Below_Culvert	16/09/2013	10676	0.0531	0.0185	9.4975	48.0149	0.0038	2.6611	0.0131
WLC_Below_Culvert	12/09/2013	10665	0.0527	0.0142	9.4443	46.9714	0.0044	2.2601	0.0611
WLC_Below_Culvert	02/05/2014	10753	0.0657	0.0161	10.7611	79.3481	0.0019	2.1493	0.0167
WLC_Below_Culvert	11/08/2014	13059	0.0549	0.0202	8.3392	62.0895	0.0018	2.5276	0.0340
WLC_Below_Culvert	16/06/2014	10897	0.0296	0.0292	3.4937	81.6891	0.0055	2.4482	0.0522
WLC_Below_Culvert	16/06/2014	10897-ICS Rep	0.0296	0.0292	3.4937	81.6891	0.0055	2.4482	0.0522
WLC_Below_Culvert	07/01/2014	10714	0.0579	0.0142	8.8660	75.8485	0.0054	2.0337	0.0844
WLC_Below_Culvert	14/01/2014	10718	0.0580	0.0154	9.8435	79.0929	0.0057	1.9879	0.1744
WLC_Below_Culvert	10/03/2014	10733	0.0687	0.0166	13.7315	101.1969	0.0078	2.1555	0.0254
WLC_12-06c	12/08/2013	10616	1.0949	0.5820	476.7504	1.0349	1.9212	5.7228	0.4765
WLC_12-06c	12/08/2013	10616R	1.0949	0.5820	476.7504	1.0349	1.9212	5.7228	0.4765
WLC_12-06c	13/09/2013	10672	0.9764	0.5872	396.7201	1.3767	5.9735	13.4909	0.4318
WLC_12-06c	26/05/2014	10797	1.0590	0.5581	430.4809	1.5424	0.6074	3.9463	0.4290
WLC_12-06c	12/08/2013	10617	0.5839	0.3368	288.0528	17.3102	0.1620	3.1686	0.2534
WLC_12-06c	11/03/2014	10739	0.2824	0.2098	145.0914	46.5589	0.0278	3.0286	0.1130

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.9713	130.4567	0.0009	0.0008	0.0003	0.0008	0.0298	0.0090	0.0005	0.0051	0.0008	0.0064
1.0266	129.3338	0.0009	0.0006	0.0002	0.0007	0.0298	0.0107	0.0005	0.0053	0.0011	0.0055
0.8419	136.1935	0.0009	0.0011	0.0001	0.0004	0.0304	0.0097	0.0004	0.0054	0.0004	0.0051
0.8419	136.1935	0.0009	0.0011	0.0001	0.0004	0.0304	0.0097	0.0004	0.0054	0.0004	0.0051
0.3282	34.3182	0.0007	0.0015	0.0002	0.0008	0.0002	0.0020	0.0075	0.0013	ud	8.4929
1.2548	71.3053	0.0007	0.0006	0.0003	0.0007	0.0020	0.0020	0.0002	0.0037	0.0004	0.0034
2.2955	153.5936	0.0006	0.0006	0.0003	0.0008	0.0004	0.0010	0.0005	0.0332	ud	0.0653
2.3298	176.3333	0.0007	0.0008	0.0004	0.0004	0.0012	0.0237	0.0004	0.0352	0.0016	0.0640
2.3142	168.2775	0.0006	0.0007	0.0003	0.0007	0.0007	0.0473	0.0004	0.0322	ud	0.0524
2.3491	212.9699	0.0008	0.0010	0.0003	0.0003	0.0006	0.0076	0.0005	0.0310	0.0022	0.0079
2.3381	215.0672	0.0008	0.0012	0.0003	0.0005	0.0003	0.0028	0.0004	0.0333	0.0015	0.0063
2.5384	210.9432	0.0011	0.0017	0.0004	0.0004	0.0005	0.0059	0.0005	0.0339	0.0007	0.0056
2.5384	210.9432	0.0011	0.0017	0.0004	0.0004	0.0005	0.0059	0.0005	0.0339	0.0007	0.0056
2.4100	216.3874	0.0009	0.0006	0.0004	0.0005	0.0003	0.0026	0.0005	0.0369	0.0014	0.0050
2.5921	217.9242	0.0010	ud	0.0003	0.0004	0.0028	0.0038	0.0005	0.0386	ud	0.0060
1.5129	113.8837	0.0010	0.0008	0.0002	0.0001	0.0001	0.0086	0.0002	0.0052	0.0009	0.0595
1.5134	114.5371	0.0010	0.0010	0.0001	0.0003	0.0001	0.0112	0.0002	0.0053	0.0010	0.0601
1.5957	107.7280	0.0010	0.0009	0.0002	0.0005	0.0001	0.0136	0.0002	0.0065	0.0012	0.1143
1.4370	119.1476	0.0006	0.0008	0.0001	0.0003	0.0001	0.0051	0.0002	0.0077	0.0004	0.1268
1.8053	119.5844	0.0011	0.0007	0.0002	0.0014	0.0000	0.0061	0.0003	0.0082	0.0005	0.0106
1.5818	102.6600	0.0009	0.0010	0.0002	0.0007	0.0245	0.0103	0.0002	0.0145	0.0168	0.0042
1.6796	117.0888	0.0022	0.0018	0.0003	0.0010	0.0003	0.0124	0.0004	0.0073	0.0007	0.0146
1.8156	117.4178	0.0008	0.0011	0.0002	0.0004	0.0005	0.0052	0.0002	0.0078	0.0004	0.0058
2.0114	125.7745	0.0013	0.0012	0.0002	0.0005	0.0008	0.0022	0.0006	0.0091	0.0004	0.5164
1.5755	149.8510	0.0011	0.0009	0.0003	0.0003	0.0002	0.0104	0.0003	0.0093	0.0011	0.0071
1.7835	128.9571	0.0011	0.0010	0.0002	0.0003	0.0000	0.0030	0.0002	0.0088	0.0005	0.0001
1.8459	142.8469	0.0009	0.0007	0.0002	0.0003	0.0004	0.0225	0.0004	0.0179	0.0007	0.0196
1.8459	142.8469	0.0009	0.0007	0.0002	0.0003	0.0004	0.0225	0.0004	0.0179	0.0007	0.0196
1.5564	170.2628	0.0007	0.0006	0.0002	0.0001	0.0005	0.0084	0.0003	0.0111	0.0013	0.0052
1.7098	163.7295	0.0007	0.0010	0.0003	0.0010	0.0004	0.0066	0.0003	0.0112	0.0012	0.2463
1.8750	204.8033	0.0007	0.0008	0.0004	0.0005	0.0004	0.0225	0.0004	0.0133	0.0011	0.0118
1.3168	3.1014	0.0030	0.0498	0.0045	0.0031	0.0450	0.6147	0.0004	0.0020	0.0123	0.0054
1.3168	3.1014	0.0030	0.0498	0.0045	0.0031	0.0450	0.6147	0.0004	0.0020	0.0123	0.0054
0.0000	3.2813	0.0052	0.1463	0.0129	0.0079	0.0505	1.7463	0.0009	0.0038	0.0125	0.0662
0.0008	4.1350	0.0012	0.0177	0.0017	0.0052	0.0321	0.2004	0.0002	0.0013	0.0137	0.0436
1.3441	46.4827	0.0014	0.0041	0.0007	0.0016	0.0518	0.0850	0.0004	0.0033	0.0056	0.0084
0.0008	96.2238	0.0011	0.0013	0.0003	0.0037	0.0394	0.0198	0.0005	0.0059	0.0040	0.3437

ICP-MS Ga ppm	ICP-MS Ge ppm	ICP-MS As ppm	ICP-MS Se ppm	ICP-MS Rb ppm	ICP-MS Sr ppm	ICP-MS Y ppm	ICP-MS Zr ppm	ICP-MS Nb ppm	ICP-MS Mo ppm	ICP-MS Ag ppm	ICP-MS Cd ppm
ud	ud	0.0028	0.0734	0.0007	0.2819	0.0000	0.0000	0.0009	0.0012	ud	0.0001
ud	ud	0.0040	0.0761	0.0008	0.2851	0.0000	0.0000	0.0011	0.0010	ud	0.0001
ud	0.0001	0.0024	0.0694	0.0005	0.2723	0.0000	0.0000	0.0010	0.0009	ud	0.0001
ud	0.0001	0.0024	0.0694	0.0005	0.2723	0.0000	0.0000	0.0010	0.0009	ud	0.0001
0.0001	0.0000	0.0003	0.0016	0.0002	0.0489	0.0000	0.0000	0.0015	0.0011	ud	0.0001
ud	0.0000	0.0008	0.0211	0.0006	0.1458	0.0000	0.0001	0.0007	0.0017	ud	0.0000
ud	0.0000	0.0160	0.1919	0.0013	0.1448	0.0000	0.0000	0.0004	0.0028	ud	0.0010
ud	ud	0.0100	0.2151	0.0014	0.1515	0.0001	0.0001	0.0003	0.0021	ud	0.0012
ud	0.0000	0.0140	0.2162	0.0015	0.1686	0.0000	0.0001	0.0006	0.0030	ud	0.0010
ud	ud	0.0211	0.2326	0.0015	0.6864	0.0000	0.0000	0.0018	0.0045	ud	0.0000
ud	0.0000	0.0233	0.2631	0.0015	0.6815	ud	0.0000	0.0017	0.0047	ud	0.0000
ud	ud	0.0179	0.2542	0.0017	0.5950	0.0000	0.0002	0.0013	0.0050	ud	0.0001
ud	ud	0.0179	0.2542	0.0017	0.5950	0.0000	0.0002	0.0013	0.0050	ud	0.0001
ud	0.0001	0.0191	0.2594	0.0016	0.5665	ud	0.0000	0.0013	0.0038	ud	ud
ud	0.0000	0.0138	0.2652	0.0017	0.4419	0.0000	0.0001	0.0009	0.0035	ud	0.0001
0.0000	0.0000	0.0103	0.0908	0.0006	0.2024	0.0000	0.0000	0.0000	0.0021	0.0001	0.0001
0.0000	0.0004	0.0080	0.0889	0.0007	0.2026	0.0000	0.0000	0.0000	0.0020	0.0001	0.0001
0.0000	0.0000	0.0066	0.0716	0.0009	0.2140	0.0000	0.0001	0.0000	0.0019	0.0001	0.0001
0.0000	0.0000	0.0019	0.0828	0.0006	0.2208	0.0000	0.0000	0.0001	0.0020	0.0001	0.0001
ud	ud	0.0043	0.0506	0.0009	0.2587	0.0000	0.0000	0.0011	0.0018	ud	0.0001
0.0000	0.0000	0.0057	0.0753	0.0008	0.2137	0.0000	0.0000	0.0001	0.0017	0.0001	0.0001
0.0000	0.0000	0.0067	0.0879	0.0008	0.2376	0.0000	0.0000	0.0001	0.0022	0.0001	0.0001
ud	ud	0.0043	0.0618	0.0010	0.2650	0.0000	0.0001	0.0000	0.0017	ud	0.0001
ud	ud	0.0041	0.0659	0.0011	0.2737	0.0000	0.0002	0.0016	0.0020	ud	0.0002
0.0000	0.0000	0.0086	0.1114	0.0008	0.2590	0.0000	0.0000	0.0001	0.0027	0.0001	0.0001
0.0000	0.0001	0.0122	0.1016	0.0010	0.2342	0.0000	0.0000	0.0000	0.0022	0.0001	0.0001
0.0000	0.0000	0.0049	0.1440	0.0007	0.1972	0.0000	0.0000	0.0000	0.0019	0.0001	0.0001
0.0000	0.0000	0.0049	0.1440	0.0007	0.1972	0.0000	0.0000	0.0000	0.0019	0.0001	0.0001
0.0000	0.0000	0.0074	0.1399	0.0009	0.2915	0.0000	0.0001	0.0001	0.0025	0.0001	0.0001
0.0000	0.0000	0.0055	0.1346	0.0008	0.2847	0.0000	0.0001	0.0001	0.0024	0.0001	0.0001
0.0000	0.0000	0.0094	0.1950	0.0010	0.3446	0.0001	0.0001	0.0000	0.0031	0.0001	0.0001
ud	0.0121	0.0025	0.0009	0.0039	0.2027	0.0006	0.0041	0.0015	0.0019	ud	0.0001
ud	0.0121	0.0025	0.0009	0.0039	0.2027	0.0006	0.0041	0.0015	0.0019	ud	0.0001
0.0010	0.0107	0.0021	0.0003	0.0115	0.2025	0.0018	0.0102	0.0010	0.0018	ud	0.0002
0.0000	0.0105	0.0027	0.0016	0.0019	0.2018	0.0003	0.0019	0.0002	0.0016	0.0001	0.0001
ud	0.0066	0.0034	0.0274	0.0009	0.1966	0.0002	0.0008	0.0014	0.0028	ud	ud
0.0000	0.0037	0.0068	0.0930	0.0007	0.1926	0.0001	0.0004	0.0000	0.0021	0.0001	0.0001

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0001	0.0001	0.1610	0.0879	0.0000	0.0000	0.0000	ud	ud	ud	ud	ud
0.0001	0.0001	0.2063	0.0888	0.0000	0.0000	0.0000	ud	ud	ud	ud	ud
0.0000	0.0001	0.1759	0.0840	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0001	0.1759	0.0840	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0001	0.0003	0.0000	0.0560	0.0000	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0004	0.1442	0.0518	ud	0.0000	ud	ud	ud	ud	ud	ud
ud	0.0005	ud	0.0201	ud	0.0000	ud	0.0000	0.0000	ud	ud	ud
0.0001	0.0005	ud	0.0175	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0005	0.0015	0.0235	0.0000	0.0000	ud	0.0000	0.0000	ud	ud	0.0000
0.0000	0.0005	0.0021	0.0238	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0005	0.0020	0.0238	ud	ud	ud	ud	ud	ud	ud	ud
ud	0.0005	0.0016	0.0245	ud	ud	ud	ud	ud	ud	ud	ud
ud	0.0005	0.0016	0.0245	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0005	0.0015	0.0255	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0005	0.1304	0.0255	ud	0.0000	ud	ud	0.0000	ud	ud	ud
0.0000	0.0003	0.0000	0.0804	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0000	0.0786	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0003	0.0538	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0002	0.0798	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0003	0.0017	0.0797	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0003	0.0006	0.0517	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0003	0.0002	0.0607	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0001	0.0833	0.0000	0.0000	0.0000	0.0000	0.0000	ud	0.0000	0.0000
0.0001	0.0004	ud	0.0842	0.0000	ud	ud	ud	0.0000	ud	0.0000	ud
0.0001	0.0004	0.0001	0.0659	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0000	0.0638	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0002	0.0663	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0002	0.0663	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0006	0.0003	0.0000	0.0931	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0004	0.0003	0.0000	0.0947	0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
0.0033	0.0003	0.0001	0.0940	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0007	0.0003	0.0018	0.1887	0.0006	0.0012	0.0001	0.0005	0.0001	0.0000	0.0001	0.0000
0.0007	0.0003	0.0018	0.1887	0.0006	0.0012	0.0001	0.0005	0.0001	0.0000	0.0001	0.0000
0.0011	0.0007	0.0008	0.2150	0.0019	0.0036	0.0004	0.0014	0.0003	0.0001	0.0003	0.0000
0.0009	0.0005	0.0003	0.2117	0.0003	0.0003	0.0001	0.0002	0.0000	0.0000	0.0000	0.0000
0.0006	0.0004	0.0018	0.1780	0.0001	0.0002	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
0.0018	0.0012	0.0001	0.1145	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Hg	Tl	Pb	Th
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0009	ud
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0005	ud
ud	ud	0.0000	ud	ud	0.0000	ud	0.0000	ud	ud	0.0000	0.0000	0.0000
ud	ud	0.0000	ud	ud	0.0000	ud	0.0000	ud	ud	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	0.0002	0.0000	ud
ud	ud	ud	ud	ud	ud	0.0001	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	0.0001	ud	0.0000	ud	ud
0.0000	ud	ud	ud	0.0000	0.0000	0.0001	0.0000	ud	ud	0.0000	0.0004	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	0.0004	ud
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	ud	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	0.0003	0.0000	0.0000	ud
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	0.0003	0.0000	0.0000	ud
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000
ud	0.0000	0.0000	0.0000	ud	ud	0.0000	0.0000	ud	ud	ud	ud	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0001	0.0000	0.0001	ud	0.0001	0.0000	0.0001	0.0000	0.0016	0.0004	0.0000	0.0108	0.0002
0.0001	0.0000	0.0001	ud	0.0001	0.0000	0.0001	0.0000	0.0016	0.0004	0.0000	0.0108	0.0002
0.0003	0.0001	0.0002	0.0000	0.0002	0.0000	0.0009	0.0001	0.0014	0.0054	0.0001	0.0307	0.0009
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	0.0015	0.0000	0.0000	0.0084	0.0003
0.0000	ud	0.0000	ud	ud	0.0000	0.0000	0.0000	0.0018	ud	ud	0.0034	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0015	0.0008	0.0000	0.0071	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0014	0.25	2.26	0.03	0.10	11.11	0.03	226.84				
0.0015	0.03	2.24	0.03	0.10	11.02	0.03	227.36				
0.0013	0.03	1.78	0.03	0.10	10.30	0.03	204.90	ud	131.132	ud	0.979
0.0013	0.03	1.78	0.03	0.10	10.30	0.03	204.90	ud	131.132	ud	0.979
0.0008	0.26	0.37	0.03	0.10	0.02	0.03	12.10	0.002	117.269	0.000	0.992
0.0016	0.15	0.54	0.03	0.10	5.13	0.03	96.92				
0.0073	0.03	0.59	0.03	0.10	4.54	0.03	301.66	0.002	160.594	0.001	2.282
0.0072	0.24	0.89	0.03	0.10	6.40	0.03	428.81	0.002	174.186	0.001	2.189
0.0085	0.32	1.08	0.03	0.10	6.62	0.03	422.25	0.002	174.794	0.001	2.445
0.0087	0.03	3.00	0.03	0.10	5.72	0.03	783.14	0.002	214.581	0.000	2.556
0.0090	0.03	3.48	0.03	0.10	6.19	0.03	753.10	0.002	214.975	0.000	2.317
0.0088	0.47	3.03	0.03	0.10	6.49	0.03	700.81	0.002	216.531	0.000	2.405
0.0088	0.47	3.03	0.03	0.10	6.49	0.03	700.81	0.002	216.531	0.000	2.405
0.0086	0.26	2.72	0.03	0.10	6.83	0.03	734.98	0.002	223.981	0.000	2.447
0.0090	0.03	2.39	0.03	0.10	7.74	0.03	661.09	0.002	247.042	0.000	2.631
0.0035	0.25	1.98	0.03	0.03	14.05	0.03	283.12	0.002	115.644	0.000	2.024
0.0034	0.25	1.98	0.03	0.03	14.05	0.03	283.12	0.002	115.644	0.000	2.024
0.0034	0.20	2.25	0.03	0.03	14.08	0.03	306.75	0.002	122.545	0.000	1.845
0.0042								0.002	122.724	0.000	1.780
0.0024	0.03	1.36	0.03	0.10	13.95	0.03	226.64	0.002	123.508	0.000	1.948
0.0035	0.17	2.02	0.03	0.03	17.60	0.03	309.52	0.002	124.182	0.000	1.888
0.0036	0.16	2.63	0.03	0.03	15.64	0.03	314.29	0.002	124.917	0.000	1.934
0.0032	0.21	1.33	0.03	0.10	15.16	0.03	240.53	0.002	132.805	0.000	2.096
0.0030	0.13	1.37	0.03	0.10	14.99	0.03	240.70	0.002	133.972	0.000	2.186
0.0051	0.17	3.54	0.03	0.10	25.02	0.03	446.92	0.002	156.700	0.000	2.042
0.0068	0.57	2.25	0.03	0.03	14.06	0.03	327.12	0.002	160.362	0.000	1.551
0.0056	0.19	2.68	0.03	0.03	14.06	0.03	above	0.002	160.943	0.000	2.093
0.0056	0.21	2.62	0.03	0.03	14.06	0.03	above	0.002	160.943	0.000	2.093
0.0058	0.03	2.71	0.03	0.10	37.08	0.03	440.18	0.002	172.568	0.000	2.105
0.0059	0.10	2.79	0.03	0.10	41.28	0.03	454.50	0.002	175.445	0.000	2.151
0.0072	0.31	5.16	0.03	0.10	29.24	0.03	502.14	0.006	189.654	0.000	2.198
0.0007	2.54	30.04	0.03	0.10	0.02	0.03	3.83	0.002	2.958	0.000	1.317
0.0007	2.54	30.04	0.03	0.10	0.02	0.03	3.83	0.002	2.958	0.000	1.317
0.0007	2.80	31.07	0.03	0.25	0.02	0.26	2.94	0.002	3.255	0.000	1.527
0.0007								0.019	4.275	0.000	1.877
0.0014	1.84	17.35	0.16	0.10	0.75	0.03	68.75	0.002	47.630	0.000	1.344
0.0028	0.86	15.91	1.23	0.10	4.49	0.03	40.87	0.015	93.401	0.000	1.331

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
					7.41	5.1		915	144	5.49	7.66	133
					7.41	5.1		915	144	5.49	7.60	149
40.950	8.805	ud	0.078	90.063	7.33	4.9		926	118	5.73	7.57	159
40.950	8.805	ud	0.078	90.063	7.33	4.9		926	118	5.73	7.66	153
36.373	8.456	0.002	72.670	0.062	7.76	3.3	123	256	265	11.26	7.87	96
					6.12	7.6	150				7.53	108
94.284	1.750	0.017	155.407	0.226	7.91	4.4	297				7.56	178
95.848	1.864	0.016	168.690	0.246	7.60	9.0	274				7.64	181
100.045	2.302	0.016	174.877	0.261	7.98	7.2	289				7.42	169
142.362	9.180	0.002	304.748	0.285	7.81	10.5	202				8.06	164
136.025	7.786	0.021	286.308	0.298	8.01	11.2	221				7.93	177
128.103	6.882	0.005	271.795	0.294	8.07	16.3	214				8.02	172
128.103	6.882	0.005	271.795	0.294	8.07	16.3	214				8.02	172
130.977	6.763	0.005	276.389	0.297	8.24	13.4	236				7.87	177
130.345	5.864	0.017	266.327	0.303	7.97	16.6	258				7.80	183
56.251	8.522	0.005	95.920	0.099	7.26	7.0	212					
56.251	8.522	0.005	95.920	0.099								
54.959	7.727	0.006	98.022	0.093	7.41		180				7.80	168
57.859	8.347	0.027	95.514	0.112	7.59		196				7.58	173
49.919	9.064	0.002	91.849	0.070	7.45	6.4	170				7.90	173
56.028	8.243	0.004	99.112	0.097	7.39	5.2	190				7.96	158
61.200	8.296	0.029	105.309	0.131	7.44	5.9	205				7.81	249
53.270	9.713	0.005	96.723	0.075	7.43	6.7	204				7.67	142
54.834	9.875	0.004	99.583	0.079	7.41	6.5	204				7.90	144
76.129	10.613	0.015	142.712	0.144							7.71	170
101.508	1.218	0.037	185.685	0.361	7.39	15.1	195				7.66	177
80.239	3.662	0.016	134.275	0.189							7.79	161
80.239	3.662	0.016	134.275	0.189							7.79	161
80.535	11.123	0.014	160.029	0.161	7.57	3.5	198				7.80	151
82.702	11.398	0.022	165.069	0.164	7.78	3.4	193				7.72	155
93.766	12.790	0.035	188.780	0.229	7.78	2.6	194				7.63	164
0.885	384.768	0.402	1.734	0.002	9.11	4.0		1682	-173	0.00	8.68	666
0.885	384.768	0.402	1.734	0.002	9.11	4.0		1682	-173	0.00	8.71	702
0.933	328.586	0.430	1.890	0.002	8.47	4.6		1588	-254	0.00	8.66	691
1.581	348.552	0.558	2.032	0.070	8.45	4.0	831				8.56	685
17.500	229.375	0.208	33.907	0.037	9.11	4.0		1682	-173	0.00	8.18	447
44.749	130.820	0.125	85.729	0.149	8.93	4.4	421				7.85	335

HoleID	Date	Sample Number	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
			Li	B	Na	Mg	Al	Si	P
			ppm	ppm	ppm	ppm	ppm	ppm	ppm
WLC_12-06c	04/07/2013	10531	1.0200	0.5520	474.5075	2.9656	6.2840	13.3801	0.5252
WLC_12-07a	15/05/2014	10785	0.0192	0.0850	6.8778	22.5687	0.0062	4.6651	0.0608
WLC_12-07a	15/05/2014	10786	0.0193	0.0874	7.8830	23.0991	0.0065	4.7405	0.0493
WLC_12-07a	26/05/2014	10795	0.0215	0.0904	8.2834	22.4778	0.0043	5.0500	0.0458
WLC_12-07a	16/06/2014	10893	0.0228	0.0891	10.3843	22.7246	0.0073	9.2068	0.0738
WLC_12-07a	09/07/2014	10941	0.0223	0.0906	8.0956	24.5320	0.0138	7.6940	0.0300
WLC_12-07a	15/07/2014	10971	0.0229	0.0877	10.0498	24.4495	0.0115	9.3212	0.1685
WLC_12-07a	09/07/2014	10942	0.0220	0.0867	8.2193	25.0703	0.0047	3.4292	0.0369
WLC_12-07a	13/07/2013	10553	0.0230	0.0858	7.1109	23.8605	0.0132	5.1508	0.0521
WLC_12-07a	13/07/2013	10553	0.0230	0.0858	7.1109	23.8605	0.0132	5.1508	0.0521
WLC_12-07b	11/08/2013	10613	0.0587	0.2813	25.5719	32.5506	0.0054	4.3584	0.0601
WLC_12-07b	11/08/2013	10615	0.0763	0.3235	34.4006	36.5038	0.0045	4.5864	0.0502
WLC_12-07b	12/08/2013	10616	0.0763	0.3235	34.4006	36.5038	0.0045	4.5864	0.0502
WLC_12-07b	06/06/2013	10486	0.0719	0.3306	37.0620	39.3261	0.0049	4.5230	0.0391
WLC_12-07b	11/03/2014	10737	0.0309	0.1569	14.6037	26.6325	0.0082	3.9001	0.0348
WLC_12-07b	11/03/2014	10738	0.0313	0.1566	15.0154	26.7729	0.0062	3.8671	0.0294
WLC_12-07b	05/06/2013	10479	0.0292	0.1886	16.2782	31.9653	0.0050	4.1447	0.0280
WLC_12-07b	14/05/2014	10783	0.0352	0.1621	17.3491	29.7027	0.0018	3.9765	0.0346
WLC_12-07b	14/05/2014	10783-MS Rep	0.0355	0.1622	16.5371	29.3948	0.0018	3.8821	0.0310
WLC_12-07b	29/05/2014	10820	0.0215	0.0830	7.5894	27.1108	0.0012	3.7140	0.0553
WLC_12-07b	23/05/2014	10794	0.0063	0.0271	2.3436	23.1363	0.0017	3.6984	0.0474
WLC_12-07b	23/05/2014	10794-MS Rep	0.0091	0.0218	1.8648	16.7670	0.0048	3.1266	0.0430
WLC_12-07b	23/05/2014	10794-MS Rep	0.0103	0.0249	2.0586	18.3701	0.0001	3.5124	0.0345
WLC_12-07b	13/07/2013	10565	0.0794	0.3405	37.4130	38.6919	0.0146	4.3508	0.0675
WLC_12-10c	12/03/2014	10742-ICS Rep	0.4071	0.3407	276.0841	5.1408	0.0058	3.3646	0.0234
WLC_12-10c	12/03/2014	10742	0.4071	0.3407	276.0841	5.1408	0.0058	3.3646	0.0234
WLC_12-10c	15/07/2014	10973	0.5006	0.3122	286.5485	5.3894	0.0054	7.1011	0.1457
WLC_12-10c	28/05/2014	10812	0.4882	0.3097	279.8738	5.0463	0.0229	3.7190	0.0457
WLC_12-10c	14/09/2013	10673	0.4757	0.3364	270.2909	5.1290	0.0082	3.6876	0.0140
WLC_12-10c	13/08/2013	10621	0.5168	0.3241	332.4845	5.7386	0.0090	3.4845	0.0788
WLC_12-10c	29/08/2014	13096-IC Rep	0.4710	0.3544	276.8521	5.7758	0.0185	3.1816	0.0353
WLC_12-10c	29/08/2014	13096	0.4710	0.3544	276.8521	5.7758	0.0185	3.1816	0.0353
WLC_12-10c	10/08/2013	10607	0.5616	0.3146	321.3452	5.3567	0.0179	3.4615	0.0492
WLC_12-10c	10/08/2013	10606	0.5342	0.3072	320.6463	5.6748	0.0063	3.3118	0.0493
WLC_12-10c	11/08/2013	10606b	0.5342	0.3072	320.6463	5.6748	0.0063	3.3118	0.0493
WLC_12-06a	15/07/2014	10967	0.0230	0.0182	1.6657	150.3903	0.0069	8.2906	0.3125
WLC_12-06a	15/07/2014	10967-ICS Rep	0.0230	0.0182	1.6657	150.3903	0.0069	8.2906	0.3125

ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
	7.1353	0.0059	0.1696	0.0141	0.0088	0.0650	2.0191	0.0009	0.0027	0.0147	0.0074
1.7936	60.2851	0.0026	0.0018	0.0004	0.0004	0.0004	0.2033	0.0002	0.0035	0.0021	0.0298
1.7436	60.2566	0.0027	0.0017	0.0003	0.0003	0.0002	0.0010	0.0001	0.0028	0.0019	0.0101
1.7268	60.1166	0.0013	0.0013	0.0006	0.0004	0.0012	0.0068	0.0001	0.0043	0.0031	0.0371
1.4283	62.2825	0.0020	0.0013	0.0005	0.0003	0.0019	0.0053	0.0002	0.0065	0.0020	0.1047
1.5465	65.0832	0.0019	0.0012	0.0006	0.0013	0.0021	0.0121	0.0002	0.0057	0.0026	0.1516
1.8281	65.1755	0.0020	0.0014	0.0006	0.0003	0.0120	0.0235	0.0005	0.0061	0.0032	0.1200
1.4568	66.0186	0.0019	0.0014	0.0005	0.0006	0.0020	0.0094	0.0002	0.0046	0.0024	0.0277
2.1206	70.8493	0.0019	0.0013	0.0006	0.0006	0.0279	0.0090	0.0006	0.0059	0.0021	0.0082
2.1206	70.8493	0.0019	0.0013	0.0006	0.0006	0.0279	0.0090	0.0006	0.0059	0.0021	0.0082
1.2507	64.2769	0.0021	0.0016	0.0003	0.0010	0.0029	0.0048	0.0001	0.0047	0.0017	0.0908
0.8140	65.4604	0.0021	0.0016	0.0003	0.0007	0.0120	0.0019	0.0001	0.0044	0.0010	0.0343
0.8140	65.4604	0.0021	0.0016	0.0003	0.0007	0.0120	0.0019	0.0001	0.0044	0.0010	0.0343
0.9097	72.3225	0.0014	0.0016	0.0005	0.0006	0.3739	0.0049	0.0007	0.0043	0.0026	0.0218
0.8602	71.3504	0.0014	0.0011	0.0002	0.0006	0.0060	0.0096	0.0002	0.0032	0.0013	0.0135
0.8822	72.3358	0.0014	0.0009	0.0002	0.0006	0.0059	0.0017	0.0001	0.0030	0.0012	0.0193
1.6278	71.0144	0.0013	0.0009	0.0005	0.0008	0.0465	0.0088	0.0003	0.0049	0.0033	0.1722
0.8527	76.4937	0.0023	0.0015	0.0000	0.0006	0.0034	0.0114	0.0001	0.0027	0.0010	0.0347
0.7784	76.1731	0.0021	0.0014	0.0000	0.0006	0.0034	0.0128	0.0001	0.0027	0.0010	0.0334
0.9986	85.5531	0.0011	0.0009	0.0001	0.0006	0.0091	0.0037	0.0002	0.0039	0.0013	0.0572
1.1049	89.5076	0.0010	0.0012	0.0000	0.0002	0.0011	0.0010	0.0002	0.0040	0.0006	0.0322
0.5960	51.6215	0.0008	0.0010	0.0001	0.0001	0.0005	0.0078	0.0001	0.0021	0.0002	0.0022
0.6981	58.6834	0.0010	0.0007	0.0001	0.0004	0.0004	0.0022	0.0001	0.0023	0.0002	0.0035
0.8920	74.4482	0.0018	0.0016	0.0003	0.0006	0.2599	0.0215	0.0007	0.0042	0.0014	0.0916
0.0008	10.0383	0.0012	0.0014	0.0000	0.0022	0.1029	0.0418	0.0001	0.0016	0.0049	0.0239
0.0008	10.0383	0.0012	0.0014	0.0000	0.0022	0.1029	0.0418	0.0001	0.0016	0.0049	0.0239
0.0008	10.1082	0.0013	0.0016	0.0001	0.0010	0.0882	0.2139	0.0002	0.0013	0.0094	0.0452
0.0008	10.1656	0.0010	0.0014	0.0006	0.0064	0.0770	0.0299	0.0002	0.0045	0.0192	0.1425
0.0001	9.9630	0.0012	0.0014	ud	ud	0.1111	0.0074	0.0003	0.0032	0.0060	0.0071
0.0001	12.0414	0.0015	0.0019	0.0002	0.0010	0.1018	0.0138	0.0003	0.0052	0.0076	0.0023
0.0008	10.6702	0.0013	0.0012	0.0001	0.0013	0.0971	0.0269	0.0000	0.0004	0.0049	0.0042
0.0008	10.6702	0.0013	0.0012	0.0001	0.0013	0.0971	0.0269	0.0000	0.0004	0.0049	0.0042
0.0001	11.6957	0.0016	0.0013	0.0001	0.0006	0.0883	0.0052	0.0003	0.0055	0.0069	0.0005
0.0001	12.9128	0.0015	0.0014	ud	0.0008	0.0857	0.0202	0.0004	0.0079	0.0059	0.0017
0.0001	12.9128	0.0015	0.0014	ud	0.0008	0.0857	0.0202	0.0004	0.0079	0.0059	0.0017
1.7470	237.0403	0.0013	0.0013	0.0001	0.0004	0.0012	0.0174	0.0007	0.0147	0.0008	0.0079
1.7470	237.0403	0.0013	0.0013	0.0001	0.0004	0.0012	0.0174	0.0007	0.0147	0.0008	0.0079

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Ga	Ge	As	Se	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0008	0.0110	0.0027	0.0033	0.0111	0.2260	0.0022	0.0109	0.0018	0.0027	ud	0.0001
0.0000	0.0000	0.0006	0.0018	0.0009	0.6693	0.0000	0.0001	0.0001	0.0036	0.0001	0.0000
0.0000	0.0000	0.0008	0.0017	0.0009	0.6642	0.0000	0.0001	0.0000	0.0036	0.0001	0.0001
0.0001	0.0000	0.0004	0.0020	0.0012	0.7224	0.0001	0.0000	0.0001	0.0038	0.0001	0.0000
0.0000	0.0000	0.0007	0.0015	0.0010	0.6891	0.0000	0.0000	0.0000	0.0033	0.0001	0.0000
0.0000	0.0000	0.0005	0.0014	0.0010	0.7036	0.0001	0.0000	0.0001	0.0032	0.0001	0.0000
0.0000	0.0000	0.0004	0.0014	0.0013	0.7711	0.0001	0.0000	0.0001	0.0037	0.0001	0.0001
0.0000	0.0000	0.0005	0.0010	0.0010	0.7020	0.0000	0.0000	0.0001	0.0028	0.0001	0.0000
0.0000	0.0000	0.0007	0.0025	0.0011	0.7189	0.0001	0.0001	0.0006	0.0036	ud	0.0000
0.0000	0.0000	0.0007	0.0025	0.0011	0.7189	0.0001	0.0001	0.0006	0.0036	ud	0.0000
ud	ud	0.0004	0.0009	0.0007	1.5147	0.0000	0.0001	0.0015	0.0028	ud	0.0001
ud	0.0001	0.0004	0.0003	0.0007	1.9138	0.0000	0.0001	0.0012	0.0012	ud	0.0000
ud	0.0001	0.0004	0.0003	0.0007	1.9138	0.0000	0.0001	0.0012	0.0012	ud	0.0000
ud	0.0000	0.0006	0.0003	0.0008	1.7633	0.0001	0.0001	0.0004	0.0013	ud	ud
0.0000	0.0000	0.0004	0.0037	0.0005	0.8299	0.0000	0.0000	0.0000	0.0006	0.0001	0.0000
0.0000	0.0000	0.0005	0.0038	0.0004	0.8339	0.0000	0.0002	0.0000	0.0007	0.0001	0.0000
ud	ud	0.0011	0.0037	0.0008	1.0320	0.0000	0.0001	0.0003	0.0040	ud	0.0001
0.0000	0.0000	0.0008	0.0053	0.0005	0.9736	0.0000	0.0000	0.0001	0.0007	0.0001	0.0000
0.0000	0.0001	0.0004	0.0057	0.0005	0.9459	0.0000	0.0000	0.0001	0.0007	0.0001	0.0000
0.0000	0.0000	0.0002	0.0041	0.0005	0.6273	0.0000	0.0000	0.0001	0.0010	0.0001	0.0000
0.0000	0.0000	0.0008	0.0052	0.0003	0.2121	0.0000	0.0000	0.0001	0.0008	0.0001	0.0000
0.0000	0.0000	0.0001	0.0019	0.0003	0.2303	0.0000	0.0000	0.0001	0.0010	0.0001	0.0000
0.0000	0.0000	0.0001	0.0014	0.0003	0.2736	0.0000	0.0000	0.0001	0.0013	0.0001	0.0000
ud	0.0001	0.0006	0.0007	0.0009	2.0004	0.0001	0.0001	0.0008	0.0012	ud	0.0000
0.0000	0.0009	0.0002	0.0003	0.0013	0.7305	0.0000	0.0002	0.0000	0.0022	0.0001	0.0000
0.0000	0.0009	0.0002	0.0003	0.0013	0.7305	0.0000	0.0002	0.0000	0.0022	0.0001	0.0000
0.0000	0.0007	0.0005	0.0006	0.0015	0.8072	0.0000	0.0001	0.0001	0.0036	0.0001	0.0000
0.0000	0.0008	0.0003	0.0003	0.0015	0.8067	0.0000	0.0002	0.0001	0.0074	0.0001	0.0000
ud	0.0010	0.0006	ud	0.0014	0.7654	0.0000	0.0003	0.0000	0.0022	ud	0.0000
ud	0.0010	0.0006	0.0020	0.0015	0.7932	0.0000	0.0002	0.0014	0.0038	ud	0.0000
0.0000	0.0007	0.0004	0.0008	0.0014	0.8129	0.0000	0.0002	0.0000	0.0022	0.0001	0.0000
0.0000	0.0007	0.0004	0.0008	0.0014	0.8129	0.0000	0.0002	0.0000	0.0022	0.0001	0.0000
ud	0.0008	0.0007	0.0010	0.0014	0.7490	ud	0.0002	0.0010	0.0046	ud	ud
ud	0.0007	0.0006	0.0012	0.0015	0.7522	0.0000	0.0002	0.0014	0.0059	ud	ud
ud	0.0007	0.0006	0.0012	0.0015	0.7522	0.0000	0.0002	0.0014	0.0059	ud	ud
0.0000	0.0000	0.0310	0.2925	0.0008	0.1960	0.0000	0.0000	0.0001	0.0015	0.0001	0.0001
0.0000	0.0000	0.0310	0.2925	0.0008	0.1960	0.0000	0.0000	0.0001	0.0015	0.0001	0.0001

ICP-MS Sn ppm	ICP-MS Sb ppm	ICP-MS Cs ppm	ICP-MS Ba ppm	ICP-MS La ppm	ICP-MS Ce ppm	ICP-MS Pr ppm	ICP-MS Nd ppm	ICP-MS Sm ppm	ICP-MS Eu ppm	ICP-MS Gd ppm	ICP-MS Tb ppm
0.0313	0.0004	0.1462	0.2670	0.0023	0.0046	0.0005	0.0018	0.0004	0.0001	0.0004	0.0001
0.0007	0.0012	0.0002	0.0645	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0007	0.0012	0.0001	0.0645	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0006	0.0011	0.0003	0.0734	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0003	0.0009	0.0002	0.0796	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0004	0.0008	0.0003	0.0828	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0007	0.0011	0.0003	0.0604	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0004	0.0008	0.0003	0.0816	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0003	0.0012	0.1175	0.0661	0.0000	0.0000	0.0000	0.0000	ud	ud	ud	0.0000
0.0003	0.0012	0.1175	0.0661	0.0000	0.0000	0.0000	0.0000	ud	ud	ud	0.0000
0.0002	0.0004	0.0019	0.0912	ud	ud	ud	ud	ud	ud	ud	ud
0.0002	0.0002	0.0014	0.1064	0.0000	ud	ud	0.0000	ud	ud	ud	ud
0.0002	0.0002	0.0014	0.1064	0.0000	ud	ud	0.0000	ud	ud	ud	ud
0.0001	0.0001	ud	0.1016	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0004	0.0001	0.0001	0.0721	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0003	0.0001	0.0002	0.0798	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0005	ud	0.0708	0.0000	0.0000	0.0000	0.0000	ud	ud	ud	ud
0.0001	0.0001	0.0001	0.0976	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0962	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0002	0.0849	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0001	0.0003	0.0832	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0003	0.0793	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0002	0.0896	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0002	0.1400	0.0947	0.0000	0.0001	0.0000	0.0000	0.0000	ud	0.0000	0.0000
0.0007	0.0001	0.0001	0.2166	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0007	0.0001	0.0001	0.2166	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0006	0.0003	0.1893	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0004	0.0006	0.0003	0.3011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0001	0.0001	0.2094	0.0000	0.0000	0.0000	0.0000	0.0000	ud	ud	ud
0.0002	0.0002	0.0017	0.1966	ud	ud	ud	ud	ud	ud	ud	ud
0.0001	0.0000	0.0000	0.2083	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0000	0.2083	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0002	0.0012	0.2018	ud	ud	ud	ud	ud	ud	ud	ud
0.0003	0.0003	0.0017	0.1741	ud	ud	ud	ud	ud	ud	ud	ud
0.0003	0.0003	0.0017	0.1741	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0001	0.0003	0.0236	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0236	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS Dy ppm	ICP-MS Ho ppm	ICP-MS Er ppm	ICP-MS Tm ppm	ICP-MS Yb ppm	ICP-MS Lu ppm	ICP-MS Hf ppm	ICP-MS Ta ppm	ICP-MS W ppm	ICP-MS Hg ppm	ICP-MS Tl ppm	ICP-MS Pb ppm	ICP-MS Th ppm
0.0003	0.0001	0.0002	0.0000	0.0002	0.0000	0.0005	0.0001	0.0017	0.0015	0.0000	0.0121	0.0008
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0004	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0005	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0003	0.0000	0.0000	0.0003	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0001	0.0000
0.0000	ud	0.0000	ud	0.0000	0.0000	0.0000	ud	0.0003	ud	0.0000	0.0001	0.0000
0.0000	ud	0.0000	ud	0.0000	0.0000	0.0000	ud	0.0003	ud	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0013	ud
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0012	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0000	0.0000	0.0001	ud	ud	0.0001	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
0.0000	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0001	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0052	0.0000	0.0007	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0052	0.0000	0.0007	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0037	0.0000	0.0000	0.0007	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0029	0.0000	0.0000	0.0017	0.0001
0.0000	0.0000	0.0000	0.0000	ud	0.0000	0.0002	0.0000	0.0015	0.0012	ud	0.0001	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	0.0026	ud	ud	0.0001	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0009	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0009	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	ud	0.0002	0.0000	0.0031	ud	ud	0.0001	0.0000
ud	ud	ud	ud	ud	ud	0.0002	0.0000	0.0043	ud	ud	0.0003	0.0001
ud	ud	ud	ud	ud	ud	0.0002	0.0000	0.0043	ud	ud	0.0003	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0011	2.80	29.55	0.03	0.10	0.02	0.03	10.72				
0.0009	0.42	2.13	0.03	0.10	0.11	0.03	55.52	0.002	61.686	0.000	1.891
0.0009	0.42	2.26	0.03	0.10	0.13	0.03	55.80	0.005	61.963	0.000	1.927
0.0010								0.002	63.934	0.000	2.134
0.0009	0.45	2.16	0.03	0.03	0.10	0.03	61.01	0.002	65.454	0.000	1.990
0.0007	0.39	1.61	0.03	0.03	0.03	0.03	63.81	0.002	69.637	0.000	1.769
0.0010	0.37	1.67	0.03	0.03	0.20	0.03	70.14	0.004	69.707	0.000	2.113
0.0007	0.38	1.70	0.03	0.03	0.17	0.03	63.72	0.004	69.974	0.000	1.769
0.0016	0.37	1.30	0.03	0.10	0.19	0.03	36.13	ud	70.103	ud	2.279
0.0016	0.33	0.94	0.03	0.10	0.17	0.03	34.86	ud	70.103	ud	2.279
0.0010	0.30	1.13	0.03	0.10	0.02	0.03	29.35	0.002	67.505	0.000	1.722
0.0006	0.35	1.77	0.03	0.10	0.02	0.03	29.56	0.002	69.714	0.000	1.533
0.0006	0.35	1.77	0.03	0.10	0.02	0.03	29.56	0.002	69.714	0.000	1.533
0.0011	0.22	2.17	0.03	0.10	0.03	0.03	28.83	0.002	69.764	0.000	1.656
0.0007	0.03	2.72	0.03	0.10	1.23	0.03	143.06	0.009	70.412	0.000	1.244
0.0007	0.31	4.28	0.07	0.10	10.55	0.03	46.38	0.009	71.100	0.000	1.270
0.0023	0.18	1.21	0.03	0.10	0.56	0.03	46.75	0.002	73.626	0.000	2.010
0.0005	0.19	2.48	0.03	0.10	0.46	0.03	62.64	0.008	79.553	0.000	1.320
0.0005	0.19	2.48	0.03	0.10	0.46	0.03	62.64	0.008	79.553	0.000	1.320
0.0008								0.007	85.183	0.000	1.188
0.0010								0.002	90.282	0.000	1.033
0.0007								0.002	90.282	0.000	1.033
0.0007								0.002	90.282	0.000	1.033
0.0008	0.28	2.24	0.03	0.10	0.02	0.03	26.66	ud	67.674	ud	1.540
0.0005	1.03	11.53	0.03	0.10	1.01	0.03	1.48	0.025	10.209	0.000	1.824
0.0005	1.04	11.45	0.03	0.10	0.96	0.03	1.44	0.025	10.209	0.000	1.824
0.0004	1.04	9.77	0.03	0.10	0.02	0.03	27.29	0.015	10.603	0.000	1.811
0.0004								0.014	10.758	0.000	1.841
0.0005	0.90	6.52	0.03	0.10	0.02	0.03	1.53	0.002	11.329	0.002	1.861
0.0005	0.96	6.98	0.03	0.10	2.72	0.03	2.58	< 0.004	11.388	0.000	1.917
0.0002	1.22	10.10	0.03	0.10	0.02	0.06	0.41	0.002	11.968	0.000	1.590
0.0002	1.24	10.00	0.03	0.10	0.02	0.03	0.65	0.002	11.968	0.000	1.590
0.0004	1.00	7.49	0.03	0.10	0.06	0.03	3.94	0.002	12.140	0.002	1.777
0.0003	0.93	8.01	0.03	0.10	0.12	0.03	6.07	0.002	13.171	0.002	2.021
0.0003	0.93	8.00	0.03	0.10	0.12	0.03	6.24	0.002	13.171	0.002	2.021
0.0097	0.13	2.51	0.03	0.03	17.20	0.03	872.24	0.006	239.805	0.000	1.973
0.0097	0.14	2.61	0.03	0.03	17.21	0.03	872.41	0.006	239.805	0.000	1.973

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
					8.10	5.1		1247	-251	0.00	8.26	616
21.139	7.094	0.042	18.838	0.014	7.20	6.1					7.97	167
21.338	7.212	0.046	19.322	0.013							8.03	164
22.143	9.402	0.049	19.449	0.019							7.94	175
22.765	10.076	0.029	18.753	0.009							7.96	197
22.504	8.325	0.031	15.454	0.020	7.80	7.0	233				8.14	188
22.806	10.471	0.034	18.290	0.014	7.46	5.8		540	59		7.76	190
22.606	8.332	0.030	15.612	0.012							8.00	186
23.007	7.700	0.017	ud	14.895			240				7.58	177
23.007	7.700	0.017	ud	14.895			240				7.58	177
34.277	21.073	0.027	11.201	0.002	7.12	6.1	312				7.70	246
37.625	27.560	0.019	11.613	0.002	7.12	6.1	350	753	74	2.68	7.68	267
37.625	27.560	0.019	11.613	0.002	6.99	7.5	350	722	107	5.53	7.68	267
39.717	28.959	0.032	14.017	0.002	7.01	6.9	390	698	-33	0.99	7.96	270
25.371	13.412	0.047	15.536	0.029	7.67	5.8	216	658	219	3.96	7.69	217
25.651	13.876	0.048	15.902	0.029				1698	-50	0.00	7.51	210
32.341	13.981	0.027	22.808	0.005			290				7.61	194
28.240	14.902	0.046	21.487	0.029	7.09	6.1	257	718	309		7.60	227
28.240	14.902	0.046	21.487	0.029							7.60	227
24.992	8.141	0.039	30.797	0.030	6.86	6.4		667	227		7.65	214
21.650	2.445	0.033	34.046	0.027	7.34	7.6	232	641	304		7.77	160
21.650	2.445	0.033	34.046	0.027							7.77	160
21.650	2.445	0.033	34.046	0.027							7.77	160
39.520	32.622	0.021	ud	12.916	6.30	5.7	390	748	97	2.34	7.58	305
4.846	262.231	0.094	0.009	0.060							8.21	508
4.846	262.231	0.094	0.009	0.060	8.35	3.4		1269	-244	0.00	8.01	510
5.160	229.793	0.068	0.114	0.040	8.00	4.5	674				8.16	529
4.900	251.926	0.081	0.382	0.055							8.07	523
5.409	247.346	0.007	0.813	0.000	7.92	3.5		1191	-248	0.00	8.16	483
5.502	269.957	0.027	1.306	0.002	7.90	3.9		1165	-208	0.00	8.10	501
6.254	286.117	0.046	0.009	0.041	8.09	11.7	648				8.15	577
6.254	286.117	0.046	0.009	0.041	8.09	11.7	648				8.13	599
5.474	270.153	0.032	1.537	0.000	8.13	6.3		1215	-70	0.07	8.81	515
6.044	281.030	0.025	2.349	0.000							8.09	518
6.044	281.030	0.025	2.349	0.000							8.05	522
143.837	1.701	0.034	279.129	0.380	6.78	5.8	285	1880	77			
143.837	1.701	0.034	279.129	0.380								

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_12-06a	24/07/2013	10589	0.0236	0.0077	1.8985	140.9249	0.0101	2.9970	0.0423
WLC_12-06a	23/08/2013	10634	0.0245	0.0100	1.7727	163.2039	0.0055	3.1126	0.0606
WLC_12-06a	10/06/2013	10489	0.0223	0.0124	1.9379	148.8307	0.0017	3.1931	0.0164
WLC_12-06a	11/06/2014	10866	0.0238	0.0139	2.0712	164.1863	0.0029	2.9082	0.0399
WLC_12-06a	26/05/2014	10796	0.0236	0.0184	1.7628	164.4215	0.0001	2.7711	0.0421
WLC_12-06a	13/05/2014	10773	0.0266	0.0291	1.8798	198.6032	0.0025	3.0332	0.0246
WLC_12-06a	12/03/2014	10743	0.0255	0.0206	1.9440	202.2943	0.0024	3.0642	0.0209
WLC_12-06a	11/03/2014	10734	0.0265	0.0148	2.0600	221.2765	0.0078	3.0185	0.0305
WLC_12-06a	06/05/2014	10756	0.0271	0.0293	2.3232	212.0877	0.0022	3.0129	0.0200
WLC_12-06a	15/01/2014	10720	0.0257	0.0307	1.6827	199.8850	0.0111	2.9189	0.2537
WLC_12-06a	11/07/2013	10556	0.0231	0.0107	1.6761	142.7739	0.0047	3.1049	0.0313
WLC_12-09d	02/07/2013	10513	0.0082	0.0126	6.5434	33.4686	0.0174	4.2098	0.0420
WLC_12-09d	11/06/2014	10867	0.0027	0.0099	1.0764	29.8104	0.0032	2.8983	0.0545
WLC_12-09d	05/06/2014	10848							
WLC_12-09d	12/05/2014	10768	0.0023	0.0111	1.7229	33.8709	0.0025	4.1736	0.0274
WLC_12-09d	12/05/2014	10768-ICS Rep	0.0023	0.0111	1.7229	33.8709	0.0025	4.1736	0.0274
WLC_12-09d	07/05/2014	10759	0.0029	0.0551	5.2292	33.0007	0.0038	4.1363	0.0234
WLC_12-09d	31/05/2014	10825	0.0031	0.0131	1.5692	32.3383	0.0004	3.0138	0.0376
WLC_12-09d	26/05/2014	10798	0.0027	0.0148	1.3969	33.7935	0.0023	4.2410	0.0310
WLC_12-09d	02/06/2014	10841	0.0028	0.0095	1.2890	30.5221	0.0035	3.8905	0.0327
WLC_12-09d	17/07/2013	10574			3.5470	37.9512			
WLC_12-09d	02/07/2013	10514	0.0079	0.0141	6.7517	33.7142	0.0187	4.3905	0.0377
WLC_12-09d	06/07/2013	10535	0.0069	0.0082	4.9592	33.7053	0.0132	4.1031	0.0419
WLC_12-09d	02/07/2013	10513R	0.0082	0.0142	6.5106	32.8358	0.0181	4.2611	0.0423
WLC_Seep	13/09/2013	10667	0.0074	0.0064	1.7287	28.5429	0.0103	3.9651	0.0420
WLC_Seep	30/08/2013	10648	0.0075	0.0067	1.5753	35.3847	0.0061	3.9165	0.0472
WLC_Seep	23/08/2013	10631	0.0075	0.0062	1.3852	36.9964	0.0047	3.8857	0.0547
WLC_Seep	14/08/2013	10623	0.0077	0.0065	1.2964	38.7195	0.0020	3.8103	0.0256
WLC_Seep	14/08/2013	10623	0.0077	0.0065	1.2964	38.7195	0.0020	3.8103	0.0256
WLC_Seep	07/08/2013	10603	0.0075	0.0069	1.2039	39.0472	0.0017	3.7623	0.0284
WLC_Seep	23/07/2013	10586R	0.0071	0.0029	1.0514	40.1600	0.0045	3.5983	0.0687
WLC_Seep	14/06/2013	10495	0.0073	0.0067	1.1510	48.7144	0.0076	3.8074	0.0473
WLC_Seep	07/06/2013	10482	0.0076	0.0083	1.2532	43.3407	0.0051	4.0438	0.0131
WLC_Seep	03/06/2013	10474							
WLC_Seep	26/06/2013	10506	0.0072	0.0078	1.1759	38.3567	0.0339	3.5858	0.0370
WLC_Seep	02/07/2013	10520	0.0074	0.0082	1.2558	41.1175	0.0085	3.8755	0.0258
WLC_Seep	02/07/2013	10521	0.0072	0.0071	1.1925	39.9568	0.0054	3.8183	0.0290

ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
1.9086	240.1506	0.0013	ud	0.0002	0.0006	0.0082	0.0090	0.0006	0.0101	0.0006	0.0047
1.9249	268.9864	0.0015	0.0012	0.0002	0.0007	0.0084	0.0054	0.0006	0.0105	0.0010	0.0060
2.0953	272.7138	0.0009	0.0008	0.0003	0.0005	0.0006	0.0072	0.0004	0.0091	0.0013	0.0169
2.0460	270.1179	0.0012	0.0011	0.0001	0.0004	0.0007	0.0338	0.0006	0.0213	0.0003	0.0076
1.9906	258.8640	0.0009	0.0008	0.0001	0.0004	0.0004	0.0010	0.0004	0.0120	0.0004	0.0147
1.8127	326.2686	0.0015	0.0014	0.0001	0.0005	0.0005	0.0083	0.0005	0.0104	0.0006	0.0242
2.1285	345.0415	0.0011	0.0010	0.0002	0.0004	0.0116	0.0070	0.0009	0.0144	0.0007	0.0639
2.4107	353.9116	0.0011	0.0009	0.0001	0.0007	0.0019	0.0108	0.0007	0.0143	0.0013	0.0400
1.5895	332.9828	0.0015	0.0013	0.0002	0.0006	0.0004	0.0083	0.0005	0.0108	0.0002	0.0426
2.0571	303.8420	0.0011	0.0010	0.0003	0.0012	0.0019	0.0336	0.0006	0.0128	0.0007	0.0303
1.7785	244.7082	0.0011	0.0010	0.0002	0.0007	0.0015	0.0051	0.0005	0.0082	0.0006	0.0035
1.8109	166.2445	0.0017	0.0012	0.0004	0.0008	0.0068	0.0209	0.0004	0.0058	0.0007	0.0238
0.9187	129.0274	0.0012	0.0009	0.0001	0.0004	0.0009	0.0064	0.0003	0.0110	0.0008	0.0154
1.8353	142.4443	0.0022	0.0015	0.0002	0.0005	0.0023	0.0048	0.0002	0.0053	0.0013	0.2183
1.8353	142.4443	0.0022	0.0015	0.0002	0.0005	0.0023	0.0048	0.0002	0.0053	0.0013	0.2183
1.4904	139.3853	0.0023	0.0016	0.0001	0.0010	0.0143	0.0092	0.0003	0.0064	0.0011	0.2000
0.5964	140.4068	0.0009	0.0008	0.0001	0.0004	0.0011	0.0038	0.0002	0.0058	0.0003	0.1290
1.4395	147.9412	0.0012	0.0009	0.0001	0.0004	0.0014	0.0049	0.0002	0.0068	0.0008	0.0164
0.9669	137.5654	0.0013	0.0008	0.0002	0.0010	0.0028	0.0103	0.0004	0.0103	0.0008	0.0163
2.1568	310.8330										
1.8706	167.1662	0.0018	0.0011	0.0004	0.0008	0.0069	0.0215	0.0004	0.0067	0.0013	0.0221
1.8135	158.7660	0.0016	0.0014	0.0002	0.0008	0.0227	0.0243	0.0004	0.0070	0.0013	0.0135
1.7966	163.4968	0.0017	0.0015	0.0004	0.0008	0.0070	0.0238	0.0004	0.0066	0.0007	0.0246
0.8930	96.8720	0.0023	0.0016	0.0002	0.0005	0.0005	0.0052	0.0005	0.0035	0.0001	0.5224
0.9097	107.3608	0.0020	0.0014	0.0001	0.0002	0.0001	0.0010	0.0002	0.0045	0.0001	0.0011
0.9052	109.8318	0.0017	0.0021	0.0002	0.0005	0.0001	0.0010	0.0002	0.0047	0.0004	0.0022
0.8980	115.0562	0.0017	0.0014	0.0002	0.0005	0.0002	0.0012	0.0002	0.0044	0.0003	0.0020
0.8980	115.0562	0.0017	0.0014	0.0002	0.0005	0.0002	0.0012	0.0002	0.0044	0.0003	0.0020
0.9522	116.6781	0.0018	0.0010	0.0001	0.0004	0.0004	0.0009	0.0002	0.0048	0.0006	0.0022
0.8586	117.8144	0.0016	ud	0.0001	0.0005	0.0002	0.0022	0.0002	0.0043	ud	0.0017
0.8315	132.7556	0.0013	0.0008	0.0002	0.0003	0.0000	0.0010	0.0002	0.0046	0.0002	0.0005
0.9256	137.6877	0.0011	0.0010	0.0004	0.0002	0.0006	0.0060	0.0002	0.0046	0.0006	0.0030
0.8851	120.3437	0.0014	0.0053	0.0004	0.0010	0.0011	0.0476	0.0002	0.0035	0.0005	0.0021
0.9599	122.9583	0.0014	0.0009	0.0002	0.0006	0.0006	0.0121	0.0002	0.0036	0.0005	0.0028
0.9067	118.6869	0.0014	0.0010	0.0002	0.0006	0.0005	0.0078	0.0003	0.0038	0.0002	0.0023

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Ga	Ge	As	Se	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
ud	0.0000	0.0173	0.2851	0.0007	0.1648	0.0000	0.0001	0.0011	0.0017	ud	0.0001
ud	ud	0.0244	0.3230	0.0006	0.1927	0.0000	0.0000	0.0014	0.0034	ud	0.0000
ud	0.0002	0.0157	0.3282	0.0006	0.1756	0.0000	0.0001	0.0003	0.0012	ud	0.0000
0.0000	0.0001	0.0122	0.3408	0.0007	0.2118	0.0000	0.0000	0.0001	0.0015	0.0001	0.0000
0.0000	0.0000	0.0295	0.4122	0.0007	0.2435	0.0000	0.0000	0.0001	0.0017	0.0001	0.0000
0.0000	0.0000	0.0298	0.4003	0.0006	0.2390	0.0000	0.0001	0.0001	0.0015	0.0001	0.0001
0.0000	0.0001	0.0297	0.4973	0.0008	0.2362	0.0000	0.0001	0.0000	0.0016	0.0001	0.0001
0.0000	0.0000	0.0241	0.5258	0.0010	0.2489	0.0000	0.0001	0.0000	0.0015	0.0001	0.0001
0.0000	0.0000	0.0391	0.4389	0.0003	0.2433	0.0000	0.0000	0.0001	0.0012	0.0001	0.0001
0.0000	0.0000	0.0229	0.4378	0.0009	0.2187	0.0001	0.0001	0.0001	0.0013	0.0001	0.0001
ud	ud	0.0104	0.2686	0.0006	0.1666	0.0000	0.0001	0.0007	0.0015	ud	0.0000
ud	0.0000	0.0017	0.0351	0.0009	0.1683	0.0001	0.0001	0.0010	0.0009	ud	0.0000
0.0000	0.0001	0.0033	0.0900	0.0003	0.1268	0.0000	0.0001	0.0001	0.0002	0.0001	0.0000
0.0000	0.0001	0.0026	0.0296	0.0005	0.1662	0.0000	0.0001	0.0001	0.0012	0.0001	0.0000
0.0000	0.0001	0.0026	0.0296	0.0005	0.1662	0.0000	0.0001	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0026	0.0304	0.0003	0.1826	0.0000	0.0001	0.0001	0.0014	0.0001	0.0000
0.0000	0.0000	0.0030	0.0784	0.0001	0.1344	0.0001	0.0000	0.0001	0.0002	0.0001	0.0001
0.0000	0.0000	0.0010	0.0221	0.0004	0.1539	0.0000	0.0001	0.0001	0.0007	0.0001	0.0000
0.0000	0.0000	0.0066	0.0915	0.0003	0.1349	0.0000	0.0000	0.0001	0.0002	0.0001	0.0000
		0.0046	0.0550								0.0002
ud	0.0000	0.0018	0.0355	0.0010	0.1710	0.0001	0.0001	0.0006	0.0010	ud	0.0000
ud	0.0000	0.0015	0.0407	0.0007	0.1655	0.0001	0.0001	0.0009	0.0011	ud	0.0000
ud	0.0002	0.0019	0.0354	0.0009	0.1696	0.0001	0.0002	0.0010	0.0010	ud	0.0000
0.0000	ud	0.0036	0.0500	0.0004	0.1342	0.0000	0.0000	0.0016	0.0019	ud	0.0000
ud	ud	0.0061	0.0642	0.0003	0.1293	0.0000	0.0000	0.0013	0.0015	ud	ud
ud	ud	0.0049	0.0756	0.0003	0.1344	ud	0.0000	0.0016	0.0014	ud	0.0000
ud	ud	0.0067	0.0826	0.0003	0.1373	ud	0.0000	0.0012	0.0015	ud	0.0000
ud	ud	0.0067	0.0826	0.0003	0.1373	ud	0.0000	0.0012	0.0015	ud	0.0000
ud	0.0000	0.0062	0.0870	0.0004	0.1364	ud	0.0000	0.0011	0.0015	ud	ud
ud	0.0004	0.0056	0.0932	0.0004	0.1300	0.0000	0.0001	0.0011	0.0016	ud	0.0000
0.0000	0.0000	0.0026	0.1065	0.0003	0.1365	0.0000	0.0000	0.0005	0.0014	0.0001	0.0000
ud	0.0000	0.0058	0.1072	0.0003	0.1409	0.0000	0.0000	0.0003	0.0013	ud	0.0000
ud	ud	0.0035	0.0883	0.0004	0.1329	0.0001	0.0001	0.0008	0.0015	ud	0.0000
ud	ud	0.0060	0.0900	0.0004	0.1306	0.0000	0.0001	0.0007	0.0012	ud	0.0000
ud	ud	0.0045	0.0936	0.0004	0.1316	0.0000	0.0001	0.0008	0.0013	ud	0.0000

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0001	0.1650	0.0271	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
ud	0.0001	0.0017	0.0294	ud	ud	ud	ud	ud	ud	ud	ud
0.0001	0.0001	ud	0.0235	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0001	0.0002	0.0293	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0003	0.0349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0001	0.0461	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0002	0.0001	0.0293	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0005	0.0002	0.0001	0.0221	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0004	0.0001	0.0001	0.0546	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0005	0.0001	0.0000	0.0352	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.1258	0.0237	0.0000	0.0000	ud	ud	ud	ud	0.0000	ud
0.0000	0.0001	0.1857	0.1246	0.0000	0.0001	0.0000	0.0000	ud	ud	ud	ud
0.0000	0.0001	0.0003	0.1574	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0002	0.0001	0.0737	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0002	0.0001	0.0737	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0003	0.0003	0.0001	0.2181	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.1939	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0003	0.0753	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0002	0.1822	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.1034	0.1243	0.0000	0.0001	0.0000	0.0000	ud	ud	0.0000	0.0000
0.0015	0.0001	0.1777	0.1136	0.0000	0.0001	0.0000	0.0000	ud	ud	ud	ud
0.0001	0.0001	0.1867	0.1245	0.0000	0.0001	0.0000	0.0000	ud	ud	ud	ud
0.0001	0.0000	ud	0.0600	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0000	0.0017	0.0673	ud	ud	ud	0.0000	ud	ud	ud	ud
0.0000	0.0000	0.0019	0.0698	ud	ud	ud	ud	ud	ud	ud	ud
ud	0.0000	0.0014	0.0713	ud	ud	ud	ud	ud	ud	ud	ud
ud	0.0000	0.0014	0.0713	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	ud	0.0014	0.0709	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0000	0.1619	0.0559	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0000	0.3294	0.0770	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	ud	0.0778	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0000	0.1550	0.0719	0.0000	0.0001	0.0000	0.0000	0.0000	ud	ud	ud
0.0001	0.0000	0.1244	0.0700	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0001	0.0000	0.1505	0.0713	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud

ICP-MS Dy ppm	ICP-MS Ho ppm	ICP-MS Er ppm	ICP-MS Tm ppm	ICP-MS Yb ppm	ICP-MS Lu ppm	ICP-MS Hf ppm	ICP-MS Ta ppm	ICP-MS W ppm	ICP-MS Hg ppm	ICP-MS Tl ppm	ICP-MS Pb ppm	ICP-MS Th ppm
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	ud	0.0001	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	ud	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0001	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0015	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0009	0.0000	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	ud	ud	0.0000	0.0000	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	0.0000	0.0000	0.0002	0.0000	ud	ud	0.0000	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	ud	ud	ud	0.0000	ud	0.0001	0.0000	ud	ud	0.0000	0.0001	0.0000
0.0000	ud	0.0000	ud	0.0000	0.0000	0.0001	0.0000	ud	ud	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	0.0003	0.0000	ud	0.0001	0.0000	0.0001	0.0001
ud	ud	ud	ud	ud	0.0000	0.0001	ud	ud	ud	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	ud	ud	ud	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	ud	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	ud	ud
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	ud	0.0002	ud	ud	ud	ud	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	0.0000	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0001	ud
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	ud	0.0001	0.0000
0.0000	ud	ud	ud	ud	ud	0.0003	0.0000	ud	ud	ud	0.0001	0.0001
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0000	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0097	0.03	1.04	0.03	0.10	9.52	0.03	758.51	0.002	241.253	0.000	1.929
0.0104	0.15	1.41	0.03	0.10	10.89	0.03	862.49	0.005	257.521	0.000	1.925
0.0108	0.03	2.33	0.03	0.10	11.78	0.03	784.11	0.002	258.170	0.000	2.035
0.0125	0.12	4.12	0.03	0.03	19.68	0.03	above	0.002	264.155	0.000	2.090
0.0109								0.002	267.531	0.000	2.080
0.0115	0.08	4.10	0.03	0.10	21.60	0.03	1223.98	0.002	299.744	0.000	2.211
0.0127	0.25	4.02	0.03	0.10	20.94	0.03	1209.09	0.013	307.286	0.000	2.370
0.0140	0.22	4.43	0.03	0.10	22.44	0.03	1253.12	0.010	308.440	0.000	2.574
0.0126	0.07	4.30	0.03	0.10	22.46	0.03	1280.90	0.002	313.431	0.000	2.235
0.0140	0.03	3.93	0.07	0.10	39.31	0.03	1203.99	0.002	324.846	0.000	2.583
0.0094	0.03	1.24	0.03	0.10	9.06	0.03	741.52	ud	231.663	ud	1.894
0.0017	0.18	3.78	0.03	0.10	16.95	0.03	90.64	0.002	106.699	0.000	0.570
0.0013	0.12	1.37	0.03	0.03	10.78	0.03	200.97	0.002	138.672	0.000	0.924
	0.12	1.38	0.03	0.03	11.17	0.03	218.43	0.005	139.445	0.000	1.053
0.0017	0.28	3.01	0.03	0.10	18.60	0.03	124.62	0.002	144.955	0.000	1.978
0.0017	0.28	2.97	0.03	0.10	18.60	0.03	124.33	0.002	144.955	0.000	1.978
0.0023	0.34	4.91	0.03	0.10	16.09	0.03	126.91	0.005	146.058	0.000	1.748
0.0011								0.007	146.416	0.000	0.894
0.0014								0.008	149.095	0.000	1.562
0.0013	0.13	1.55	0.03	0.03	13.32	0.03	204.93	0.007	149.134	0.000	0.991
							105.00	0.005	310.833	0.000	2.157
0.0017	0.13	3.62	0.22	0.10	16.25	0.03	81.95				
0.0017	0.03	2.89	0.03	0.10	11.99	0.03	100.31				
0.0017	0.18	3.78	0.03	0.10	16.95	0.03	90.64				
0.0014	0.31	0.38	0.03	0.10	3.15	0.03	88.26	0.002	98.597	0.000	0.824
0.0016	0.46	0.35	0.03	0.10	4.21	0.03	113.92	0.002	110.556	0.000	0.843
0.0016	0.30	0.38	0.03	0.10	4.69	0.03	127.26	0.002	111.767	0.000	0.856
0.0018	0.27	0.44	0.03	0.10	5.38	0.03	153.04	0.002	119.248	0.000	0.851
0.0018	0.27	0.44	0.03	0.10	5.38	0.03	153.04	0.002	119.248	0.000	0.851
0.0017	0.31	0.33	0.03	0.10	5.93	0.03	166.45	0.002	124.731	0.000	0.908
0.0017	0.28	0.34	0.03	0.10	5.95	0.03	159.25	0.002	125.442	0.000	0.803
0.0019	0.57	0.50	0.03	0.10	6.35	0.03	166.28	0.002	135.305	0.000	0.861
0.0017	0.31	0.49	0.03	0.10	6.64	0.03	187.13	0.002	137.096	0.000	0.942
								0.002	140.490	0.000	0.923
0.0016	0.23	0.52	0.03	0.10	6.40	0.03	171.01				
0.0017	0.55	0.78	0.03	1.56	5.92	0.03	151.26				
0.0019	0.31	0.42	0.03	0.10	6.37	0.03	165.37				

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
141.184	1.963	0.005	282.320	0.325	6.76	4.8		1777	84	6.18	7.37	252
158.938	1.808	0.028	323.567	0.393	7.14	4.5		1942	246	none	7.50	233
151.357	1.830	0.010	306.809	0.396	6.67	5.5		1862	200	7.21	7.42	209
167.859	2.020	0.020	341.870	0.435	7.06	5.1	277	2091	308		7.79	230
174.035	1.991	0.039	356.803	0.484			254				7.47	210
199.763	2.046	0.025	395.063	0.528		5.4	277	2415	336		7.50	221
203.133	2.394	0.049	392.092	0.554							7.37	229
213.349	2.241	0.051	415.022	0.596	7.60	3.9	299				7.35	415
205.791	2.106	0.025	404.698	0.545			293				7.37	221
220.584	2.380	0.022	436.117	0.556	7.43	3.8		2482	194	6.64	7.41	270
148.384	1.826	ud	0.338	291.867	5.94	4.9		1801	105	5.87	7.35	226
31.718	1.456	0.033	46.357	0.066	6.97	6.7		989	146	7.82	7.24	258
30.802	1.159	0.018	67.838	0.116	7.21	5.3	224	874	298		7.78	183
29.427	1.181	0.027	73.587	0.143	7.22		240				7.66	171
32.635	1.983	0.036	39.215	0.054	7.20	5.5	337				7.72	263
32.635	1.983	0.036	39.215	0.054							7.72	263
31.325	5.584	0.031	39.803	0.048							7.63	311
31.361	1.346	0.041	56.587	0.122	6.85	4.9	265	902	279		7.50	231
32.534	1.608	0.056	45.657	0.065	7.57	4.5		964	246		7.69	294
31.866	1.243	0.035	65.136	0.138	7.04		386				7.69	251
37.951	3.547	0.207	54.114	0.055	7.47	7.8		932	189	10.72	7.63	260
											7.32	265
					6.90	6.0		1	170	7.61	7.31	259
					6.97	6.7		989	146	7.82	7.24	258
31.059	1.636	0.002	39.442	0.057	7.23	8.2	217				7.91	183
35.731	1.482	0.002	51.497	0.079	7.39	5.1	245				7.70	141
37.459	1.360	0.019	55.783	0.092	7.21	5.1	200				7.61	176
39.226	1.263	0.006	62.167	0.099	7.26	5.1	217				7.77	174
39.226	1.263	0.006	62.167	0.099	7.26	5.1	217				7.76	174
40.566	1.225	0.005	67.446	0.108	7.27	5.1	202				7.80	175
39.977	1.076	0.002	69.327	0.109	7.21	5.3	196				7.57	171
42.411	1.189	0.007	76.327	0.133	7.61	6.1	223				7.49	150
43.509	1.319	0.008	76.173	0.128	7.26	6.9	227				7.54	173
43.143	1.326	0.006	77.291	0.137	6.26	5.2	223				7.84	184
					7.64	6.7	196				7.61	147
					8.14	7.6	216				7.54	143
					8.14	7.6	216				7.54	144

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_Seep	03/07/2013	10521	0.0072	0.0071	1.1925	39.9568	0.0054	3.8183	0.0290
WLC_Seep	13/07/2013	10567	0.0070	0.0038	1.0577	39.7743	0.0133	3.4802	0.0346
WLC_Seep	23/07/2013	10586	0.0072	0.0024	1.0547	40.8173	0.0047	3.5667	0.0670
WLC_Seep_1	07/01/2014	10712	0.0070	0.0128	1.8596	25.5368	0.0079	3.8885	0.1116
WLC_Seep_1	13/01/2014	10716	0.0070	0.0197	1.7774	24.8499	0.0038	3.5156	0.1475
WLC_Seep_1	14/05/2014	10779	0.0078	0.0157	2.0492	28.6903	0.0021	4.0582	0.0172
WLC_Seep_1	12/03/2014	10740	0.0063	0.0120	1.8004	31.0712	0.0096	3.8638	0.0417
WLC_Seep_1	29/05/2014	10817	0.0080	0.0191	2.0175	29.8780	0.0001	4.1904	0.0270
WLC_Seep_1	15/01/2014	10723	0.0063	0.0120	1.5205	39.4524	0.0036	3.8261	0.1514
WLC_Seep_1	15/07/2014	10975	0.0075	0.0123	1.0940	45.2059	0.0035	3.9284	0.0149
WLC_Seep_1	12/06/2014	10872							
WLC_Seep_1	23/06/2014	10909	0.0077	0.0195	1.2302	43.0037	0.0034	7.0107	0.0634
WLC_Seep_1b	13/09/2013	10668	0.0077	0.0068	1.8382	28.4519	0.0074	4.2404	0.0394
WLC_Seep_1b	13/09/2013	10668	0.0077	0.0068	1.8382	28.4519	0.0074	4.2404	0.0394
WLC_Seep_1b	05/09/2013	10660	0.0085	0.0139	2.0433	29.1634	0.0073	4.2882	0.0654
WLC_Seep_1b	30/08/2013	10645	0.0080	0.0063	1.5318	32.4313	0.0127	4.2665	0.0424
WLC_Seep_1b	23/07/2013	10587	0.0079	0.0030	1.3268	35.8143	0.0040	4.1425	0.0425
WLC_Seep_1b	09/08/2013	10604	0.0078	0.0068	1.3718	34.9331	0.0034	4.2916	0.0308
WLC_Seep_1b	09/08/2013	10604R	0.0076	0.0078	1.3904	36.0098	0.0033	4.2977	0.0313
WLC_Seep_2	12/03/2014	10741	0.0096	0.0290	2.2194	18.7345	0.0045	3.2314	0.0395
WLC_Seep_2	07/01/2014	10711	0.0103	0.0295	2.1445	17.6715	0.0064	3.4099	0.2239
WLC_Seep_2	13/01/2014	10715	0.0137	0.0505	2.3059	18.3851	0.0177	3.2233	0.1060
WLC_Seep_2	15/01/2014	10724	0.0101	0.0392	2.2825	19.1273	0.0045	3.4931	0.0931
WLC_Seep_2	01/09/2014	13106	0.0105	0.0277	2.2229	18.3649	0.0188	3.7062	0.0645
WLC_Seep_2	07/01/2014	10710	0.0100	0.0302	1.8009	17.6446	0.0047	3.5218	0.1641
WLC_Seep_2	12/09/2013	10666	0.0138	0.0232	2.7093	17.8571	0.0070	3.9554	0.0455
WLC_Seep_2	18/08/2014	13068	0.0099	0.0230	2.1415	19.9926	0.0044	3.6094	0.0200
WLC_Seep_2	17/08/2014	13067	0.0100	0.0232	2.0339	20.4720	0.0064	3.5829	0.0261
WLC_Seep_2	23/08/2013	10632	0.0109	0.0180	2.4545	21.0324	0.0113	3.9864	0.0706
WLC_Seep_2	23/08/2013	10632R	0.0109	0.0184	2.6019	20.9845	0.0147	4.0069	0.0676
WLC_Seep_2	16/08/2014	13066	0.0102	0.0225	2.0334	20.9320	0.0034	3.7046	0.0218
WLC_Seep_2	30/08/2013	10646	0.0114	0.0211	2.6713	19.5641	0.0011	3.9669	0.0286
WLC_Seep_2	15/08/2014	13065	0.0097	0.0242	1.9348	21.2868	0.0061	3.5883	0.0126
WLC_Seep_2	30/08/2013	10647	0.0114	0.0212	2.6912	20.0270	0.0012	3.9718	0.0295
WLC_Seep_2	14/08/2014	13064	0.0108	0.0250	2.4430	22.0295	0.0038	4.0406	0.0290
WLC_Seep_2	12/08/2014	13062	0.0108	0.0261	2.5101	23.2153	0.0050	4.1090	0.0248
WLC_Seep_2	14/08/2013	10624	0.0110	0.0190	2.4628	20.7980	0.0025	4.0019	0.0347

ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
0.9067	118.6869	0.0014	0.0010	0.0002	0.0006	0.0005	0.0078	0.0003	0.0038	0.0002	0.0023
0.8070	122.9277	0.0015	0.0014	0.0001	0.0003	0.0013	0.0174	0.0002	0.0035	0.0003	0.0016
0.8341	117.2472	0.0016	ud	0.0002	0.0005	0.0002	0.0019	0.0002	0.0041	ud	0.0017
0.7279	80.7039	0.0013	0.0012	0.0002	0.0001	0.0006	0.0064	0.0001	0.0033	0.0003	0.0018
0.6848	77.1567	0.0014	0.0011	0.0002	0.0010	0.0003	0.0025	0.0002	0.0030	0.0010	0.0093
0.5448	82.2695	0.0020	0.0015	0.0001	0.0007	0.0003	0.0053	0.0001	0.0030	0.0006	0.0227
0.8197	89.9644	0.0014	0.0011	0.0002	0.0005	0.0006	0.0519	0.0002	0.0039	0.0011	0.0050
0.4541	85.6511	0.0011	0.0010	0.0000	0.0005	0.0002	0.0056	0.0001	0.0033	0.0002	0.0244
0.8926	109.7231	0.0013	0.0013	0.0001	0.0009	0.0002	0.0140	0.0002	0.0048	0.0006	0.0066
0.8809	123.5107	0.0017	0.0014	0.0002	0.0002	0.0005	0.0125	0.0002	0.0039	0.0005	0.0003
0.7760	120.7506	0.0015	0.0008	0.0001	0.0002	0.0006	0.0100	0.0004	0.0103	0.0010	0.0243
0.9009	98.2592	0.0025	0.0017	0.0002	0.0003	0.0006	0.0055	0.0005	0.0035	0.0001	0.4429
0.9009	98.2592	0.0025	0.0017	0.0002	0.0003	0.0006	0.0055	0.0005	0.0035	0.0001	0.4429
0.9311	99.1906	0.0025	0.0018	0.0001	0.0001	0.0067	0.0022	0.0006	0.0037	0.0041	0.5096
0.8752	104.3188	0.0022	0.0017	0.0001	0.0001	0.0009	0.0100	0.0002	0.0044	0.0005	0.0050
0.7844	114.7564	0.0018	ud	0.0001	0.0005	0.0002	0.0005	0.0002	0.0043	ud	0.0015
0.8457	113.7442	0.0021	0.0012	0.0002	0.0004	0.0004	0.0022	0.0002	0.0048	0.0003	0.0017
0.8469	116.2142	0.0020	0.0011	0.0001	0.0003	0.0004	0.0019	0.0002	0.0041	0.0003	0.0016
0.8054	55.6734	0.0011	0.0012	0.0002	0.0003	0.0002	0.0079	0.0001	0.0020	0.0010	0.0046
0.8076	62.2161	0.0012	0.0014	0.0002	0.0057	0.0027	0.0183	0.0003	0.0081	0.0007	0.0037
0.6644	59.7116	0.0013	0.0012	0.0002	0.0011	0.0003	0.0068	0.0001	0.0025	0.0007	0.0232
0.7272	60.7275	0.0012	0.0012	0.0001	0.0001	0.0001	0.0084	0.0001	0.0022	0.0004	0.0123
0.6983	61.0625	0.0016	0.0015	0.0002	0.0004	0.0001	0.0051	0.0001	0.0015	0.0003	0.0015
0.6574	60.9265	0.0011	0.0008	0.0002	0.0001	0.0006	0.0094	0.0001	0.0022	0.0001	0.0017
0.8859	67.3135	0.0021	0.0017	0.0001	0.0006	0.0004	0.0018	0.0004	0.0028	0.0006	0.3648
0.6498	64.0546	0.0016	0.0013	0.0003	0.0015	0.0006	0.0067	0.0001	0.0012	0.0000	0.0022
0.6109	63.6890	0.0016	0.0013	0.0003	0.0021	0.0004	0.0121	0.0002	0.0013	0.0010	0.0021
0.7862	69.8804	0.0019	0.0027	0.0002	0.0005	0.0003	0.0127	0.0001	0.0025	0.0007	0.0022
0.8106	69.9922	0.0018	0.0039	0.0002	0.0004	0.0004	0.0217	0.0001	0.0025	0.0009	0.0021
0.5822	64.0170	0.0018	0.0013	0.0004	0.0030	0.0001	0.0162	0.0001	0.0014	0.0019	0.0022
0.8402	69.9307	0.0020	0.0014	0.0000	0.0003	0.0000	0.0026	0.0002	0.0026	0.0002	0.0009
0.5358	63.8552	0.0016	0.0014	0.0005	0.0069	0.0004	0.0128	0.0001	0.0013	0.0039	0.0018
0.8626	69.4797	0.0020	0.0013	0.0001	0.0002	0.0000	0.0020	0.0001	0.0027	0.0003	0.0010
0.7257	68.8674	0.0019	0.0009	0.0001	0.0004	0.0000	0.0123	0.0001	0.0021	0.0008	0.0001
0.7503	71.3393	0.0018	0.0009	0.0002	0.0004	0.0002	0.0135	0.0001	0.0024	0.0014	0.0001
0.8142	71.4249	0.0019	0.0014	0.0002	0.0005	0.0003	0.0018	0.0001	0.0027	0.0007	0.0022

ICP-MS Ga ppm	ICP-MS Ge ppm	ICP-MS As ppm	ICP-MS Se ppm	ICP-MS Rb ppm	ICP-MS Sr ppm	ICP-MS Y ppm	ICP-MS Zr ppm	ICP-MS Nb ppm	ICP-MS Mo ppm	ICP-MS Ag ppm	ICP-MS Cd ppm
ud	ud	0.0045	0.0936	0.0004	0.1316	0.0000	0.0001	0.0008	0.0013	ud	0.0000
ud	0.0000	0.0037	0.0885	0.0003	0.1220	0.0000	0.0001	0.0007	0.0015	ud	0.0000
ud	ud	0.0051	0.0949	0.0003	0.1279	0.0000	0.0001	0.0011	0.0016	ud	ud
0.0000	0.0000	0.0009	0.0222	0.0003	0.1013	0.0000	0.0000	0.0001	0.0018	0.0001	0.0000
0.0000	0.0000	0.0009	0.0221	0.0002	0.1017	0.0000	0.0001	0.0001	0.0019	0.0001	0.0000
0.0000	0.0000	0.0023	0.0324	0.0001	0.1288	0.0000	0.0000	0.0001	0.0017	0.0001	0.0000
0.0000	0.0000	0.0025	0.0431	0.0004	0.0968	0.0000	0.0001	0.0000	0.0018	0.0001	0.0001
0.0000	0.0000	0.0015	0.0367	0.0001	0.1339	0.0000	0.0000	0.0001	0.0016	0.0001	0.0000
0.0000	0.0000	0.0033	0.0704	0.0002	0.1031	0.0000	0.0000	0.0001	0.0015	0.0001	0.0000
0.0000	0.0000	0.0130	0.1116	0.0003	0.1426	0.0000	0.0000	0.0000	0.0018	0.0001	0.0000
0.0000	0.0000	0.0056	0.0983	0.0002	0.1477	0.0000	0.0000	0.0000	0.0014	0.0001	0.0000
ud	ud	0.0036	0.0450	0.0002	0.1620	0.0000	0.0000	0.0014	0.0016	ud	0.0000
ud	ud	0.0036	0.0450	0.0002	0.1620	0.0000	0.0000	0.0014	0.0016	ud	0.0000
ud	ud	0.0026	0.0485	0.0002	0.1769	0.0000	0.0000	0.0016	0.0020	ud	0.0001
ud	ud	0.0053	0.0569	0.0002	0.1552	0.0000	0.0000	0.0020	0.0012	ud	ud
ud	ud	0.0041	0.0742	0.0002	0.1672	0.0000	0.0001	0.0012	0.0010	ud	ud
ud	ud	0.0039	0.0710	0.0002	0.1698	ud	0.0001	0.0017	0.0012	ud	ud
ud	0.0003	0.0051	0.0711	0.0001	0.1700	ud	0.0000	0.0016	0.0012	ud	ud
0.0000	0.0000	0.0000	0.0018	0.0004	0.2430	0.0000	0.0000	0.0000	0.0013	0.0001	0.0000
0.0000	0.0000	0.0005	0.0015	0.0003	0.2339	0.0000	0.0000	0.0001	0.0013	0.0001	0.0000
0.0002	0.0000	0.0003	0.0016	0.0001	0.2396	0.0000	0.0000	0.0000	0.0014	0.0001	0.0000
0.0000	0.0000	0.0002	0.0015	0.0001	0.2405	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0009	0.0047	0.0003	0.2127	0.0000	0.0001	0.0000	0.0011	0.0001	0.0000
0.0000	0.0000	0.0001	0.0017	0.0003	0.2352	0.0000	0.0000	0.0001	0.0013	0.0001	0.0000
ud	ud	0.0005	0.0032	0.0004	0.2516	0.0000	0.0001	0.0011	0.0015	ud	0.0000
0.0000	0.0000	0.0010	0.0120	0.0003	0.1991	0.0000	0.0000	0.0000	0.0013	0.0001	0.0000
0.0000	0.0000	0.0013	0.0124	0.0003	0.1963	0.0000	0.0000	0.0000	0.0013	0.0001	0.0000
0.0000	ud	0.0005	0.0050	0.0003	0.2226	0.0000	0.0001	0.0017	0.0014	ud	0.0000
ud	ud	0.0006	0.0059	0.0003	0.2213	ud	0.0000	0.0018	0.0015	ud	0.0000
0.0000	0.0000	0.0013	0.0135	0.0003	0.1951	0.0000	0.0000	0.0000	0.0015	0.0001	0.0000
ud	ud	0.0005	0.0037	0.0003	0.2144	0.0000	0.0000	0.0012	0.0013	ud	ud
0.0000	0.0000	0.0014	0.0160	0.0003	0.1923	0.0000	0.0000	0.0000	0.0012	0.0001	0.0000
ud	ud	0.0005	0.0037	0.0003	0.2191	0.0000	0.0000	0.0012	0.0013	ud	ud
0.0000	0.0000	0.0018	0.0158	0.0003	0.2220	0.0000	0.0000	0.0000	0.0014	0.0001	0.0000
0.0000	0.0000	0.0025	0.0185	0.0003	0.2253	0.0000	0.0000	0.0000	0.0015	0.0001	0.0001
ud	0.0000	0.0012	0.0088	0.0003	0.2173	ud	0.0000	0.0013	0.0013	ud	0.0000

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0001	0.0000	0.1505	0.0713	0.0000	0.0000	ud	1.0000	ud	ud	ud	ud
0.0001	0.0000	0.1233	0.0623	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0000	0.1601	0.0546	ud	0.0000	ud	0.0000	0.0000	ud	ud	ud
0.0004	0.0001	0.0000	0.0360	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0000	0.0000	0.0431	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.0840	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0012	0.0001	0.0001	0.0344	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.1307	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0000	0.0001	0.0455	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0003	0.0000	0.0000	0.0727	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0002	0.0989	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	ud	0.1474	ud	0.0000	ud	0.0000	ud	ud	ud	ud
0.0001	0.0000	ud	0.1474	ud	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0001	ud	0.1949	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0000	0.0025	0.1572	0.0000	0.0000	ud	ud	ud	ud	ud	ud
ud	0.0000	0.1707	0.1715	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
ud	ud	0.0021	0.1720	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	ud	0.0021	0.1708	ud	ud	ud	ud	ud	ud	ud	ud
0.0002	0.0000	0.0002	0.0882	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0000	0.0000	0.0930	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0000	0.0000	0.1431	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0000	0.0000	0.1059	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0000	0.0812	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0005	0.0000	0.0000	0.0911	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	ud	0.0881	0.0000	ud	ud	0.0000	ud	ud	ud	ud
0.0001	0.0000	0.0000	0.0814	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0001	0.0811	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0021	0.0887	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0000	0.0021	0.0915	ud	ud	ud	ud	ud	ud	ud	ud
0.0001	0.0000	0.0000	0.0826	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0016	0.0907	ud	ud	ud	ud	ud	ud	ud	ud
0.0001	0.0000	0.0000	0.0809	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0016	0.0916	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0000	0.0000	0.0910	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0000	0.0911	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0016	0.0917	ud	ud	ud	ud	ud	ud	ud	ud

ICP-MS Dy ppm	ICP-MS Ho ppm	ICP-MS Er ppm	ICP-MS Tm ppm	ICP-MS Yb ppm	ICP-MS Lu ppm	ICP-MS Hf ppm	ICP-MS Ta ppm	ICP-MS W ppm	ICP-MS Hg ppm	ICP-MS Tl ppm	ICP-MS Pb ppm	ICP-MS Th ppm
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	ud	ud	ud	ud	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	ud	ud	ud	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	ud	ud	ud	0.0000	0.0000	0.0000
ud	ud	0.0000	ud	ud	ud	ud	0.0000	ud	ud	0.0000	0.0002	ud
ud	ud	ud	ud	ud	ud	0.0001	0.0000	ud	ud	ud	0.0002	0.0000
0.0000	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0000	0.0001
ud	ud	ud	ud	ud	ud	0.0001	0.0000	ud	ud	ud	0.0000	0.0001
ud	ud	ud	ud	ud	ud	0.0001	0.0000	ud	ud	ud	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0550	0.0001	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0001	ud	ud	ud	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	ud	ud	ud	ud	ud	ud	0.0000	ud

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0019	0.71	0.37	0.03	0.10	6.38	0.03	162.87				
0.0016	0.27	0.31	0.03	0.10	5.99	0.03	145.94	ud	115.318	ud	0.820
0.0017	0.28	0.34	0.03	0.10	5.95	0.03	159.25	ud	116.158	ud	0.824
0.0013	0.41	0.93	0.03	0.10	2.36	0.03	113.01	0.002	83.962	0.000	0.808
0.0013	0.47	1.44	0.03	0.03	2.69	0.03	51.79	0.002	84.326	0.000	0.746
0.0012	0.26	1.25	0.03	0.10	3.17	0.03	87.91	0.006	85.915	0.000	0.817
0.0015	0.40	1.50	0.03	0.10	4.42	0.03	89.09	0.007	89.337	0.000	0.821
0.0013								0.002	90.596	0.000	0.758
0.0018	0.33	1.67	0.03	0.03	7.09	0.03	200.60	0.002	117.619	0.000	0.926
0.0021	0.43	0.90	0.03	0.03	10.15	0.03	235.56	0.002	124.491	0.000	0.883
	0.34	1.35	0.03	0.03	12.60	0.03	243.82	0.002	129.169	0.000	0.935
0.0017	0.08	0.64	0.03	0.03	8.29	0.03	189.64	0.002	133.876	0.000	0.896
0.0012	0.30	0.38	0.03	0.10	2.68	0.03	79.74	0.002	100.639	0.000	0.871
0.0012	0.27	0.40	0.03	0.10	2.74	0.03	78.89	0.002	100.639	0.000	0.871
0.0014	0.36	0.40	0.03	0.10	3.18	0.03	89.65	0.002	102.159	0.000	1.031
0.0014	0.30	0.43	0.03	0.10	3.54	0.03	97.05	0.002	107.911	0.000	0.839
0.0014	0.49	0.53	0.03	0.10	4.89	0.03	126.86	0.002	120.068	0.000	0.778
0.0014	0.30	0.46	0.03	0.10	4.99	0.03	141.09	0.002	122.165	0.000	0.816
0.0013	0.30	0.46	0.03	0.10	4.99	0.03	141.09	0.002	122.165	0.000	0.816
0.0008	0.31	0.81	0.03	0.10	0.34	0.03	37.13	0.006	57.775	0.000	0.844
0.0008	0.36	0.72	0.03	0.10	0.27	0.03	43.30	0.002	63.123	0.000	0.884
0.0012	0.34	0.70	0.03	0.10	0.27	0.03	42.63	0.002	63.424	0.000	0.897
0.0009	1.00	1.00	0.50	1.00	1.00	1.00	43.02	0.002	63.852	0.000	0.845
0.0008								0.002	64.202	0.000	0.804
0.0008	0.39	0.89	0.03	0.10	0.32	0.03	41.28	0.002	64.360	0.000	0.864
0.0007	0.30	0.29	0.03	0.10	0.23	0.03	23.35	0.002	69.755	0.000	0.892
0.0009	0.31	0.78	0.03	0.03	1.24	0.03	49.44	0.002	70.016	0.000	0.827
0.0009	0.31	0.88	0.03	0.03	1.29	0.03	50.86	0.002	70.042	0.000	0.858
0.0009	0.34	0.33	0.03	0.10	0.44	0.03	23.48	0.002	70.122	0.000	0.792
0.0009	0.34	0.33	0.03	0.10	0.44	0.03	23.48	0.002	70.122	0.000	0.792
0.0009	0.32	0.78	0.03	0.03	1.34	0.03	51.93	0.002	70.497	0.000	0.869
0.0009	0.32	0.41	0.03	0.10	0.44	0.03	22.66	0.002	70.783	0.000	0.826
0.0009	0.39	0.79	0.03	0.03	1.49	0.03	54.14	0.002	70.988	0.000	0.888
0.0009	0.31	0.32	0.03	0.10	0.29	0.03	22.66	0.002	71.313	0.000	0.819
0.0010	0.50	0.68	0.03	0.03	1.66	0.03	55.95	0.002	72.336	0.000	0.841
0.0010	0.49	0.87	0.03	0.03	1.75	0.03	58.91	0.002	74.389	0.000	0.870
0.0010	0.26	0.36	0.03	0.10	0.68	0.03	26.40	0.002	74.449	0.000	0.826

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
					8.14	7.6	216				7.54	144
39.386	1.127	ud	0.103	65.600	7.59	6.5	203				7.70	154
40.777	1.207	ud	0.108	69.277	7.21	5.3	196				7.57	171
26.736	2.202	0.017	22.446	0.033	7.50		239				7.76	190
26.173	2.490	0.012	21.082	0.029	7.52	4.6	235				7.71	193
27.135	2.124	0.029	29.379	0.055	8.28	5.7					7.89	173
29.310	1.950	0.039	31.715	0.070	7.66	4.4	245				7.62	190
29.169	2.074	0.027	32.523	0.060	8.24	5.1	228				7.80	171
41.745	1.727	0.026	61.023	0.094	7.47	4.3	254				7.71	192
43.988	1.298	0.002	78.446	0.123	7.73	5.1	228				7.60	152
45.994	1.260	0.014	81.421	0.144	7.80	5.1					7.72	166
44.579	1.271	0.007	78.867	0.123							7.82	165
31.168	1.769	0.002	36.456	0.051	7.74	6.4	238				7.99	188
31.168	1.769	0.002	36.456	0.051	7.74	6.4	238				7.96	183
32.445	3.808	0.007	41.210	0.058	7.76	6.4	242				7.96	192
33.640	1.585	0.002	44.770	0.069	7.74	6.1	229				7.92	186
35.996	1.350	0.002	56.514	0.088	7.52	5.9	225				7.46	178
36.285	1.383	0.005	57.438	0.089	7.59	5.8	227				7.95	182
36.285	1.383	0.005	57.438	0.089	7.59	5.8	227				7.95	182
17.198	2.337	0.029	13.705	0.017	7.72	4.1	174				7.67	148
18.826	2.479	0.008	14.592	0.002							7.61	151
18.822	2.603	0.014	14.898	0.002	7.58	4.6	191				7.75	148
18.972	2.589	0.007	15.187	0.002	7.54	4.5	185				7.75	147
18.399	2.472	0.014	13.299	0.018							7.91	175
18.696	2.491	0.016	14.743	0.005	7.39	4.6	170				7.42	151
20.011	2.672	0.002	11.178	0.002	7.38	4.7	213				7.90	167
20.506	2.525	0.006	16.644	0.017							8.17	185
21.259	2.679	0.013	17.535	0.024							7.79	160
20.084	2.476	0.022	11.068	0.007	7.32	4.7	189				7.82	169
20.084	2.476	0.022	11.068	0.007	7.32	4.7	189				7.82	169
21.301	2.663	0.005	18.204	0.018							7.21	183
19.765	2.587	0.002	10.761	0.002	7.42	4.7	226				7.64	169
21.605	2.974	0.006	18.960	0.021							7.57	155
19.664	2.505	0.002	10.885	0.002	7.42	4.7	226				7.65	140
21.249	2.539	0.007	19.087	0.019	7.28		219				7.63	169
21.745	2.390	0.006	20.379	0.022							7.46	154
20.937	2.508	0.005	12.717	0.012	7.25	4.7	211				7.51	331

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_Seep_2	09/08/2014	13049	0.0104	0.0253	2.3474	23.5524	0.0018	4.0835	0.0082
WLC_Seep_2	07/08/2013	10602	0.0105	0.0186	2.4664	21.2914	0.0038	4.0210	0.0252
WLC_Seep_2	11/08/2014	13051	0.0110	0.0260	2.5455	23.2468	0.0022	4.3351	0.0265
WLC_Seep_2	04/08/2014	13031	0.0102	0.0174	2.1261	24.1803	0.0031	5.8910	0.0481
WLC_Seep_2	05/08/2014	13032	0.0096	0.0169	2.2532	22.8821	0.0064	8.6550	0.0549
WLC_Seep_2	03/08/2014	13030	0.0097	0.0171	2.1641	23.6015	0.0049	5.4049	0.0295
WLC_Seep_2	01/08/2014	13028	0.0096	0.0164	2.0732	24.0020	0.0038	5.5373	0.0387
WLC_Seep_2	02/08/2014	13029	0.0095	0.0162	2.0384	23.3008	0.0031	5.4861	0.0356
WLC_Seep_2	31/07/2014	13025	0.0097	0.0168	2.1210	23.9532	0.0042	5.6537	0.0533
WLC_Seep_2	28/07/2014	13011	0.0095	0.0167	2.0799	24.5659	0.0037	7.1417	0.0319
WLC_Seep_2	23/07/2013	10583	0.0113	0.0126	2.3562	25.4496	0.0047	4.0549	0.0697
WLC_Seep_2	30/07/2014	13024	0.0096	0.0167	2.0346	23.9381	0.0030	4.7731	0.0249
WLC_Seep_2	29/07/2014	13023	0.0095	0.0170	1.9473	24.2401	0.0032	4.8328	0.0289
WLC_Seep_2	27/07/2014	13010	0.0093	0.0165	2.0333	24.5983	0.0062	5.9874	0.0185
WLC_Seep_2	24/07/2014	13006	0.0095	0.0151	1.9817	24.9707	0.0034	5.4950	0.0253
WLC_Seep_2	25/07/2014	13007	0.0093	0.0145	1.9897	24.9699	0.0035	5.7051	0.0296
WLC_Seep_2	26/07/2014	13009	0.0092	0.0151	1.9658	24.8720	0.0037	5.7209	0.0324
WLC_Seep_2	23/07/2014	13005	0.0094	0.0166	2.1453	25.5327	0.0042	5.4075	0.0235
WLC_Seep_2	22/07/2014	13004 b	0.0096	0.0165	2.0300	25.9027	0.0048	5.3128	0.0245
WLC_Seep_2	22/07/2014	13004 b-MS Rep	0.0095	0.0163	1.9949	25.7368	0.0047	5.3144	0.0223
WLC_Seep_2	16/07/2014	10983	0.0094	0.0211	1.9754	29.3728	0.0029	7.9770	0.1251
WLC_Seep_2	17/07/2014	10984	0.0093	0.0234	1.9817	28.3487	0.0088	9.8924	0.2004
WLC_Seep_2	08/06/2014	10856	0.0111	0.0281	2.1048	26.0652	0.0031	7.0622	0.0370
WLC_Seep_2	15/07/2014	10972	0.0095	0.0204	1.9787	29.1403	0.0028	8.4601	0.1301
WLC_Seep_2	11/07/2014	10962	0.0098	0.0170	1.9648	31.3954	0.0026	9.7261	0.2471
WLC_Seep_2	03/07/2014	10927	0.0095	0.0176	1.6669	35.5640	0.0034	2.8944	0.0231
WLC_Seep_2	03/07/2013	10525	0.0101	0.0118	1.9226	30.4036	0.0028	4.1862	0.0334
WLC_Seep_2	09/07/2013	10543	0.0098	0.0119	1.9583	28.2086	0.0048	3.9520	0.0336
WLC_Seep_2	13/07/2013	10568	0.0101	0.0127	2.2630	26.4998	0.0040	3.7413	0.0322
WLC_Seep_2	09/07/2013	10543	0.0098	0.0119	1.9583	28.2086	0.0048	3.9520	0.0336
WLC_Seep_2b	14/09/2013	10669							
WLC_Seep_2b	04/09/2013	10657	0.0113	0.0243	2.5815	19.1274	0.0199	3.9563	0.0437
WLC_Seep_2b	30/08/2013	10644	0.0113	0.0210	2.5311	19.5367	0.0019	4.0115	0.0494
WLC_Seep_2b	09/08/2013	10605	0.0106	0.0183	2.3546	21.7309	0.0043	4.1172	0.0331
WLC_Seep_2b	23/07/2013	10585	0.0106	0.0125	2.2222	24.8293	0.0037	4.0509	0.0546
WLC_Seep_2c	17/06/2014	10892	0.0056	0.1228	1.8860	14.9630	3.8493	18.3146	0.2169
WLC_Seep_3	23/08/2013	10633							

ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
0.8064	60.2291	0.0018	0.0013	0.0002	0.0002	0.0000	0.0010	0.0001	0.0023	0.0006	0.0001
0.8149	73.0187	0.0018	0.0011	0.0002	0.0005	0.0001	0.0011	0.0001	0.0029	0.0010	0.0018
0.7779	76.3295	0.0019	0.0013	0.0003	0.0003	0.0002	0.0010	0.0001	0.0026	0.0011	0.0001
0.7038	72.5846	0.0018	0.0013	0.0001	0.0005	0.0001	0.0130	0.0001	0.0020	0.0018	0.0685
0.7263	69.5306	0.0017	0.0010	0.0002	0.0006	0.0004	0.0174	0.0001	0.0037	0.0018	0.0057
0.6823	70.2041	0.0017	0.0012	0.0001	0.0005	0.0002	0.0099	0.0001	0.0020	0.0013	0.0034
0.6946	72.6341	0.0017	0.0014	0.0002	0.0010	0.0000	0.0114	0.0001	0.0022	0.0010	0.0030
0.6816	70.6914	0.0016	0.0012	0.0001	0.0006	0.0001	0.0112	0.0001	0.0021	0.0007	0.0435
0.7591	72.8436	0.0017	0.0013	0.0001	0.0006	0.0000	0.0124	0.0001	0.0020	0.0013	0.0037
0.6919	74.4868	0.0017	0.0013	0.0001	0.0006	0.0001	0.0117	0.0001	0.0019	0.0012	0.0031
0.7583	81.3734	0.0018	ud	0.0001	0.0007	0.0003	0.0029	0.0001	0.0035	ud	0.0025
0.7059	72.6559	0.0017	0.0013	0.0001	0.0006	0.0000	0.0111	0.0001	0.0019	0.0011	0.0025
0.6972	73.7525	0.0017	0.0011	0.0001	0.0006	0.0001	0.0083	0.0001	0.0022	0.0014	0.0036
0.6991	74.9992	0.0017	0.0011	0.0001	0.0006	0.0000	0.0064	0.0001	0.0019	0.0009	0.0026
0.7239	75.6715	0.0018	0.0014	0.0000	0.0002	0.0000	0.0108	0.0001	0.0020	0.0010	0.0589
0.6842	74.4178	0.0018	0.0011	0.0001	0.0005	0.0000	0.0059	0.0001	0.0019	0.0011	0.0022
0.6799	76.1707	0.0017	0.0016	0.0001	0.0004	0.0000	0.0057	0.0001	0.0020	0.0010	0.0033
0.8850	76.9953	0.0018	0.0011	0.0001	0.0004	0.0001	0.0090	0.0001	0.0022	0.0013	0.0025
0.7367	77.8535	0.0018	0.0011	0.0001	0.0002	0.0006	0.0055	0.0001	0.0025	0.0011	0.0616
0.7393	77.3922	0.0018	0.0011	0.0001	0.0003	0.0006	0.0054	0.0001	0.0023	0.0012	0.0609
0.7276	87.6623	0.0016	0.0008	0.0001	0.0002	0.0004	0.0045	0.0002	0.0035	0.0001	0.0092
0.7213	84.0439	0.0016	0.0011	0.0001	0.0004	0.0008	0.0112	0.0003	0.0025	0.0292	0.0097
0.7273	88.7591	0.0017	0.0012	0.0002	0.0012	0.0016	0.1287	0.0002	0.0078	0.0002	0.0189
0.7472	89.1330	0.0016	0.0010	0.0001	0.0003	0.0004	0.0052	0.0003	0.0040	0.0001	0.0533
0.7502	88.9611	0.0016	0.0012	0.0001	0.0001	0.0011	0.0107	0.0003	0.0043	0.0008	0.0553
0.7313	99.3648	0.0016	0.0013	0.0003	0.0010	0.0007	0.0051	0.0002	0.0068	0.0019	0.0096
0.8083	98.5438	0.0015	0.0010	0.0002	0.0006	0.0005	0.0033	0.0002	0.0032	0.0007	0.0025
0.7238	92.8268	0.0015	0.0011	0.0002	0.0007	0.0006	0.0152	0.0002	0.0029	0.0003	0.0024
0.7776	87.7422	0.0016	0.0010	0.0001	0.0003	0.0006	0.0054	0.0002	0.0027	0.0003	0.0024
0.7238	92.8268	0.0015	0.0011	0.0002	0.0007	0.0006	0.0152	0.0002	0.0029	0.0003	0.0024
0.8337	67.3222	0.0020	0.0029	0.0002	0.0013	0.0003	0.0222	0.0002	0.0027	0.0004	0.0043
0.8002	69.0623	0.0020	0.0014	0.0001	0.0003	0.0001	0.0030	0.0001	0.0027	0.0003	0.0017
0.7966	75.9993	0.0019	0.0015	0.0001	0.0004	0.0006	0.0117	0.0001	0.0028	0.0003	0.0011
0.7028	82.7745	0.0018	ud	0.0002	0.0005	0.0003	0.0047	0.0001	0.0037	ud	0.0025
2.6236	57.1043	0.0058	0.1581	0.0123	0.0078	0.1118	2.2514	0.0009	0.0078	0.0027	0.0824

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Ga	Ge	As	Se	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0001	0.0026	0.0247	0.0004	0.1960	0.0000	0.0000	0.0000	0.0013	0.0001	0.0000
ud	ud	0.0009	0.0135	0.0003	0.2131	ud	0.0001	0.0012	0.0014	ud	ud
0.0000	0.0000	0.0030	0.0215	0.0003	0.2299	0.0000	0.0000	0.0000	0.0015	0.0001	0.0000
0.0001	0.0000	0.0032	0.0257	0.0003	0.2293	0.0000	0.0000	0.0001	0.0013	0.0001	0.0001
0.0000	0.0000	0.0011	0.0217	0.0003	0.2177	0.0000	0.0001	0.0001	0.0013	0.0001	0.0001
0.0000	0.0000	0.0026	0.0270	0.0003	0.2160	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0025	0.0286	0.0003	0.2199	0.0000	0.0000	0.0001	0.0013	0.0001	0.0001
0.0000	0.0000	0.0019	0.0256	0.0003	0.2183	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0027	0.0273	0.0003	0.2207	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0032	0.0317	0.0003	0.2226	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
ud	ud	0.0012	0.0241	0.0003	0.2078	0.0000	0.0000	0.0012	0.0014	ud	0.0001
0.0000	0.0000	0.0023	0.0288	0.0003	0.2154	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0026	0.0316	0.0003	0.2199	0.0000	0.0000	0.0001	0.0014	0.0001	0.0000
0.0000	0.0000	0.0028	0.0306	0.0003	0.2237	0.0000	0.0000	0.0001	0.0013	0.0001	0.0000
0.0000	0.0000	0.0034	0.0357	0.0003	0.2166	0.0000	0.0001	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0024	0.0318	0.0003	0.2233	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0030	0.0338	0.0003	0.2249	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0038	0.0342	0.0004	0.2187	0.0000	0.0001	0.0001	0.0014	0.0001	0.0000
0.0000	0.0000	0.0035	0.0379	0.0003	0.2200	0.0000	0.0004	0.0000	0.0014	0.0001	0.0000
0.0000	0.0002	0.0025	0.0360	0.0003	0.2247	0.0000	0.0004	0.0000	0.0013	0.0001	0.0000
0.0000	0.0000	0.0053	0.0445	0.0003	0.2135	0.0000	0.0000	0.0000	0.0013	0.0001	0.0000
0.0000	0.0000	0.0050	0.0420	0.0003	0.2148	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0010	0.0000	0.0014	0.0449	0.0002	0.3594	0.0000	0.0000	0.0001	0.0012	0.0001	0.0000
0.0000	0.0000	0.0062	0.0469	0.0003	0.2410	0.0000	0.0000	0.0000	0.0014	0.0001	0.0000
0.0000	0.0000	0.0053	0.0501	0.0003	0.2328	0.0000	0.0000	0.0000	0.0014	0.0001	0.0000
0.0000	0.0000	0.0057	0.0647	0.0003	0.2520	0.0000	0.0000	0.0001	0.0017	0.0001	0.0002
ud	ud	0.0043	0.0558	0.0004	0.2356	0.0000	0.0000	0.0009	0.0014	ud	ud
0.0000	ud	0.0023	0.0425	0.0003	0.2200	0.0000	0.0000	0.0008	0.0014	ud	0.0000
ud	ud	0.0021	0.0315	0.0003	0.2078	0.0000	0.0000	0.0007	0.0014	ud	0.0000
0.0000	ud	0.0023	0.0425	0.0003	0.2200	0.0000	0.0000	0.0008	0.0014	ud	0.0000
ud	ud	0.0003	0.0026	0.0003	0.2425	0.0000	0.0000	0.0012	0.0015	ud	0.0000
ud	ud	0.0005	0.0044	0.0003	0.2177	0.0000	0.0000	0.0011	0.0014	ud	ud
ud	ud	0.0009	0.0113	0.0003	0.2130	ud	0.0000	0.0013	0.0015	ud	ud
ud	ud	0.0018	0.0279	0.0003	0.2067	0.0000	0.0001	0.0011	0.0015	ud	0.0000
0.0002	0.0001	0.0013	0.0003	0.0077	0.0925	0.0022	0.0051	0.0008	0.0023	0.0001	0.0002

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0000	0.0000	0.0668	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	ud	0.0015	0.0922	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0000	0.0000	0.0973	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0006	0.0902	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0006	0.0875	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0006	0.0885	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0006	0.0880	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0006	0.0881	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0006	0.0891	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0004	0.0897	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1795	0.0943	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0000	0.0005	0.0902	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0005	0.0892	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0004	0.0903	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0005	0.0917	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0004	0.0916	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0006	0.0907	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0003	0.0911	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0004	0.0927	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0004	0.0930	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.1144	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0004	0.1191	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0002	0.1447	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.1065	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.1084	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0004	0.1270	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1531	0.1150	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0003	0.0000	0.1487	0.1036	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0001	0.0000	0.1269	0.1041	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0003	0.0000	0.1487	0.1036	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0001	ud	0.0015	0.0901	0.0000	ud	ud	ud	0.0000	ud	0.0000	0.0000
0.0000	0.0000	0.0015	0.0920	0.0000	ud	ud	ud	ud	ud	ud	ud
ud	ud	0.0015	0.0980	ud	ud	ud	ud	ud	ud	ud	ud
0.0001	0.0000	0.1657	0.1041	ud	0.0000	ud	0.0000	ud	ud	ud	ud
0.0001	0.0002	0.0007	0.2959	0.0016	0.0032	0.0005	0.0020	0.0004	0.0001	0.0004	0.0001

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Hg	Tl	Pb	Th
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
ud	ud	ud	ud	ud	ud	0.0001	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0002	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0002	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0001	0.0000	ud	ud	ud	0.0000	0.0001
ud	ud	ud	ud	ud	ud	0.0001	0.0000	ud	ud	ud	ud	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0000	0.0000
0.0004	0.0001	0.0002	0.0000	0.0002	0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	0.0010	0.0003

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0013	0.49	0.81	0.03	0.03	2.26	0.03	64.55	0.002	78.577	0.000	0.794
0.0010	0.41	0.47	0.03	0.10	0.95	0.03	40.23	0.002	78.922	0.000	0.766
0.0015	0.50	0.93	0.03	0.03	1.82	0.03	60.42	0.002	79.118	0.000	0.823
0.0011	0.56	0.90	0.03	0.03	4.00	0.03	75.23	0.002	81.600	0.000	0.781
0.0010	0.48	0.73	0.03	0.03	3.95	0.03	74.19	0.002	82.325	0.000	0.801
0.0011	0.55	0.60	0.03	0.03	4.12	0.03	78.05	0.002	82.641	0.000	0.778
0.0011	0.46	0.55	0.03	0.03	4.29	0.03	84.14	0.002	82.990	0.000	0.785
0.0011	0.44	0.89	0.03	0.03	4.15	0.03	79.51	0.002	84.111	0.000	0.824
0.0010	0.33	0.59	0.03	0.03	4.35	0.03	83.29	0.002	84.500	0.000	0.782
0.0011	0.49	0.59	0.04	0.03	4.53	0.03	88.02	0.002	85.140	0.000	0.821
0.0011	0.39	0.34	0.03	0.10	1.59	0.03	46.84	0.002	85.236	0.000	0.745
0.0011	0.35	0.78	0.03	0.03	4.43	0.03	85.08	0.002	85.312	0.000	0.805
0.0011	0.56	0.63	0.03	0.03	4.49	0.03	86.66	0.002	86.837	0.000	0.820
0.0011	0.50	0.48	0.03	0.03	4.60	0.03	89.61	0.002	86.910	0.000	0.833
0.0011	0.55	0.54	0.03	0.03	4.80	0.03	94.19	0.002	87.460	0.000	0.849
0.0011	0.51	1.10	0.03	0.03	4.59	0.03	87.34	0.002	87.546	0.000	0.878
0.0011	0.34	0.66	0.03	0.03	4.64	0.03	91.10	0.002	87.633	0.000	0.821
0.0010	0.51	0.65	0.03	0.03	4.89	0.03	96.20	0.002	89.057	0.000	0.903
0.0012								0.002	90.012	0.000	0.872
0.0011								0.002	90.012	0.000	0.872
0.0017	0.33	0.82	0.03	0.03	4.40	0.03	124.72	0.007	91.172	0.000	0.860
0.0015	0.37	0.87	0.03	0.03	4.27	0.03	122.53	0.007	91.550	0.000	0.839
0.0013	0.34	1.20	0.03	0.03	7.58	0.03	107.06	0.002	95.549	0.000	0.898
0.0012	0.38	0.67	0.03	0.03	4.36	0.03	125.21	0.002	95.882	0.000	0.837
0.0014	0.39	1.04	0.03	0.03	5.28	0.03	139.44	0.002	99.633	0.000	0.822
0.0015	0.38	0.94	0.03	0.03	7.03	0.03	170.58	0.002	109.644	0.000	0.791
0.0013	0.41	0.33	0.03	0.10	3.55	0.03	100.66				
0.0012	0.59	0.29	0.03	0.10	2.75	0.03	80.89	ud	90.724	ud	0.786
0.0012	0.32	0.30	0.03	0.10	2.22	0.03	57.73	ud	87.718	ud	0.799
0.0012	0.57	0.25	0.03	0.10	2.63	0.03	82.36	ud	90.724	ud	0.786
								0.002	71.033	0.000	0.930
0.0008								0.002	71.041	0.000	0.836
0.0009	0.30	0.43	0.03	0.10	0.37	0.03	23.94	0.002	71.783	0.000	0.823
0.0010	0.28	0.36	0.03	0.10	0.82	0.03	38.72	0.002	78.190	0.000	0.806
0.0011	0.30	0.45	0.03	0.10	1.68	0.03	51.05	0.002	88.096	0.000	0.737
0.0007	0.22	1.48	0.03	0.03	0.03	0.03	9.50	0.002	75.415	0.000	2.077
								0.005	97.093	0.000	0.726

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
22.308	2.361	0.038	22.748	0.063							7.63	163
21.735	2.368	0.004	15.385	0.017	7.29	4.5	199				7.84	176
21.421	2.353	0.039	21.251	0.060							7.68	178
23.531	2.259	0.013	25.814	0.036								
23.376	2.347	0.013	25.365	0.034								
23.752	2.241	0.011	26.517	0.039								
24.330	2.275	0.004	28.036	0.043								
24.081	2.300	0.012	27.445	0.040								
24.027	2.268	0.004	27.910	0.040								
25.617	2.311	0.004	30.602	0.044								
24.062	2.283	0.002	22.390	0.027			203				7.81	175
24.601	2.275	0.005	28.890	0.043								
24.848	2.235	0.005	29.613	0.044								
25.833	2.307	0.002	31.239	0.047								
26.294	2.270	0.009	32.492	0.049								
26.098	2.344	0.004	31.980	0.048								
25.855	2.272	0.002	31.512	0.048								
26.425	2.303	0.005	32.898	0.051								
26.520	2.282	0.004	33.427	0.051								
26.520	2.282	0.004	33.427	0.051								
28.158	2.163	0.044	37.211	0.095							7.79	177
27.557	2.065	0.046	37.180	0.094	7.15	4.4	224					
26.344	2.318	0.015	35.273	0.063							7.91	184
28.123	2.040	0.017	36.889	0.067	7.15	4.4	222				7.95	177
29.884	1.973	0.024	40.635	0.082								
32.993	1.966	0.012	51.184	0.090								
					7.10	6.2	226				7.55	164
27.579	2.056	ud	0.048	33.793	6.58	4.9	220				7.61	174
26.895	2.316	ud	0.040	28.763	6.72	4.8	232					
27.579	2.056	ud	0.048	33.793	6.58	4.9	220				7.61	174
19.592	2.573	0.002	11.169	0.002							7.76	166
19.912	2.562	0.002	10.903	0.005	7.47	4.9	225				7.93	167
19.998	2.539	0.002	11.210	0.004	7.45	4.8	224				7.81	173
21.597	2.405	0.002	14.878	0.016	7.41	5.6	209				7.93	177
24.397	2.202	0.002	24.112	0.030	7.34	5.1	231				7.73	165
15.691	1.419	0.295	1.182	0.002							7.05	166
25.334	2.029	0.023	13.453	0.019							7.92	224

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_Seep_3	23/08/2013	10633							
WLC_Seep_3	30/08/2013	10649	0.0068	0.0049	2.2500	25.8560	0.0017	5.3564	0.0403
WLC_Seep_3	10/08/2013	10608	0.0074	0.0100	2.1485	25.4539	0.0023	5.3740	0.0372
WLC_Seep_3	03/07/2013	10526	0.0071	0.0056	1.6934	32.9022	0.0069	5.0979	0.0310
WLC_Seep_3	22/07/2013	10580	0.0077	0.0015	1.8935	28.9207	0.0116	4.9831	0.0559
WLC_Seep_3	10/07/2013	10542	0.0074	0.0054	1.8231	31.4442	0.0086	4.8217	0.0419
WLC_Seep_3	10/07/2013	10542R	0.0073	0.0050	1.8615	31.5842	0.0079	4.8021	0.0423
WLC_Seep_4	22/07/2013	10579	0.0067	ud	2.2208	24.3876	0.0220	5.1548	0.0623
WLC_Seep_4	03/07/2013	10527R	0.0067	0.0010	2.4906	26.9164	0.0238	5.5673	0.0294
WLC_Seep_4	03/07/2013	10527	0.0067	ud	2.4861	27.0449	0.0245	5.5888	0.0342
WLC_Seep_4	10/07/2013	10548	0.0055	0.0017	2.1552	22.8419	0.0107	5.0594	0.0418
WLC_Seep_5	04/07/2013	10532	0.0111	0.0149	3.1132	25.5302	0.0129	5.6062	0.0368
WLC_Seep_5	11/07/2013	10551	0.0107	0.0114	2.8186	26.2399	0.0071	5.3916	0.0334
WLC_Seep_6	05/07/2013	10534	0.0045	0.0040	1.6186	19.0784	0.0095	4.7356	0.0483
WLC_Seep_6	11/07/2013	10552	0.0045	0.0039	1.6357	19.6165	0.0072	4.6682	0.0343
WLC_Seep_6a	15/07/2014	10976	0.0066	0.0150	1.1272	45.2602	0.0034	9.1530	0.1913
WLC_Seep_6a	17/06/2014	10890	0.0069	0.0098	1.1566	43.9091	0.0018	7.3543	0.0509
WLC_Seep_6b	15/07/2014	10977	0.0065	0.0159	1.1609	44.5115	0.0038	10.1362	0.1839
WLC_Seep_6b	15/07/2014	10978	0.0066	0.0139	1.1401	45.9029	0.0037	9.5030	0.2694
WLC_Seep_7	12/06/2014	10871	0.0018	0.0058	1.8166	20.6168	0.0029	6.9437	0.0491
WLC_Seep_7a	24/09/2014	13122	0.0068	0.0080	1.3611	41.8115	0.0198	3.5063	0.0458
WLC_Seep_7a	27/08/2014	13083	0.0067	0.0074	1.0722	42.5958	0.0151	3.4823	0.0251
WLC_Seep_7a	28/07/2014	13021	0.0069	0.0057	1.0291	43.6627	0.0067	3.8449	0.0360
WLC_Seep_7a	26/06/2014	10914	0.0066	0.0134	1.1432	37.8128	0.0024	3.5182	0.0053
WLC_Seep_7a	14/08/2014	13063	0.0079	0.0092	1.4851	46.5643	0.0059	3.6909	0.0585
WLC_Seep_7a	09/07/2014	10946	0.0071	0.0161	1.2049	47.2858	0.0020	3.2374	0.0303
WLC_Seep_7a	13/06/2014	10885	0.0071	0.0070	1.1420	42.5812	0.0029	7.6130	0.0406
WLC_Seep_7a	13/06/2014	10884	0.0072	0.0090	1.1977	43.5704	0.0038	7.6757	0.0546
WLC_Seep_7b	22/07/2014	10998	0.0071	0.0121	1.1430	47.6734	0.0027	10.2081	0.0223
WLC_Drain_Sink	14/06/2013	10496							
WLC_Drain_Sink	22/07/2013	10577R	0.0142	0.0097	1.0086	67.7344	0.0046	1.8101	0.0407
WLC_Drain_Sink	22/07/2013	10577	0.0142	0.0097	1.0086	67.7344	0.0046	1.8101	0.0407
WLC_Drain_Sink	10/06/2013	10488	0.0092	0.0097	0.7548	46.2741	0.0040	1.3942	0.0132
WLC_Drain_Sink	26/06/2013	10505	0.0092	0.0083	1.0619	42.9004	0.0031	1.6636	0.0187
WLC_Drain_Sink	02/07/2013	10519	0.0110	0.0142	0.8102	52.4141	0.0078	1.6586	0.0210
WLC_Left_Culv_mix	05/06/2014	10843	0.0197	0.0249	1.0133	82.3911	0.0017	3.9813	0.0358
WLC_Left_Culv_mix	10/06/2014	10860	0.0182	0.0230	0.9854	80.9608	0.0016	4.6354	0.0293

ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
0.8373	98.3577	0.0027	0.0020	0.0001	ud	0.0002	0.0007	0.0002	0.0040	0.0003	0.0006
0.7338	99.2348	0.0025	0.0015	0.0001	0.0002	0.0007	0.0022	0.0002	0.0049	0.0005	0.0019
0.7329	115.0884	0.0018	0.0010	0.0002	0.0004	0.0003	0.0090	0.0002	0.0037	0.0003	0.0020
0.7273	105.7341	0.0023	ud	0.0002	0.0006	0.0003	0.0110	0.0002	0.0040	ud	0.0012
0.7678	113.5902	0.0018	0.0012	0.0002	0.0006	0.0004	0.0081	0.0002	0.0035	0.0004	0.0026
0.7978	113.6456	0.0019	0.0012	0.0002	0.0007	0.0005	0.0098	0.0002	0.0035	0.0004	0.0026
0.4932	96.4724	0.0023	ud	0.0002	0.0005	0.0024	0.0317	0.0002	0.0040	ud	0.0026
0.6636	99.9804	0.0021	0.0018	0.0003	0.0008	0.0011	0.0419	0.0003	0.0033	0.0007	0.0023
0.6566	102.5477	0.0021	0.0015	0.0004	0.0011	0.0011	0.0372	0.0002	0.0032	0.0007	0.0019
0.6499	93.9718	0.0020	0.0013	0.0002	0.0003	0.0004	0.0096	0.0002	0.0030	0.0005	0.0019
0.9171	86.1582	0.0020	0.0014	0.0004	0.0007	0.0058	0.0070	0.0002	0.0028	0.0006	0.0012
0.8233	87.0370	0.0021	0.0014	0.0003	0.0004	0.0031	0.0091	0.0002	0.0029	0.0005	0.0011
0.9728	86.3086	0.0019	0.0010	0.0003	0.0006	0.0008	0.0101	0.0002	0.0026	0.0004	0.0011
0.9318	87.4446	0.0019	0.0013	0.0002	0.0007	0.0007	0.0076	0.0002	0.0029	0.0007	0.0061
0.8347	120.2727	0.0015	0.0011	0.0001	0.0003	0.0005	0.0214	0.0004	0.0060	0.0005	0.0075
0.8744	121.4698	0.0014	0.0013	0.0001	0.0003	0.0000	0.0061	0.0003	0.0102	0.0001	0.0118
0.8451	113.8352	0.0015	0.0011	0.0002	0.0004	0.0004	0.0112	0.0004	0.0048	0.0002	0.0087
0.8469	118.2939	0.0015	0.0012	0.0002	0.0003	0.0004	0.0089	0.0004	0.0054	0.0000	0.0053
1.1989	104.8494	0.0015	0.0012	0.0002	0.0003	0.0005	0.0104	0.0003	0.0088	0.0005	0.0058
1.1403	111.3308	0.0016	0.0015	0.0002	0.0009	0.0008	0.0057	0.0002	0.0035	0.0010	0.0033
0.8264	108.6737	0.0014	0.0010	0.0001	0.0004	0.0002	0.0029	0.0002	0.0024	0.0000	0.0017
0.8114	110.2185	0.0014	0.0017	0.0001	0.0005	0.0002	0.0099	0.0002	0.0035	0.0012	0.0047
0.6560	92.6056	0.0013	0.0010	0.0001	0.0002	0.0001	0.0079	0.0003	0.0080	0.0004	0.0074
1.2351	113.1452	0.0017	0.0016	0.0002	0.0005	0.0003	0.0154	0.0002	0.0040	0.0018	0.0001
0.7460	120.6032	0.0013	0.0011	0.0002	0.0009	0.0002	0.0099	0.0003	0.0066	0.0008	0.0186
0.8396	122.4512	0.0014	0.0010	0.0002	0.0003	0.0005	0.0041	0.0003	0.0101	0.0005	0.0072
0.8197	124.9241	0.0015	0.0009	0.0002	0.0004	0.0007	0.0058	0.0003	0.0099	0.0004	0.0095
0.8197	116.1208	0.0014	0.0009	0.0003	0.0013	0.0005	0.0274	0.0004	0.0095	0.0007	0.0103
1.5041	139.0662	0.0008	0.0018	0.0003	0.0005	0.0007	0.0023	0.0003	0.0293	ud	0.0101
1.5041	139.0662	0.0008	0.0018	0.0003	0.0005	0.0007	0.0023	0.0003	0.0293	ud	0.0101
1.3226	99.2217	0.0004	0.0006	0.0004	0.0001	0.0007	0.0063	0.0002	0.0163	0.0012	0.0141
1.1499	90.4730	0.0006	0.0006	0.0003	0.0010	0.0005	0.0029	0.0002	0.0120	0.0006	0.0145
1.5410	107.9321	0.0006	0.0005	0.0005	0.0007	0.0022	0.0041	0.0003	0.0142	0.0008	0.0086
1.8737	143.8642	0.0008	0.0006	0.0003	0.0008	0.0007	0.0144	0.0006	0.0383	0.0009	0.0743
1.8292	143.5436	0.0009	0.0007	0.0003	0.0006	0.0006	0.0121	0.0005	0.0376	0.0009	0.0738

ICP-MS Ga ppm	ICP-MS Ge ppm	ICP-MS As ppm	ICP-MS Se ppm	ICP-MS Rb ppm	ICP-MS Sr ppm	ICP-MS Y ppm	ICP-MS Zr ppm	ICP-MS Nb ppm	ICP-MS Mo ppm	ICP-MS Ag ppm	ICP-MS Cd ppm
ud	ud	0.0013	0.0127	0.0002	0.1421	0.0000	0.0000	0.0020	0.0010	ud	ud
ud	ud	0.0010	0.0169	0.0002	0.1456	ud	0.0000	0.0012	0.0011	ud	ud
ud	0.0000	0.0026	0.0508	0.0002	0.1445	0.0000	0.0001	0.0009	0.0009	ud	ud
ud	ud	0.0024	0.0394	0.0002	0.1555	0.0000	0.0001	0.0015	0.0010	ud	0.0000
ud	ud	0.0021	0.0466	0.0003	0.1515	0.0000	0.0001	0.0010	0.0008	ud	ud
ud	0.0002	0.0033	0.0470	0.0003	0.1498	0.0000	0.0001	0.0009	0.0009	ud	ud
ud	ud	0.0004	0.0057	0.0002	0.1161	0.0001	0.0001	0.0016	0.0008	ud	0.0001
ud	0.0000	0.0003	0.0023	0.0003	0.1207	0.0001	0.0002	0.0011	0.0008	ud	0.0000
ud	0.0000	ud	0.0024	0.0003	0.1178	0.0001	0.0001	0.0010	0.0007	ud	0.0000
ud	ud	ud	0.0027	0.0002	0.1072	0.0000	0.0000	0.0008	0.0008	ud	0.0000
ud	0.0000	ud	ud	0.0004	0.1515	0.0000	0.0001	0.0010	0.0013	ud	ud
0.0000	ud	0.0004	0.0006	0.0003	0.1581	0.0000	0.0000	0.0006	0.0018	ud	0.0000
ud	0.0000	0.0002	0.0004	0.0003	0.0863	0.0000	0.0001	0.0007	0.0007	ud	ud
ud	ud	0.0002	0.0013	0.0003	0.0869	0.0000	0.0000	0.0007	0.0008	ud	0.0000
0.0000	0.0000	0.0135	0.1036	0.0003	0.1061	0.0000	0.0000	0.0001	0.0009	0.0001	0.0000
0.0000	0.0000	0.0051	0.1108	0.0002	0.1027	0.0000	0.0000	0.0001	0.0008	0.0001	0.0000
0.0000	0.0000	0.0136	0.1007	0.0003	0.1073	0.0000	0.0000	0.0001	0.0010	0.0001	0.0000
0.0000	0.0000	0.0121	0.1011	0.0003	0.1074	0.0000	0.0000	0.0001	0.0010	0.0001	0.0000
0.0000	0.0000	0.0027	0.0573	0.0002	0.1150	0.0001	0.0001	0.0001	0.0004	0.0001	0.0000
0.0000	0.0000	0.0110	0.0934	0.0004	0.1015	0.0000	0.0000	0.0000	0.0011	0.0001	0.0001
0.0000	0.0000	0.0081	0.1044	0.0003	0.0940	0.0000	0.0000	0.0000	0.0010	0.0001	0.0000
0.0000	0.0000	0.0096	0.1031	0.0003	0.1052	0.0000	0.0001	0.0001	0.0009	0.0001	0.0001
0.0000	0.0000	0.0062	0.1052	0.0002	0.1019	0.0000	0.0000	0.0001	0.0010	0.0001	0.0000
0.0000	0.0000	0.0124	0.1058	0.0006	0.1084	0.0000	0.0003	0.0000	0.0011	0.0001	0.0000
0.0000	0.0000	0.0131	0.1024	0.0002	0.1131	0.0000	0.0000	0.0001	0.0013	0.0001	0.0001
0.0000	0.0000	0.0044	0.1099	0.0003	0.1224	0.0000	0.0000	0.0001	0.0011	0.0001	0.0000
0.0000	0.0000	0.0049	0.1080	0.0002	0.1227	0.0000	0.0000	0.0001	0.0011	0.0001	0.0000
0.0000	0.0000	0.0116	0.1014	0.0003	0.1085	0.0000	0.0000	0.0001	0.0011	0.0001	0.0000
ud	ud	0.0085	0.1537	0.0012	0.1052	0.0000	0.0000	0.0009	0.0013	ud	0.0003
ud	ud	0.0085	0.1537	0.0012	0.1052	0.0000	0.0000	0.0009	0.0013	ud	0.0003
0.0001	0.0000	0.0064	0.0888	0.0010	0.0692	0.0000	0.0001	0.0005	0.0014	ud	0.0004
ud	0.0000	0.0039	0.0829	0.0010	0.0680	0.0000	0.0001	0.0008	0.0016	ud	0.0005
ud	ud	0.0070	0.1147	0.0017	0.0847	0.0000	0.0000	0.0008	0.0013	ud	0.0003
0.0000	0.0000	0.0056	0.1622	0.0013	0.1011	0.0000	0.0001	0.0000	0.0019	0.0001	0.0014
0.0001	0.0000	0.0046	0.1578	0.0012	0.0993	0.0000	0.0000	0.0000	0.0016	0.0001	0.0013

ICP-MS Sn ppm	ICP-MS Sb ppm	ICP-MS Cs ppm	ICP-MS Ba ppm	ICP-MS La ppm	ICP-MS Ce ppm	ICP-MS Pr ppm	ICP-MS Nd ppm	ICP-MS Sm ppm	ICP-MS Eu ppm	ICP-MS Gd ppm	ICP-MS Tb ppm
0.0000	0.0000	0.0026	0.2017	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0000	0.0015	0.1830	ud	ud	ud	ud	ud	ud	ud	ud
0.0004	0.0000	0.1696	0.2307	0.0000	0.0000	ud	ud	ud	ud	ud	ud
ud	0.0000	0.2167	0.1807	0.0000	0.0000	ud	0.0000	0.0000	ud	0.0000	ud
0.0009	0.0000	0.1760	0.2078	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0009	0.0000	0.1735	0.2076	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0000	0.2285	0.2697	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	ud	ud
0.0001	0.0000	0.1875	0.2947	0.0000	0.0001	0.0000	0.0001	0.0000	ud	0.0000	0.0000
0.0001	0.0000	0.1886	0.2920	0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.1434	0.2585	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0010	0.0001	0.1840	0.2129	0.0000	0.0000	ud	0.0000	0.0000	ud	ud	ud
0.0001	0.0001	0.1197	0.2193	0.0000	0.0000	ud	ud	0.0000	ud	0.0000	ud
0.0007	0.0000	0.1265	0.2417	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0000	0.1319	0.2537	0.0000	0.0000	ud	ud	ud	0.0000	ud	0.0000
0.0000	0.0000	0.0003	0.0455	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0002	0.0591	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0005	0.0529	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0004	0.0495	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0001	0.0002	0.1881	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0647	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
0.0003	0.0000	0.0000	0.0529	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0005	0.0535	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0002	0.0484	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0001	0.0000	0.0602	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.0865	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.0726	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0003	0.0749	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0000	0.0003	0.0613	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.1238	0.0281	ud	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0003	0.1238	0.0281	ud	0.0000	ud	0.0000	ud	ud	ud	ud
0.0001	0.0003	ud	0.0177	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0001	0.0003	0.1508	0.0178	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0003	0.1499	0.0280	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0005	0.0002	0.0281	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0002	0.0251	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Hg	Tl	Pb	Th
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0001	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0001	ud	ud	ud	ud	0.0001	0.0001
ud	ud	ud	ud	ud	ud	0.0002	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0002	ud	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0002	0.0000	ud	ud	ud	0.0000	0.0001
0.0000	ud	ud	ud	ud	0.0000	0.0003	0.0000	ud	ud	ud	0.0000	0.0001
0.0000	ud	ud	ud	ud	0.0000	0.0002	0.0000	ud	ud	ud	0.0000	0.0001
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	ud	ud	0.0000	0.0000
0.0000	ud	ud	ud	ud	0.0000	0.0002	ud	ud	ud	ud	0.0000	0.0000
0.0000	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0001	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	0.0000	ud	0.0000	0.0000	ud	ud	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
								0.004	98.306	0.000	0.736
0.0009	0.23	0.52	0.03	0.10	0.75	0.03	30.27	0.002	101.733	0.000	0.798
0.0010	0.39	0.59	0.03	0.10	1.08	0.03	40.34	0.002	103.586	0.000	0.754
0.0011	0.23	0.60	0.03	0.10	3.44	0.03	99.03	0.002	114.139	0.000	0.766
0.0011	0.37	0.97	0.03	0.10	2.29	0.03	65.22	0.002	162.638	0.000	0.780
0.0010	0.23	0.50	0.03	0.10	2.96	0.03	80.66	ud	111.078	ud	0.797
0.0010	0.23	0.50	0.03	0.10	2.96	0.03	80.66	ud	111.078	ud	0.797
0.0009	0.17	1.08	0.03	0.10	0.30	0.03	15.83	0.002	136.987	0.000	0.596
0.0009	0.25	3.70	0.03	0.10	0.20	0.03	19.14				
0.0009	0.25	3.70	0.03	0.10	0.20	0.03	19.14				
0.0007	0.21	1.20	0.03	0.10	0.14	0.03	10.49	ud	95.982	ud	0.701
0.0011	0.35	1.13	0.03	0.10	0.02	0.03	11.48				
0.0012	0.29	0.96	0.03	0.10	0.02	0.03	12.84	ud	88.777	ud	0.866
0.0004	0.09	0.28	0.03	0.10	0.02	0.03	3.66				
0.0004	0.21	0.45	0.03	0.10	0.02	0.03	5.10	ud	86.428	ud	0.986
0.0018	0.16	0.87	0.03	0.03	10.57	0.03	249.45	0.002	127.981	0.000	0.919
0.0018	0.25	1.36	0.03	0.03	13.12	0.03	253.18	0.002	129.543	0.000	0.933
0.0018	0.17	0.91	0.03	0.03	10.55	0.03	251.11	0.002	121.781	0.000	0.840
0.0018	0.14	0.87	0.03	0.03	10.38	0.03	249.54	0.002	122.076	0.000	0.903
0.0005	0.15	1.07	0.03	0.03	7.75	0.03	116.23	0.002	116.898	0.000	1.307
0.0017								0.002	109.364	0.000	1.128
0.0019	0.20	0.79	0.03	0.03	7.67	0.03	101.03	0.002	115.314	0.000	0.913
0.0019	0.22	0.97	0.03	0.03	10.34	0.03	262.13	0.002	127.121	0.000	0.867
0.0022	0.24	1.05	0.03	0.03	10.52	0.03	237.40	0.002	127.523	0.000	0.888
0.0021	0.03	1.36	0.03	0.03	9.44	0.03	233.87	0.002	127.823	0.000	0.894
0.0020	0.23	0.86	0.03	0.03	10.31	0.03	247.07	0.002	129.320	0.000	0.896
0.0021	0.16	0.96	0.03	0.03	9.81	0.03	149.34	0.002	131.956	0.000	0.949
0.0021	0.27	1.42	0.03	0.03	12.90	0.03	247.10	0.002	133.351	0.000	0.922
0.0018	0.19	0.90	0.03	0.03	10.87	0.03	268.92	0.002	120.839	0.000	0.915
	0.18	0.23	0.03	0.10	6.52	0.03	156.09	0.002	102.770	0.000	1.205
0.0055	0.03	0.46	0.03	0.10	9.20	0.03	309.21	0.002	174.854	0.000	1.679
0.0055	0.03	0.46	0.03	0.10	9.24	0.03	308.31	0.002	174.854	0.000	1.679
0.0032	0.25	0.37	0.03	0.10	6.23	0.03	160.52				
0.0031	0.03	0.57	0.03	0.10	6.20	0.03	152.41				
0.0038	0.18	0.31	0.03	0.10	7.48	0.03	209.15				
0.0068	0.19	2.30	0.03	0.03	12.10	0.03	above	0.002	141.933	0.002	1.975
0.0065	0.18	2.30	0.03	0.03	12.46	0.03	391.71	0.002	142.536	0.002	1.951

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
25.538	2.045	0.025	13.534	0.021							7.92	224
25.629	2.097	0.002	12.679	0.015		8.0	315				7.88	230
25.462	2.012	0.007	15.518	0.022	7.50	7.0	330				7.74	214
30.909	1.713	0.004	38.764	0.064	6.88	5.1	264				7.75	205
31.960	2.365	0.042	32.858	0.049	7.67		294				7.95	239
31.038	1.860	ud	0.057	38.862	6.85	4.9	270				7.65	207
31.038	1.860	ud	0.057	38.862	6.85	4.9	270				7.65	207
26.990	2.700	0.065	7.647	0.008	7.64	6.2	314				7.82	269
					6.87	5.8	344				7.74	252
					6.87	5.8	344				7.71	253
23.235	2.268	ud	ud	5.140	7.28	5.2	312				7.66	235
					6.67	16.8	319				7.78	216
25.444	2.838	ud	ud	4.143	7.03	13.4	297				7.81	242
					6.74	8.7	253				7.73	203
18.582	1.750	0.005	ud	1.468	6.76	6.9	285				7.48	202
44.857	1.311	0.014	76.415	0.134	7.06		221				7.78	187
45.737	1.095	0.013	80.580	0.138							7.86	169
44.106	1.315	0.022	75.660	0.142	8.03	8.0	214				7.91	186
44.050	1.202	0.016	75.688	0.136							8.00	171
21.750	2.004	0.017	40.140	0.083	7.65	7.0					8.07	193
43.229	1.364	0.016	72.970	0.119	8.13	15.4					7.47	152
43.440	1.211	0.014	71.619	0.130	7.84	7.7	209				7.56	159
45.539	1.163	0.005	83.088	0.134	8.06		214				7.52	129
45.993	1.311	0.042	81.054	0.180	7.75		217				7.93	135
48.446	1.255	0.006	79.118	0.122	8.03	11.1	220				7.68	139
43.614	1.132	0.016	74.592	0.134	8.18	10.2	199				7.73	148
45.047	1.250	0.016	80.580	0.140							7.65	156
45.107	1.219	0.019	80.714	0.145							7.51	159
44.407	1.169	0.014	78.921	0.130	7.13	5.1					7.81	150
47.101	0.716	0.005	69.610	0.114	8.11	9.4	179				8.25	137
79.729	1.344	0.046	143.308	0.215	8.17	23.1	203				7.97	154
79.729	1.344	0.046	143.308	0.215	8.17	23.1	203				7.97	154
					8.13	17.7	187				8.31	157
					8.08	12.4	178				8.04	136
					8.44	30.9	182				7.90	132
82.439	1.079	0.018	127.271	0.206	7.65		279					
81.190	1.129	0.020	128.492	0.211							7.96	219

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_Left_Culv_mix	02/06/2014	10833	0.0211	0.0264	1.1117	83.7837	0.0011	3.9860	0.0219
WLC_Left_Culv_mix	28/05/2014	10809	0.0239	0.0186	1.1064	98.4266	0.0001	1.9113	0.0196
WLC_Left_Culv_mix	10/06/2014	10863	0.0221	0.0393	1.4551	95.4570	0.0025	2.2610	0.0582
WLC_Left_Culv_mix	26/06/2014	10913	0.0184	0.0222	1.1721	88.2815	0.0008	2.1121	0.0289
WLC_Left_Culv_mix	26/06/2014	10913-MS Rep	0.0189	0.0216	1.1920	88.5484	0.0006	2.1603	0.0297
WLC_Left_Culv_mix	02/07/2014	10926	0.0200	0.0332	1.4123	103.4146	0.0014	2.1669	0.0366
WLC_Left_Culv_mix	09/07/2014	10934	0.0210	0.0263	1.3645	122.0288	0.0021	2.7877	0.0282
WLC_Left_Culv_mix	09/07/2014	10934-ICS Rep	0.0210	0.0263	1.3645	122.0288	0.0021	2.7877	0.0282
WLC_Left_Culv_mix	15/07/2014	10974	0.0227	0.0238	1.4414	131.0833	0.0084	6.9031	0.1748
WLC_Left_Culv_mix	21/07/2014	10993	0.0231	0.0203	1.4777	133.6532	0.0032	6.8695	0.1253
WLC_Left_Culv_mix	28/07/2014	13012	0.0233	0.0151	1.3350	126.5086	0.0019	3.4692	0.0216
WLC_Left_Culvert_Mix	05/08/2014	13035	0.0249	0.0133	1.3846	136.9651	0.0023	4.8627	0.0360
WLC_Left_Culvert_Mix	29/08/2013	10641	0.0313	0.0160	1.6933	162.6898	0.0013	2.5590	0.0533
WLC_Left_Culvert	05/09/2012	10378	0.0172	0.0181	1.7009	145.9777	0.0012	2.3838	0.0251
WLC_Left_Culvert	15/10/2013	L10695A	0.0325	0.0267	2.0736	180.7036	0.0024	2.3921	0.0494
WLC_Left_Culvert	12/09/2012	10387	0.0320	0.0151	1.9691	177.9020	0.0053	2.4478	0.0277
WLC_Left_Culvert	12/09/2012	10387RR	0.0320	0.0151	1.9691	177.9020	0.0053	2.4478	0.0277
WLC_Left_Culvert	19/09/2012	10399	0.0322	0.0177	1.9426	191.2988	0.0007	2.5484	0.0269
WLC_Left_Culvert	24/10/2012	10451	0.0313	0.0169	2.0505	182.8690	0.0020	1.8225	0.0287
WLC_Left_Culvert	24/10/2012	10451	0.0313	0.0169	2.0505	182.8690	0.0020	1.8225	0.0287
WLC_Left_Culvert	03/09/2013	10655	0.0320	0.0171	2.0284	164.7941	0.0025	2.5242	0.0191
WLC_Left_Culvert	19/09/2012	10398	0.0314	0.0168	1.9084	191.7255	0.0004	2.4864	0.0250
WLC_Left_Culvert	01/10/2013	L10689A							
WLC_Left_Culvert	16/08/2012	10311RR	0.0171	0.0179	1.7635	125.8786	0.0049	2.5408	0.0288
WLC_Left_Culvert	26/09/2012	10409	0.0316	0.0209	1.8590	186.8095	0.0021	2.6077	0.0331
WLC_Left_Culvert	12/09/2013	10664	0.0320	0.0164	1.9683	159.8157	0.0035	2.4956	0.0366
WLC_Left_Culvert	10/10/2012	10433	0.0331	0.0223	1.6804	195.5932	0.0019	2.5948	0.0919
WLC_Left_Culvert	03/10/2012	10425	0.0333	0.0215	1.8978	194.8635	0.0012	2.6361	0.0389
WLC_Left_Culvert	16/09/2013	10675							
WLC_Left_Culvert	17/10/2012	10444	0.0319	0.0195	1.9661	200.0792	0.0016	2.3962	0.0238
WLC_Left_Culvert	17/10/2012	10444	0.0319	0.0195	1.9661	200.0792	0.0016	2.3962	0.0238
WLC_Left_Culvert	17/10/2012	10444RR	0.0319	0.0195	1.9661	200.0792	0.0016	2.3962	0.0238
WLC_Left_Culvert	21/02/2013	10455	0.0342	0.0160	2.0488	232.5595	0.0020	2.2816	0.0314
WLC_Left_Culvert	28/03/2013	10459	0.0353	0.0214	2.3009	229.9112	0.0048	2.0541	0.0354
WLC_Left_Culvert	26/06/2013	10507	0.0168	0.0140	1.1276	75.4720	0.0058	1.9984	0.0317
WLC_Left_Culvert	02/07/2013	10522	0.0202	0.0154	1.2679	101.8852	0.0012	2.5458	0.0316
WLC_Left_Culvert	08/07/2013	10538	0.0209	0.0117	1.4287	105.5478	0.0023	2.3055	0.0360

ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
1.7410	141.4701	0.0008	0.0006	0.0004	0.0011	0.0004	0.0172	0.0005	0.0352	0.0012	0.0582
1.9738	148.2600	0.0006	0.0006	0.0001	0.0003	0.0004	0.0033	0.0004	0.0307	0.0011	0.0553
2.0889	163.4254	0.0009	0.0009	0.0003	0.0006	0.0007	0.0113	0.0006	0.0436	0.0012	0.1751
1.8555	160.8951	0.0009	0.0006	0.0002	0.0002	0.0008	0.0168	0.0005	0.0431	0.0010	0.0871
1.8406	159.7349	0.0009	0.0007	0.0001	0.0001	0.0008	0.0127	0.0005	0.0420	0.0010	0.0853
1.9320	189.3062	0.0009	0.0007	0.0002	0.0001	0.0009	0.0110	0.0005	0.0502	0.0008	0.1217
1.7200	193.9170	0.0009	0.0007	0.0005	0.0018	0.0012	0.0130	0.0004	0.0474	0.0012	0.0893
1.7200	193.9170	0.0009	0.0007	0.0005	0.0018	0.0012	0.0130	0.0004	0.0474	0.0012	0.0893
2.1222	211.5089	0.0011	0.0009	0.0003	0.0003	0.0021	0.0382	0.0007	0.0564	0.0012	0.2278
2.1653	223.2822	0.0011	0.0008	0.0002	0.0002	0.0018	0.0193	0.0007	0.0605	0.0009	0.1799
2.1580	204.4842	0.0010	0.0008	0.0002	0.0001	0.0015	0.0135	0.0004	0.0504	0.0018	0.1398
2.1231	215.9945	0.0011	0.0009	0.0002	0.0004	0.0014	0.0192	0.0004	0.0515	0.0023	0.0801
2.3700	285.4224	0.0013	0.0010	0.0002	0.0003	0.0026	0.0587	0.0007	0.0656	0.0018	0.1046
2.2850	303.7254	0.0008	0.0007	0.0004	0.0012	0.0029	0.0696	0.0006	0.0609	0.0019	0.0947
1.9749	282.6970	0.0008	0.0009	0.0003	0.0010	0.0003	0.0092	0.0005	0.0496	0.0014	0.0538
2.4215	266.5723	0.0008	0.0005	0.0004	0.0008	0.0026	0.0642	0.0005	0.0557	0.0025	0.0615
2.4215	266.5723	0.0008	0.0005	0.0004	0.0008	0.0026	0.0642	0.0005	0.0557	0.0025	0.0615
2.4500	277.6555	0.0009	0.0004	0.0004	0.0007	0.0024	0.0621	0.0006	0.0567	0.0026	0.0654
2.6132	310.1072	0.0005	0.0007	0.0003	0.0006	0.0002	0.0427	0.0003	0.0387	0.0027	0.0316
2.6132	310.1072	0.0005	0.0007	0.0003	0.0006	0.0002	0.0427	0.0003	0.0387	0.0027	0.0316
2.7339	280.3033	0.0013	0.0010	0.0003	0.0007	0.0020	0.0072	0.0006	0.0596	0.0014	0.1080
2.3931	277.0168	0.0009	0.0004	0.0003	0.0006	0.0023	0.0567	0.0006	0.0562	0.0025	0.0638
2.3754	250.0415	0.0008	0.0009	0.0003	0.0008	0.0026	0.0575	0.0005	0.0574	0.0029	0.1039
2.4150	298.4176	0.0012	0.0008	0.0003	0.0005	0.0025	0.0368	0.0006	0.0560	0.0065	0.1143
2.6449	288.8753	0.0015	0.0013	0.0003	0.0005	0.0024	0.0062	0.0010	0.0685	0.0017	0.5225
2.1814	345.3134	0.0010	0.0015	0.0008	0.0027	0.0014	0.2188	0.0006	0.0488	0.0058	0.0694
2.4736	327.2946	0.0011	0.0011	0.0003	0.0009	0.0026	0.0796	0.0007	0.0612	0.0059	0.1183
2.3909	305.5096	0.0006	0.0007	0.0003	0.0003	0.0008	0.0156	0.0004	0.0466	0.0026	0.0563
2.3909	305.5096	0.0006	0.0007	0.0003	0.0003	0.0008	0.0156	0.0004	0.0466	0.0026	0.0563
2.3909	305.5096	0.0006	0.0007	0.0003	0.0003	0.0008	0.0156	0.0004	0.0466	0.0026	0.0563
2.5215	319.5442	0.0005	0.0007	0.0003	0.0004	ud	0.0084	0.0004	0.0358	0.0012	0.0181
2.7624	294.3518	0.0005	0.0009	0.0004	0.0007	0.0005	0.0084	0.0004	0.0341	0.0011	0.0175
1.9124	154.3593	0.0008	0.0013	0.0004	0.0012	0.0014	0.0079	0.0004	0.0253	0.0011	0.0580
2.0660	194.8313	0.0010	0.0006	0.0003	0.0006	0.0014	0.0086	0.0005	0.0317	0.0009	0.0668
2.1174	201.6363	0.0009	0.0007	0.0003	0.0007	0.0023	0.0086	0.0005	0.0331	0.0014	0.0736

ICP-MS Ga ppm	ICP-MS Ge ppm	ICP-MS As ppm	ICP-MS Se ppm	ICP-MS Rb ppm	ICP-MS Sr ppm	ICP-MS Y ppm	ICP-MS Zr ppm	ICP-MS Nb ppm	ICP-MS Mo ppm	ICP-MS Ag ppm	ICP-MS Cd ppm
0.0000	0.0000	0.0139	0.1791	0.0011	0.1079	0.0000	0.0000	0.0000	0.0020	0.0001	0.0011
0.0000	0.0000	0.0092	0.1880	0.0014	0.1123	0.0000	0.0001	0.0001	0.0022	0.0001	0.0011
0.0001	0.0000	0.0061	0.1957	0.0012	0.1290	0.0000	0.0001	0.0001	0.0017	0.0001	0.0015
0.0000	0.0000	0.0116	0.1961	0.0009	0.1225	0.0000	0.0000	0.0001	0.0015	0.0001	0.0016
0.0000	0.0010	0.0126	0.1987	0.0009	0.1202	0.0000	0.0001	0.0001	0.0015	0.0001	0.0016
0.0000	0.0001	0.0093	0.2007	0.0009	0.1332	0.0001	0.0001	0.0001	0.0016	0.0001	0.0016
0.0000	0.0000	0.0308	0.2481	0.0012	0.1482	0.0000	0.0001	0.0001	0.0016	0.0001	0.0020
0.0000	0.0000	0.0308	0.2481	0.0012	0.1482	0.0000	0.0001	0.0001	0.0016	0.0001	0.0020
0.0000	0.0000	0.0355	0.2762	0.0017	0.1556	0.0001	0.0001	0.0000	0.0017	0.0001	0.0020
0.0000	0.0001	0.0283	0.2689	0.0018	0.1616	0.0001	0.0001	0.0000	0.0016	0.0001	0.0022
0.0000	0.0000	0.0258	0.2800	0.0018	0.1610	0.0001	0.0001	0.0001	0.0016	0.0001	0.0021
0.0000	0.0000	0.0260	0.3019	0.0017	0.1688	0.0000	0.0001	0.0001	0.0016	0.0001	0.0022
ud	0.0001	0.0340	0.3740	0.0018	0.1744	0.0000	0.0001	0.0013	0.0020	ud	0.0028
ud	0.0001	0.0190	0.3977	0.0018	0.1839	0.0000	0.0001	0.0000	0.0020	ud	0.0034
0.0000	0.0000	0.0264	0.4647	0.0008	0.1820	0.0000	0.0001	0.0001	0.0034	0.0001	0.0015
ud	ud	0.0231	0.4055	0.0018	0.1819	0.0001	0.0003	0.0000	0.0021	ud	0.0029
ud	ud	0.0231	0.4055	0.0018	0.1819	0.0001	0.0003	0.0000	0.0021	ud	0.0029
ud	ud	0.0233	0.4340	0.0019	0.1939	0.0001	0.0001	0.0001	0.0022	ud	0.0030
ud	ud	0.0359	0.4850	0.0019	0.1933	0.0000	0.0001	0.0002	0.0042	ud	0.0014
ud	ud	0.0359	0.4850	0.0019	0.1933	0.0000	0.0001	0.0002	0.0042	ud	0.0014
ud	0.0001	0.0344	0.3843	0.0017	0.1821	0.0000	0.0001	0.0017	0.0019	ud	0.0029
ud	ud	0.0240	0.4221	0.0019	0.1915	0.0001	0.0001	0.0000	0.0022	ud	0.0031
ud	0.0002	0.0201	0.3211	0.0018	0.1604	0.0001	0.0002	0.0000	0.0019	ud	0.0034
ud	0.0001	0.0168	0.4427	0.0019	0.1898	0.0000	0.0001	0.0001	0.0022	ud	0.0031
ud	ud	0.0250	0.4187	0.0020	0.2063	0.0001	0.0001	0.0014	0.0023	ud	0.0029
ud	ud	0.0169	0.4988	0.0019	0.1909	0.0000	0.0000	0.0003	0.0029	ud	0.0022
ud	0.0000	0.0218	0.4637	0.0019	0.2001	0.0000	0.0001	0.0002	0.0022	ud	0.0037
ud	ud	0.0347	0.5146	0.0020	0.2011	0.0000	0.0001	0.0002	0.0032	ud	0.0022
ud	ud	0.0347	0.5146	0.0020	0.2011	0.0000	0.0001	0.0002	0.0032	ud	0.0022
ud	ud	0.0347	0.5146	0.0020	0.2011	0.0000	0.0001	0.0002	0.0032	ud	0.0022
ud	0.0003	0.0278	0.5449	0.0020	0.2051	0.0000	0.0001	0.0003	0.0056	ud	0.0005
ud	0.0002	0.0218	0.5351	0.0020	0.2088	0.0000	0.0000	0.0001	0.0058	ud	0.0004
ud	ud	0.0083	0.1600	0.0014	0.0943	0.0000	0.0001	0.0007	0.0016	ud	0.0017
ud	ud	0.0093	0.2193	0.0016	0.1215	0.0000	0.0001	0.0007	0.0016	ud	0.0023
ud	ud	0.0101	0.2228	0.0016	0.1258	0.0000	0.0001	0.0007	0.0015	ud	0.0023

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0004	0.0002	0.0233	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0005	0.0002	0.0165	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0003	0.0474	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0002	0.0428	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0002	0.0436	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0002	0.0572	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0003	0.0271	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0003	0.0271	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0003	0.0238	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0004	0.0003	0.0203	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0003	0.0192	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0005	0.0205	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0016	0.0277	ud	ud	ud	0.0000	ud	ud	ud	ud
ud	0.0005	0.0000	0.0320	0.0000	ud	ud	ud	ud	ud	ud	0.0000
0.0001	0.0005	0.0000	0.1132	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0000	0.0291	0.0000	0.0000	ud	ud	ud	ud	ud	0.0000
0.0000	0.0005	0.0000	0.0291	0.0000	0.0000	ud	ud	ud	ud	ud	0.0000
0.0000	0.0005	0.0000	0.0296	0.0000	ud	ud	ud	ud	ud	ud	0.0000
0.0000	0.0005	0.0000	0.0285	ud	ud	ud	ud	0.0000	ud	ud	0.0000
0.0000	0.0005	0.0000	0.0285	ud	ud	ud	ud	0.0000	ud	ud	0.0000
0.0000	0.0004	0.0021	0.0278	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0004	0.0000	0.0299	ud	ud	0.0000	ud	ud	ud	0.0000	0.0000
0.0001	0.0005	0.0000	0.0273	0.0002	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
0.0000	0.0005	0.0000	0.0315	0.0000	0.0000	ud	0.0000	0.0000	ud	ud	0.0000
0.0002	0.0005	ud	0.0297	0.0000	0.0000	ud	0.0000	ud	ud	ud	0.0000
0.0001	0.0005	0.0000	0.0300	ud	ud	ud	0.0000	0.0000	ud	ud	0.0000
0.0001	0.0005	0.0000	0.0320	0.0000	ud	ud	ud	0.0000	ud	ud	0.0000
ud	0.0005	ud	0.0301	0.0000	ud	ud	ud	ud	ud	ud	0.0000
ud	0.0005	ud	0.0301	0.0000	ud	ud	ud	ud	ud	ud	0.0000
ud	0.0005	ud	0.0301	0.0000	ud	ud	ud	ud	ud	ud	0.0000
0.0000	0.0005	ud	0.0269	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0005	0.0000	0.0645	ud	0.0002	ud	ud	ud	ud	0.0000	ud
0.0000	0.0004	0.1219	0.0152	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0005	0.1307	0.0175	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0003	0.0004	0.1216	0.0183	0.0000	0.0000	ud	ud	ud	ud	ud	ud

ICP-MS Dy ppm	ICP-MS Ho ppm	ICP-MS Er ppm	ICP-MS Tm ppm	ICP-MS Yb ppm	ICP-MS Lu ppm	ICP-MS Hf ppm	ICP-MS Ta ppm	ICP-MS W ppm	ICP-MS Hg ppm	ICP-MS Tl ppm	ICP-MS Pb ppm	ICP-MS Th ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	0.0000	0.0000	0.0000
0.0000	ud	ud	ud	0.0000	0.0000	ud	0.0000	ud	ud	0.0000	0.0000	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	0.0000	ud	0.0000	ud	ud	0.0000	ud	0.0005	0.0000	ud	ud
ud	ud	0.0000	ud	0.0000	ud	ud	0.0000	ud	0.0005	0.0000	ud	ud
0.0000	0.0000	0.0000	ud	0.0000	ud	ud	0.0000	ud	ud	0.0000	0.0000	ud
ud	ud	0.0000	ud	ud	ud	ud	0.0000	0.0001	0.0002	0.0000	0.0000	ud
ud	ud	0.0000	ud	ud	ud	ud	0.0000	0.0001	0.0002	0.0000	0.0000	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	ud	ud	ud	0.0002	0.0000	0.0000	ud
0.0000	ud	0.0000	ud	0.0000	0.0000	ud	ud	0.0000	ud	0.0000	0.0002	ud
ud	ud	ud	ud	0.0000	ud	ud	0.0000	0.0003	ud	0.0000	0.0000	0.0001
ud	ud	ud	ud	ud	ud	0.0001	0.0000	0.0000	ud	0.0000	0.0001	0.0003
ud	ud	ud	ud	ud	ud	ud	0.0000	0.0002	0.0003	0.0000	0.0000	0.0000
0.0000	ud	0.0000	ud	ud	ud	ud	0.0000	0.0002	0.0001	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	0.0000	0.0000	0.0000	0.0000	ud
ud	ud	ud	ud	ud	0.0000	ud	0.0000	0.0000	0.0000	0.0000	0.0000	ud
ud	ud	ud	ud	ud	0.0000	ud	0.0000	0.0000	0.0000	0.0000	0.0000	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	0.0000	0.0002	ud
ud	ud	ud	ud	ud	0.0000	ud	ud	ud	ud	0.0000	0.0004	ud
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0002	0.0000
ud	ud	ud	ud	0.0000	ud	0.0001	0.0000	ud	ud	0.0000	0.0000	0.0001
0.0000	ud	0.0000	ud	ud	ud	0.0001	ud	ud	ud	0.0000	0.0001	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0066	0.17	2.59	0.03	0.03	13.27	0.03	above	0.002	148.447	0.001	1.991
0.0074								0.007	156.776	0.001	2.113
0.0084	0.17	3.00	0.03	0.03	11.54	0.03	above	0.002	166.546	0.002	2.344
0.0100	0.14	2.02	0.03	0.03	11.19	0.03	483.77	0.007	171.167	0.002	2.052
0.0099	0.14	2.02	0.03	0.03	11.19	0.03	483.77	0.007	171.167	0.002	2.052
0.0090	0.13	2.51	0.03	0.03	13.31	0.03	564.46	0.002	189.117	0.002	2.108
0.0088	0.09	2.43	0.03	0.03	17.75	0.03	639.45	0.004	203.149	0.002	2.265
0.0088	0.10	2.33	0.03	0.03	17.86	0.03	639.69	0.004	203.149	0.002	2.265
0.0099	0.10	2.49	0.03	0.03	18.39	0.03	676.95	0.004	208.084	0.002	2.246
0.0098	0.10	2.82	0.03	0.03	19.19	0.03	724.12	0.005	209.047	0.003	2.212
0.0104	0.17	3.46	0.03	0.03	16.82	0.03	746.66	0.002	228.387	0.002	2.392
0.0111	0.13	3.88	0.03	0.03	17.80	0.03	802.40	0.002	242.602	0.002	2.295
0.0144	0.03	2.35	0.03	0.10	16.16	0.03	895.95	0.002	283.994	0.003	2.408
0.0149	0.03	4.64	0.03	0.10	28.22	0.03	977.32	0.002	267.009	0.003	2.303
0.0173	0.28	1.89	0.03	0.10	22.38	0.03	866.58	0.002	270.489	0.001	2.567
0.0149	0.03	2.30	0.03	0.10	17.32	0.03	893.65	0.002	270.545	0.003	2.703
0.0166	0.03	2.30	0.03	0.10	17.32	0.03	893.65	0.002	270.545	0.003	2.703
0.0172	0.03	2.41	0.03	0.10	18.07	0.03	929.39	0.002	275.077	0.003	2.754
0.0206								0.002	282.173	0.001	2.477
0.0206	0.03	3.01	0.03	0.10	20.81	0.03	1053.04	0.002	282.173	0.001	2.477
0.0155	0.30	2.01	0.03	0.10	16.75	0.03	923.68	0.002	284.496	0.003	2.571
0.0173	0.03	2.46	0.03	0.10	17.94	0.03	925.23	0.002	284.785	0.003	2.484
								0.006	285.030	0.002	2.537
0.0127	0.13	2.23	0.03	0.10	15.06	0.03	738.70	0.002	288.039	0.000	3.192
0.0171	0.03	4.33	0.03	0.10	29.42	0.03	1033.57	0.002	291.300	0.003	2.621
0.0143	0.13	1.90	0.03	0.10	18.56	0.03	994.79	0.002	294.902	0.003	2.796
0.0194	0.03	2.89	0.03	0.10	19.90	0.03	1007.66	0.004	296.476	0.002	2.717
0.0180	0.03	4.43	0.03	0.10	29.99	0.03	1017.23	0.002	298.365	0.003	2.841
								0.002	301.896	0.003	2.799
0.0194	0.03	2.81	0.03	0.10	20.51	0.03	1029.27	0.002	304.328	0.002	2.357
0.0212								0.002	304.328	0.002	2.357
0.0212	0.03	2.81	0.03	0.10	20.51	0.03	1029.27	0.002	304.328	0.002	2.357
0.0188	0.22	3.50	0.03	0.10	24.95	0.03	1196.45	0.002	328.231	0.000	2.812
0.0199	0.03	0.98	0.03	0.10	7.79	0.03	546.01	0.002	328.231	0.000	2.812
0.0060	0.57	0.59	0.03	0.10	7.24	0.03	319.70				
0.0060	0.03	0.69	0.03	0.10	9.28	0.03	411.18				
0.0077	0.35	0.99	0.03	0.10	10.73	0.03	504.85				

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
85.072	1.110	0.020	132.187	0.214	7.67		269				7.90	156
98.846	1.244	0.044	151.625	0.287							7.86	241
98.395	1.337	0.021	163.603	0.253							7.79	245
92.350	1.211	0.053	158.899	0.307							7.71	196
92.350	1.211	0.053	158.899	0.307							7.71	196
107.429	1.370	0.009	193.340	0.266							8.09	234
115.509	1.434	0.028	207.841	0.322	7.59	7.3					8.01	250
115.509	1.434	0.028	207.841	0.322							8.01	250
121.256	1.499	0.029	218.448	0.338	7.53	4.1	318				7.91	250
124.917	1.474	0.037	229.953	0.372	7.56	4.0	322				7.78	174
138.859	1.739	0.048	259.456	0.365							7.51	227
146.206	1.648	0.019	277.084	0.392							7.73	147
173.265	1.791	0.002	340.134	0.458	7.50	6.9	333				7.82	260
158.827	1.728	0.019	307.791	0.453							7.74	471
190.980	3.998	0.013	383.237	0.532							7.78	174
171.685	2.045	0.019	328.453	0.483	7.73	12.1	339				7.71	455
171.685	2.045	0.019	328.453	0.483							7.95	454
179.349	2.144	0.015	339.675	0.496								
185.507	1.923	0.011	366.259	0.541								
185.507	1.923	0.011	366.259	0.541								
180.221	1.913	0.006	353.168	0.473	7.38	6.9	337				7.99	265
177.155	1.898	0.013	337.014	0.488	7.66	10.2	348					
190.897	1.959	0.057	351.747	0.544							7.84	255
191.927	4.526	0.015	363.610	0.223							7.88	431
187.832	1.991	0.019	356.917	0.523							7.81	420
193.656	2.077	0.007	371.482	0.496	7.51	7.8	372				7.95	270
189.349	2.097	0.012	371.768	0.545								
192.391	2.160	0.019	369.074	0.538							7.81	407
195.157	2.146	0.007	378.068	0.504							7.95	271
186.380	1.760	0.011	349.535	0.503							7.65	185
186.380	1.760	0.011	349.535	0.503							7.65	185
186.380	1.760	0.011	349.535	0.503							7.65	185
218.566	2.377	0.014	460.727	0.702							7.97	414
218.566	2.377	0.014	460.727	0.702	8.10	3.5					7.76	140
					7.15	6.6	286				7.74	193
					6.76	5.4	248				7.83	216
					7.85	6.7	318				7.67	225

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_Left_Culvert	13/07/2013	10561	0.0218	0.0136	1.3717	113.5773	0.0020	2.3791	0.0522
WLC_Left_Culvert	13/07/2013	10562	0.0219	0.0134	1.3393	110.5607	0.0017	2.3285	0.0264
WLC_Left_Culvert	02/07/2013	10522	0.0202	0.0154	1.2679	101.8852	0.0012	2.5458	0.0316
WLC_Left_Culvert	13/07/2013	10561	0.0218	0.0136	1.3717	113.5773	0.0020	2.3791	0.0522
WLC_Left_Culvert	11/08/2014	13058	0.0388	0.0252	2.2596	215.0869	0.0024	2.8421	0.0315
WLC_Left_Culvert	05/08/2014	13036	0.0248	0.0129	1.4839	139.1210	0.0029	5.0061	0.0277
WLC_Left_Culvert	20/08/2014	13075	0.0285	0.0235	1.6489	152.1947	0.0030	2.6238	0.0201
WLC_Left_Culvert	27/08/2014	13084	0.0291	0.0193	1.7332	161.9250	0.0146	2.6336	0.0253
WLC_Left_Culvert	13/05/2014	10778	0.0326	0.0179	1.9367	194.0669	0.0012	2.2088	0.0260
WLC_Left_Culvert	08/05/2014	10763	0.0325	0.0150	1.9725	190.1361	0.0064	2.1607	0.0365
WLC_Left_Culvert	29/01/2014	10726	0.0343	0.0181	2.1511	205.1749	0.0001	2.0201	0.0155
WLC_Left_Culvert	10/03/2014	10731	0.0301	0.0227	1.9518	208.6804	0.0022	1.9768	0.0343
WLC_Left_Culvert	17/12/2013	10709	0.0315	0.0248	1.8926	207.8203	0.0003	2.2418	0.0704
WLC_Left_Culvert	21/11/2013	10703	0.0291	0.0250	1.9410	193.2520	0.0022	2.3287	0.1213
WLC_Left_Culvert	21/11/2013	10703 - Alk Rep	0.0291	0.0250	1.9410	193.2520	0.0022	2.3287	0.1213
WLC_Left_Culvert	12/02/2014	10727	0.0345	0.0251	2.4459	208.2650	0.0007	1.8215	0.0168
WLC_Left_Culvert	25/02/2014	10730	0.0443	0.0205	2.1874	209.3381	0.0127	1.9897	0.0235
WLC_Left_Culvert	03/12/2013	10705	0.0307	0.0294	2.3280	200.9283	0.0033	2.4930	0.1336
WLC_Left_Culvert	25/02/2014	10729	0.0339	0.0154	1.9743	208.9401	0.0012	1.9294	0.0348
WLC_Left_Culvert	25/02/2014	10729-MS Rep	0.0345	0.0162	2.0876	209.0158	0.0010	1.8900	0.0324
WLC_Left_Culvert	25/03/2014	10745	0.0322	0.0202	2.0203	214.8033	0.0001	2.4888	0.0077
WLC_Left_Culvert	15/04/2014	10747							
WLC_Left_Culvert	07/01/2014	10713	0.0313	0.0140	1.6210	204.7052	0.0061	2.0402	0.1117
WLC_Lower_Toe	07/05/2014	10761	0.0443	0.0459	12.5789	65.9552	0.0028	2.9790	0.0390
WLC_Lower_Toe	07/05/2014	10761-MS Rep	0.0436	0.0448	12.4571	65.3060	0.0027	2.9356	0.0392
WLC_Lower_Toe	13/05/2014	10777	0.0479	0.0550	13.6832	70.4457	0.0030	3.1047	0.0535
WLC_Lower_Toe	10/06/2014	10862	0.0224	0.0228	1.3530	98.7605	0.0152	2.3322	0.0472
WLC_Lower_Toe	05/06/2014	10845	0.0239	0.0244	1.2239	101.2282	0.0019	4.3173	0.0355
WLC_Lower_Toe	02/06/2014	10834							
WLC_Lower_Toe	31/05/2014	10828	0.0263	0.0233	1.7158	112.6389	0.0029	1.8705	0.0392
WLC_Lower_Toe	03/06/2013	10473	0.0216	0.0181	1.7960	94.2692	0.0094	2.1149	0.0261
WLC_Lower_Toe	03/06/2013	10473 - Rep	0.0218	0.0180	1.7470	96.7742	0.0114		0.0254
WLC_Lower_Toe	27/05/2013	10468	0.0239	0.0209	2.3236	94.2983	0.0034	2.1962	0.0286
WLC_Lower_Toe	14/06/2013	10492							
WLC_Lower_Toe	27/05/2014	10803	0.0414	0.0284	1.9366	124.9121	0.0151	2.1398	0.0474
WLC_Lower_Toe	09/07/2014	10940	0.0290	0.0328	3.5037	132.5066	0.0041	2.6776	0.0342
WLC_Lower_Toe	15/07/2014	10968	0.0316	0.0274	4.4678	131.6046	0.0029	6.9660	0.2500

ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
2.0285	221.5626	0.0010	0.0007	0.0003	0.0008	0.0024	0.0069	0.0005	0.0366	0.0010	0.0824
1.9980	220.8137	0.0010	0.0012	0.0003	0.0005	0.0024	0.0125	0.0006	0.0364	0.0010	0.0819
2.0660	194.8313	0.0010	0.0006	0.0003	0.0006	0.0014	0.0086	0.0005	0.0317	0.0009	0.0668
2.0285	221.5626	0.0010	0.0007	0.0003	0.0008	0.0024	0.0069	0.0005	0.0366	0.0010	0.0824
3.2278	307.8445	0.0013	0.0010	0.0004	0.0004	0.0014	0.0064	0.0005	0.0725	0.0010	0.0017
2.2508	215.9719	0.0011	0.0010	0.0003	0.0006	0.0014	0.0208	0.0004	0.0539	0.0015	0.0846
2.2486	259.7708	0.0012	0.0009	0.0004	0.0001	0.0019	0.0148	0.0005	0.0536	0.0000	0.0866
2.3578	264.4543	0.0011	0.0008	0.0003	0.0001	0.0017	0.0092	0.0005	0.0530	0.0009	0.0845
2.1956	291.0641	0.0011	0.0011	0.0003	0.0007	0.0006	0.1813	0.0005	0.0325	0.0009	0.0321
2.3455	265.8508	0.0011	0.0014	0.0003	0.0002	0.0004	0.0108	0.0005	0.0304	0.0014	0.0223
2.3041	307.8667	0.0007	0.0004	0.0003	0.0005	0.0000	0.0004	0.0006	0.0337	0.0003	0.0023
2.4440	325.7378	0.0007	0.0008	0.0004	0.0006	0.0003	0.0069	0.0007	0.0369	0.0014	0.0270
2.1377	304.8036	0.0007	0.0007	0.0000	0.0001	0.0000	0.0010	0.0005	0.0339	0.0003	0.0021
2.4708	285.1954	0.0007	0.0009	0.0003	0.0001	0.0001	0.0010	0.0004	0.0372	0.0003	0.0035
2.4708	285.1954	0.0007	0.0009	0.0003	0.0001	0.0001	0.0010	0.0004	0.0372	0.0003	0.0035
2.3595	319.4800	0.0008	0.0004	0.0002	0.0001	0.0000	0.0010	0.0007	0.0380	0.0009	0.0065
2.3429	327.6392	0.0007	0.0017	0.0003	0.0003	0.0002	0.0010	0.0007	0.0370	0.0009	0.0362
2.8089	297.0563	0.0007	0.0007	0.0002	0.0010	0.0009	0.0111	0.0005	0.0389	0.0009	0.0283
2.4541	324.9600	0.0008	0.0006	0.0003	0.0002	0.0000	0.0010	0.0007	0.0365	0.0007	0.0153
2.5370	317.6764	0.0008	0.0006	0.0002	0.0001	0.0000	0.0010	0.0007	0.0352	0.0007	0.0158
2.0146	344.3133	0.0008	0.0008	0.0008	0.0005	0.0000	0.0099	0.0005	0.0359	0.0009	0.0226
2.1769	326.9549	0.0007	0.0011	0.0003	0.0001	0.0008	0.0141	0.0005	0.0375	0.0019	0.0194
1.6849	157.2432	0.0017	0.0016	0.0003	0.0005	0.0006	0.0071	0.0003	0.0116	0.0016	0.0110
1.6668	156.2641	0.0016	0.0018	0.0004	0.0003	0.0005	0.0103	0.0003	0.0114	0.0015	0.0108
1.6857	162.1743	0.0016	0.0013	0.0003	0.0009	0.0003	0.0131	0.0003	0.0117	0.0007	0.0184
2.2147	169.3124	0.0009	0.0013	0.0003	0.0006	0.0008	0.0228	0.0006	0.0448	0.0014	0.0782
2.0466	166.0679	0.0009	0.0008	0.0004	0.0008	0.0007	0.0108	0.0007	0.0460	0.0011	0.0835
2.4741	178.0900	0.0006	0.0010	0.0002	0.0004	0.0004	0.0027	0.0004	0.0365	0.0008	0.0746
2.2313	172.5885	0.0007	0.0008	0.0004	0.0001	0.0021	0.0159	0.0004	0.0370	0.0018	0.0783
2.2582	176.6474	0.0007	0.0007	0.0003	0.0005	0.0022	0.0214	0.0005	0.0366	0.0019	0.0780
2.4424	167.8051	0.0006	0.0005	0.0003	0.0009	0.0004	0.0017	0.0004	0.0336	0.0006	0.0604
2.4222	184.3840	0.0006	0.0017	0.0001	0.0006	0.0011	0.0063	0.0007	0.0380	0.0018	0.0742
2.0493	218.7926	0.0010	0.0010	0.0005	0.0014	0.0006	0.0151	0.0006	0.0453	0.0018	0.1403
2.2768	233.9713	0.0012	0.0008	0.0003	0.0004	0.0005	0.0232	0.0006	0.0536	0.0010	0.0741

ICP-MS Ga ppm	ICP-MS Ge ppm	ICP-MS As ppm	ICP-MS Se ppm	ICP-MS Rb ppm	ICP-MS Sr ppm	ICP-MS Y ppm	ICP-MS Zr ppm	ICP-MS Nb ppm	ICP-MS Mo ppm	ICP-MS Ag ppm	ICP-MS Cd ppm
ud	ud	0.0110	0.2533	0.0016	0.1286	0.0000	0.0001	0.0009	0.0016	ud	0.0027
ud	0.0000	0.0142	0.2623	0.0016	0.1316	0.0000	0.0002	0.0007	0.0016	ud	0.0028
ud	ud	0.0093	0.2193	0.0016	0.1215	0.0000	0.0001	0.0007	0.0016	ud	0.0023
ud	ud	0.0110	0.2533	0.0016	0.1286	0.0000	0.0001	0.0009	0.0016	ud	0.0027
0.0000	0.0000	0.0635	0.5299	0.0025	0.1922	0.0000	0.0001	0.0000	0.0026	0.0001	0.0014
0.0000	0.0000	0.0309	0.3167	0.0018	0.1681	0.0000	0.0001	0.0001	0.0016	0.0001	0.0021
0.0000	0.0000	0.0291	0.3836	0.0019	0.1670	0.0000	0.0001	0.0000	0.0017	0.0001	0.0029
0.0000	0.0000	0.0313	0.4072	0.0019	0.1724	0.0000	0.0001	0.0000	0.0018	0.0001	0.0029
0.0000	0.0000	0.0357	0.4470	0.0013	0.2010	0.0000	0.0001	0.0001	0.0047	0.0001	0.0006
0.0000	0.0000	0.0402	0.4606	0.0018	0.1988	0.0000	0.0001	0.0001	0.0049	0.0001	0.0004
0.0000	0.0000	0.0408	0.5719	0.0013	0.2195	0.0000	0.0001	0.0000	0.0051	0.0001	0.0000
0.0000	0.0000	0.0248	0.5725	0.0016	0.2166	0.0000	0.0001	0.0000	0.0058	0.0001	0.0004
0.0000	0.0000	0.0269	0.5319	0.0011	0.1855	0.0000	0.0000	0.0000	0.0051	0.0001	0.0000
0.0000	0.0000	0.0269	0.4973	0.0013	0.1836	0.0000	0.0000	0.0001	0.0045	0.0001	0.0001
0.0000	0.0000	0.0269	0.4973	0.0013	0.1836	0.0000	0.0000	0.0001	0.0045	0.0001	0.0001
0.0000	0.0000	0.0321	0.5732	0.0011	0.2199	0.0000	0.0001	0.0001	0.0053	0.0001	0.0000
0.0000	0.0000	0.0302	0.5722	0.0014	0.2240	0.0000	0.0008	0.0000	0.0055	0.0001	0.0005
0.0000	0.0000	0.0263	0.4890	0.0013	0.1903	0.0000	0.0001	0.0000	0.0048	0.0001	0.0010
0.0000	0.0000	0.0297	0.5659	0.0020	0.2211	0.0000	0.0001	0.0000	0.0054	0.0001	0.0003
0.0000	0.0023	0.0290	0.5786	0.0020	0.2223	0.0000	0.0001	0.0000	0.0057	0.0001	0.0004
0.0000	0.0000	0.0401	0.6981	0.0014	0.2297	0.0000	0.0001	0.0001	0.0059	0.0001	0.0004
0.0000	0.0000	0.0246	0.5494	0.0019	0.2003	0.0000	0.0001	0.0001	0.0047	0.0001	0.0007
0.0000	0.0000	0.0084	0.0999	0.0012	1.1162	0.0000	0.0001	0.0001	0.0123	0.0001	0.0002
0.0000	0.0004	0.0076	0.1042	0.0012	1.0997	0.0000	0.0001	0.0001	0.0126	0.0001	0.0002
0.0000	0.0000	0.0090	0.1063	0.0012	1.1443	0.0001	0.0001	0.0001	0.0095	0.0001	0.0002
0.0000	0.0000	0.0054	0.1926	0.0017	0.1302	0.0000	0.0001	0.0001	0.0017	0.0001	0.0015
0.0000	0.0000	0.0091	0.2009	0.0017	0.1277	0.0000	0.0000	0.0000	0.0020	0.0001	0.0015
0.0000	0.0000	0.0062	0.2231	0.0012	0.1414	0.0001	0.0001	0.0001	0.0022	0.0001	0.0014
ud	0.0000	0.0101	0.2181	0.0015	0.1318	0.0000	0.0001	0.0004	0.0022	ud	0.0015
ud	ud	0.0122	0.2093	0.0015	0.1293	0.0000	0.0001	0.0004	0.0021	ud	0.0016
ud	0.0001	0.0134	0.2172	0.0015	0.1681	0.0001	0.0001	0.0003	0.0031	ud	0.0012
0.0000	0.0000	0.0120	0.2446	0.0018	0.1861	0.0001	0.0009	0.0001	0.0030	0.0001	0.0014
0.0000	0.0000	0.0306	0.2405	0.0013	0.3186	0.0000	0.0001	0.0001	0.0028	0.0001	0.0017
0.0000	0.0000	0.0290	0.2660	0.0020	0.4851	0.0001	0.0000	0.0000	0.0034	0.0001	0.0016

ICP-MS Sn ppm	ICP-MS Sb ppm	ICP-MS Cs ppm	ICP-MS Ba ppm	ICP-MS La ppm	ICP-MS Ce ppm	ICP-MS Pr ppm	ICP-MS Nd ppm	ICP-MS Sm ppm	ICP-MS Eu ppm	ICP-MS Gd ppm	ICP-MS Tb ppm
0.0011	0.0005	0.1652	0.0190	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0028	0.0005	0.1331	0.0187	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0005	0.1307	0.0175	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0011	0.0005	0.1652	0.0190	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0006	0.0000	0.0213	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0006	0.0202	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0000	0.0246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0004	0.0000	0.0248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0002	0.0367	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0027	0.0005	0.0002	0.0266	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0001	0.0465	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0005	0.0001	0.0333	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0000	0.0426	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0000	0.0271	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0000	0.0271	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0001	0.0633	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0001	0.0659	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0005	0.0000	0.0379	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0001	0.0303	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0001	0.0299	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0001	0.0626	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0005	0.0000	0.0255	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0005	0.0007	0.0001	0.0254	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0005	0.0007	0.0001	0.0252	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0006	0.0001	0.0327	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0002	0.0189	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0002	0.0169	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0006	0.0003	0.0210	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0006	ud	0.0143	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0001	0.0005	0.0000	0.0146	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0001	0.0006	0.0000	0.0184	0.0000	0.0000	ud	0.0000	0.0000	ud	ud	ud
0.0001	0.0006	0.0002	0.0211	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0003	0.0468	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0003	0.0194	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS Dy ppm	ICP-MS Ho ppm	ICP-MS Er ppm	ICP-MS Tm ppm	ICP-MS Yb ppm	ICP-MS Lu ppm	ICP-MS Hf ppm	ICP-MS Ta ppm	ICP-MS W ppm	ICP-MS Hg ppm	ICP-MS Tl ppm	ICP-MS Pb ppm	ICP-MS Th ppm
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	0.0000	0.0000	0.0000
ud	ud	ud	ud	0.0000	ud	0.0001	0.0000	ud	ud	0.0000	0.0000	0.0001
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.0000	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	0.0000	0.0003	ud
ud	ud	ud	ud	0.0000	0.0000	0.0001	0.0000	ud	0.0003	0.0000	0.0003	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0003	0.0002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0077	0.03	1.01	0.03	0.10	11.24	0.03	542.14	ud	200.167	0.003	2.044
0.0088	0.03	0.94	0.03	0.10	11.19	0.03	542.24	ud	203.375	0.003	2.040
0.0076	0.03	0.68	0.03	0.10	9.17	0.03	411.47				
0.0085	0.03	1.08	0.03	0.10	11.01	0.03	532.03	ud	200.167	0.003	2.044
0.0254	0.32	3.62	0.03	0.03	18.13	0.03	above	0.002	192.630	0.000	2.431
0.0109	0.14	3.65	0.03	0.03	17.92	0.03	808.98	0.002	245.339	0.003	2.340
0.0135	0.12	4.02	0.03	0.03	19.23	0.03	891.63	0.002	256.443	0.003	2.606
0.0146	0.14	3.92	0.03	0.03	20.31	0.03	927.80	0.002	273.598	0.003	2.537
0.0146	0.14	4.87	0.03	0.10	30.94	0.03	1083.99	0.004	275.578	0.001	2.714
0.0152	0.15	5.01	0.03	0.10	29.72	0.03	1108.08	0.002	279.444	0.001	2.648
0.0246	0.60	6.08	0.30	0.60	35.27	0.60	1179.46	0.009	290.597	0.000	2.530
0.0188	0.13	3.71	0.03	1.50	29.61	0.03	1182.72	0.008	293.974	0.001	2.887
0.0231	0.03	4.55	0.03	0.10	40.36	0.03	1126.03	0.023	294.794	0.000	2.711
0.0218								0.004	295.271	0.000	2.690
0.0218								0.004	295.271	0.000	2.690
0.0228	0.19	4.79	0.03	0.10	28.95	0.03	1098.42	0.013	296.184	0.001	2.641
0.0215	0.21	4.72	0.03	0.10	29.37	0.03	1095.03	0.013	296.551	0.000	2.708
0.0191	0.03	3.95	0.03	0.10	36.78	0.03	1123.88	0.002	297.036	0.001	2.629
0.0222	0.35	4.74	0.03	0.10	29.27	0.03	1102.47	0.014	299.416	0.000	2.567
0.0219	0.35	4.74	0.03	0.10	29.27	0.03	1102.47	0.014	299.416	0.000	2.567
0.0222	0.03	5.02	0.03	0.10	29.99	0.03	above	0.006	309.834	0.000	2.706
	0.20	5.13	0.03	0.10	27.51	0.03	1092.51	0.009	313.743	0.000	2.869
0.0194	0.03	4.82	0.03	0.10	41.64	0.03	1142.84	0.002	313.836	0.001	2.841
0.0029	0.32	5.43	0.03	0.10	1.64	0.03	448.08	0.002	158.268	0.000	2.133
0.0029	0.32	5.43	0.03	0.10	1.64	0.03	448.08	0.002	158.268	0.000	2.133
0.0017	0.27	5.86	0.03	0.10	1.59	0.03	480.90	0.005	163.381	0.000	2.363
0.0081	0.18	2.98	0.03	0.03	11.56	0.03	above	0.002	166.634	0.002	2.370
0.0087	0.13	3.22	0.03	0.03	8.91	0.03	506.17	0.002	166.943	0.002	2.377
	0.12	3.74	0.03	0.03	9.94	0.03	508.19	0.002	168.014	0.001	2.274
0.0085								0.002	173.362	0.002	2.365
0.0075	0.03	0.91	0.03	0.10	6.54	0.03	406.36	0.002	175.136	0.002	2.232
0.0074	0.03	0.91	0.03	0.10	6.54	0.03	406.36	0.002	175.136	0.002	2.232
0.0084	0.03	0.90	0.03	0.10	6.53	0.03	421.53	0.002	177.255	0.001	2.459
								0.002	183.181	0.002	2.336
0.0084								0.005	191.468	0.002	2.539
0.0090	0.14	3.34	0.03	0.03	13.09	0.03	712.99	0.002	221.685	0.002	2.397
0.0085	0.16	3.44	0.03	0.03	12.85	0.03	740.66	0.009	224.858	0.002	2.381

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
113.978	1.443	ud	0.294	209.649	7.38	7.5	306				7.65	210
114.019	1.419	ud	0.300	213.115							7.60	213
					6.76	5.4	248				7.83	216
113.978	1.443	ud	0.294	209.649							7.65	210
137.563	8.272	0.030	297.668	0.369							7.94	287
149.268	1.661	0.017	282.997	0.398								
167.742	1.961	0.012	310.070	0.433							7.92	301
172.039	1.813	0.025	313.197	0.485							7.77	304
197.821	2.261	0.037	382.284	0.615							8.04	242
196.353	2.216	0.028	382.566	0.597							7.98	230
207.829	2.432	0.064	390.173	0.760							8.11	240
211.960	2.297	0.049	394.023	0.677							7.71	253
212.421	2.334	0.072	407.422	0.735							7.74	209
208.382	2.122	0.063	411.392	0.778							8.12	245
208.382	2.122	0.063	411.392	0.778							8.13	245
204.859	2.130	0.058	386.484	0.742							7.64	220
207.183	2.162	0.059	389.372	0.753							7.68	223
208.061	2.397	0.010	385.232	0.539							7.64	212
205.411	2.182	0.056	385.437	0.747							7.96	228
205.411	2.182	0.056	385.437	0.747							7.96	228
216.768	2.312	0.048	408.343	0.777							8.07	236
233.782	2.371	0.046	434.394	0.848							8.02	242
219.753	2.302	0.014	408.852	0.596	8.10	3.1	299				8.01	251
63.525	11.949	0.036	144.262	0.132	7.63		241				8.00	194
63.525	11.949	0.036	144.262	0.132							8.00	194
69.779	13.737	0.065	158.814	0.159							8.00	207
98.097	1.345	0.019	162.957	0.248								
102.844	1.385	0.022	167.457	0.256	7.47		323				7.87	253
100.747	2.196	0.019	162.819	0.246	7.37		329				7.64	211
110.906	1.573	0.035	174.833	0.292	7.40	3.4	306				7.61	219
96.730	1.799	0.009	169.962	0.251	6.34	4.1	287				7.62	203
96.730	1.799	0.009	169.962	0.251	6.34	4.1	287				7.82	212
102.062	2.323	0.016	178.308	0.268	6.97	4.1	319				7.85	225
101.294	1.947	0.018	176.887	0.248							7.51	216
126.633	2.244	0.047	201.036	0.337	7.36	3.6	320					
120.692	3.513	0.028	228.181	0.320	7.50	9.8	299				7.98	253
122.194	4.244	0.047	233.180	0.349	7.60	3.2	295				7.88	262

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_Lower_Toe	21/07/2014	10990	0.0344	0.0266	5.0618	134.7079	0.0070	8.7187	0.2616
WLC_Lower_Toe	22/07/2013	10576	0.0374	0.0213	5.3585	118.6725	0.0045	2.8059	0.0357
WLC_Lower_Toe	28/07/2014	13019	0.0354	0.0242	5.5589	123.5053	0.0020	2.7570	0.0844
WLC_Lower_Toe	11/08/2013	10611	0.0414	0.0282	7.4197	122.7694	0.0158	2.9287	0.0563
WLC_Lower_Toe	05/08/2014	13033	0.0394	0.0260	6.8084	125.7545	0.0041	5.6016	0.0425
WLC_Lower_Toe	23/08/2013	10629	0.0465	0.0309	8.4253	139.7680	0.0038	3.0737	0.0607
WLC_Lower_Toe	11/08/2014	13055	0.0442	0.0376	8.9200	134.4689	0.0011	3.2282	0.0328
WLC_Lower_Toe	30/07/2013	10594	0.0390	0.0282	6.2473	127.4850	0.0021	3.0031	0.0400
WLC_Lower_Toe	20/08/2014	13076	0.0455	0.0414	11.1966	120.5479	0.0029	3.1901	0.0315
WLC_Lower_Toe	29/08/2014	13097	0.0497	0.0476	11.4376	114.6311	0.0154	3.3622	0.0349
WLC_Lower_Toe	07/08/2013	10600	0.0425	0.0287	7.0526	127.1305	0.0025	3.0146	0.0376
WLC_Lower_Toe	29/08/2013	10642	0.0481	0.0335	8.7410	130.2370	0.0017	3.1583	0.0594
WLC_Lower_Toe	29/08/2013	10642	0.0481	0.0335	8.7410	130.2370	0.0017	3.1583	0.0594
WLC_Lower_Toe	03/09/2013	10654	0.0506	0.0372	10.7582	131.3243	0.0029	3.1732	0.0242
WLC_Lower_Toe	03/09/2013	10654	0.0506	0.0372	10.7582	131.3243	0.0029	3.1732	0.0242
WLC_Lower_Toe	14/09/2013	10671							
WLC_Lower_Toe	26/06/2013	10504	0.0240	0.0198	2.4960	97.1334	0.0038	2.2826	0.0205
WLC_Lower_Toe	02/07/2013	10518	0.0274	0.0195	3.3848	111.2988	0.0035	2.6186	0.0365
WLC_Lower_Toe	07/07/2013	10537	0.0304	0.0195	3.6043	117.1828	0.0009	2.6115	0.0274
WLC_Lower_Toe	13/07/2013	10560	0.0331	0.0218	4.2144	119.5997	0.0048	2.6321	0.0540
WLC_Lower_Toe#2	29/08/2014	13098	0.0393	0.0369	8.7294	113.8875	0.0206	0.2299	0.0273
WLC_Lower_Toe#2	20/08/2014	13077	0.0399	0.0385	7.9257	120.1669	0.0026	0.3814	0.0250
WLC_Lower_Toe#2	11/08/2014	13056	0.0439	0.0363	8.3888	140.8607	0.0016	0.7438	0.0310
WLC_Lower_Toe#2	21/07/2014	10991	0.0330	0.0323	4.8907	135.2725	0.0063	2.1611	0.1668
WLC_Lower_Toe#2	05/08/2014	13034	0.0377	0.0252	6.4538	125.8534	0.0032	1.1160	0.0302
WLC_Lower_Toe#2	09/07/2014	10944	0.0288	0.0282	3.4249	128.8120	0.0032	2.5856	0.0312
WLC_Lower_Toe#2	09/07/2014	10945	0.0284	0.0294	3.2452	129.4263	0.0042	2.9244	0.0460
WLC_Lower_Toe#2	09/07/2014	10945-MS Rep	0.0286	0.0299	3.4183	132.5478	0.0046	3.2128	0.0440
WLC_Lower_Toe#2	15/07/2014	10969	0.0310	0.0252	4.4667	128.1689	0.0065	7.5060	0.2894
WLC_Lower_Toe#2	28/07/2014	13020	0.0351	0.0255	5.5152	123.8459	0.0032	1.1182	0.0336
WLC_Right_Culvert	10/06/2014	10859	0.0221	0.0341	1.5270	93.2914	0.0022	2.1987	0.0449
WLC_Right_Culvert	02/06/2014	10832	0.0252	0.0283	1.4770	96.5194	0.0022	5.0088	0.0291
WLC_Right_Culvert	02/06/2014	10832-MS Rep	0.0259	0.0282	1.6069	96.4403	0.0027	5.1037	0.0240
WLC_Right_Culvert	05/06/2014	10844	0.0239	0.0271	1.3425	99.0709	0.0026	4.4763	0.0304
WLC_Right_Culvert	07/06/2013	10485	0.0211	0.0173	1.9829	97.2892	0.0025	2.0354	0.0165
WLC_Right_Culvert	03/06/2013	10477	0.0214	0.0178	1.7705	98.3482	0.0050		0.0213
WLC_Right_Culvert	03/06/2013	10477-Rep	0.0219	0.0182	1.9428	99.6853	0.0050		0.0202

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
2.3098	229.5665	0.0012	0.0010	0.0003	0.0003	0.0007	0.0180	0.0007	0.0511	0.0009	0.1318
2.4420	236.2488	0.0012	ud	0.0003	0.0004	0.0005	0.0091	0.0005	0.0450	ud	0.0595
2.3551	213.5548	0.0012	0.0008	0.0002	0.0002	0.0003	0.0073	0.0005	0.0413	0.0016	0.0525
2.6727	243.7050	0.0015	0.0033	0.0004	0.0004	0.0011	0.0256	0.0006	0.0523	0.0009	0.0629
2.4046	222.6791	0.0014	0.0010	0.0002	0.0003	0.0003	0.0128	0.0004	0.0394	0.0017	0.0526
2.6278	261.4497	0.0014	0.0014	0.0003	0.0003	0.0003	0.0022	0.0005	0.0435	0.0011	0.0636
2.6182	240.3312	0.0015	0.0011	0.0003	0.0004	0.0000	0.0010	0.0004	0.0392	0.0006	0.0005
2.5843	231.0723	0.0014	0.0011	0.0003	0.0004	0.0004	0.0028	0.0005	0.0490	0.0007	0.0814
2.3479	252.4818	0.0014	0.0012	0.0004	0.0001	0.0002	0.0082	0.0005	0.0323	0.0009	0.0399
2.2260	247.3700	0.0014	0.0013	0.0003	0.0002	0.0001	0.0084	0.0005	0.0263	0.0008	0.0323
2.6337	241.3284	0.0014	0.0007	0.0003	0.0005	0.0004	0.0034	0.0005	0.0469	0.0022	0.0739
2.5168	266.5422	0.0016	0.0014	0.0003	0.0003	0.0007	0.0026	0.0005	0.0425	0.0012	0.0554
2.5168	266.5422	0.0016	0.0014	0.0003	0.0003	0.0007	0.0026	0.0005	0.0425	0.0012	0.0554
2.5740	268.4827	0.0015	0.0013	0.0004	0.0006	0.0001	0.0023	0.0006	0.0373	0.0014	0.0530
2.5740	268.4827	0.0015	0.0013	0.0004	0.0006	0.0001	0.0023	0.0006	0.0373	0.0014	0.0530
2.2645	172.6605	0.0008	0.0006	0.0003	0.0008	0.0009	0.0051	0.0005	0.0279	0.0010	0.0613
2.3631	202.1824	0.0009	0.0010	0.0004	0.0009	0.0009	0.0063	0.0005	0.0297	0.0008	0.0619
2.2594	224.2310	0.0010	0.0007	0.0003	0.0006	0.0008	0.0044	0.0005	0.0325	0.0008	0.0661
2.2712	233.4134	0.0010	0.0015	0.0002	0.0002	0.0008	0.0069	0.0005	0.0331	0.0009	0.0644
1.0054	160.9903	0.0001	0.0003	0.0003	0.0003	0.0108	0.0381	0.0004	0.0166	0.0011	0.0050
1.6378	193.1397	0.0002	0.0005	0.0004	0.0001	0.0030	0.0114	0.0005	0.0256	0.0011	0.0087
2.2991	219.9705	0.0004	0.0007	0.0004	0.0003	0.0037	0.0021	0.0005	0.0344	0.0019	0.0021
2.5236	212.9200	0.0009	0.0009	0.0004	0.0004	0.0069	0.0126	0.0008	0.0442	0.0005	0.0267
2.3323	192.6195	0.0005	0.0006	0.0004	0.0005	0.0032	0.0125	0.0005	0.0303	0.0015	0.0130
2.1397	215.3897	0.0009	0.0009	0.0005	0.0011	0.0048	0.0284	0.0006	0.0434	0.0015	0.0552
2.0298	213.1828	0.0010	0.0012	0.0005	0.0014	0.0048	0.0179	0.0007	0.0430	0.0013	0.1546
2.1236	213.5355	0.0010	0.0030	0.0006	0.0015	0.0047	0.0201	0.0007	0.0430	0.0013	0.1542
2.4134	216.3895	0.0010	0.0009	0.0003	0.0003	0.0056	0.0278	0.0008	0.0483	0.0007	0.0501
2.5617	202.2804	0.0006	0.0006	0.0003	0.0003	0.0062	0.0084	0.0005	0.0370	0.0017	0.0659
2.0350	163.3646	0.0009	0.0008	0.0003	0.0005	0.0007	0.0123	0.0006	0.0413	0.0007	0.0594
1.8710	158.8239	0.0009	0.0010	0.0004	0.0009	0.0007	0.0139	0.0005	0.0375	0.0007	0.0526
1.9710	155.7914	0.0009	0.0013	0.0004	0.0010	0.0007	0.0179	0.0006	0.0362	0.0006	0.0507
2.0109	162.9490	0.0009	0.0008	0.0003	0.0007	0.0008	0.0108	0.0007	0.0431	0.0008	0.0731
2.4504	175.3732	0.0006	0.0010	0.0003	0.0003	0.0006	0.0146	0.0004	0.0346	0.0009	0.0517
2.1627	175.1247	0.0007	0.0006	0.0004	0.0003	0.0007	0.0160	0.0004	0.0341	0.0012	0.0613
2.3341	177.2399	0.0007	0.0005	0.0003	0.0003	0.0006	0.0157	0.0004	0.0342	0.0012	0.0621

ICP-MS Ga ppm	ICP-MS Ge ppm	ICP-MS As ppm	ICP-MS Se ppm	ICP-MS Rb ppm	ICP-MS Sr ppm	ICP-MS Y ppm	ICP-MS Zr ppm	ICP-MS Nb ppm	ICP-MS Mo ppm	ICP-MS Ag ppm	ICP-MS Cd ppm
0.0000	0.0001	0.0312	0.2451	0.0018	0.5107	0.0001	0.0001	0.0001	0.0031	0.0001	0.0015
ud	0.0001	0.0171	0.2728	0.0017	0.4660	0.0000	0.0001	0.0010	0.0034	ud	0.0018
0.0000	0.0000	0.0215	0.2448	0.0018	0.6012	0.0000	0.0001	0.0001	0.0035	0.0001	0.0013
ud	0.0000	0.0188	0.2525	0.0017	0.6616	0.0001	0.0001	0.0011	0.0050	ud	0.0016
0.0000	0.0001	0.0225	0.2415	0.0018	0.7309	0.0001	0.0001	0.0001	0.0036	0.0001	0.0014
ud	ud	0.0201	0.2653	0.0018	0.7749	0.0000	0.0001	0.0012	0.0047	ud	0.0015
0.0000	0.0000	0.0347	0.2854	0.0019	0.7913	0.0000	0.0001	0.0000	0.0043	0.0001	0.0002
ud	0.0001	0.0198	0.2782	0.0016	0.5453	0.0000	0.0001	0.0013	0.0033	ud	0.0018
0.0000	0.0000	0.0180	0.2360	0.0018	0.9234	0.0001	0.0001	0.0000	0.0042	0.0001	0.0013
0.0000	0.0000	0.0170	0.1945	0.0018	1.1490	0.0000	0.0001	0.0000	0.0048	0.0001	0.0012
ud	0.0000	0.0169	0.2628	0.0017	0.6183	0.0000	0.0001	0.0014	0.0040	ud	0.0015
ud	ud	0.0244	0.2546	0.0017	0.8303	0.0000	0.0001	0.0015	0.0045	ud	0.0013
ud	ud	0.0244	0.2546	0.0017	0.8303	0.0000	0.0001	0.0015	0.0045	ud	0.0013
ud	0.0000	0.0210	0.2397	0.0018	0.9337	0.0000	0.0001	0.0015	0.0046	ud	0.0013
ud	0.0000	0.0210	0.2397	0.0018	0.9337	0.0000	0.0001	0.0015	0.0046	ud	0.0013
ud	ud	0.0105	0.2184	0.0016	0.1631	0.0000	0.0001	0.0007	0.0023	ud	0.0018
ud	ud	0.0135	0.2507	0.0016	0.2479	0.0000	0.0001	0.0008	0.0025	ud	0.0018
ud	ud	0.0123	0.2578	0.0017	0.2900	0.0000	0.0001	0.0006	0.0026	ud	0.0021
0.0000	0.0001	0.0105	0.2530	0.0016	0.3369	0.0000	0.0001	0.0008	0.0035	ud	0.0020
0.0000	0.0000	0.0122	0.1538	0.0011	0.6003	0.0000	0.0000	0.0000	0.0037	0.0001	0.0001
0.0000	0.0000	0.0166	0.1992	0.0016	0.6386	0.0000	0.0000	0.0000	0.0039	0.0001	0.0001
0.0000	0.0000	0.0296	0.2540	0.0018	0.6990	0.0000	0.0000	0.0000	0.0043	0.0001	0.0002
0.0000	0.0000	0.0270	0.2342	0.0019	0.4908	0.0001	0.0001	0.0001	0.0038	0.0001	0.0005
0.0000	0.0000	0.0232	0.2309	0.0019	0.6330	0.0000	0.0000	0.0001	0.0036	0.0001	0.0003
0.0000	0.0000	0.0282	0.2354	0.0016	0.3340	0.0001	0.0001	0.0001	0.0029	0.0001	0.0011
0.0000	0.0000	0.0270	0.2298	0.0012	0.3163	0.0001	0.0002	0.0000	0.0030	0.0001	0.0011
0.0000	0.0000	0.0282	0.2331	0.0013	0.3082	0.0001	0.0001	0.0001	0.0033	0.0001	0.0011
0.0000	0.0000	0.0314	0.2587	0.0019	0.4628	0.0001	0.0001	0.0001	0.0032	0.0001	0.0007
0.0000	0.0000	0.0217	0.2313	0.0018	0.5616	0.0000	0.0001	0.0001	0.0032	0.0001	0.0003
0.0004	0.0000	0.0056	0.1867	0.0010	0.1481	0.0000	0.0000	0.0001	0.0018	0.0001	0.0012
0.0000	0.0000	0.0211	0.2083	0.0012	0.1587	0.0000	0.0001	0.0000	0.0022	0.0001	0.0010
0.0000	0.0009	0.0207	0.2198	0.0012	0.1576	0.0000	0.0000	0.0001	0.0024	0.0001	0.0011
0.0000	0.0000	0.0077	0.1978	0.0011	0.1442	0.0001	0.0001	0.0001	0.0021	0.0001	0.0012
ud	0.0001	0.0091	0.1974	0.0014	0.1475	0.0000	0.0001	0.0003	0.0021	ud	0.0013
ud	ud	0.0099	0.2114	0.0014	0.1500	0.0000	0.0000	0.0003	0.0024	ud	0.0012
ud	0.0000	0.0103	0.2105	0.0014	0.1520	0.0000	0.0000	0.0003	0.0023	ud	0.0013

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0005	0.0003	0.0220	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.1446	0.0234	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0004	0.0004	0.0214	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	0.0006	0.0013	0.0318	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0005	0.0005	0.0229	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	0.0005	0.0014	0.0275	ud	ud	ud	0.0000	ud	ud	ud	ud
0.0000	0.0006	0.0000	0.0238	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	0.0005	0.0015	0.0248	ud	ud	ud	ud	ud	ud	ud	ud
0.0001	0.0006	0.0000	0.0277	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0006	0.0000	0.0296	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0018	0.0265	ud	ud	ud	ud	ud	ud	ud	ud
0.0001	0.0006	0.0019	0.0296	0.0000	ud	ud	ud	ud	ud	ud	ud
0.0001	0.0006	0.0019	0.0296	0.0000	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0005	0.0020	0.0294	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0005	0.0020	0.0294	ud	ud	ud	ud	ud	ud	ud	ud
0.0001	0.0005	0.1206	0.0154	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0005	0.1493	0.0184	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0006	0.0005	0.1107	0.0189	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0001	0.0005	0.1539	0.0200	ud	0.0000	ud	0.0000	0.0000	ud	ud	ud
0.0000	0.0005	0.0000	0.0246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0005	0.0000	0.0196	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0006	0.0000	0.0262	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0004	0.0004	0.0248	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0005	0.0213	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0003	0.0346	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0003	0.0322	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0003	0.0333	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0003	0.0210	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0005	0.0227	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0003	0.1095	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0002	0.0263	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0002	0.0269	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0003	0.0515	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	ud	0.0166	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0005	ud	0.0168	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0005	ud	0.0170	0.0000	0.0000	ud	ud	ud	ud	ud	ud

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Hg	Tl	Pb	Th
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	ud	ud	ud	ud	ud	ud	0.0000	ud	0.0005	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	0.0000	0.0003	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	ud	0.0001	0.0000	ud	ud	ud	0.0001	0.0001
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	0.0000	0.0002	0.0000
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	0.0000	0.0002	0.0000
ud	ud	ud	ud	ud	ud	ud	ud	ud	ud	ud	0.0001	ud
ud	ud	ud	ud	ud	ud	ud	ud	ud	ud	ud	0.0001	ud
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	0.0000	0.0000	ud
0.0000	ud	ud	ud	ud	ud	0.0001	ud	ud	ud	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0001	ud
0.0000	ud	ud	ud	ud	ud	0.0001	0.0000	ud	ud	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	0.0000	0.0001	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0085	0.12	3.81	0.03	0.03	13.15	0.03	793.83	0.006	225.210	0.002	2.527
0.0090	0.03	2.58	0.03	0.10	8.40	0.03	665.00	0.002	235.550	0.000	2.480
0.0080	0.20	8.80	0.03	0.03	11.65	0.03	791.43	0.002	241.816	0.001	2.635
0.0092	0.03	2.35	0.03	0.10	7.39	0.03	710.19	0.002	245.297	0.002	2.545
0.0083	0.16	9.22	0.03	0.03	11.18	0.03	823.08	0.002	247.592	0.001	2.588
0.0092	0.32	3.26	0.03	0.10	7.47	0.03	766.59	0.005	250.554	0.001	2.692
0.0127	0.15	10.35	0.03	0.03	10.33	0.03	above	0.007	250.965	0.002	2.719
0.0092	0.73	2.93	0.03	0.10	8.64	0.03	739.97	0.002	252.863	0.002	2.543
0.0079	0.19	7.30	0.03	0.03	9.04	0.03	842.32	0.002	253.381	0.001	3.002
0.0064	0.20	8.09	0.03	0.03	7.22	0.03	834.15	0.002	255.495	0.001	2.608
0.0093	0.03	2.73	0.03	0.10	8.01	0.03	746.88	0.002	256.107	0.002	2.580
0.0091	0.03	3.64	0.03	0.10	7.29	0.03	793.40	0.002	263.310	0.001	2.721
0.0091	0.48	3.67	0.03	0.10	7.40	0.03	813.56	0.002	263.310	0.001	2.721
0.0090	0.25	4.03	0.03	0.10	7.10	0.03	822.61	0.002	264.908	0.001	2.883
0.0090	0.25	4.03	0.03	0.10	7.10	0.03	822.61	0.002	264.908	0.001	2.883
								0.002	276.178	0.001	2.889
0.0074	0.31	1.08	0.03	0.10	6.76	0.03	452.45				
0.0097	0.03	1.74	0.03	0.10	8.11	0.03	545.68				
0.0080	0.03	1.98	0.03	0.10	8.68	0.03	603.20				
0.0086	0.03	2.12	0.03	0.10	8.34	0.03	609.55	ud	213.159	0.002	2.402
0.0046	0.07	4.19	0.11	0.03	2.62	0.03	790.70	0.002	164.587	0.000	1.309
0.0066	0.10	5.04	0.30	0.03	5.69	0.03	816.85	0.002	194.795	0.000	2.249
0.0121	0.16	9.67	0.17	0.03	7.44	0.03	above	0.002	198.272	0.000	2.427
0.0083	0.11	3.72	0.03	0.03	11.47	0.03	777.13	0.005	208.057	0.000	2.763
0.0075	0.17	8.82	0.13	0.03	8.60	0.03	824.56	0.002	214.558	0.000	2.512
0.0087	0.11	3.04	0.03	0.03	12.93	0.03	718.67	0.002	217.118	0.001	2.381
0.0093	0.10	3.08	0.03	0.03	12.85	0.03	716.68	0.002	218.098	0.001	2.381
0.0092	0.10	3.08	0.03	0.03	12.85	0.03	716.68	0.002	218.098	0.001	2.381
0.0087	0.13	3.62	0.03	0.03	12.06	0.03	741.38	0.002	222.131	0.001	2.460
0.0083	0.19	8.54	0.39	0.03	9.87	0.03	789.42	0.002	232.167	0.000	2.665
0.0081	0.18	2.93	0.03	0.03	11.35	0.03	above	0.002	163.245	0.001	2.327
0.0083	0.19	3.33	0.03	0.03	12.27	0.03	above	0.002	163.375	0.001	2.415
0.0082	0.19	3.33	0.03	0.03	12.27	0.03	above	0.002	163.375	0.001	2.415
0.0085	0.13	3.18	0.03	0.03	8.87	0.03	503.33	0.002	167.373	0.002	2.383
0.0072	0.03	0.83	0.03	0.10	6.06	0.03	390.12	0.002	169.902	0.001	2.265
0.0070	0.03	0.61	0.03	0.10	4.12	0.03	312.04	0.002	170.687	0.001	2.254
0.0071	0.03	0.61	0.03	0.10	4.12	0.03	312.04	0.002	170.687	0.001	2.254

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
125.968	5.174	0.043	248.797	0.350	7.47	8.0	321				7.99	256
130.408	5.451	0.015	264.145	0.310	7.59	3.7	308				7.85	241
133.305	6.545	0.057	271.907	0.316	7.53		322				7.59	235
128.153	7.175	0.018	268.060	0.301	7.80	3.5	296				7.89	237
132.349	7.673	0.024	279.707	0.308	7.18	13.0	333				7.40	205
137.088	8.447	0.037	289.281	0.319	7.77	3.4	223				8.03	249
133.071	8.635	0.058	280.844	0.405	7.59	16.2	309				8.00	270
135.059	6.347	0.013	281.170	0.326	7.68	3.7	304				7.81	245
137.645	11.644	0.021	308.973	0.338	7.75	11.3	308				7.96	270
119.551	12.344	0.022	284.674	0.216	7.65	3.6					7.58	255
132.522	7.095	0.015	279.242	0.309	7.81	3.3	287				7.87	244
139.364	9.228	0.012	303.727	0.298	7.80	3.6	315				7.90	234
139.364	9.228	0.012	303.727	0.298	7.80	3.6	315				7.90	234
141.279	10.227	0.011	314.013	0.296	7.64	4.2	315				7.96	239
141.279	10.227	0.011	314.013	0.296	7.64	4.2	315				7.99	240
136.883	11.524	0.014	309.157	0.261	7.76	4.5	308				7.99	236
					6.95	3.8	269				7.47	213
					7.70	3.6	281				7.55	216
					6.98	7.4	303				7.56	242
123.562	4.550	0.005	0.312	239.666	7.05	3.9	303				7.51	218
120.305	9.599	0.019	273.057	0.177	8.22	14.4	120				7.26	106
133.151	9.723	0.012	283.164	0.221							7.82	171
158.044	1.702	0.034	300.616	0.514							7.74	187
123.676	5.037	0.033	245.659	0.324	8.06	21.9	281				7.82	195
133.536	7.264	0.018	281.269	0.277	7.33	26.1					7.61	170
120.284	3.604	0.024	228.203	0.312							7.85	231
120.119	3.459	0.025	226.592	0.315							7.73	214
120.119	3.459	0.025	226.592	0.315							7.73	214
123.469	4.240	0.031	239.610	0.309	8.06	11.6	294				7.74	219
133.723	6.097	0.008	272.409	0.298	8.01		290					
96.782	1.536	0.021	160.875	0.247							7.73	207
102.812	1.706	0.021	163.793	0.251	8.03		298				7.73	207
102.812	1.706	0.021	163.793	0.251							7.73	207
102.248	1.461	0.021	165.615	0.253	8.14		301				7.73	207
94.333	1.832	0.010	163.477	0.241	8.10	8.4	263				7.80	194
94.536	1.906	0.017	164.028	0.237	7.81	5.7	288				7.73	184
94.536	1.906	0.017	164.028	0.237	7.81	5.7	288				7.73	184

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm
WLC_Right_Culvert	28/05/2014	10810	0.0283	0.0227	1.6701	119.6839	0.0005	2.0490	0.0403
WLC_Right_Culvert	28/05/2014	10811	0.0294	0.0235	1.6309	120.0710	0.0001	2.1509	0.0284
WLC_Right_Culvert	26/06/2014	10912	0.0228	0.0216	1.8977	99.5118	0.0015	1.9999	0.0342
WLC_Right_Culvert	14/06/2013	10494RR							
WLC_Right_Culvert	21/07/2014	10992	0.0313	0.0213	4.2853	119.0048	0.0026	2.5442	0.0374
WLC_Right_Culvert	02/07/2014	10925	0.0259	0.0232	2.7806	111.4659	0.0009	2.1714	0.0475
WLC_Right_Culvert	28/07/2014	13013	0.0342	0.0247	5.2583	121.6058	0.0028	1.8806	0.0310
WLC_Right_Culvert	15/07/2014	10970							
WLC_Right_Culvert	09/07/2014	10933	0.0289	0.0271	3.1099	131.3630	0.0026	2.5623	0.0226
WLC_Right_Culvert	26/06/2013	10508	0.0239	0.0195	2.6851	90.1992	0.0064	2.1641	0.0434
WLC_Right_Culvert	02/07/2013	10523	0.0281	0.0202	3.1576	108.4435	0.0039	2.5371	0.0293
WLC_Right_Culvert	08/07/2013	10539	0.0301	0.0194	3.9111	113.8353	0.0025	2.3565	0.0303
WLC_Right_Culvert	13/07/2013	10563	0.0324	0.0198	4.2975	114.9845	0.0015	2.3558	0.0362
WLC_Right_Culvert	26/06/2013	10508	0.0239	0.0195	2.6851	90.1992	0.0064	2.1641	0.0434
WLC_Upper_Toe	03/06/2013	10472	0.0091	0.0068	0.6722	42.8180	0.0013	1.8228	0.0267
WLC_Upper_Toe	27/05/2013	10467	0.0094	0.0086	0.6575	43.5290	0.0012	1.8892	0.0291
WLC_Upper_Toe	16/06/2014	10895	0.0100	0.0240	0.9052	46.6747	0.0041	2.1082	0.0680
WLC_Upper_Toe	05/06/2014	10847	0.0128	0.0175	0.8210	49.8066	0.0028	1.8447	0.0371
WLC_Upper_Toe	10/06/2014	10864	0.0112	0.0113	0.7575	48.1597	0.0035	1.9086	0.0304
WLC_Upper_Toe	23/06/2014	10906	0.0099	0.0228	0.7747	45.2738	0.0026	2.0651	0.0432
WLC_Upper_Toe	14/06/2013	10491	0.0098	0.0048	0.6704	52.8699	0.0055	1.9910	0.0386
WLC_Upper_Toe	02/06/2014	10835	0.0124	0.0149	0.7245	50.2496	0.0029	3.9100	0.0288
WLC_Upper_Toe	07/06/2013	10480	0.0093	0.0102	0.8685	46.4537	0.0035	2.0418	0.0098
WLC_Upper_Toe	31/05/2014	10829	0.0130	0.0173	0.8794	57.5837	0.0014	1.7621	0.0603
WLC_Upper_Toe	31/05/2014	10830	0.0133	0.0176	1.0448	59.6616	0.0001	1.7902	0.0521
WLC_Upper_Toe	27/05/2014	10801	0.0162	0.0166	0.8546	65.9024	0.0010	1.8767	0.0581
WLC_Upper_Toe	11/08/2014	13057	0.0188	0.0130	1.2773	105.4963	0.0037	2.5693	0.0275
WLC_Upper_Toe	15/07/2014	10966	0.0129	0.0139	0.8888	72.0091	0.0048	6.1528	0.2398
WLC_Upper_Toe	15/07/2014	10966-MS Rep	0.0127	0.0134	0.9159	69.3635	0.0048	6.1239	0.2324
WLC_Upper_Toe	30/07/2013	10593	0.0139	0.0090	0.9990	73.3789	0.0014	2.2798	0.0236
WLC_Upper_Toe	07/08/2013	10599	0.0158	0.0086	1.0592	83.1960	0.0022	2.3163	0.0463
WLC_Upper_Toe	22/07/2013	10575	0.0131	0.0046	0.9196	65.3791	0.0028	2.2638	0.0471
WLC_Upper_Toe	11/08/2013	10610	0.0161	0.0092	1.1414	88.1633	0.0022	2.3087	0.0348
WLC_Upper_Toe	11/08/2013	10609	0.0163	0.0102	1.0721	87.8239	0.0030	2.3213	0.0520
WLC_Upper_Toe	23/08/2013	10628	0.0198	0.0094	1.2988	111.5781	0.0039	2.3638	0.0505
WLC_Upper_Toe	23/08/2013	10628	0.0198	0.0094	1.2988	111.5781	0.0039	2.3638	0.0505
WLC_Upper_Toe	28/08/2014	13093	0.0204	0.0149	1.3155	117.3103	0.0171	2.4499	0.0452

ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
2.4014	174.1053	0.0006	0.0009	0.0002	0.0003	0.0008	0.0053	0.0006	0.0349	0.0018	0.0566
2.3701	176.7224	0.0006	0.0007	0.0002	0.0003	0.0009	0.0057	0.0005	0.0348	0.0015	0.0583
2.0857	139.2937	0.0009	0.0008	0.0002	0.0002	0.0003	0.0031	0.0004	0.0379	0.0004	0.0102
2.5415	177.3538	0.0008	0.0008	0.0003	0.0005	0.0015	0.0096	0.0004	0.0321	0.0007	0.0057
2.1689	201.9594	0.0010	0.0006	0.0002	0.0001	0.0014	0.0123	0.0006	0.0477	0.0005	0.1178
2.3733	183.5117	0.0007	0.0010	0.0002	0.0005	0.0001	0.0089	0.0004	0.0314	0.0013	0.0051
1.8286	207.9835	0.0009	0.0008	0.0006	0.0016	0.0041	0.0155	0.0006	0.0446	0.0006	0.0337
2.3616	173.3394	0.0008	0.0012	0.0005	0.0012	0.0010	0.0094	0.0004	0.0259	0.0008	0.0496
2.1794	201.7012	0.0008	0.0006	0.0004	0.0008	0.0012	0.0075	0.0005	0.0275	0.0007	0.0418
2.3983	216.7658	0.0009	0.0006	0.0004	0.0018	0.0030	0.0056	0.0005	0.0305	0.0011	0.0452
2.3658	227.4849	0.0009	0.0009	0.0003	0.0004	0.0022	0.0034	0.0005	0.0304	0.0007	0.0263
2.3616	173.3394	0.0008	0.0012	0.0005	0.0012	0.0010	0.0094	0.0004	0.0259	0.0008	0.0496
1.1624	90.2760	0.0005	0.0005	0.0003	0.0001	0.0002	ud	0.0002	0.0165	0.0011	0.0297
1.1888	86.2955	0.0005	0.0004	0.0003	0.0009	0.0001	0.0030	0.0002	0.0163	ud	0.0280
1.5392	89.4178	0.0008	0.0005	0.0002	0.0003	0.0006	0.0150	0.0003	0.0221	0.0008	0.0446
1.3327	92.0104	0.0008	0.0006	0.0002	0.0005	0.0005	0.0092	0.0005	0.0244	0.0009	0.0461
1.3285	91.7283	0.0007	0.0006	0.0001	0.0003	0.0003	0.0075	0.0004	0.0230	0.0007	0.0396
1.0855	90.3293	0.0008	0.0006	0.0002	0.0003	0.0006	0.0087	0.0004	0.0225	0.0019	0.0920
1.1319	99.6341	0.0007	0.0005	0.0003	0.0003	0.0003	0.0010	0.0003	0.0194	0.0009	0.0382
1.1681	91.6320	0.0007	0.0006	0.0003	0.0009	0.0010	0.0067	0.0004	0.0223	0.0008	0.1289
1.3927	97.4610	0.0006	0.0004	0.0003	0.0004	0.0009	0.0030	0.0003	0.0193	0.0016	0.0370
1.2761	101.9760	0.0005	0.0008	0.0002	0.0003	0.0005	0.0095	0.0003	0.0190	0.0009	0.1108
1.2383	104.7057	0.0005	0.0006	0.0001	0.0005	0.0003	0.0068	0.0003	0.0191	0.0025	0.0405
1.3239	103.7387	0.0006	0.0010	0.0001	0.0005	0.0003	0.0023	0.0004	0.0201	0.0011	0.0335
1.6734	189.3200	0.0012	0.0011	0.0003	0.0002	0.0003	0.0034	0.0004	0.0446	0.0023	0.0026
1.1605	133.6787	0.0010	0.0008	0.0001	0.0002	0.0018	0.0146	0.0005	0.0350	0.0008	0.1674
1.1991	132.1595	0.0010	0.0008	0.0002	0.0002	0.0017	0.0168	0.0005	0.0348	0.0009	0.1626
1.3310	149.1027	0.0011	0.0008	0.0002	0.0005	0.0021	0.0020	0.0004	0.0371	0.0008	0.0754
1.4062	166.5936	0.0011	0.0008	0.0003	0.0006	0.0021	0.0019	0.0004	0.0420	0.0007	0.0901
1.3226	145.8686	0.0010	0.0014	0.0002	0.0006	0.0024	0.0018	0.0003	0.0345	ud	0.0633
1.4131	180.5191	0.0011	0.0005	0.0003	0.0004	0.0033	0.0090	0.0004	0.0436	0.0009	0.0955
1.3767	178.8861	0.0011	0.0007	0.0002	0.0005	0.0021	0.0126	0.0004	0.0421	0.0009	0.0899
1.6615	202.6887	0.0011	0.0017	0.0003	0.0005	0.0020	0.0038	0.0005	0.0490	0.0014	0.1016
1.6615	202.6887	0.0011	0.0017	0.0003	0.0005	0.0020	0.0038	0.0005	0.0490	0.0014	0.1016
1.5945	212.9401	0.0010	0.0011	0.0003	0.0002	0.0007	0.0088	0.0004	0.0413	0.0008	0.0683

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Ga	Ge	As	Se	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0000	0.0101	0.2421	0.0016	0.1764	0.0001	0.0001	0.0001	0.0027	0.0001	0.0011
0.0000	0.0000	0.0102	0.2428	0.0016	0.1758	0.0000	0.0001	0.0001	0.0026	0.0001	0.0011
0.0000	0.0000	0.0093	0.2257	0.0011	0.1711	0.0000	0.0000	0.0001	0.0022	0.0001	0.0001
0.0000	0.0000	0.0230	0.2416	0.0018	0.4304	0.0000	0.0001	0.0001	0.0031	0.0001	0.0001
0.0000	0.0001	0.0084	0.2121	0.0013	0.2716	0.0001	0.0001	0.0000	0.0026	0.0001	0.0010
0.0000	0.0000	0.0212	0.2241	0.0017	0.5064	0.0000	0.0000	0.0001	0.0031	0.0001	0.0000
0.0000	0.0000	0.0309	0.2607	0.0016	0.3598	0.0000	0.0001	0.0000	0.0030	0.0001	0.0003
0.0000	0.0000	0.0107	0.2071	0.0015	0.1820	0.0000	0.0001	0.0009	0.0024	ud	0.0014
ud	ud	0.0137	0.2481	0.0016	0.2477	0.0001	0.0001	0.0007	0.0026	ud	0.0012
ud	ud	0.0101	0.2477	0.0017	0.2920	0.0000	0.0001	0.0007	0.0024	ud	0.0007
ud	ud	0.0129	0.2670	0.0016	0.3361	0.0000	0.0001	0.0008	0.0033	ud	0.0005
0.0000	0.0000	0.0107	0.2071	0.0015	0.1820	0.0000	0.0001	0.0009	0.0024	ud	0.0014
ud	ud	0.0053	0.0806	0.0009	0.0634	0.0000	0.0000	0.0003	0.0019	ud	0.0006
ud	ud	0.0052	0.0881	0.0009	0.0638	0.0000	0.0000	0.0005	0.0018	ud	0.0005
0.0000	0.0000	0.0037	0.0879	0.0004	0.0758	0.0000	0.0000	0.0000	0.0017	0.0001	0.0007
0.0000	0.0000	0.0043	0.0980	0.0008	0.0751	0.0000	0.0001	0.0000	0.0018	0.0001	0.0007
0.0000	0.0000	0.0033	0.0971	0.0009	0.0762	0.0000	0.0000	0.0001	0.0016	0.0001	0.0008
0.0000	0.0000	0.0063	0.0866	0.0005	0.0760	0.0000	0.0000	0.0001	0.0016	0.0001	0.0008
0.0001	0.0000	0.0030	0.0934	0.0010	0.0687	0.0000	0.0000	0.0005	0.0014	0.0001	0.0008
0.0000	0.0000	0.0086	0.1095	0.0008	0.0763	0.0000	0.0000	0.0000	0.0019	0.0001	0.0007
ud	0.0000	0.0046	0.0961	0.0010	0.0693	0.0000	0.0001	0.0004	0.0016	ud	0.0008
0.0000	0.0000	0.0044	0.1142	0.0006	0.0778	0.0000	0.0000	0.0001	0.0018	0.0001	0.0006
0.0000	0.0000	0.0037	0.1133	0.0004	0.0794	0.0000	0.0000	0.0001	0.0019	0.0001	0.0007
0.0000	0.0000	0.0056	0.1258	0.0007	0.0820	0.0000	0.0000	0.0001	0.0022	0.0001	0.0007
0.0000	0.0000	0.0317	0.2680	0.0013	0.1433	0.0000	0.0001	0.0000	0.0014	0.0001	0.0022
0.0000	0.0000	0.0174	0.1385	0.0011	0.1097	0.0000	0.0000	0.0001	0.0013	0.0001	0.0015
0.0000	0.0006	0.0179	0.1365	0.0011	0.1083	0.0000	0.0000	0.0000	0.0013	0.0001	0.0015
ud	0.0000	0.0112	0.1726	0.0010	0.1097	0.0000	0.0000	0.0011	0.0014	ud	0.0019
ud	ud	0.0159	0.2007	0.0011	0.1164	0.0000	0.0000	0.0014	0.0012	ud	0.0023
ud	0.0000	0.0086	0.1481	0.0010	0.1017	0.0000	0.0001	0.0010	0.0012	ud	0.0021
ud	ud	0.0162	0.2101	0.0010	0.1254	0.0000	0.0000	0.0016	0.0012	ud	0.0024
ud	0.0000	0.0150	0.2063	0.0010	0.1205	0.0000	0.0000	0.0016	0.0013	ud	0.0025
ud	ud	0.0194	0.2635	0.0012	0.1391	0.0000	0.0000	0.0018	0.0015	ud	0.0027
ud	ud	0.0194	0.2635	0.0012	0.1391	0.0000	0.0000	0.0018	0.0015	ud	0.0027
0.0000	0.0000	0.0264	0.3007	0.0014	0.1450	0.0000	0.0001	0.0000	0.0014	0.0001	0.0027

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0006	0.0002	0.0212	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0006	0.0002	0.0209	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0003	0.0205	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0006	0.0200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0004	0.0002	0.0499	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0005	0.0005	0.0193	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.0003	0.0277	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0004	0.1587	0.0202	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0001	0.0005	0.1243	0.0200	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud
0.0012	0.0005	0.1341	0.0215	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0007	0.0005	0.1576	0.0216	ud	0.0000	ud	0.0000	0.0000	ud	ud	ud
0.0000	0.0004	0.1587	0.0202	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0003	ud	0.0146	ud	0.0000	ud	0.0000	ud	ud	ud	ud
0.0000	0.0003	ud	0.0157	ud	0.0000	ud	ud	0.0000	ud	ud	ud
0.0000	0.0003	0.0002	0.0527	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0002	0.0303	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0002	0.0201	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0003	0.0449	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.3249	0.0158	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0002	0.0208	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0002	0.0003	ud	0.0159	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0001	0.0003	0.0003	0.0251	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0003	0.0002	0.0291	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0004	0.0003	0.0250	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0000	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.0003	0.0224	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.0003	0.0224	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0002	0.0013	0.0262	ud	ud	ud	ud	ud	ud	ud	ud
ud	0.0002	0.0016	0.0306	ud	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0002	0.1436	0.0244	ud	0.0000	ud	0.0000	0.0000	ud	ud	ud
ud	0.0003	0.0019	0.0344	ud	ud	ud	ud	ud	ud	ud	ud
ud	0.0002	0.0019	0.0315	ud	ud	ud	ud	ud	ud	ud	ud
ud	0.0003	0.0023	0.0373	0.0000	ud	ud	ud	ud	ud	ud	ud
ud	0.0003	0.0023	0.0373	0.0000	ud	ud	ud	ud	ud	ud	ud
0.0006	0.0003	0.0000	0.0354	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS
Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Hg	Tl	Pb	Th
ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ud	ud	0.0000	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0002	0.0000
ud	ud	ud	ud	ud	ud	0.0001	0.0000	ud	ud	0.0000	0.0000	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	0.0000	0.0000	0.0000
ud	ud	0.0000	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0002	0.0000
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0001	ud
ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0010	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	ud	0.0000
ud	ud	ud	ud	ud	0.0000	0.0000	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	ud	0.0000	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0004	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0004	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0097								0.008	174.520	0.001	2.378
0.0097								0.007	178.573	0.001	2.525
0.0092	0.06	1.92	0.03	0.03	8.61	0.03	445.04	0.006	181.618	0.001	2.321
	0.03	0.95	0.03	0.10	6.70	0.03	414.57	0.002	185.874	0.002	2.278
0.0084	0.14	3.78	0.03	0.03	11.22	0.03	764.44	0.002	194.408	0.000	2.782
0.0092	0.14	3.16	0.03	0.03	11.60	0.03	642.23	0.002	200.519	0.001	2.445
0.0081	0.14	8.57	0.06	0.03	9.96	0.03	788.81	0.002	204.937	0.000	2.743
	0.12	3.49	0.03	0.03	12.20	0.03	751.44	0.002	205.213	0.000	2.475
0.0083	0.12	3.15	0.03	0.03	12.78	0.03	707.70	0.002	213.137	0.001	2.546
0.0071	0.03	1.01	0.03	0.10	6.26	0.03	438.48				
0.0078	0.03	1.24	0.03	0.10	7.60	0.03	514.49				
0.0081	0.03	2.13	0.03	0.10	8.27	0.03	584.69				
0.0084	0.03	1.82	0.03	0.10	8.04	0.03	608.33	ud	207.361	0.000	2.363
0.0071	0.03	1.01	0.03	0.10	6.26	0.03	438.48				
0.0031	0.03	0.21	0.03	0.10	5.53	0.03	123.41	0.002	89.722	0.001	1.222
0.0038	0.03	0.29	0.03	0.10	6.69	0.03	147.90	0.002	93.629	0.000	1.307
0.0032	0.18	1.18	0.03	0.03	12.63	0.03	216.99	0.002	95.749	0.001	1.247
0.0036	0.23	1.25	0.03	0.03	13.48	0.03	220.50	0.002	97.772	0.001	1.337
0.0038	0.18	1.01	0.03	0.03	13.26	0.03	217.38	0.002	99.289	0.001	1.239
0.0032	0.17	0.83	0.03	0.03	9.69	0.03	216.63	0.002	99.316	0.001	1.181
0.0036	0.12	0.25	0.03	0.10	6.51	0.03	152.43	0.002	100.388	0.001	1.200
0.0038	0.19	1.23	0.03	0.03	14.51	0.03	228.37	0.002	100.741	0.001	1.320
0.0034	0.15	0.36	0.03	0.10	6.99	0.03	157.11	0.002	101.287	0.001	1.304
0.0040								0.002	102.098	0.001	1.001
0.0038								0.002	104.025	0.001	1.419
0.0042								0.002	108.368	0.001	1.299
0.0126	0.23	2.41	0.03	0.03	15.70	0.03	above	0.002	120.185	0.000	2.034
0.0048	0.12	1.23	0.03	0.03	13.00	0.03	364.66	0.004	143.177	0.002	1.302
0.0048	0.12	1.23	0.03	0.03	13.00	0.03	364.66	0.004	143.177	0.002	1.302
0.0060	0.73	0.50	0.03	0.10	11.35	0.03	348.48	0.002	161.034	0.002	1.243
0.0070	0.20	0.62	0.03	0.10	11.26	0.03	399.03	0.002	173.497	0.002	1.380
0.0054	0.03	0.44	0.03	0.10	9.35	0.03	294.40	0.002	179.403	0.000	1.287
0.0076	0.03	0.54	0.03	0.10	11.98	0.03	435.41	0.002	184.462	0.003	1.337
0.0076	0.03	0.79	0.03	0.10	11.95	0.03	427.93	0.002	185.792	0.003	1.323
0.0100	0.03	0.94	0.03	0.10	14.44	0.03	531.84	0.002	199.862	0.003	1.586
0.0100	0.03	0.91	0.03	0.10	14.58	0.03	535.78	0.002	199.862	0.003	1.586
0.0106	0.11	2.37	0.03	0.03	16.88	0.03	660.03	0.002	207.889	0.002	1.689

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
116.757	1.858	0.050	192.989	0.336	8.06	4.3	342				8.09	266
117.889	1.838	0.051	187.480	0.332							7.68	199
105.369	2.115	0.056	188.910	0.348	8.08		281				7.73	207
99.256	1.962	0.012	176.720	0.249								
122.449	4.912	0.026	244.984	0.314	8.15	16.1	281				7.73	207
116.036	3.048	0.008	221.061	0.280							7.73	207
135.814	6.480	0.006	278.167	0.293	8.06		235					
122.559	4.278	0.019	240.145	0.307	8.10	18.9	260				7.73	207
123.790	3.712	0.031	232.574	0.329	8.21	4.3	288				7.73	207
					7.90	11.1	282				7.67	175
					8.54	11.2	274				7.65	190
					8.33	7.9	293				7.65	226
121.000	4.360	ud	0.311	237.398	7.79	10.7	291				7.62	195
					7.90	11.1	282				8.06	205
44.832	0.714	0.014	61.564	0.101	6.96	4.2	200				7.66	127
47.854	0.745	0.013	65.816	0.112	6.75	3.5	182				7.81	126
48.251	0.758	0.012	70.558	0.118	7.41	3.1	187				7.72	151
52.630	0.827	0.015	72.823	0.131	7.60		198				7.75	160
50.710	0.903	0.012	73.020	0.126							7.80	157
47.490	0.731	0.005	68.638	0.105	7.39		198				7.82	155
47.013	0.713	0.014	68.332	0.113	6.93	6.7	155				7.57	137
53.077	0.808	0.017	73.780	0.140	7.56		181				7.89	160
45.807	0.812	0.011	66.421	0.119	7.09	5.4	187				7.54	134
54.986	1.056	0.024	80.974	0.154	7.54	3.1	195				7.73	168
56.693	0.999	0.017	82.356	0.148							7.62	85
62.358	0.886	0.031	94.360	0.186	7.62	2.8	217				7.82	174
58.842	8.331	0.031	107.712	0.146	7.31	15.8	269				7.90	244
67.602	0.912	0.027	111.824	0.190	7.00	3.8	243				7.45	195
67.602	0.912	0.027	111.824	0.190							7.45	195
75.332	0.986	0.005	134.757	0.200	7.03	3.1	237				7.47	191
87.237	1.103	0.006	156.276	0.234	6.98	4.1	237				7.33	201
70.726	1.160	0.039	130.797	0.201	8.09	4.2	240				7.38	182
92.263	1.082	0.008	166.570	0.248	6.73	4.4	270				7.30	204
90.589	1.071	0.010	163.829	0.246	6.73	4.4	270				7.47	205
112.439	1.308	0.046	202.737	0.314	6.94	4.4	250				7.94	241
112.439	1.308	0.046	202.737	0.314	6.94	4.4	250				7.94	241
122.838	1.398	0.026	226.345	0.364	7.20	5.3	284				7.53	257

HoleID	Date	Sample Number	ICP-MS Li ppm	ICP-MS B ppm	ICP-MS Na ppm	ICP-MS Mg ppm	ICP-MS Al ppm	ICP-MS Si ppm	ICP-MS P ppm	ICP-MS K ppm	ICP-MS Ca ppm	ICP-MS Sc ppm	ICP-MS Ti ppm	ICP-MS V ppm	ICP-MS Cr ppm	ICP-MS Mn ppm	ICP-MS Fe ppm	ICP-MS Co ppm	ICP-MS Ni ppm	ICP-MS Cu ppm	ICP-MS Zn ppm
WLC_Upper_Toe	07/05/2014	10760	0.0264	0.0148	1.5417	147.2485	0.0020	1.9347	0.0160	1.8044	206.8020	0.0009	0.0009	0.0003	0.0004	0.0001	0.0095	0.0004	0.0236	0.0007	0.0123
WLC_Upper_Toe	29/08/2013	10643	0.0215	0.0101	1.3385	116.9780	0.0834	2.4043	0.0567	1.6328	219.8327	0.0014	0.0014	0.0014	0.0004	0.0018	0.0397	0.0006	0.0517	0.0018	0.1000
WLC_Upper_Toe	29/08/2013	10643R	0.0215	0.0100	1.3296	116.3579	0.0835	2.3959	0.0567	1.6207	222.4217	0.0014	0.0014	0.0014	0.0003	0.0018	0.0396	0.0006	0.0516	0.0018	0.0993
WLC_Upper_Toe	03/09/2013	10653	0.0228	0.0125	1.3109	121.0014	0.0035	2.3999	0.0158	1.5816	224.2805	0.0012	0.0010	0.0003	0.0006	0.0017	0.0035	0.0005	0.0466	0.0014	0.0939
WLC_Upper_Toe	13/05/2014	10775	0.0265	0.0301	1.6836	155.6561	0.0022	2.1015	0.0213	1.6921	242.8463	0.0011	0.0009	0.0003	0.0006	0.0002	0.0078	0.0004	0.0254	0.0018	0.0188
WLC_Upper_Toe	17/09/2013	10682	0.0238	0.0144	1.2872	130.6304	0.0050	2.5651	0.0284	1.4916	230.4611	0.0009	0.0005	0.0002	0.0003	0.0018	0.0079	0.0005	0.0535	0.0022	0.0981
WLC_Upper_Toe	17/09/2013	10682	0.0238	0.0144	1.2872	130.6304	0.0050	2.5651	0.0284	1.4916	230.4611	0.0009	0.0005	0.0002	0.0003	0.0018	0.0079	0.0005	0.0535	0.0022	0.0981
WLC_Upper_Toe	13/09/2013	10663	0.0232	0.0108	1.5831	120.7913	0.0060	2.4029	0.0594	2.0224	235.6315	0.0015	0.0017	0.0003	0.0005	0.0024	0.0061	0.0010	0.0563	0.0023	0.5844
WLC_Upper_Toe	02/05/2014	10752	0.0346	0.0159	1.9179	211.9286	0.0062	2.2010	0.0160	2.3867	313.6995	0.0011	0.0009	0.0004	0.0004	0.0001	0.0123	0.0005	0.0339	0.0009	0.0220
WLC_Upper_Toe	26/06/2013	10503	0.0091	0.0094	0.9098	42.4397	0.0018	1.8473	0.0153	1.1165	88.4240	0.0007	0.0005	0.0003	0.0007	0.0006	0.0027	0.0002	0.0132	0.0007	0.0295
WLC_Upper_Toe	02/07/2013	10517	0.0097	0.0065	0.7593	48.8324	0.0037	2.2007	0.0378	1.1701	108.8065	0.0008	0.0009	0.0003	0.0010	0.0012	0.0126	0.0004	0.0174	0.0008	0.0451
WLC_Upper_Toe	07/07/2013	10536	0.0103	0.0048	0.8088	56.3636	0.0030	2.0825	0.0371	1.1859	121.7309	0.0008	0.0008	0.0002	0.0006	0.0016	0.0142	0.0003	0.0197	0.0006	0.0500
WLC_Upper_Toe	13/07/2013	10559	0.0116	0.0084	1.0586	64.2282	0.0116	2.1985	0.0465	1.2110	139.7499	0.0009	0.0010	0.0002	0.0003	0.0021	0.0122	0.0004	0.0222	0.0007	0.0532

ICP-MS Ga ppm	ICP-MS Ge ppm	ICP-MS As ppm	ICP-MS Se ppm	ICP-MS Rb ppm	ICP-MS Sr ppm	ICP-MS Y ppm	ICP-MS Zr ppm	ICP-MS Nb ppm	ICP-MS Mo ppm	ICP-MS Ag ppm	ICP-MS Cd ppm
0.0000	0.0001	0.0289	0.3349	0.0012	0.1519	0.0000	0.0001	0.0001	0.0059	0.0001	0.0001
ud	ud	0.0262	0.2816	0.0012	0.1444	0.0001	0.0001	0.0016	0.0015	ud	0.0029
ud	0.0012	0.0261	0.2820	0.0012	0.1435	0.0001	0.0001	0.0016	0.0015	ud	0.0029
ud	0.0001	0.0234	0.2806	0.0013	0.1513	0.0000	0.0000	0.0012	0.0016	ud	0.0027
0.0000	0.0000	0.0306	0.3585	0.0010	0.1621	0.0000	0.0001	0.0001	0.0048	0.0001	0.0001
ud	ud	0.0223	0.3157	0.0014	0.1728	0.0001	0.0001	0.0000	0.0015	ud	0.0027
ud	ud	0.0223	0.3157	0.0014	0.1728	0.0001	0.0001	0.0000	0.0015	ud	0.0027
ud	ud	0.0149	0.3249	0.0015	0.1724	0.0000	0.0003	0.0015	0.0019	0.0000	0.0029
0.0000	0.0001	0.0445	0.5238	0.0020	0.2165	0.0000	0.0002	0.0001	0.0048	0.0001	0.0005
ud	0.0000	0.0046	0.0817	0.0009	0.0660	0.0000	0.0001	0.0006	0.0017	ud	0.0009
ud	ud	0.0046	0.1018	0.0009	0.0812	0.0000	0.0001	0.0007	0.0012	ud	0.0013
ud	ud	0.0053	0.1161	0.0009	0.0868	0.0000	0.0001	0.0009	0.0012	ud	0.0018
ud	ud	0.0058	0.1276	0.0010	0.0915	0.0000	0.0000	0.0007	0.0013	ud	0.0017

ICP-MS Sn ppm	ICP-MS Sb ppm	ICP-MS Cs ppm	ICP-MS Ba ppm	ICP-MS La ppm	ICP-MS Ce ppm	ICP-MS Pr ppm	ICP-MS Nd ppm	ICP-MS Sm ppm	ICP-MS Eu ppm	ICP-MS Gd ppm	ICP-MS Tb ppm
0.0001	0.0005	0.0002	0.0301	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0003	0.0020	0.0386	0.0000	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0003	0.0020	0.0387	0.0000	ud	ud	ud	ud	ud	ud	ud
0.0000	0.0003	0.0015	0.0398	ud	ud	ud	ud	ud	ud	ud	ud
0.0002	0.0004	0.0001	0.0412	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0003	0.0001	0.0415	0.0000	0.0000	0.0000	0.0000	0.0000	ud	0.0000	0.0000
0.0001	0.0003	0.0001	0.0415	0.0000	0.0000	0.0000	0.0000	0.0000	ud	0.0000	0.0000
0.0001	0.0004	0.0000	0.0411	0.0000	0.0000	ud	0.0000	ud	ud	0.0001	ud
0.0001	0.0005	0.0009	0.0261	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0001	0.0002	0.1100	0.0174	0.0000	0.0000	ud	ud	ud	ud	ud	ud
0.0000	0.0002	0.1360	0.0187	ud	0.0000	ud	ud	ud	ud	ud	ud
0.0003	0.0003	0.1650	0.0204	ud	0.0000	ud	0.0000	ud	ud	ud	ud
0.0001	0.0003	0.1246	0.0211	0.0000	0.0000	ud	0.0000	ud	ud	ud	ud

ICP-MS Dy ppm	ICP-MS Ho ppm	ICP-MS Er ppm	ICP-MS Tm ppm	ICP-MS Yb ppm	ICP-MS Lu ppm	ICP-MS Hf ppm	ICP-MS Ta ppm	ICP-MS W ppm	ICP-MS Hg ppm	ICP-MS Tl ppm	ICP-MS Pb ppm	ICP-MS Th ppm
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	ud	0.0000	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0001	0.0002
0.0000	ud	0.0000	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0001	0.0002
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0000	ud
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	ud	ud	0.0000	0.0001	0.0001
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	ud	ud	0.0000	0.0001	0.0001
ud	ud	ud	ud	ud	ud	0.0003	0.0000	ud	ud	0.0000	0.0001	0.0003
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
ud	ud	ud	ud	ud	0.0000	ud	0.0000	ud	ud	ud	0.0000	ud
ud	ud	ud	ud	ud	ud	ud	0.0000	ud	ud	ud	0.0001	ud
ud	ud	ud	ud	ud	0.0000	0.0001	0.0000	ud	ud	ud	0.0000	0.0000
ud	ud	0.0000	ud	0.0000	0.0000	ud	0.0000	ud	ud	ud	0.0000	0.0000

ICP-MS U ppm	ICS Flouride as mg/L F	ICS Chloride as mg/L Cl	ICS Nitrite as mg/L N	ICS Bromide as mg/L Br	ICS Nitrate as mg/L N	ICS Phosphate as mg/L P	ICS Sulphate as mg/L SO4	ICP-OES As (mg/L)	ICP-OES Ca (mg/L)	ICP-OES Cd (mg/L)	ICP-OES K (mg/L)
0.0118	0.19	3.43	0.03	0.10	30.76	0.03	783.52	0.002	213.895	0.000	1.970
0.0108	0.03	0.74	0.03	0.10	15.16	0.03	576.53	0.002	220.285	0.003	1.568
0.0108	0.03	0.74	0.03	0.10	15.16	0.03	576.53	0.002	220.285	0.003	1.568
0.0115	0.03	0.85	0.03	0.10	15.96	0.03	609.88	0.002	226.834	0.003	1.652
0.0107	0.17	3.16	0.03	0.10	32.33	0.03	845.40	0.004	232.042	0.000	2.094
0.0134								0.002	238.378	0.003	1.811
0.0134								0.002	238.378	0.003	1.811
0.0121	0.25	1.01	0.03	0.10	18.48	0.03	700.65	0.002	242.151	0.003	1.962
0.0176	0.15	5.24	0.03	0.10	33.76	0.03	1194.61	0.002	300.787	0.001	2.808
0.0029	0.03	0.24	0.03	0.10	5.97	0.03	136.38				
0.0038	0.45	0.29	0.03	0.10	7.35	0.03	189.99				
0.0037	0.03	0.42	0.03	0.10	7.91	0.03	220.04				
0.0042	0.03	0.42	0.03	0.10	8.48	0.03	237.55				

ICP-OES Mg (mg/L)	ICP-OES Na (mg/L)	ICP-OES P (mg/L)	ICP-OES S (mg/L)	ICP-OES Se (mg/L)	Field pH	Field T	Field Alk as CaCO3 mg/L	SpC uS/cm	ORP mV	LDO mg/L O2	Lab pH	Lab Alkalinity as CaCO3 mg/L
141.856	1.663	0.020	263.133	0.424	7.72		243				7.95	189
121.647	1.344	0.005	225.701	0.324	6.91	4.7	288				7.55	227
121.647	1.344	0.005	225.701	0.324	6.91	4.7	288				7.55	227
129.310	1.428	0.005	238.387	0.339	7.05	4.2	301				7.70	239
154.465	1.823	0.024	294.782	0.489							7.96	195
144.298	1.546	0.009	268.429	0.391							7.69	241
144.298	1.546	0.009	268.429	0.391							7.69	241
143.850	1.641	0.007	264.821	0.380	7.06	4.7	286				7.59	245
211.455	2.211	0.022	388.523	0.624	8.04	6.6	287				8.03	238
					6.99	4.0	171				7.33	132
					7.07	4.9	183				7.37	149
					6.40	3.4	209				7.24	155
					6.38	3.8	221				7.14	160