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30 March 2015

Ms. Aimee Reynolds
Project Officer, Remediation Division
Montana Department of Environmental Quality
1225 Cedar Street
Helena, Montana 59601

Subject: 2014 Annual Monitoring and Maintenance Report
Burlington Northern Livingston Shop Complex - Livingston, Montana
K/J 1596021.16

Dear Ms. Reynolds:

On behalf of BNSF Railway Company (BNSF), Kennedy/Jenks Consultants is pleased to submit two (2) hard copies and one (1) electronic copy of the draft *2014 Annual Monitoring and Maintenance Report, Burlington Northern Livingston Shop Complex, Livingston, Montana* (2014 AM&M Report). This document has been prepared in accordance with Section 5.1.18, Subtask 18: Monitoring and Maintenance Report, of the *Statement of Work for Spring 2005 Activities, BNSF Livingston Shop Complex, Park County, Montana* (Spring 2005 SOW) dated August 2005. The Spring 2005 SOW became effective on 9 August 2005. Activities performed for Tasks C, F, G, I, J, and L are covered by the Spring 2005 SOW. Activities associated with Tasks A and H, Task D/E, Task K, and Task M which are not covered by the Spring 2005 SOW are being reported to DEQ under separate cover; however, a brief summary of activities performed under these tasks in 2014 is provided in Table 1.

In its letter to BNSF dated 30 May 2013, DEQ required the conceptual site model (CSM) be included in the annual monitoring and maintenance reports. The CSM presented in the 2014 AM&M Report is currently in the process of being updated based on information obtained from Task L supplemental investigation and mathematical modeling performed by Dr. Bernie Kueper to assess the diffusive and advective mass flux of tetrachloroethene (PCE) between the alluvial aquifer and bedrock. An updated CSM will be presented in the *Task L Supplemental Investigation Report for Bedrock Aquifer(s)* which is due to DEQ on or before 23 April 2015.

As required by DEQ, one of the two copies of this report submitted to DEQ contains paper copies of the field sampling forms (Appendix B), analytical laboratory reports (Appendix C), and historical groundwater analytical data tables (Appendix H). As part of Kennedy/Jenks Consultants sustainability program, the remaining copies of the report have PDF files of these appendices on a CD.

Please contact me at (415) 243-2448 or email me at ToddMiller@KennedyJenks.com if you have questions regarding this submittal.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Todd Miller
Project Manager

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2014 Annual Monitoring and Maintenance Report

Burlington Northern Livingston Shop Complex
Livingston, Montana

Volume 1 of 3

BNSF Railway Company

K/J 1596021.16
March 2015

Kennedy/Jenks Consultants

2014 ANNUAL MONITORING AND MAINTENANCE REPORT
Burlington Northern Livingston Shop Complex
Livingston, Montana

Volume 1 of 3

Prepared for

BNSF RAILWAY COMPANY

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1.0 INTRODUCTION

This *2014 Annual Monitoring and Maintenance Report* has been prepared by Kennedy/Jenks Consultants, on behalf of the BNSF Railway Company (BNSF), for the Burlington Northern Livingston Shop Complex (Facility) (see Figure 1) in accordance with "Subtask 18: Monitoring and Maintenance Report" of the *Statement of Work for Spring 2005 Activities* (Spring 2005 SOW) dated August 2005. The Spring 2005 SOW became effective on 9 August 2005 [Montana Department of Environmental Quality (DEQ) 2005]. Where indicated, supporting information included in the appendices to this document is provided on a CD. As required by DEQ, one copy of the *2014 Annual Monitoring and Maintenance Report* submitted to DEQ contains paper copies of the supporting information.

A summary of Spring 2005 SOW work performed at the Facility during 2014 is provided in Table 1[1]. One Spring 2005 SOW remedial design/remedial action (RD/RA) task (Task C: Cinder Pile Capping) required post-remedial action monitoring and maintenance during 2014.

Source removal followed by monitored natural attenuation (MNA) is the selected remedy in the *Record of Decision* (ROD) (DEQ 2001) for dissolved volatile organic compounds (VOCs) and petroleum hydrocarbons in groundwater at the Facility. According to the Spring 2005 SOW and subsequent requirements from DEQ, this remedy is to include quarterly and/or semiannual groundwater monitoring (or other DEQ-approved sampling frequency) of selected wells to obtain data for evaluating concentration trends and developing a long-term monitoring strategy for the Facility. Historical and ongoing source remediation activities are described in various technical reports, such as:

[1] Table 1 also includes a brief summary of non-Spring 2005 SOW activities performed at the Facility in 2014. Further information regarding these tasks is provided to DEQ under separate cover in accordance with DEQ-approved work plans, addenda, and/or as directed by DEQ.

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- *Tasks A and H: Comprehensive Interim Action and Confirmation Sampling Summary* (Kennedy/Jenks Consultants 2008b). DEQ approval of this document is pending.

- *Final Task F Stage I – Part 2 Pilot Test Report for Volatile Organic Compound-Containing Alluvial Aquifer Groundwater* (Kennedy/Jenks Consultants 2009c).

- *Revised Task F Stage I – Part 2: Comprehensive Chemical Testing Report* (Kennedy/Jenks Consultants 2013b). DEQ approval of this document is pending.

- *Revised Task F Stage I – Part 2: Soil Vapor Extraction (SVE) Report* (Kennedy/Jenks Consultants 2011b).

- *Task D/E Annual Reports* (Kennedy/Jenks Consultants 2009a; 2010b; 2011c; 2012b; 2014e).

Additional information regarding remedial actions conducted in 2014 is provided in Table 1.

Groundwater monitoring at selected wells has been ongoing at the Facility since 1988. Current groundwater monitoring at the Facility is defined in the following Spring 2005 SOW RD/RA tasks.

- **Task F Stage I – Part 1 (SI-P1)** quarterly groundwater monitoring and annual private well monitoring program commenced in June 2007, as part of the Spring 2005 SOW Task F activities, upon DEQ's approval of the *Task F Stage I – Part 1 Remedial Action Plan for VOC-Containing Alluvial Aquifer Groundwater*, as modified by DEQ [hereinafter referred to as Task F SI-P1 RAP (DEQ Version) (DEQ 2007)]. Quarterly monitoring converted to semiannual monitoring in June 2008 with DEQ approval. The three years of groundwater monitoring required by Task F SI-P1 RAP (DEQ Version) was completed in March 2008. In a letter to BNSF dated 17 June 2010 (DEQ 2010a), DEQ required that semiannual

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monitoring of the alluvial aquifer continue in accordance with Task F SI-P1 RAP (DEQ Version). As noted below, in December 2012, DEQ combined the Task F (alluvial aquifer) and Task L (bedrock) groundwater monitoring programs under a single directive. Private well monitoring, as required by the Task F SI-P1 RAP (DEQ Version), was conducted as an annual event during 2014 (see Section 3.1).

Task G groundwater monitoring program was initially presented in the *Task G Stage I Remedial Action Plan for Dissolved Phase Petroleum Hydrocarbons in Groundwater* (Task G Stage I RAP) (Kennedy/Jenks Consultants 2005). On 28 February 2008, BNSF requested a no further action (NFA) determination for Spring 2005 SOW Task G (Kennedy/Jenks Consultants 2008a) based on additional groundwater data obtained during implementation of Task D/E. In a letter to BNSF dated 19 April 2011, DEQ denied BNSF's request for a NFA determination (DEQ 2011). The letter stated that "DEQ believes that Task D must be completed before it can be determined that dissolved petroleum concentrations in the area of LNAPL do not exceed screening levels" and that "DEQ is officially placing Task G on-hold." DEQ also considered the Task G Stage I RAP dated 1 June 2005 to be "out-of-date" and does not intend to review the 2005 work plan. In December 2014, the Task D/E dual-level pumping light non-aqueous phase (LNAPL) recovery system constructed under Task D/E was shutdown with DEQ approval (see Table 1). The Task G Stage I RAP will be revised in 2015 to reflect additional petroleum hydrocarbon-related data obtained since 2005 and resubmitted to DEQ for review and approval. The Revised Task G Stage I RAP will identify a groundwater monitoring program for dissolved phase petroleum hydrocarbons in the alluvial aquifer.

- **Task L** quarterly groundwater monitoring of bedrock wells constructed in 2010 and 2011 commenced in September 2011 in accordance with the DEQ-approved *Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s) – DEQ Version* (DEQ 2010b) [Task L SI Work Plan (DEQ Version)]. The last quarter of the required four quarters of groundwater sampling was conducted in June 2012.

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Additional Task L monitoring wells (including both bedrock and alluvial aquifer wells) were constructed in 2012 in accordance with the DEQ-approved *Addendum No. 1 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s) (Revision No. 1)* (Revised Addendum No. 1) (Kennedy/Jenks Consultants 2012a), in 2013 in accordance the DEQ-approved *Addendum No. 2 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s) (*Addendum No. 2) (Kennedy/Jenks Consultants 2013a) and *Addendum No. 3 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s) (*Addendum No. 3) (Kennedy/Jenks Consultants 2013d), and in 2014 in accordance the DEQ-approved *Revised Addendum No. 4 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s)* (Revised Addendum No. 4) (Kennedy/Jenks Consultants 2014i). As noted below, in December 2012, DEQ combined the Task F (alluvial aquifer) and Task L (bedrock) groundwater monitoring programs under a single directive.

On 22 October 2012, BNSF received DEQ's requirements for continued alluvial and bedrock groundwater monitoring (DEQ 2012b). Kennedy/Jenks Consultants, on behalf of BNSF, evaluated DEQ's requirements for the alluvial/bedrock groundwater monitoring program and provided proposed modifications to DEQ via email on 4 December 2012. In a conference call between Kennedy/Jenks Consultants, DEQ, and its consultant CDM Smith on 7 December 2012, a modified alluvial/bedrock groundwater monitoring program was agreed upon [hereinafter referred to as DEQ's Groundwater Monitoring Program Directive No. 1 (GWMD-1)]. This program included both quarterly and semiannual sampling requirements for VOCs and general water chemistry parameters. The first quarterly sampling event required under GWMD-1 was conducted in December 2012. Upon completion of four quarters of sampling in September 2013, Kennedy/Jenks Consultants submitted *Groundwater Monitoring Program Directive No. 1 – Proposal for Modification of Groundwater Sampling Frequency and Analyses, Burlington Northern Livingston Shop Complex, Livingston, Montana* dated 27 November 2013 (Kennedy/Jenks Consultants 2013e) to the DEQ for review and approval. Based on DEQ's review of the proposal, DEQ issued Groundwater Monitoring Program Directive

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No. 2 (GWMD-2) in a letter to BNSF dated 16 December 2013 (DEQ 2013d). This program included both quarterly and semiannual sampling requirements for VOCs and general water chemistry parameters. The first quarterly sampling event required under GWMD-2 was conducted in December 2013/January 2014; subsequent quarterly/ semiannual events were conducted in February 2014, June 2014, and September 2014.

Upon completion of four quarters of sampling in September 2014, Kennedy/Jenks Consultants submitted *Groundwater Monitoring Program Directive No. 2 – Proposal for Modification of Groundwater Sampling Frequency and Analyses, Burlington Northern Livingston Shop Complex, Livingston, Montana* dated 3 December 2014 (Kennedy/Jenks Consultants 2014k) to the DEQ for review and approval. DEQ verbally approved the proposed revisions on 9 December 2014 and provided a formal approval in its letter to BNSF dated 23 December 2014 (DEQ 2014l). GWMD-2R includes both quarterly and semiannual sampling requirements for VOCs and general water chemistry parameters. The first quarterly sampling event required under GWMD-2R was conducted in January 2015.

Groundwater sampling of alluvial aquifer and bedrock wells at the Facility will continue under GWMD-2R until otherwise directed by DEQ.

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2.0 TASK C: CINDER PILE CAPPING

2.1 WORK PERFORMED

The *2nd Draft Cinder Pile Remedial Action Report* (2nd Draft Cinder Pile RA Report) dated 29 December 2011 was submitted to DEQ on 3 January 2012 by Envirocon, Inc. of Missoula, Montana (Envirocon 2011). The Declaration of Institutional Control on Real Property for the Cinder Pile was recorded on 7 February 2012. In a letter from DEQ to BNSF dated 1 March 2012, DEQ approved the 2nd Draft Cinder Pile RA Report with the inclusion of the final recorded institutional control.

Information similar to that required under Subtask 18 of the Spring 2005 SOW for annual monitoring and maintenance reports is provided in the DEQ-approved 2nd Draft Cinder Pile RA Report including the following:

- Description of work performed
- General field observations
- Discussion of quality assurance/quality control (QA/QC)
- Deviations from work plan
- Institutional controls
- Verification of compliance with environmental requirements, criteria, and limitations (ERCLs)
- Conclusions on design implementation success
- Recommendation for follow-up actions

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- Table summarizing the test results for cap import material

- Figures showing pre-construction cinder pile surface, re-contoured subgrade before capping, cap final surface, surface cross-sections (pre-construction, final subgrade, and final cap), traffic routing, and schematic fence design

- Appendices including notification to DEQ Permitting and Compliance Division that the cinder pile may contain asbestos-containing materials (ACM), draft post-construction maintenance/monitoring plan, stormwater pollution prevention plan (SWPPP), Notice of Intent (NOI) form and DEQ's letter confirming receipt, DEQ approval of subgrade, asbestos permit application and worker certifications, supplier certification of clean import materials, seed weed-free certification, photographs, weed control plan with approval, asbestos air monitoring results, and project field logs.

Since some of the information required for the annual monitoring and maintenance report has already been provided for Task C in the remedial action report, the information is not repeated in this report.

2.2 POST-REMEDIAL ACTION MONITORING AND MAINTENANCE

No sampling was required or performed as part of the Task C post-remedial action monitoring and maintenance.

2.2.1 Cinder Pile Inspections

A cinder pile inspection was conducted by Kennedy/Jenks Consultants, on behalf of BNSF, on 6 June 2014 after the spring run-off. Mr. Clay Williams (Park County Weed Inspector) and Mr. Bob Alexander (CDM Smith) were present during the inspection. The cinder pile inspection was documented on the cinder pile inspection forms included in

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Quarterly Status Report No. 36 (Kennedy/Jenks Consultants 2014g). Copies of the inspection forms are also included in Appendix A of this report.

The cinder pile was walked with Mr. Williams and Mr. Alexander. Mr. Williams stated that the cinder pile surface cover was "completely vegetated and coverage was excellent." Mr. Williams took no exceptions to the plants that were present on the cinder pile. No listed noxious weeds were found. The cinder pile was mowed on 9 and 10 June 2014.

A small strip of bare ground was noted along the southern fence line; the result of weed control overspraying by Montana Rail Link (MRL) in 2013. Mr. Williams recommended broadcast seeding with crested wheatgrass in Spring 2015 to help re-establish vegetation.

2.2.2 Future Monitoring and Maintenance

Future inspections are tentatively scheduled on an annual basis with the next inspection scheduled to be conducted in June/July 2015 (after spring runoff), unless otherwise directed by DEQ. Broadcast seeding with crested wheatgrass over the strip of bare ground will occur in Spring 2015, as recommended by Mr. Williams.

Cap maintenance and security fence maintenance are being conducted, as required.

2.2.3 Institutional Controls

The Declaration of Institutional Control on Real Property for the Cinder Pile was recorded on 7 February 2012.

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2.3 OTHER ACTIVITIES

An additional investigation of the cinder pile was conducted by Water & Environmental Technologies, Inc. (WET) on behalf of the Livingston Restoration Group (LRG) in 2014. Investigation activities performed by WET are not part of Task C as defined in the Spring 2005 SOW and are being reported to the DEQ under separate cover.

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3.0 TASK F

3.1 TASK F STAGE I – PART 1 GROUNDWATER MONITORING

In December 2012, DEQ combined the Task F (alluvial) and Task L (bedrock) groundwater monitoring programs. The combined groundwater monitoring events conducted during 2014 are discussed in Section 6.0. Annual private well monitoring continues to be conducted under Task F SI-P1.

3.1.1 Annual Private Well Monitoring

Annual sampling of private wells located within a DEQ-defined sampling boundary (see Table 2) was conducted in June 2014. The DEQ-defined sampling boundary is "the estimated area where PCE is expected to be present above the DEQ-7 required reporting limit of 0.5 µg/L" as determined by DEQ. Thirty private wells were identified within the DEQ-defined private well sampling boundary in the Task F SI-P1 RAP (DEQ Version). Since approval and implementation of the Task F SI-P1 RAP (DEQ Version) in 2007, DEQ has revised the private well sampling boundary several times (see below). As documented in previous annual monitoring and maintenance reports, each modification of the boundary has resulted in some peripheral private wells either being added or removed from the private well monitoring program in accordance with Table 7 of the Task F SI-P1 RAP (DEQ Version).

- April 2007 boundary. Original sampling boundary identified in the Task F SI-P1 RAP (DEQ Version). This boundary was used for the annual private well sampling events in June 2007, June 2008, and June 2009.

- October 2009 boundary. DEQ required this boundary be used in its email to Kennedy/Jenks Consultants dated 21 May 2010. The boundary was identified on the "Petroleum Free-Product Plume and Dissolved Tetrachloroethylene (PCE)

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Plume 2009" map posted on DEQ's website dated October 2009. This boundary was used for the annual private well sampling event in July 2010.

- August 2010 boundary. DEQ required that the annual private well monitoring program be updated in the Task L SI Work Plan (DEQ Version). The boundary was shown on DEQ-provided Figure 3 in Task L SI Work Plan (DEQ Version). This boundary (which is similar to the October 2009 boundary) was subsequently superseded by the May 2011 boundary.

- May 2011 boundary. DEQ provided a revised boundary that was included in the *Private and Public Well Inventory (Revision No. 5)* dated January 2011 (updated May 2011) (Kennedy/Jenks Consultants 2011a). The boundary was shown on DEQ-provided Figure 2. This boundary was used for the annual private well sampling events in June 2011, June 2012, June/July 2013, and June 2014.

The number of wells in the Task F SI-P1 private well monitoring program was revised to reflect the May 2011 private well sampling boundary. A total of 37 private wells were identified within the May 2011 boundary. Table 2 summarizes the status of the private well monitoring program in 2014. The locations of the wells included in the Task F SI-P1 private well monitoring program are shown on Figure 2.

Subsequent to the June 2014 private well sampling, DEQ posted revised "Petroleum Free-Product Plume and Dissolved Tetrachloroethene (PCE) Plume 2014" maps on its website; these maps will be used as the DEQ-defined private well sampling boundary for future annual private well sampling events.

Per the Task F SI-P1 RAP (DEQ Version), "wells that do not have operational pumping systems will not be sampled. Private wells that do not have an operational pumping system, however, will be checked at least annually to confirm an operational pumping system is not present." Prior to the June 2014 monitoring event, private well property owners were contacted to arrange access to determine the operational status of the well(s), and sample if appropriate. Between 5 June and 16 June 2014, Kennedy/Jenks

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Consultants collected water samples from nine private wells (12R02, 12R06, 7L01, 7P10, 7P17, 7Q01, 18D04, 18D06, and 18D11) located within the May 2011 DEQ-defined private well sampling boundary where (1) operational pumping systems were present, and (2) where access was granted. Water samples were submitted to Energy Laboratories, Inc. in Billings, Montana (Energy) under chain-of-custody protocol and analyzed for VOCs using U.S. Environmental Protection Agency (EPA) Method 524.2. Additional information regarding sampling protocols and procedures is provided in Section 6.2.

Field parameters (e.g., temperature, pH, and specific conductance) and other observations (e.g., volume flushed, turbidity, color, etc.) made during sampling were recorded on a domestic water sampling record. Copies of the domestic water sampling records are provided in Appendix B.

Analytical results for private well samples collected in 2014 are summarized in Table 3 and shown on Figure 3. Historical data are provided in Appendix H.

Copies of the analytical laboratory reports are provided in Appendix C. Copies of the data validation summaries are provided in Appendix D. The findings with respect to the QA/QC data do not adversely affect the use of the analytical results for evaluation of VOCs in private well water samples.

3.1.2 Private Well Analytical Results

Of the nine private well samples collected in June 2014, dissolved PCE was detected in three samples at concentrations ranging from 0.51 to 10 micrograms per liter (µg/L) (see Table 3). Estimated concentrations of PCE (0.23J and 0.44J µg/L) were also reported in water samples collected from two other wells. The water sample collected from private well 7L01 (10 µg/L) contained dissolved PCE above the ROD cleanup level of 5 µg/L. The water sample from this well also contained dissolved trichloroethene (TCE) at an estimated concentration of 0.44J µg/L and cis-1,2-dichloroethene (cis-1,2-DCE) at an

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estimated concentration of 0.20J µg/L. These concentrations are below the ROD cleanup levels for TCE (5 µg/L) and cis-1,2-DCE (70 µg/L). Well 7L01 is located at the City of Livingston Publicly Owned Treatment Plant (POTW) and is used for general maintenance/washing activities. These results are consistent with analytical data from nearby alluvial aquifer groundwater monitoring wells.

Estimated concentrations of chlorodibromomethane and chloroform were reported in the water sample collected from private well 12R02 (0.32J µg/L and 0.34J µg/L, respectively). Chloroform was also reported in the water sample collected from well 7P10 at an estimated concentration of 0.43J µg/L. These estimated concentrations are below Circular DEQ-7 Montana Numeric Water Quality Standards (DEQ-7 Standards) dated October 2012 (DEQ 2012a).

3.1.3 Future Private Well Monitoring

Water samples will continue to be collected from private wells on an annual basis in accordance with Task F SI-P1 RAP (DEQ Version), unless otherwise directed by DEQ.

As previously indicated, DEQ's revised "Petroleum Free-Product Plume and Dissolved Tetrachloroethene (PCE) Plume 2014" maps will be used to define the private well sampling boundary for future monitoring events.

3.2 TASK F STAGE I – PART 1 REMEDIAL ACTION REPORT

The *Task F Stage I – Part 1 Remedial Action Report* (Task F RA Report) (Kennedy/Jenks Consultants 2010a) was submitted to DEQ on 4 February 2010 for review and approval. DEQ approval of this document is pending. Recommendations in this report regarding modification to the groundwater monitoring program have been superseded by DEQ's groundwater monitoring program directives (see Section 6.0).

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3.3 TASK F STAGE I – PART 2

Task F Stage I - Part 2 activities involve the testing of one or more selected remediation technologies to evaluate their efficacy in promoting the attainment of ROD groundwater cleanup levels. The remediation technology selected for evaluation was the subsurface injection of sodium permanganate for treatment of chlorinated VOCs by *in situ* chemical oxidation (ISCO) (referred to hereinafter as Task F SI-P2 ISCO pilot testing). Several ISCO pilot tests have been conducted in the vicinity of the Former Electric Shop and Locomotive Shop between 2008 and 2011, as summarized in previous annual monitoring and maintenance reports.

In a letter to BNSF dated 3 September 2010, DEQ required that a comprehensive report for the Task F SI-P2 ISCO pilot testing be prepared upon completion of additional pilot testing activities conducted in November 2011. *Task F Stage I – Part 2: Comprehensive Chemical Testing Report* (Comprehensive Report) was submitted to DEQ for review and approval on 7 June 2012. DEQ comments on the Comprehensive Report were received in a letter to BNSF dated 10 June 2013 (DEQ 2013a). The *Revised Task F Stage I – Part 2: Comprehensive Chemical Testing Report* (Revised Comprehensive Report) (Kennedy/Jenks Consultants 2013b) was submitted to DEQ for review and approval on 22 July 2013. DEQ approval of the Revised Comprehensive Report is pending.

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4.0 TASK G

In May 2005, the Task G Stage I RAP was submitted to DEQ for review/approval in accordance with the Spring 2005 SOW. On 28 February 2008, Kennedy/Jenks Consultants, on behalf of BNSF, submitted a letter to DEQ summarizing the results of the Task D/E groundwater sampling activities conducted at the Facility and requesting a NFA determination under Task G (Dissolved Phase Petroleum Hydrocarbons in Groundwater) of the Spring 2005 SOW. The Task D/E activities included sampling Facility groundwater for dissolved phase petroleum hydrocarbons.

In a letter to BNSF dated 19 April 2011 (DEQ 2011), DEQ denied BNSF's request for a NFA determination under Task G of the Spring 2005 SOW. The DEQ's letter stated that "DEQ believes that Task D must be completed before it can be determined that dissolved petroleum concentrations in the area of LNAPL do not exceed screening levels" and that "DEQ is officially placing Task G on-hold." Finally, DEQ considers the Task G Stage I RAP dated 1 June 2005 to be "out-of-date" and does not intend to review the 2005 work plan.

No work was required by DEQ under Task G in 2014; however, DEQ has agreed that Task G can be used as the mechanism to identify data gaps, propose additional data to be collected, and present the methodology to be applied to evaluate NSZD. Preliminary data gathering for the NSZD evaluation was initiated in 2013 and consisted of collecting groundwater samples from selected groundwater monitoring wells located upgradient, within, and downgradient of the petroleum hydrocarbon zone. Groundwater samples were also collected from individual Task D/E dual-level pumping wells and combined total influent to the Task D/E Groundwater Treatment Plant (GWTP).

Groundwater samples were collected from the groundwater monitoring wells between 20 September and 1 October 2013 (see Table 4) as reported in the *2013 Annual Monitoring and Maintenance Report* (2013 Annual Report) (Kennedy/Jenks Consultants 2014b). Additional groundwater samples were collected on 27 February 2014 from wells

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PMW-3, PMW-5, and MUW-41, and submitted to Energy under chain-of-custody protocol for analysis of sulfate, sulfide, iron, manganese, and methane (see Table 4).

Copies of the field forms are provided in Appendix B. Copies of the analytical laboratory reports and data validation summaries are provided in Appendix C and Appendix D, respectively.

In December 2014, DEQ approved shut down of the Task D/E dual-level pumping LNAPL recovery system. The Task G Stage I RAP will be revised in 2015 to reflect additional data collected since 2005 and resubmitted to DEQ for review and approval. The revised Task G Stage I RAP will identify a groundwater monitoring program for dissolved phase petroleum hydrocarbons in alluvial aquifer groundwater. The groundwater monitoring program will identify wells requiring liquid level measurements (including frequency of measurements), wells to be sampled for dissolved phase petroleum hydrocarbons, and frequency of sample collection. In addition to collecting samples for analysis of petroleum hydrocarbons, samples may also be collected in support of an evaluation of NSZD and to supplement the initial data gathering effort.

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5.0 TASK L

In December 2012, DEQ combined the Task F (alluvial aquifer) and Task L (bedrock) groundwater monitoring programs. The combined groundwater monitoring events conducted during 2014 are discussed in Section 6.0. The following additional Task L activities were conducted in 2014.

5.1 ADDENDUM NO. 2 AND ADDENDUM NO. 3 ACTIVITIES

5.1.1 Transducers

Pressure transducers were deployed in selected wells (see below) in June 2013 and January 2014 as part of the Task L Addendum No. 2 and Addendum No. 3 activities. The addendums required transducer data be collected for a period of 1 year to evaluate seasonal fluctuations in groundwater levels and assess potential upward and downward vertical groundwater gradients.

Bedrock Well	Alluvial Aquifer Well	Transducer Installation Date	Addendum	Comment
10-1	ISCO-24R	June 2013	Addendum No. 2	10 feet apart
10-2	ISCO-1 and ISCO-2	June 2013		37 feet northeast of well 10-2 (ISCO-1) and 14 feet southwest of well 10-2 (ISCO-2)
10-3	12-7	June 2013		6 feet apart
10-4	12-8	June 2013		6 feet apart
10-7	12-9	June 2013		6 feet apart
12-1(a)	12-10	June 2013		6 feet apart (a) FLUTe™ well 12-1 has four pressure transducers associated with four of the five sampling zones
13-8	13-1	January 2014	Addendum No.3	8 feet apart
13-9	E-7	January 2014		7 feet apart
13-10	13-5	January 2014		6 feet apart

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The pressure transducers have been programmed to record data every 12 hours (11 a.m. and 11 p.m. MST) with an accuracy of +/- 0.01 foot water column pressure. A single pressure transducer was concurrently programmed and deployed out of water to record barometric pressure (P_{baro}); affording the conversion from absolute pressure (P_{abs}) to water column pressure (P_{wc}) within each of the paired wells.

$$P_{wc} = P_{abs} - P_{baro}$$

Data were downloaded from the transducers approximately every 2 weeks using a RuggedReader and were periodically provided to DEQ under separate cover. During 2014, transducer data were downloaded on 3, 14, and 31 January 2014; 11 February 2014; 6 and 18 March 2014; 3 and 17 April 2014; 2 May 2014; 2 and 17 June 2014; 9 and 31 July 2014; 18 August 2014; 11 and 25 September 2014; 8 and 22 October 2014; 20 November 2014; and 5 and 18 December 2014. In June 2014, the 1 year of data collection from a subset of the wells was completed; in discussions with DEQ, it was decided to continue data collection from those wells.

Water level plots generated from transducer data from 28 June 2013 through December 2014 are shown on Figures 4 through 12.

Table 5 summarizes the net head gradient for paired wells through December 2014. The net head gradient was computed by taking the difference between the average (mean) hydraulic head in bedrock and alluvial aquifer well pairs. Water level data that are not representative of static groundwater conditions (e.g., drawdown during sampling/slug testing and high water discharge during a MRL water pipe breakage) were not included in the computation of the net gradient.

Bedrock FLUTe™ well 12-1 (located adjacent to alluvial aquifer well 12-10) was constructed with Level Troll 500 vented pressure transducers deployed within four of the five sampling zones (Zones 1, 2, 4, and 5) to monitor potential differences in hydraulic head between the zones. Ongoing problems with the transducers in Zones 1, 2, and 4,

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as documented in the 2013 Annual Report, have made transducer data from these zones unreliable.

Transducer data continues to be collected as described in Section 5.5. An evaluation of the water level data will be provided to DEQ in the draft *Task L Supplemental Investigation Report for Bedrock Aquifer(s)* (Task L SI Report) which will be submitted to DEQ on or before 23 April 2015 (see Section 5.5.1).

5.1.2 Slug Test

Slug tests were conducted on bedrock wells 10-2, 13-8, 13-9, and 13-10 to acquire hydraulic conductivity estimates for bedrock in this vicinity. Rising and falling head slug testing were conducted between 7 and 13 February 2014. Slug testing was performed by lowering a cylindrical slug of a known volume into the well, imparting a near-instantaneous rise in head within the well casing. Pressure transducers were installed to monitor the recovering water level in the well as the aquifer rebounded to equilibrium (falling head slug test). The slug was then pulled from the well, and the water level in the well was monitored as it recovered to equilibrium (rising head slug test).

Slug test data were analyzed graphically, using the Hvorslev (1951) method, and analytically, using a number of solutions available within the Aqtesolv computer software (Hvorslev, 1951; Bouwer and Rice, 1976; and Hyder, et al, 1994). Results of the slug testing analysis for the bedrock wells will be provided in the Task L SI Report which will be submitted to DEQ on or before 23 April 2015 (see Section 5.5.1).

5.2 SUPPLEMENTAL GROUNDWATER SAMPLING

Quarterly and semiannual groundwater sampling of Task L bedrock and alluvial aquifer wells conducted as part of the Facility-wide groundwater monitoring program are discussed in Section 6.0. Supplemental groundwater samples were collected as part of

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the Task L activities in 2014. In an email to DEQ dated 16 April 2014, Kennedy/Jenks Consultants, on behalf of BNSF, proposed conducting supplemental groundwater sampling at selected bedrock and alluvial aquifer wells, as follows:

- Collecting monthly groundwater samples for three consecutive months from bedrock/alluvial aquifer well pair 10-2 and ISCO-2 starting in April 2014 and analyzing the samples for VOCs to support the groundwater modeling effort.

- Collecting groundwater samples from alluvial aquifer wells E-7, 13-3, and 92-1 in April 2014 to help in assessing the potential effects of air rotary drilling on VOC concentrations in the alluvial aquifer in proximity to newly constructed bedrock well 13-9. Additional monthly groundwater sampling may be performed, if warranted.

DEQ agreed to the supplemental sampling in an email to Kennedy/Jenks Consultants dated 18 April 2014. DEQ required that well 13-9 be sampled as part of the aforementioned supplemental groundwater sampling activities.

Groundwater samples were collected from wells 10-2, ISCO-2, 13-3, 13-9, E-7, and 92-1 on 28 April 2014 and 5 May 2014. Groundwater samples were also collected from these wells in June 2014 during the GWMD-2 groundwater sampling event. Except for well 92-1, these wells are part of the GWMD-2 monitoring program. Groundwater sample collection protocols and procedures are described in Section 6.0. Copies of the groundwater purge and sample forms for each monitoring event are provided in Appendix B. Copies of the analytical laboratory reports and data validation summaries are provided in Appendix C and Appendix D, respectively.

5.2.1 Supplemental Sampling Analytical Results

The results of the supplemental groundwater sampling, and previous sampling events, are provided in Table 6. Prior to construction of alluvial aquifer well 13-3 and bedrock

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well 13-9 in 2013, groundwater in this portion of the Facility was monitored using alluvial aquifer well 92-1. Since Task F SI-P1 groundwater sampling commenced in 2007, the concentrations of dissolved PCE in groundwater samples from well 92-1 have ranged from 13 to 92 micrograms per liter (µg/L). Well 92-1 was removed from the groundwater monitoring program in December 2013 and replaced with nearby alluvial aquifer wells 13-3 and E-7, both of which are located in closer proximity to bedrock well 13-9. Previous data from well E-7 (constructed and sampled as part of the ISCO pilot testing) showed dissolved PCE concentrations ranging from 24 to 185 µg/L. After construction of bedrock well 13-9, the concentrations of dissolved PCE in groundwater samples collected from well E-7 was 1,000 µg/L; the concentrations have declined in subsequent supplemental monitoring events to 306 µg/L. Alluvial aquifer well 13-3 was sampled initially in July 2013, after its construction. Dissolved PCE was detected at a concentration of 62 µg/L. When the well was sampled again in December 2013, after construction of nearby bedrock well 13-9, dissolved PCE was detected at a concentration of 670 µg/L. In subsequent supplemental sampling events, the concentration of dissolved PCE increased to a maximum of 1,010 µg/L in April 2014; concentrations have declined in subsequent sampling events. A similar increase in dissolved PCE concentrations was not observed in alluvial aquifer well 92-1. It should be noted that the three wells are screened to the alluvium/bedrock contact; well 92-1 has a longer (10-foot) well screen while E-7 and 13-3 have shorter well screen intervals (5-foot and 3-foot, respectively).

5.3 MASS DISCHARGE MODELING

During a conference call between BNSF, Kennedy/Jenks Consultants, DEQ, CDM Smith, and Dr. Bernie Kueper (hereinafter referred to as the modeling group) on 14 February 2014, DEQ agreed to move forward with Task L bedrock/alluvial mass discharge modeling prior to any additional bedrock well installations. Dr. Bernie Kueper prepared *A Discussion of Modeling Approach, Evaluation of PCE Mass Flux and Mass Discharge between Bedrock and the Alluvial Aquifer* which was submitted to DEQ on

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28 February 2014. During a subsequent conference call on 7 March 2014, DEQ agreed with the general modeling approach outlined in the 28 February 2014 modeling proposal.

Dr. Bernie Kueper prepared and submitted the *Discussion of Model Input Data, Evaluation of PCE Mass Flux and Mass Discharge between Bedrock and the Alluvial Aquifer* to DEQ on 5 May 2014. DEQ provided general and specific comments on the model input data in its letter to BNSF dated 15 May 2014 (DEQ 2014b). During a conference call between the modeling group on 23 May 2014, a path forward was decided on model parameter selection and model sensitivity analysis to be included in a revised submittal. Dr. Bernie Kueper submitted the revised *Discussion of Model Input Data, Evaluation of PCE Mass Flux and Mass Discharge between Bedrock and the Alluvial Aquifer* to DEQ on 6 June 2014. DEQ provided general and specific comments in response to the revised submittal in its letter to BNSF dated 19 June 2014 (DEQ 2014c). During a conference call between the modeling group on 30 June 2014, a path forward was decided to finalize model parameter selection and model sensitivity analysis. Dr. Bernie Kueper prepared and submitted a second revised *Discussion of Model Input Data, Evaluation of PCE Mass Flux and Mass Discharge between Bedrock and the Alluvial Aquifer* to DEQ on 7 July 2014. DEQ provided its approval of that submittal in its letter to BNSF dated 14 July 2014 (DEQ 2014d).

On 15 July 2014, Dr. Bernie Kueper presented the base case simulation results for bedrock diffusive mass discharge to the alluvial aquifer to the modeling group. The sensitivity analyses results for bedrock diffusive mass discharge to the alluvial aquifer were presented on 24 July 2014. Based on the sensitivity analyses results, it was suspected that there was a “bug” in the code. Dr. Bernie Kueper initiated contact with the code developer for technical assistance. DEQ granted an extension to the 31 July 2014 deadline due to the code problem.

On 1 August 2014, Dr. Bernie Kueper notified the modeling group that the code developer had confirmed a “bug” existed in the Matrix Diffusion Toolkit (Site) computer code. The Matrix Diffusion Toolkit code developers sent a revised spreadsheet that had

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fixed the original computer code “bug” on 5 August 2014, and Dr. Kueper resumed running the modeling simulations.

The preliminary results of the Matrix Diffusion Toolkit model were presented to the modeling group on 8 August 2014. The mass flux analysis [diffusive modeling component from Matrix Diffusion Toolkit along with results of vertical (bedrock to alluvium) and horizontal (downgradient through alluvium) advective PCE mass discharge calculations] was presented on 12 August 2014. Dr. Kueper concluded that the bedrock is likely not contributing (via advective or diffusive processes) appreciable PCE mass to the alluvial aquifer groundwater. Dr. Kueper also concluded through a soil-to-groundwater partitioning exercise that a PCE soil concentration of 1 mg/kg may impart PCE groundwater concentrations in excess of 100 µg/L.

Dr. Kueper is currently preparing a report summarizing the evaluation of PCE mass discharge between bedrock and the alluvial aquifer. That report, along with an updated conceptual site model (CSM), will be submitted to DEQ as part of the Task L SI Report which is due to DEQ on or before 23 April 2015 (see Section 5.5.1).

5.4 ADDENDUM NO. 4 ACTIVITIES

In 2014, DEQ required additional alluvial aquifer and bedrock data be collected to further evaluate: 1) the subsurface spatial distribution of PCE dense non-aqueous phase liquid (DNAPL) and dissolved PCE concentrations in groundwater; 2) the vertical component of the hydraulic gradient between the alluvial aquifer and shallow bedrock; and 3) the potential for PCE mass within shallow bedrock to migrate upward into the alluvium at a level sufficient to sustain the PCE concentrations observed in the alluvial aquifer plume. The additional data and information would be acquired beneath the Former Electric Shop, Locomotive Shop, and manways associated with the industrial wastewater sewer line east of existing bedrock well 13-9. These are locations where PCE potentially may have been released into the groundwater.

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In response to DEQ's requirements for additional alluvial aquifer and bedrock data, *Addendum No. 4 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s)* (Addendum No. 4) was submitted to DEQ on 30 September 2014 for review and approval. DEQ provided its comments and required revisions to Addendum No.4 in a letter to BNSF dated 16 October 2014. DEQ's comment letter required re-submittal of Addendum No. 4 on or before 31 October 2014. DEQ's required revisions were discussed in a conference call between DEQ, BNSF, Kennedy/Jenks Consultants, Dr. Bernie Kueper, and CDM Smith on 28 October 2014. As a result of the technical discussion, it was agreed that a redline revision of Addendum No. 4 reflecting the agreed upon changes to the scope of work would be submitted to the DEQ no later than 31 October 2014. The redline revision was submitted to DEQ on 31 October 2014. In an email from DEQ to Kennedy/Jenks Consultants dated 3 November 2014, DEQ indicated it had only minor comments to the redline revision and that well construction activities could proceed. BNSF received DEQ's email comments on 6 November 2014. *Revised Addendum No. 4 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s)* (Revised Addendum No. 4) (Kennedy/Jenks Consultants 2014i) was submitted to DEQ on 26 November 2014. DEQ's approval of the Revised Addendum No. 4 was received in a letter to BNSF dated 23 December 2014 (DEQ 2014n). Revised Addendum No. 4 scope of work included:

- Construction of three shallow bedrock monitoring wells: well 14-1 located inside the Former Electric Shop (subsequently renamed well 14-6, see below), well 14-2 located inside the Locomotive Shop between the Transfer Pit and Locomotive Shop manways, and well 14-4 located adjacent to the industrial wastewater sewer line manway.

- Construction of deeper bedrock monitoring well 14-3 located adjacent to the industrial wastewater sewer line manway and alluvial aquifer well 13-4.

- Construction of alluvial aquifer well 14-5 located near well 14-4 to create a well pair.

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- Installation of pressure transducers in the four newly created alluvial aquifer/shallow bedrock and alluvial aquifer/bedrock well pairs, and record piezometric head level data in the wells on a twice daily basis for a period of 1 year.

- Performing an initial groundwater sampling event following completion and development of the newly constructed wells and quarterly sampling for VOCs and general water chemistry parameters for three additional calendar quarters (i.e., quarterly sampling for 1 year).

The new data and information from each location investigated will be evaluated to ascertain whether the subsurface conditions encountered and/or groundwater sampling results indicate that PCE as DNAPL is present at or near the location (see Section 5.5.1).

5.4.1 Well Construction

Proposed Task L alluvial aquifer/bedrock well locations (14-2 through 14-6) were identified during a field reconnaissance on 8 November 2014. The locations of the wells are shown on Figure 13. Revised Addendum No. 4 identified the new groundwater monitoring wells as 14-1 through 14-5. At the time of the well construction activities, DEQ notified Kennedy/Jenks Consultants that WET, on behalf of the LRG, had constructed a well identified as 14-1. Therefore, shallow bedrock well 14-1 located inside the Former Electric Shop was renumbered as well 14-6. Well 14-3 was located as close to well 13-4 as possible (approximately 23 feet apart) based on drill rig access constraints.

Underground utility clearances were conducted on 17 November 2014, and concrete coring and pot holing activities were completed on 17 and 18 November 2014. The four new bedrock wells (14-2, 14-3, 14-4, and 14-6) and one new alluvial aquifer well (14-5) were constructed by Cascade Drilling, L.P of Woodinville, Washington, between 4 and 21 December 2014. Well borings were advanced using sonic drilling techniques. The

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alluvial aquifer well was constructed with a 3-foot screened interval above the alluvium/bedrock contact. The three shallow bedrock wells (14-2, 14-4, and 14-6) were constructed with a single 8-inch conductor casing and a 5-foot screened interval within the uppermost bedrock zone. The deeper bedrock well (14-3) was constructed with a telescoped double-casing (8-inch outer casing and 6-inch inner casing) and a 5-foot screened interval within the deeper bedrock zone, similar to previous deeper bedrock well constructions at the Facility. Copies of the boring and well construction logs are provided in Appendix E.

After construction of the 8-inch conductor casings, the seals were checked by measuring any changes in residual water inside the casing, prior to advancing the borehole. With the exception of well 14-2, seal testing results indicated adequate seals for each of the bedrock well conductor casings, including the second inner conductor casing for well 14-3. The hydraulic testing was performed approximately 24 hours after construction was complete, to allow time for the cement grout to cure and stabilize around the casings.

Due to cement grout entering the 14-2 well conductor casing to a level above the water table, hydraulic testing could not be performed within the 24-hour period. Instead, the grout was allowed to fully cure within the casing for 13 days and then drilled out to an appropriate depth near the base of the casing for hydraulic seal testing. Once the cement within the casing was drilled out, water levels were monitored for a period of 15 hours. No water entered the casing during the test period and the seal was deemed adequate.

Casing rinsate samples were collected after construction of the conductor casings at wells 14-3, 14-4, and 14-6 and submitted to Energy under chain-of-custody protocol for analysis of VOCs using EPA Method 8260 (see Table 7). Due to the encountered conditions discussed above, a rinsate sample was not able to be collected during construction of well 14-2. No VOCs were detected in the rinsate samples. After construction of the outer 8-inch casing at well 14-3, a reconnaissance groundwater sample was collected from the shallow bedrock immediately below the outer well casing in accordance with Revised Addendum No. 4 (prior to construction of the inner 6-inch

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casing) and submitted to Energy for analysis of VOCs (see Table 7). PCE was detected in the reconnaissance groundwater sample at a concentration of 14 µg/L. Copies of the analytical laboratory reports and data validation summaries are provided in Appendix C and Appendix D, respectively.

During well construction activities, soil samples were collected for analysis in accordance with the Revised Addendum No. 4 and submitted to Energy under chain-of-custody protocol for analysis of VOCs and organic matter. Soil analytical results are summarized in Table 8. Copies of the analytical reports and data validation summaries are provided in Appendix C and Appendix D, respectively. PCE was detected in the soil samples collected from the alluvium at concentration ranging from 0.0088 to 0.62 mg/kg, below the ROD cleanup level of 4 mg/kg. PCE was detected in the sample collected from shallow bedrock at 14-6 at a concentration (5.6 mg/kg) above the ROD cleanup level. Detected concentrations of TCE in the soil samples were below the ROD cleanup level of 2 mg/kg.

The new bedrock and alluvial aquifer wells were developed between 18 and 21 December 2014. Copies of the well development forms are provided in Appendix F.

5.5 2015 ACTIVITIES

Task L related activities have continued into 2015. Groundwater samples were collected from the new 14-series wells on 8 January 2015 in accordance with Revised Addendum No. 4 and DEQ's Revised Groundwater Monitoring Program Directive No. 2 (GWMD-2R) (see Section 6.0). DEQ approved the following modifications to the transducer monitoring program in an email to Kennedy/Jenks Consultants dated 9 January 2015:

- Removing existing transducers from well pairs 10-7/12-9, 10-4/12-8, 10-3/12-7, and 12-1/12-10 for use in the new 14-series well pairs (14-2/ISCO-7, 14-3/13-4, 14-4/14-5, and 14-6/89-3. Note: The transducers in FLUTe™ well 12-1 cannot be removed without damaging the well; however, data are no longer being collected.

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As such, one new transducer was added to the existing group to complete monitoring of the 14-series well pairs.

- Increasing the data collection frequency from every 12 hours to every 4 hours to enhance resolution and assist in temporal trend analysis.

- Continue collecting monthly hand measurements to ensure the transducers are accurately calibrated.

The revised transducer monitoring program is summarized below.

Bedrock Well	Alluvial Aquifer Well	Transducer Installation Date	Comment
10-1	ISCO-24R	June 2013	10 feet apart
10-2	ISCO-1 and ISCO-2	June 2013	37 feet northeast of well 10-2 (ISCO-1) and 14 feet southwest of well 10-2 (ISCO-2)
13-8	13-1	January 2014	8 feet apart
13-9	E-7	January 2014	7 feet apart
13-10	13-5	January 2014	6 feet apart
14-2	ISCO-7	January 2015	7 feet apart
14-3	13-4	January 2015	23 feet apart
14-4	14-5	January 2015	7.5 feet apart
14-6	89-3	January 2015	14 feet apart

Slug tests were conducted on bedrock wells 14-2, 14-3, 14-4, and 14-6 to supplement previously acquired hydraulic conductivity estimates for bedrock at the Facility. Rising and falling head slug testing were conducted between 11 and 12 February 2015. Another slug test was performed on bedrock well 14-2 between 24 and 28 February 2015, following well redevelopment activities, which occurred from 13 through 15 February 2015. Slug testing was performed as previously described (see Section 5.1.2).

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5.5.1 Task L Supplemental Investigation Report

In an email to Kennedy/Jenks Consultants dated 26 February 2015, DEQ notified BNSF that the supplemental investigation report required under Section 5.1.5 Subtask 5 of the Spring 20015 SOW could be prepared. The Task L SI Report will present a comprehensive summary of Task L data collected at the Facility starting in 2010 through March 2015, the findings of the supplemental investigation and mass discharge modeling, and present an updated CSM to facilitate evaluation of remedial actions in accordance with the ROD. The Task L SI Report is due to DEQ on or before 23 April 2015.

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6.0 DEQ'S GROUNDWATER MONITORING PROGRAM DIRECTIVES

6.1 BACKGROUND

On 1 May 2007, DEQ approved the Task F SI-P1 RAP (DEQ Version). This plan included the installation of new alluvial aquifer monitoring wells, quarterly groundwater monitoring, and annual private well monitoring. Groundwater samples were analyzed for VOCs, natural attenuation parameters (NAPs), and dissolved lead. The fourth quarter of groundwater monitoring under Task F SI-P1 was conducted in March 2008. On 23 May 2008, Kennedy/Jenks Consultants, on behalf of BNSF, submitted a request to DEQ to modify the Task F SI-P1 groundwater monitoring program (Kennedy/Jenks Consultants 2008c). This request was made after the completion of four quarters of groundwater monitoring conducted in accordance with the Task F SI-P1 RAP (DEQ Version). Based on a comparison of the newly acquired groundwater data to the existing 20-year comprehensive groundwater database, BNSF requested the following modifications:

- Semiannual sampling instead of quarterly sampling
- Removal of multi-level wells (except 07-5A) from the sampling program based on the lack of any appreciable stratification of VOC concentrations in the multi-level wells
- Discontinuing analyzing groundwater samples for dissolved lead.

In its letter to BNSF dated 13 June 2008 (DEQ 2008), DEQ approved the reduction of the monitoring frequency from quarterly to semiannual and removal of lead as an analyte from the Task F SI-P1 monitoring program. DEQ also approved removal of the deeper multi-levels wells from the monitoring program but required that shallow wells 07-2A, 90-1C, 90-2B, and LS-11 (which are part of multi-level nested well sets) continue to be

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sampled. DEQ's letter also stated "because of the apparent stratification within well 89-3, DEQ requires that the well continue to be sampled using diffusion bags."[2]

The first semiannual groundwater monitoring event was conducted in June 2008 to coincide with the annual private well monitoring event. As required by DEQ, a replacement well (MW-5R) was constructed on 10 July 2008 and added to the Task F SI-P1 groundwater monitoring program in 2009. In March 2010, the 3 years of groundwater monitoring required by the Task F SI-P1 RAP (DEQ Version) was completed. In a letter to BNSF dated 17 June 2010 (DEQ 2010a), DEQ required that semiannual groundwater monitoring for VOCs and NAPs continue at the Facility. Sampling for NAPs was discontinued in June 2012 in accordance with DEQ's letter to BNSF dated 25 August 2011 and DEQ's email to Kennedy/Jenks Consultants dated 8 May 2012. DEQ determined that sufficient NAP data had been acquired.

Semiannual monitoring of alluvial aquifer groundwater continued at the Facility through June 2012. In December 2012, DEQ's requirements for continuation of alluvial aquifer and bedrock groundwater monitoring at the Facility were finalized in GWMD-1. Groundwater sampling was conducted in accordance with GWMD-1 in December 2012 (quarterly event), February 2013 (quarterly/semiannual), June 2013 (quarterly/semiannual), and September 2013 (quarterly).

Upon completion of four quarters of sampling in September 2013 under GWMD-1, Kennedy/Jenks Consultants submitted *Groundwater Monitoring Program Directive No. 1 - Proposal for Modification of Groundwater Sampling Frequency and Analyses, Burlington Northern Livingston Shop Complex, Livingston, Montana* dated 27 November 2013 (Kennedy/Jenks Consultants 2013e) to the DEQ for review and approval.

[2] Well 89-3 was initially sampled using passive diffusion bags (PDBs) in December 2007, as part of DEQ-required groundwater sampling under Task I.

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Based on DEQ's review of the proposal, DEQ issued GWMD-2 in a letter to BNSF dated 16 December 2013 (DEQ 2013d). GWMD-2 included collection of groundwater samples from wells ISCO-1, E-6, and E-7 during the February/March 2014 sampling event in support of the groundwater modeling (see Section 5.3). A signed copy of DEQ's GWMD-2 is provided in Appendix G. Locations of the groundwater monitoring wells in GWMD-2 are shown on Figure 14. Groundwater sampling was conducted in accordance with GWMD-2 in December 2013/January 2014 (quarterly event), February 2014 (quarterly/semiannual event), June 2014 (quarterly/semiannual event), and September 2014 (quarterly event).

Upon completion of four quarters of sampling in September 2014, Kennedy/Jenks Consultants submitted *Groundwater Monitoring Program Directive No. 2 – Proposal for Modification of Groundwater Sampling Frequency and Analyses, Burlington Northern Livingston Shop Complex, Livingston, Montana* dated 3 December 2014 (Kennedy/Jenks Consultants 2014k) to the DEQ for review and approval. DEQ verbally approved the proposed revisions on 9 December 2014 and provided a formal approval in its letter to BNSF dated 23 December 2014 (DEQ 2014l). GWMD-2R includes both quarterly and semiannual sampling requirements for VOCs and general water chemistry parameters. The first quarterly sampling event required under GWMD-2R was conducted in January 2015. These data are not discussed in this report; pertinent alluvial aquifer and bedrock groundwater data will be presented in the Task L SI Report that will be submitted to DEQ on or before 23 April 2015 (see Section 5.5.1).

6.2 SAMPLING PROGRAM OVERVIEW

Each quarterly/semiannual monitoring event consisted of field measurements and groundwater sample collection and analysis. Field measurements included liquid-levels (i.e., water levels and LNAPL thicknesses, where present) and water quality parameters. Based on the concentrations of dissolved PCE in groundwater samples collected from bedrock wells 10-2 and 13-9, these wells were also checked for the presence of DNAPL. Prior to groundwater sampling, a sample was collected from the bottom of the well at the

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well cap, which may serve as a “sump” if DNAPL is present in these two wells. Upon collection of the sample, a visual inspection of the sample was performed, then Oil-Red-O dye was added to the sample. Oil-Red-O is a hydrophobic powdered dye which is nearly insoluble in water and highly soluble in non-polar fluids, such as PCE DNAPL.

Groundwater samples collected at the Facility in 2013/2014 were collected using the low-flow purge and sample procedures as outlined in Standard Operating Guideline (SOG)-8 of the DEQ-approved Facility-Wide Sampling and Analysis Plan (Facility-Wide SAP) (Kennedy/Jenks Consultants 2006), unless otherwise noted on the groundwater purge and sample forms.

During purging, water quality parameters including temperature, pH, specific conductance, dissolved oxygen (DO), oxidation-reduction (redox) potential (ORP), and turbidity were measured at regular intervals until water quality parameters stabilized and recorded on the groundwater purge and sample forms. Copies of the groundwater purge and sample forms for each monitoring event are provided in Appendix B.

Samples were collected using dedicated sampling pumps except as noted on the groundwater purge and sample forms. Wells without dedicated sampling pumps were purged and sampled using a QED Sample Pro bladder pump. Non-dedicated sampling equipment was decontaminated between sampling locations and equipment blank samples collected.

Samples were collected in pre-preserved (where applicable) laboratory-supplied sample containers for the intended analyses. When filled, the bottles were labeled and packaged in a cooler with enough ice to maintain the sample temperature at approximately 4 degrees Celsius (^{o}C) ±2 ^{o}C for the duration of sample storage and shipment to the analytical laboratory. Sampling personnel documented each sample number/location, the date and time of collection, and required analyses on the chain-of-custody form. Groundwater samples collected during the 2014 quarterly/semiannual monitoring events were shipped under chain-of-custody protocol to Energy for analysis.

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GWMD-2 in Appendix G summarizes the wells to be sampled and analyses to be performed each monitoring event. Groundwater samples were analyzed for VOCs using EPA Method 8260 and the following water chemistry parameters, as appropriate:

- Alkalinity using SM A2320B
- Hardness using SM A2340B
- Sulfate using EPA Method 300.0
- Chloride using EPA Method 300.0
- Total dissolved solids using SM A2540C
- Nitrogen, Nitrate+Nitrite as N using EPA Method 353.2
- Dissolved metals (calcium, iron, magnesium, potassium, and sodium) using EPA Method 6010.

Groundwater analytical results for the 2014 groundwater monitoring events are summarized in Tables 9 through 11. Historical groundwater monitoring data are provided in Appendix H.

Copies of the groundwater purge and sample forms and analytical laboratory reports are provided in Appendix B and Appendix C, respectively. Copies of the data validation summaries are provided in Appendix D. The findings with respect to the QA/QC data do not adversely affect the use of the analytical results for evaluation of VOCs in alluvial aquifer and bedrock groundwater.

As approved by DEQ, and in accordance with the Facility-Wide SAP, purge water and decontamination water generated during the 2014 groundwater monitoring events were

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contained at the wellhead and transferred to the Task D/E groundwater treatment plant (GWTP) and subsequently treated using granular activated carbon prior to discharge under a Montana Pollutant Discharge Elimination System permit.

6.3 2014 GROUNDWATER MONITORING EVENTS

6.3.1 December 2013/January 2014

Quarterly groundwater sampling of alluvial wells 13-1 through 13-7 was conducted on 18 and 19 December 2013 in accordance with GWMD-2. Since Task L bedrock well construction activities (13-series wells) were still ongoing in December 2013, quarterly groundwater sampling of Task L bedrock wells 13-8 through 13-10 was conducted on 17 January 2014.

Groundwater analytical results from the December 2013/January 2014 groundwater monitoring event are summarized in Table 9.

6.3.2 February 2014

Quarterly/semiannual groundwater monitoring was conducted in February 2014. Liquid-level measurements were recorded between 18 and 28 February 2014 (to coincide with a required Task D/E liquid-level monitoring event). Groundwater samples were collected between 19 and 28 February 2014 and analyzed for VOCs and general water chemistry parameters in accordance with GWMD-2. Groundwater samples were also collected from wells E-6, E-8, and ISCO-1 during this sampling event (in support of the mass discharge modeling). PDBs were placed in well 89-3 approximately 2 weeks prior to sample collection. Samples were not collected from the following wells during this monitoring event:

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- Well #11. The well was dry.

- Well 90-2B. There was not sufficient water in the well to purge and sample.

- Well 13-6. The well could not be located due to surface winter weather conditions.

Groundwater analytical results from the February 2014 groundwater monitoring event are summarized in Table 10.

6.3.3 June 2014

Quarterly/semiannual groundwater monitoring was conducted in June 2014. Liquid-level measurements were recorded between 2 and 10 June 2014 (to coincide with a required Task D/E liquid-level monitoring event). Groundwater samples were collected between 2 and 16 June 2014 and analyzed for VOCs and general water chemistry parameters in accordance with GWMD-2. A groundwater sample was also collected from well 92-1 in June 2014 as part of the Task L supplemental groundwater sampling program (see Section 5.2); other wells to be sampled as part of this program (10-2, ISCO-2, 13-3, 13-9, and E-7) were sampled as part of GWMD-2 monitoring event. PDBs were placed in well 89-3 approximately 2 weeks prior to sample collection. Groundwater analytical results from the June 2014 groundwater monitoring event are summarized in Table 11.

Groundwater samples were not collected from wells E-6, E-8, and ISCO-1 during this sampling event or subsequent sampling events in accordance with GWMD-2.

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6.3.4 September 2014

Quarterly groundwater sampling was conducted between 15 and 18 September 2014 in accordance with GWMD-2. Groundwater analytical results from the September 2014 groundwater monitoring event are summarized in Table 9.

6.4 GENERAL FIELD OBSERVATIONS

Field measurements collected during the groundwater monitoring events included water levels and LNAPL thicknesses and water quality parameters. Wells in the groundwater monitoring program were visited, and water level and apparent LNAPL thickness, if any, were measured and recorded. At each well, the cap was removed and the well was left open for several minutes to allow the water level to stabilize. An electronic, oil/water interface probe (Solinst® Interface Probe and/or a Heron® H.01L Interface Meter) was then slowly lowered into the well casing until contacting groundwater or LNAPL. The depth of the top of each fluid was measured and recorded to the nearest 0.01 foot using a surveyed mark on the top of the well casing. After use at each well, the oil/water interface probe was decontaminated using a solution of phosphate-free detergent, then rinsed with potable water, then distilled water.

Liquid-level measurements recorded in 2014 for wells being monitored on a semiannual basis are summarized in Tables 12 and 13. (Note: The groundwater purge and sample forms also include a water level measurement taken immediately prior to the start of purging and may differ slightly from the measurement recorded in Tables 12 and 13 due to the time-lapse between measurements.) Tables 12 and 13 also include water level and LNAPL thickness measurements from other Facility wells that were monitored at the same time as the GWMD-2 wells. Available contemporaneous groundwater elevation data from Facility alluvial aquifer monitoring wells were used to prepare the potentiometric surface contour maps (see Figures 15 and 16).

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Water quality parameters were recorded on the groundwater purge and sample forms that are included in Appendix B.

6.4.1 Groundwater Elevation, Flow Direction, and Gradient

Static groundwater depth measurements and calculated air-water table elevations for the February and June 2014 semiannual monitoring events are summarized in Tables 12 and 13. The air-water table elevations were calculated for monitoring wells containing LNAPL by multiplying the LNAPL thickness by a density factor of 0.88 and adding the result to the measured water-LNAPL table elevation.

Water table elevations in alluvial aquifer wells measured in February 2014 ranged from 4436.41 to 4482.36 feet above mean sea level (MSL) (wells 07-7 and EX-20, respectively). As shown on Figure 15, the apparent groundwater flow direction in February 2014 was east to northeasterly near and beyond the Yellowstone River. The average hydraulic gradient was estimated to be approximately 0.004 feet per foot (ft/ft).

Water table elevations in alluvial aquifer wells measured in June 2014 ranged from 4439.15 to 4486.51 feet MSL (wells 07-7 and EX-20, respectively). As shown on Figure 16, the groundwater flow direction and gradient in June 2014 was similar to the flow direction and gradient observed in February 2014.

As expected, water table elevations in February 2014 were typically lower than the water table elevations measured in June 2014. In general, the largest variations in water table elevations were observed in wells located closest to the Yellowstone River.

Groundwater elevations, flow directions, and gradients observed in 2014 are consistent with previous years monitoring events.

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6.4.2 Apparent LNAPL Thickness

The LNAPL thickness measurements for the February and June 2014 semiannual monitoring events are summarized in Tables 12 and 13, respectively. No measurable LNAPL was detected in the GWMD-2 semiannual monitoring wells during the February and June 2014 monitoring events. An LNAPL film was observed at well EX-22 during the June 2014 monitoring event.

As shown in Tables 12 and 13, LNAPL was detected in Task D/E wells. LNAPL at the Facility is being addressed under Task D/E. The distribution of LNAPL at the Facility will be presented under separate cover (*2014 Task D/E Annual Report*).

6.4.3 DNAPL

DNAPL was not detected using Oil-Red-O dye in grab groundwater samples collected from the well "sump" of bedrock wells 10-2 and 13-9 during any of the groundwater monitoring events conducted in 2014.

6.4.4 Water Quality Parameters

During groundwater purging and sampling in 2014, water quality parameters were monitored and recorded at each well. An YSI 556 Multi Probe System® was used to measure temperature, pH, specific conductance, DO, and ORP. Turbidity was measured using a Hach 2100P portable turbidity meter or HF Scientific Micro TPI. Parameter values were recorded during purging until parameter readings stabilized. The water quality measurements were recorded on the groundwater purge and sample forms that are provided in Appendix B.

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6.5 GROUNDWATER ANALYTICAL RESULTS

This section presents the findings of GWMD-2 quarterly/semiannual groundwater sampling conducted at the Facility in 2014. Analytical results from the 2014 alluvial aquifer/bedrock monitoring events are summarized in Tables 9 through 11. Historical analytical results are presented in the comprehensive historical data tables in Appendix H. ROD cleanup or screening levels are shown in each table. The ROD cleanup levels for VOCs are based on *Circular WQB-7, Montana Numeric Water Quality Standards* (WQB-7 standards) dated September 1999 (DEQ 1999). Since the ROD was issued in 2001, the WQB-7 standards have been updated and are now called *Circular DEQ-7, Montana Numeric Water Quality Standards* (DEQ-7 standards) (DEQ 2012a). Both the ROD cleanup levels (i.e., September 1999 WQB-7 standards) and the October 2012 DEQ-7 standards are shown in the tables. As required by DEQ, DEQ-7 standards are only provided for those compounds that do not have a ROD-specified cleanup level.

6.5.1 Alluvial Aquifer Analytical Results

Dissolved VOCs detected in alluvial aquifer groundwater samples are summarized in Tables 9 through 11. Dissolved PCE and TCE concentrations and distribution in alluvial aquifer groundwater for the semiannual monitoring events conducted in February and June 2014 are shown on Figures 17 through 20. Dissolved PCE and TCE concentrations in alluvial aquifer groundwater for quarterly events conducted in December 2013/January 2014, February 2014, June 2014, and September 2014 are depicted on Figures 21 and 22. These figures also show dissolved PCE and TCE concentrations in bedrock groundwater.

Time-concentration graphs showing historical dissolved PCE concentrations in selected alluvial aquifer wells near the source area (Former Electric Shop vapor degreaser) and downgradient of the source area are included in Appendix I.

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In general, the PCE and TCE analytical data from the alluvial aquifer groundwater sampling events conducted in 2014 are consistent with previous data (see Appendix H). Pertinent data from the 2014 alluvial aquifer monitoring events are summarized below:

- Of the groundwater monitoring wells sampled on a regular basis, groundwater samples collected from monitoring well 89-3, located in the Former Electric Shop, have historically contained elevated concentrations of dissolved PCE detected in alluvial aquifer groundwater at the Facility. Since Spring 2005 SOW (Task F SI-P1) sampling commenced in June 2007, concentrations of dissolved PCE have been detected at a maximum concentration of 712 µg/L in groundwater samples collected from well 89-3 (deep PDB sample collected in August 2008). The Former Electric Shop area, surrounding well 89-3, was the focus of the Task F SI-P2 ISCO pilot testing using sodium permanganate between 2008 and 2011. The alteration of saturated zone conditions caused by the oxidation of PCE and related chemicals during the Task F SI-P2 ISCO pilot testing has resulted in variable PCE concentrations in groundwater samples collected from well 89-3 in recent years depending on when groundwater sampling events were performed relative to pilot testing activities (i.e., PCE reduction versus rebound)[3]. Overall, dissolved PCE concentrations in this well have decreased as a result of the Task F SI-P2 ISCO pilot testing (see Appendix I).

  Since 2012 (and completion of the Task F SI-P2 ISCO pilot testing), groundwater samples collected from well 89-3 using low flow purging methods (i.e., non-PDB) have consistently contained between 42 and 57 µg/L of dissolved PCE. Dissolved PCE concentrations detected in groundwater samples collected from this well in 2014 are within this range. These concentrations are less than the PCE concentrations detected in groundwater samples collected prior to Task F SI-P2 ISCO pilot testing.

[3] See Revised Comprehensive Report for additional groundwater data relating to the Task F SI-P2 ISCO pilot testing.

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- PDB sample results from well 89-3 between 2007 and 2011, identified the highest dissolved PCE concentrations in the deeper PDB samples [up to 712 µg/L (deep PDB sample collected in August 2008)]. Since completion of the Task F SI-P2 ISCO pilot testing in 2011, the vertical stratification of dissolved PCE concentrations in well 89-3 has not been observed. The reported dissolved PCE concentrations in the PDB samples in February 2014 ranged from 45 to 49 µg/L and in June 2014 ranged from 41 to 53 µg/L. These results are consistent with PDB data collected in 2011, 2012, and 2013.

- Since December 2012, three additional alluvial aquifer wells located near the Former Electric Shop (ISCO-24R) and downgradient of the Former Electric Shop and east of Locomotive Shop (ISCO-1 and ISCO-2) have been sampled on a regular basis as part of GWMD-1 and continued to be sampled in 2014 (except as noted below) in accordance with GWMD-2. The ISCO wells were constructed as part of the Task F SI-P2 ISCO pilot testing and selected wells were used to monitor the effectiveness of the pilot testing. The alteration of saturated zone conditions caused by the oxidation of PCE and related chemicals during the Task F SI-P2 ISCO pilot testing has resulted in variable PCE concentrations in groundwater samples collected from these wells in recent years depending on when groundwater sampling events were performed relative to pilot testing activities (i.e., PCE reduction versus rebound). Dissolved PCE was initially detected in groundwater samples collected from well ISCO-24[4] and ISCO-2 at concentrations of 275 and 984 µg/L, respectively. The concentrations of dissolved PCE in groundwater samples collected from wells ISCO-2 and ISCO-24R ranged from 50 to 102 µg/L and 75 to 119 µg/L in 2014.

  Dissolved PCE concentrations in groundwater samples collected from ISCO-1 were typically lower than those detected in groundwater samples collected from ISCO-2 and ISCO-24R prior to Task F SI-P2 ISCO pilot testing. Since 2012, dissolved PCE concentrations in groundwater samples collected from well ISCO-1 have varied from 3.2 to 20 µg/L. Per DEQ's GWMD-2, ISCO-1 was

[4] Well ISCO-24 was replaced by well ISCO-24R at the same location.

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sampled once in 2014, during the February 2014 sampling event. PCE was detected at a concentration of 9.0 µg/L.

- Quarterly sampling of alluvial aquifer wells (13-1 through 13-7) continued in 2014. These wells were constructed in 2013 east of the Locomotive Shop around bedrock well 10-2. The wells were initially sampled in July 2013. During the GWMD-2 quarterly groundwater sampling event in December 2013/January 2014, the concentrations of dissolved PCE in the groundwater sample collected from well 13-3 increased from 62 to 670 µg/L. This increase was possibly an artifact of the bedrock well (13-9) construction activities that were ongoing adjacent to well 13-3 at the time of sampling. As discussed in Section 5.2, supplemental groundwater sampling of well 13-3 was conducted in April, May, and June 2014. During the supplemental sampling events, the concentration of dissolved PCE increased to a maximum of 1,010 µg/L in April 2014; the concentrations declined during subsequent sampling events to 473 µg/L in September 2014.

  The dissolved PCE concentration in the groundwater sample collected from well 13-4 also increased between the initial groundwater sampling event in July 2013 and the December 2013/January 2014 sampling event (9.7J to 36 µg/L). A similar concentration (39 µg/L) was detected during the February 2014 sampling event. The dissolved PCE concentrations declined in June 2014 (18 µg/L) and September 2014 (5.0 µg/L).

  Dissolved PCE was not detected in the groundwater sample collected from well 13-1 above the method reporting limit of 0.5 µg/L since the well was constructed in 2013. An estimated concentration (0.12J µg/L) was reported in February 2014; estimated concentrations were not identified in subsequent sampling events. This well helps define the lateral distribution of dissolved PCE in alluvial aquifer groundwater in this part of the Facility.

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- Of the groundwater monitoring wells sampled on a regular basis since 2007 downgradient of the Former Electric and Locomotive Shop areas, groundwater samples collected from well 89-4 have also contained elevated concentrations of dissolved PCE. Alluvial aquifer well 12-8 was constructed in this area in 2012 as a well pair to bedrock well 10-4. Well 12-8 has been sampled on a regular basis since construction in 2012 under Task L and, starting in December 2012, under GWMD-1. After GWMD-2 was implemented in December 2013, well 12-8 replaced well 89-4 as the alluvial aquifer well in this portion of the Facility. The concentrations of dissolved PCE in groundwater samples from well 12-8 have ranged between 48 to 68 µg/L since regular sampling commenced in 2012. Dissolved PCE was detected at a concentration of 39 µg/L in groundwater samples collected from well 12-8 during both sampling events in 2014. These concentrations are consistent with dissolved PCE data previously obtained from well 89-4 (see Appendix H).

- Since Spring 2005 SOW (Task F SI-P1) sampling commenced in 2007, dissolved TCE has been detected in groundwater samples collected from six alluvial aquifer wells (89-3, 90-1C, 90-1A, L-87-2, EX-22, and 12-7) above the ROD TCE cleanup level of 5 µg/L. During the 2014 sampling events, dissolved TCE was detected above the ROD cleanup level in groundwater sample collected from well 12-7 at a concentration of 9.0 µg/L during the February 2014 sampling event. Dissolved TCE was not detected above the ROD cleanup level in the groundwater sample collected from well 12-7 during the June 2014 sampling event.

- Of the wells sampled on a regular basis as part of the Facility-wide monitoring programs, dissolved vinyl chloride has been consistently detected in groundwater samples collected from well L-87-2 at concentrations above the ROD cleanup level for vinyl chloride of 0.15 µg/L since the well was first sampled in 1987. The concentrations of dissolved vinyl chloride detected in groundwater samples collected from this well in 2014 (0.94 and 0.86 µg/L) are consistent with recent results.

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Since commencement of the Spring 2005 SOW (Task F SI-P1) sampling in 2007, vinyl chloride has also been detected in groundwater samples collected from well EX-22 at concentrations ranging from 0.32J to 0.72 µg/L. Vinyl chloride was reported at an estimated concentration of 0.18J µg/L in the duplicate sample collected during the February 2014 event but was not reported above the method reporting limit of 0.40 µg/L in the primary sample collected during the February 2014 event or during the June 2014 sampling event. Historically, the vinyl chloride detections seem to occur at this well during the February/March sampling events.

Dissolved vinyl chloride was reported in the groundwater samples collected from well MW-5R/MW-5RR for the first time in 2013 at estimated concentrations of 0.12J and 0.10J µg/L. Dissolved vinyl chloride was reported in the groundwater sample collected from well MW-5RR during one of the 2014 semiannual sampling events at an estimated concentration of 0.10J µg/L (February 2014).

Dissolved vinyl chloride has also been sporadically reported at estimated concentrations in groundwater samples collected from wells 12-7 and 12-10. Dissolved vinyl chloride was reported at estimated concentrations of 0.13J and 0.16J µg/L in groundwater samples collected from well 12-7 in February and June 2014, and at an estimated concentration of 0.32J µg/L in the groundwater sample collected from well 12-10 in June 2014.

6.5.2 Bedrock Groundwater Analytical Results

Dissolved VOCs detected in bedrock groundwater samples are summarized in Tables 9 through 11. Dissolved PCE and TCE concentrations in alluvial aquifer/bedrock groundwater for quarterly sampling events conducted in December 2013/January 2014, February 2014, June 2014, and September 2014 are depicted on Figures 21 and 22. Pertinent data from the 2014 bedrock monitoring events are summarized below:

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- Dissolved PCE and TCE were not detected in the groundwater samples collected from bedrock wells 11-1, 12-2, 12-3, 12-4, and 12-6 located outside DEQ's "less than 0.5 µg/L isoconcentration contour for PCE in alluvial aquifer groundwater" on the western side of the Yellowstone River. PCE and TCE were not detected above the method reporting limit of 0.5 µg/L in the groundwater samples collected from bedrock wells (10-8 and 12-5) located on the eastern side of the Yellowstone River. Estimated concentrations of dissolved PCE (0.017J µg/L and 0.24J µg/L) were reported in the groundwater sample collected from well 10-8 during the February and June 2014 sampling events.

  Dissolved PCE and TCE were detected above the method reporting limit of 0.5 µg/L in groundwater samples collected from the bedrock wells located within DEQ's "less than 0.5 µg/L isoconcentration contour for PCE in alluvial aquifer groundwater" on the western side of the Yellowstone River, except from bedrock well 10-5, 13-8, and 13-10. Wells 13-8 and 13-10 are located north of and south of the industrial sewer line and bedrocks wells 10-2 and 13-9, respectively, and help define the lateral distribution of dissolved PCE in bedrock groundwater in this part of the Facility. Well 13-8 is located near alluvial aquifer well 13-1. As noted above, dissolved PCE was not detected above the method reporting limit of 0.50 µg/L in groundwater samples collected from this alluvial aquifer well. Bedrock well 13-10 is located near alluvial aquifer well 13-5. Dissolved PCE was detected in alluvial aquifer groundwater samples from this well at concentrations of 10 and 16 µg/L in 2014.

- Prior to the 2014 sampling events, dissolved PCE was detected in groundwater samples collected from bedrock well 10-2 at a maximum concentration of 9,760 µg/L (February 2013). Dissolved PCE was detected in groundwater samples collected from bedrock well 10-2 at concentrations of 6,980 µg/L and 8,720 µg/L in February and June 2014, respectively. As noted in Section 6.4.3, DNAPL was not observed at this well.

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- During the first groundwater sampling event at bedrock well 13-9 in January 2014, PCE was detected at a concentration of 52,400 µg/L. During subsequent groundwater sampling events in 2014, dissolved PCE was detected at concentrations ranging from 35,400 µg/L (February 2014) to 55,600 µg/L (April 2014). As noted in Section 6.4.3, DNAPL was not observed at this well.

- Dissolved PCE was also detected in groundwater samples collected from bedrock wells 10-1, 10-3, 10-4, 10-6, 10-7, and 12-1 prior to 2014 at concentrations ranging from 3.5 to 46 µg/L. During the 2014 sampling events, dissolved PCE was detected at similar concentrations (10 to 39 µg/L) in groundwater samples collected from these bedrock wells.

- FLUTe™ well 12-1 has five depth-staggered groundwater sampling ports that allowed groundwater samples to be collected from five discreet depth intervals within the bedrock. During the first sampling event after construction in December 2012, dissolved PCE concentrations (15 to 29 µg/L) were generally similar across the vertical bedrock interval spanned by the FLUTe™ well and the overlying alluvial aquifer (well 12-10, 20 µg/L). The dissolved PCE concentrations detected in groundwater samples collected from the FLUTe™ well in 2014 are similar to those previously reported ranging from 20 µg/L to 31 µg/L in February 2014 and 11 µg/L to 33 µg/L in June 2014.
  Similar concentrations (22 µg/L and18 µg/L) were detected in the nearby alluvial aquifer well 12-10 during the same sampling events.

- Dissolved vinyl chloride was detected in the groundwater samples collected from bedrock well 13-9 at a concentration of 0.56 µg/L during the first sampling event at this well in December 2013/January 2014. Dissolved vinyl chloride was not detected during subsequent quarterly sampling events in 2014; however, it should be noted that the method reporting limits were elevated in subsequent sampling events due to sample dilution. Estimated concentrations of vinyl chloride were previously reported in groundwater samples collected from

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well 10-2; however, the method reporting limits were elevated due to sample dilution in 2014.

Estimated concentrations (018J, 0.19J, and 0.13J µg/L) of dissolved vinyl chloride were reported in the groundwater samples collected from FLUTe™ well 12-1 sampling ports 1, 2, and 3, respectively) in June 2014.

Future sampling events will be used to evaluate spatial and temporal changes in dissolved PCE concentrations in bedrock wells over time.

6.5.3 General Water Chemistry

Starting in September 2011, DEQ required groundwater samples collected from both bedrock and alluvial aquifer monitoring wells be analyzed for general chemistry parameters to evaluate whether the water collected from the two geologic zones exhibit similar geochemical signatures. General chemistry data were collected on a quarterly basis from bedrock wells starting in September 2011 and from paired alluvial aquifer wells (as well as selected Task F SI-P1 wells not paired with bedrock wells) starting in December 2012 in accordance with GWMD-1.

General chemistry parameters were collected from the 2013 alluvial aquifer/bedrock wells (13-1 through 13-10) starting in December 2013 (GWMD-2) (see Tables 9 through 11). Collection of samples for general chemistry parameters was no longer required under GWMD-2 for other alluvial aquifer/bedrock wells in the monitoring program.

The laboratory results were evaluated relative to the reported concentrations of the cations calcium, magnesium, sodium, and potassium; and the anions carbonate, bicarbonate, sulfate, and chloride. The ion concentrations, reported in milligrams per liter (mg/L), were converted to milliequivalents per liter using the following formula:

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$$milliequivalents\ per\ liter = \frac{milligrams\ per\ liter * valence}{molar\ mass}$$

Non-detects were assigned values of zero.

The comparative percentages of calcium to magnesium to sodium plus potassium were calculated for the cations. The comparative percentages of carbonate plus bicarbonate to sulfate to chloride were calculated for the anions. The values were then plotted on a Piper Diagram as percentage milliequivalents per liter.

The plotted data for each quarter for wells 13-1 through 13-10 are presented on Figures 23 through 26. The plotted results on the Piper Diagrams show, in general, a very tight clustering of the alluvial and bedrock groundwater samples on the cation side for the 13-series wells, with the exception of bedrock well 13-10. On the anion side, the groundwater samples show a tightly constrained chloride content, but with variable ratios of sulfate to bicarbonate across a range of 20 to 30 percent. Comparatively, alluvial wells show a generally higher bicarbonate content, while the bedrock wells show a higher sulfate content.

In the alluvial aquifer groundwater, calcium fractions generally range from 50 to 60 percent, magnesium fractions range from 20 to 25 percent, and sodium/potassium fractions range from 20 to 25 percent. With respect to major anions, fractions of carbonate plus bicarbonate in alluvial groundwater generally range from 50 to 75 percent, sulfate fractions range from 15 to 40 percent, and chloride fractions range from 5 to 15 percent.

In the bedrock aquifer groundwater (wells 13-8 and 13-9), calcium fractions generally range from 70 to 75 percent, magnesium fractions range from 20 to 25 percent, and fractions of sodium/potassium range from 20 to 30 percent. Well 13-10 is an outlier with very high sodium fractions of 85 to 90 percent, calcium at 10 to 15 percent, and only a trace of magnesium. With respect to major anions, fractions of carbonate/bicarbonate in bedrock groundwater generally range from 50 to 65 percent, sulfate fractions range from 30 to 45 percent, and chloride fractions range from 5 to 15 percent.

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These data indicate the alluvial aquifer groundwater geochemistry is characterized by predominantly calcium bicarbonate water, with little significant variation across the 13-series wells. The bedrock groundwater from wells 13-8 and 13-9 can be characterized also as generally calcium bicarbonate water, but with a slightly higher sulfate content. The outlier well 13-10 would be characterized as a sodium bicarbonate water.

Alluvial wells 13-1, 13-3, and 13-5 are paired with bedrock wells 13-8, 13-9, and 13-10, respectively. The data were reviewed to ascertain vertical, spatial, and temporal relationships at the well pairs and between alluvial and bedrock groundwater in general. The following observations are made:

- On the cation side, ion fractions are so tightly clustered that comparative relationships and trends cannot be readily ascertained.

- On the anion side, the bedrock wells tend to be more enriched in sulfate by 3 to 10 percent than their alluvial well counterparts.

With regard to spatial relationships, the anion fractions become more enriched in bicarbonate from north to south, consistently in the alluvial groundwater, but less so in the bedrock groundwater.

Temporally, the wells display generally consistent results from quarter to quarter. The outlier data, collected from well 13-10, is also consistent through the monitoring period. Most wells vary in their ratio of bicarbonate to sulfate within a range of 5 to 12 percent between sampling events, with no clear seasonal trend.

The results over the four quarters of monitoring show generally consistent and stable results. Additional groundwater chemistry data will be collected from the 14-series wells in accordance with GWMD-2R.

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6.6 QA/QC AND DATA VALIDATION

Field QA/QC procedures included adherence to proper chain-of-custody protocols, collection of field duplicate samples, field blank samples, and equipment blank samples and use of trip blank samples. Proper chain-of-custody protocols were followed during the 2014 groundwater monitoring events. Energy received samples intact.

6.6.1 QC Samples

QC samples submitted for analysis during the 2014 monitoring events included field duplicate samples, field blank samples, equipment blank samples, and trip blank samples, as appropriate. During the monitoring events, field duplicate samples are typically collected at a rate of approximately 10 percent. The duplicate samples were collected at the same time as primary samples by filling two sets of sample bottles and then assigning a fictitious sample identification number to the duplicate sample in accordance with the Facility-Wide SAP. Field duplicate analytical results are provided with the associated primary samples in the analytical summary tables.

In general, field blank samples are prepared in the field for each day of sampling using laboratory-supplied reagent-grade water. Equipment blank samples are collected if non-dedicated sampling equipment is used. The equipment blank sample is collected by passing laboratory-supplied reagent grade water through the sampling equipment. Trip blank samples, which were prepared by the analytical laboratory, were submitted with each cooler for analysis of VOCs. The trip blank samples are prepared at the time the sample containers were ordered and accompanied the sample containers throughout each monitoring event. QC sampling data are included in the analytical laboratory reports in Appendix C and discussed in the data validation summaries in Appendix D.

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6.6.2 Data Validation

Upon receipt of the analytical results, Kennedy/Jenks Consultants conducted a QA/QC review of the data in general accordance with applicable sections of the EPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (EPA 2014) and DEQ-approved Facility-Wide Quality Assurance Project Plan (Facility-Wide QAPP) (Kennedy/Jenks Consultants 2006)[5]. The evaluation consisted of reviewing the following:

- Holding times
- Laboratory method blank sample results
- Surrogate compound recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) sample results
- Laboratory control sample (LCS) results
- Laboratory duplicate sample results
- Field blind duplicate sample results
- Field blank sample results.

The QA/QC reviews are summarized on the data validation reports included in Appendix D. Based on the QA/QC review, data for the 2014 groundwater monitoring events generally met the requirements for each of the above criteria, except as noted in the data validation summaries, and are valid and acceptable for evaluation of alluvial aquifer and bedrock groundwater quality at the Facility.

[5] Facility-Wide QAPP is located in Appendix B of the Facility-Wide SAP.

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6.6.3 DEQ Split Samples

DEQ did not collect any split samples during the 2014 groundwater monitoring events.

6.7 FUTURE GROUNDWATER MONITORING EVENTS

Groundwater sampling of alluvial aquifer and bedrock wells will continue in accordance with GWMD-2R, until otherwise directed by DEQ.

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7.0 WELL INVENTORY

The 2014 annual update to the private and public well inventory [*Private and Public Well Inventory – 2014 Update (Revision No. 9)*] (Kennedy/Jenks Consultants 2015) was submitted to DEQ on 29 January 2015.

Since an updated private and public well inventory has been provided to DEQ under separate cover, the information is not repeated in this report.

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8.0 NO LONGER CONTAINED-IN DECISIONS, OFFSITE DISPOSAL NOTIFICATIONS, AND OFFSITE DISPOSAL INFORMATION

8.1 NO LONGER CONTAINED-IN DECISIONS

The following requests for no longer contained-in decisions were submitted to DEQ in 2014:

Media	Date of No Longer Contained-in Request	Date Determination Received from DEQ
Soil cuttings – generated during Task L - Addendum No. 3 well construction activities contained in roll-off bins HRO#51 through #52.	21 July 2014 (Kennedy/Jenks Consultants 2014f)	29 August 2014 (DEQ 2014e)

8.2 OFFSITE DISPOSAL NOTIFICATIONS

No offsite disposal notifications were submitted to DEQ during 2014.

8.3 OFFSITE DISPOSAL INFORMATION

No materials were transported offsite in 2014 for disposal at an appropriately permitted offsite disposal/recycling facility.

8.4 LANDSPREADING

The following materials were landspread in the former C&P Packing pit (DEQ-approved landspread area) in 2014:

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Media	Date of No Loner Contained-in Decision (if applicable)	Date of Landspreading
Soil cuttings – generated during Task L - Addendum No. 3 well construction activities contained in roll-off bins HRO#51 through #52.	29 August 2014	11 September 2014

On 11 September 2014, approximately 13 cubic yards of soil contained in roll-off bins HRO#51 and HRO#52 was landspread in the former C&P Packing pit (DEQ-approved landspread area). As required, DEQ was notified that soil had been landspread in an email from Kennedy/Jenks Consultants dated 15 September 2014.

8.5 OTHER

Soil cuttings generated during Task L (Addendum No. 2) well construction activities in 2013 are currently contained in roll-off bin HRO#50 located in the secured roll-off bin storage area pending disposal. DEQ provided a no longer contained-in determination for the soil contained in the roll-off bin in its letter to BNSF dated 12 December 2013 (DEQ 2013b). However, due to the concentrations of lead above the residential cleanup level of 400 mg/kg, DEQ will not allow the soil contained in roll-off bin HRO#50 to be landspread in the DEQ-approved landspread area (i.e., former C&P Packing pit) until BNSF places an institutional control on the property restricting future residential use. The soil may be disposed of at an offsite permitted Subtitle D disposal facility.

Soil cuttings generated from the Task L (Revised Addendum No. 4) well construction activities in 2014 are currently contained in roll-off bin HRO#53 located stored in the secured roll-off bin storage area pending receipt of a no longer contained-in determination from DEQ and disposal.

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9.0 FACILITY INSPECTION

The annual Facility inspection was conducted in September 2014. Parts of the annual Facility inspection activities were completed during other DEQ-required activities and were not repeated in September 2014 (e.g., the cinder pile inspection). The Facility inspection included the following:

- Cinder pile (June 2014)
- IDW storage areas (weekly)
- Facility wells (September 2014).

Results of the Facility inspection were recorded on the annual facility inspection form included in Appendix J. No problems were observed during the inspection of the cinder pile and IDW storage areas.

At the time of the 2014 Facility inspection, 370 wells including monitoring and test wells (but excluding bioventing wells/vapor monitoring points) penetrating the alluvial aquifer and underlying bedrock were known to have been constructed during Facility investigations and remediation activities[6]. During the annual inspection, field personnel were able to observe 262 wells.

The remaining 108 wells were not included in the inspection for the reasons noted below.

- Thirteen wells (MW-1Conoco, MW-2Conoco, MW-1 through MW-10, and WET MW-4) were installed as part of other investigations not related to Facility.
- Thirty-one wells are reportedly destroyed and could not be located.

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- Forty-six multi-use wells (MUWs) and four prototype wells (PMWs) were not specifically inspected as they are part of the ongoing Task D/E remediation activities. The remediation system undergoes ongoing operation and maintenance activities. Well maintenance activities are conducted as necessary.

- Six wells were not inspected due to confined spaced entry requirements.

- Eight wells could not be located and/or accessed. Reasonable efforts have been made to locate these wells during previous Facility inspections.

Observations made during the Facility well inspections were recorded on a well inspection form. The well inspection forms are included in Appendix J.

Ongoing well repair/maintenance activities are being conducted at the Facility based on the inspections and observations made during the Facility inspection, the groundwater monitoring events, and other activities being conducted at the Facility.

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[6] The five new Task L bedrock/alluvial aquifer wells (14-2 through 14-6) were not constructed at the time of the Facility inspection and are not included in the well count.

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10.0 CONCEPTUAL SITE MODEL

Kennedy/Jenks Consultants, on behalf of BNSF, developed a CSM for the Burlington Northern Livingston Shop Complex that was initially presented in 2013 and was based on currently available data and information. In its letter to BNSF dated 30 May 2013, DEQ required that the CSM be included in quarterly status reports and annual monitoring and maintenance reports prepared under the Spring 2005 SOW. The CSM was initially included in *Quarterly Status Report No. 32 (May, June, July 2013)* (Kennedy/Jenks Consultants 2013c) and has been included in subsequent quarterly status reports and annual monitoring and maintenance reports. The CSM is intended as a working document, to be updated based on additional information obtained and subsequent data evaluation(s). Based on additional information obtained throughout 2013, the CSM was updated in 2014 and presented in the *2013 Annual Monitoring and Maintenance Report* (Kennedy/Jenks Consultants 2014b).

Tabulated and graphical components (i.e., plan view, cross sections, and orthographic projection) of the 2014 CSM are presented in Table 14 and Figures 27 through 30 and discussed below. Additional information has been obtained throughout 2014 as documented in various sections of this report, including construction of four new bedrock wells (14-2, 14-3, 14-4 and 14-6) and one new alluvial aquifer well (14-5), collection of additional transducer data, and collection of additional groundwater data from the bedrock and alluvial aquifer. In a conference call between BNSF, Kennedy/Jenks Consultants, DEQ, and CDM Smith on 3 March 2015, DEQ agreed that the CSM would be updated at part of the Task L SI Report, which will be submitted to DEQ on or before 23 April 2015; therefore, this section has not been updated to reflect new information obtained in 2014, except where indicated.

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10.1 PCE SOURCES AND MIGRATION PATHWAYS

The CSM includes an identification of potential PCE sources at the Facility and migration pathways from PCE sources to and within the saturated zone. Data/information gaps that have been identified include: (1) the degree to which PCE mass flux from bedrock to alluvial aquifer groundwater (and/or vice versa) occurs, and (2) the general size of the area where PCE at parts-per-million concentration levels may be present in shallow bedrock groundwater and may serve as a source of dissolved PCE to alluvial aquifer groundwater.

In general, the lateral extent of alluvial and bedrock groundwater containing detectable concentrations of dissolved PCE has been characterized. The bedrock monitoring wells where groundwater sampling results suggest the potential presence of PCE as a DNAPL are bedrock wells 10-2 and 13-9. Known historical releases of PCE have occurred at the Facility in the vicinity of the Former Electric Shop and the Locomotive Shop. These releases have been characterized by utilizing analytical data (soil, soil gas, and groundwater), field observations (soil observation, field screenings, etc.) and knowledge of former site use and site history. The multiple lines of evidence suggest that the PCE present in the subsurface originated from: (1) a former vapor degreaser pit located west of the Former Electric Shop, (2) industrial wastewater lines (some of which are still active)[7], and (3) Former Electric Shop and Locomotive Shop manways[8] (which are accessible and still active) associated with the industrial wastewater line(s) (see Figures 27 through 30).

PCE was likely initially released to the unsaturated zone, followed by gravity driven downward vertical migration to the alluvial aquifer and then into bedrock. Groundwater PCE concentrations at these locations are elevated relative to other locations at the Facility. The amount of PCE mass released from these locations is unknown. Elevated PCE soil gas concentrations observed during the Task I supplemental investigation (Kennedy/Jenks Consultants 2009b) in the vicinity of the cinder pile in 2007/2008, as

[7] In 1989, the majority of the active drain lines were sleeved with polyethylene pipe (Envirocon 1994).
[8] In 1989, six manways were replaced and a new wastewater discharge line was installed (Envirocon 1994).

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well as the passive soil gas data collected from the cinder pile in July 2013 may be indicative of another potential PCE source area at the Facility.

The presence of dissolved PCE in alluvial aquifer groundwater appears to be attributable to a combination of sources. Potential sources of PCE in alluvial aquifer groundwater include: (1) residual DNAPL and/or adsorbed PCE in the porous material comprising the unconsolidated (saturated and unsaturated) alluvium; (2) residual DNAPL present in bedrock fractures (secondary porosity); (3) aqueous phase PCE present in the bedrock matrix (primary porosity) at higher concentrations than dissolved PCE concentrations in proximal alluvial aquifer groundwater, and (4) vapor phase PCE in the vadose zone above the unconfined water table. The relative contributions of these sources in terms of mass have not been estimated. The following paragraphs summarize past findings and data analyses have been performed to qualitatively evaluate PCE mass contribution to the alluvial aquifer from the sources identified above:

(1) Residual DNAPL and/or adsorbed PCE in the porous material comprising the unconsolidated alluvium. Data collected from Task F SI-P2 ISCO pilot testing testing (Kennedy/Jenks Consultants 2013b) of the alluvial aquifer showed rebounding of dissolved PCE concentrations in groundwater samples collected from selected monitoring wells following ISCO application. Post-ISCO rebounding of PCE concentrations in certain monitoring wells may be attributable to several phenomena. In general, the “rebounded” PCE concentrations in ISCO treated area groundwater are relatively low (i.e., less than 100 µg/L) compared to historical maximum PCE concentrations in groundwater, which ranged from 252 µg/L (ISCO-13/13R) to 984 µg/L (ISCO-2). Such rebounds can be attributable to incomplete oxidation of PCE source materials in the alluvial aquifer matrix as well as PCE movement into alluvial aquifer groundwater from diffusion. Incomplete oxidation of source materials that are not adequately contacted and treated by oxidant amended groundwater (e.g., less transmissive silt lenses, if present) and/or oxidation resistant matrices may be the principle causes of the dissolved PCE concentration “rebounds” observed at some locations. One working hypothesis, based upon observation of soil excavated in the past from beneath the vapor degreaser pit, is that some soil particles in the

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saturated zone may be “coated” with a high molecular weight petroleum hydrocarbon mixture (such as grease) with PCE mixed or “comingled” in this hydrocarbon coating. (Note: Petroleum-like odor and staining were observed in the unconsolidated alluvial aquifer deposits at wells ISCO-13 and ISCO-24 near the Transfer Pit manway). Permanganate can oxidize some of the heavy hydrocarbon coating and entrained PCE, but longer contact times than those pilot tested may be required to more completely remediate such source material.

(2) Residual DNAPL present in bedrock fractures (secondary porosity). Groundwater sampling results suggest the potential presence of PCE as a DNAPL in the vicinity of bedrock wells 10-2 and 13-9. PCE was detected in soil samples collected from Task L alluvial aquifer wells constructed in 2013 at concentration ranging from 0.011 to 0.035 mg/kg; appreciable concentrations were not detected at the alluvium/bedrock contact. Additional soil samples were collected from the alluvial aquifer and shallow bedrock as part of the 2014 Task L well construction activities (see Section 5.4.1). PCE was detected in soil samples collected from the alluvium at concentration ranging from 0.0088 to 0.49 mg/kg; and from the shallow bedrock at a concentration of 5.6 mg/kg (see Table 8). Maximum concentrations of dissolved PCE in groundwater samples collected from bedrock wells 10-2 and 13-9 are 9,760 µg/L (February 2013) and 55,600 µg/L (April 2014), respectively.

Due to the elevated PCE concentrations in groundwater samples collected from bedrock wells 10-2 and 13-9, a visual inspection for DNAPL is now being performed prior to groundwater sampling at these wells using Oil-Red-O, a hydrophobic dye soluble in non-polar fluids that has been documented as an effective dye for PCE DNAPL (Cohen, R.M. et al 1992). PCE DNAPL has not been detected since visual inspections began in February 2014.

Bedrock aquifers largely transmit water through preferential flow conduits such as fractures, bedding contacts, or other types of continuous secondary porosity structures (Motz et al. 2005). The difference in permeability between primary and secondary porosity in bedrock aquifers can span multiple orders of magnitude

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(Freeze and Cherry 1979). This is reflected in the range of hydraulic conductivities obtained from Facility wells during slug testing conducted by Kennedy/Jenks Consultants in 2012 (i.e., bulk bedrock hydraulic conductivities range from $1E^{-2}$ to $1E^{-6}$ centimeters per second). The bedrock wells where higher hydraulic conductivities are observed likely penetrate (are screened across) higher fractured bedrock than wells where low hydraulic conductivities are observed.

If an upward hydraulic gradient component (from the bedrock aquifer to the alluvial aquifer) exists over portions of the study area where dissolved PCE is detected in alluvial aquifer groundwater, the bedrock may contribute sufficient PCE mass to the alluvial aquifer to constitute a source of dissolved PCE to the alluvial aquifer groundwater. In general, based on currently available water level monitoring results (June 2013 through January 2015), the bedrock and alluvial aquifers appear to have similar hydraulic head measurements and thus significant vertical gradient has not been observed at this time (see Table 5 and Figures 4 through 12).

A mass flux analysis was performed by evaluating changes in the dissolved PCE mass discharge between two well transects oriented perpendicular to the general direction of alluvial groundwater flow. An observed increase in downgradient alluvial groundwater PCE mass discharge could be indicative of additional PCE mass transport into the alluvial groundwater between the well transect locations. The analysis, in general, showed no apparent gain or loss of PCE mass discharge between the chosen well transects, which could not be accounted for given the magnitude of uncertainty associated with large scale hydrogeological computations.

(3) Aqueous phase PCE present in the bedrock matrix (primary porosity). If PCE concentrations in the bedrock matrix groundwater are higher than those in groundwater at the base of the alluvial aquifer, upward diffusion of PCE may be occurring. Since submittal of the *2013 Annual Monitoring and Maintenance Report*, mathematical modeling to assess the diffusive and advective PCE mass flux between the alluvial aquifer and bedrock has been conducted (see Section 5.3). The results of the mathematical modeling will be provided to DEQ in the Task L SI Report.

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(4) Vapor phase PCE in the vadose zone above the unconfined water table. SVE has been operating beneath and near the Former Electric Shop and the Locomotive Shop. (Note: The Locomotive Shop SVE system was shut down on 11 December 2013 with DEQ approval.) While the effects of the SVE on dissolved PCE concentrations in alluvial aquifer groundwater have not been quantifiable, soil-vapor-to-groundwater partitioning is not expected to be an appreciable source of mass transfer of PCE into alluvial aquifer groundwater in the shop areas. During SVE performance evaluations, Henry's Law was used to compute the expected equilibrium vapor concentration of PCE in soil gas over a range of typical Facility groundwater temperatures and PCE concentrations in groundwater. In general, the computations support that vapor-to-groundwater partitioning is not likely an appreciable contributor of PCE mass to alluvial aquifer groundwater.

The contribution of PCE to the alluvial aquifer from submergence of deep vadose zone soil during periods of high groundwater levels can be evaluated by reviewing seasonal PCE concentrations trends. Existing groundwater monitoring data for the Task F SI-P2 ISCO pilot test wells do not indicate that submergence of deep vadose zone soils is a significant source of PCE mass transfer to alluvial aquifer groundwater.

Leaching of PCE from vadose zone soils to groundwater by downward movement of infiltrating water was not evaluated as part of Task F SI-P2 ISCO pilot tests; however, it is not expected to be a substantial source of PCE to alluvial aquifer groundwater given the potential age of the PCE releases (i.e., the expected "weathering" of PCE-containing soil in the vadose zone in areas where leaching potential existed) as well as the surface cover limiting infiltration that is present over much of the shops area.

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Montana Department of Environmental Quality. 2013b. RE: HRO#50 Characterization Analytical Results and Request of a No longer Contained-in Decision, Burlington Northern Livingston Shop Complex. 12 December 2013. Montana Department of Environmental Quality, Remediation Division, Helena, Montana.

Montana Department of Environmental Quality. 2013c. RE: Sampling Related to Valve break at MUW-33 - Burlington Northern Livingston Shop Complex. 12 December 2013. Montana Department of Environmental Quality, Remediation Division, Helena, Montana.

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Montana Department of Environmental Quality. 2013d. RE: Groundwater Monitoring Program Directive No. 1, Proposal for Modification of Groundwater Sampling Frequency and Analyses/Groundwater Monitoring Program Directive No. 2 - Burlington Northern Livingston Shop Complex. 16 December 2013. Montana Department of Environmental Quality, Remediation Division, Helena, Montana.

Montana Department of Environmental Quality. 2014a. RE: MUW-33 Valve break – Request for No Further Action - Burlington Northern Livingston Shop Complex. 19 March 2014. Montana Department of Environmental Quality, Remediation Division, Helena, Montana.

Montana Department of Environmental Quality. 2014b. RE: Joint Livingston Restoration Group (LRG) and BNSF Railway Company (BNSF) Bedrock Mass Discharge Modeling - Burlington Northern Livingston Shop Complex. 15 May 2014. Montana Department of Environmental Quality, Remediation Division, Helena, Montana.

Montana Department of Environmental Quality. 2014c. RE: Joint Livingston Restoration Group (LRG) and BNSF Railway Company (BNSF) Bedrock Mass Discharge Modeling – Revised Input Parameter Selection with Comment Response Letter - Burlington Northern Livingston Shop Complex. 19 June 2014. Montana Department of Environmental Quality, Remediation Division, Helena, Montana.

Montana Department of Environmental Quality. 2014d. RE: Joint Livingston Restoration Group (LRG) and BNSF Railway Company (BNSF) Bedrock Mass Discharge Modeling – Revised Input Parameter Selection with Comment Response Letter - Burlington Northern Livingston Shop Complex. 14 July 2014. Montana Department of Environmental Quality, Remediation Division, Helena, Montana.

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Montana Department of Environmental Quality. 2014k. RE: Comments of Draft Procedures for LNAPL Recovery System Shutdown and Proposed Post-Shutdown LNAPL Monitoring – Task D/E Remedial Action, Burlington Northern Livingston Shop Complex – Livingston, Montana. 14 November 2014. Montana Department of Environmental Quality, Remediation Division, Helena, Montana.

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Montana Department of Environmental Quality. 2014m. RE: November 26, 2014 Revised Procedures for LNAPL Recovery System Shutdown and Proposed Post-Shutdown LNAPL Monitoring – Task D/E Remedial Action, Burlington Northern Livingston Shop Complex. 23 December 2014. Montana Department of Environmental Quality, Remediation Division, Helena, Montana.

Montana Department of Environmental Quality. 2014n. RE: Revised Addendum No. 4 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s) - Burlington Northern Livingston Shop Complex – November 2014. 23 December 2014. Montana Department of Environmental Quality, Remediation Division, Helena, Montana.

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Tables

SUMMARY OF WORK PERFORMED IN 2014 – SPRING 2005 SOW[(a)]
Burlington Northern Livingston Shop Complex

Spring 2005 SOW Task	Post-Remedial Action Monitoring/Maintenance Required (Yes/No)	Summary of Activities Conducted in 2014	Comments
Task C: Cinder Pile Capping	Yes	**Annual Inspections** • Conducted annual inspection of the cinder pile cap on 6 June 2014. Montana Department of Environmental Quality's (DEQ's) representative (CDM Smith) and the Park County Weed Inspector were present for the inspection. – Park County Weed Inspector stated that the cinder pile surface cover was "completely vegetated and coverage was excellent." The inspector took no exceptions to the plants that were present on the cinder pile. No listed noxious weeds were found. – Park County Weed Inspector noted a small strip of bare ground along the southern fence line; the result of weed control overspraying by Montana Rail Link (MRL) in 2013. Inspector recommended broadcast seeding with crested wheatgrass in Spring 2015 to help re-establish vegetation. – Cinder pile was mowed on 9 and 10 June 2014. See Section 2.0 for additional information.	Additional investigation of the cinder pile was conducted by Water and Environmental Technologies, Inc. (WET) on behalf of the Livingston Restoration Group (LRG) in 2014. Investigation/remediation activities performed by WET are not part of the *Statement of Work for Spring 2005 Activities* (Spring 2005 SOW) (DEQ 2005), and are being reported to DEQ under separate cover.
Task F: Alluvial Aquifer Groundwater Volatile Organic Compound (VOC) Cleanup	No post-remedial action monitoring/maintenance in-place in 2014.	**Task F Stage I – Part 1** In December 2012, DEQ combined the Task F (alluvial aquifer) and Task L (bedrock) groundwater monitoring programs. • Conducted semiannual groundwater sampling of alluvial aquifer wells in February and June 2014. See Facility-wide Alluvial Aquifer/Bedrock Groundwater Monitoring Program below for information regarding groundwater sampling conducted in 2014. • Conducted annual private well sampling event in June 2014, based on DEQ's private well sampling boundary map (herein referred to as the May 2011 DEQ-defined private well sampling boundary). – In accordance with *Task F Stage I – Part 1 Remedial Action Plan for VOC-Containing Alluvial Aquifer Groundwater (DEQ Version)* [Task F SI-P1 RAP (DEQ Version)] (DEQ 2007), only those private wells with operational pumping systems at the time of sampling were sampled in June 2014. A total of nine wells located inside the May 2011 DEQ-defined private well sampling boundary were sampled in 2014. See Section 3.0 for additional information. **Task F Stage I – Part 2 [Sodium Permanganate (*in situ* chemical oxidation – ISCO) Pilot Testing]** None. • DEQ's review and approval of *Revised Task F Stage I – Part 2: Comprehensive Chemical Testing Report* (Kennedy/Jenks Consultants 2013b) submitted to DEQ on 22 July 2013 is pending. **Task F Stage I – Part 2 [Locomotive Shop Soil Vapor Extraction (SVE) System]** None. • Locomotive Shop SVE System was shut down on 11 December 2013 with DEQ approval. **Task F Stage I – Part 2 (Former Electric Shop SVE System)** • Continued operation of Former Electric Shop SVE [total 16 hours per day (i.e., operating between 2 p.m. and 6 a.m.] through first week of January 2014. – In an email to DEQ dated 31 December 2013, Kennedy/Jenks Consultants on behalf of BNSF, requested DEQ's approval to operate the Former Electric Shop SVE twice a week. DEQ concurred in its email to Kennedy/Jenks Consultants dated 2 January 2014. – Former Electric Shop SVE operated Monday's and Thursday's for 16 hours per day (i.e., operating between 2 p.m. and 6 a.m.) through 2 July 2014, when the system was shut down in preparation for WET-related field activities in the Former Electric Shop. – Monthly influent sampling of Former Electric Shop SVE system resumed in February 2014. Monthly influent samples were collected on 27 February 2014, 27 March 2014, 24 April 2014, 29 May 2014, and 26 June 2014, until the system was shut down for work performed by WET. • WET is expected to take over operation of the Former Electric Shop SVE system in consultation with DEQ, and will report to DEQ under separate cover.	DEQ review and approval of *Task F Stage I – Part 1 Remedial Action Report* (Kennedy/Jenks Consultants 2010a) submitted to DEQ on 4 February 2010 is pending. WET on behalf of the LRG conducted sub-slab depressurization tests in 2014 and expanded the SVE system in the Former Electric Shop. Investigation/remediation activities performed by WET are not part of the Spring 2005 SOW and are being reported to DEQ under separate cover.

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SUMMARY OF WORK PERFORMED IN 2014 – SPRING 2005 SOW[(a)]
Burlington Northern Livingston Shop Complex

Spring 2005 SOW Task	Post-Remedial Action Monitoring/Maintenance Required (Yes/No)	Summary of Activities Conducted in 2014	Comments
Task G: Groundwater Dissolved-Phase Petroleum Cleanup	No post-remedial action monitoring/maintenance in-place in 2014.	No work was required by DEQ in 2014 under Task G. • *Task G Stage I Remedial Action Plan for Dissolved-Phase Petroleum Hydrocarbons in Groundwater* (Kennedy/Jenks Consultants 2005) was submitted to DEQ for review and approval on 31 May 2005. • Submitted *Task G – Dissolved-Phase Petroleum Hydrocarbons in Groundwater* (Kennedy/Jenks Consultants 2008a) to DEQ for review and approval on 28 February 2008. – The letter included additional dissolved-phase petroleum hydrocarbon data collected during implementation of Task D/E activities and a request for a "No Further Action (NFA)" determination under Task G of the Spring 2005 SOW. • In a letter to BNSF dated 19 April 2011 (DEQ 2011), DEQ denied BNSF's request for a NFA determination. – DEQ's letter also stated that "DEQ believes that Task D must be completed before it can be determined that dissolved petroleum concentrations in the area of LNAPL do not exceed screening levels" and that "DEQ is officially placing Task G on-hold". Finally, DEQ considers the Task G Stage I RAP dated 1 June 2005 to be "out-of-date" and does not intend to review the 2005 work plan. – DEQ's 19 April 2011 letter deferred implementation and confirmation of remedial action under Task G until Task D cleanup levels has been achieved to DEQ's satisfaction. See Section 4.0 for additional information.	In December 2014, DEQ agreed to the shutdown of the Task D/E dual-level pumping light non-aqueous phase liquid (LNAPL) recovery system (see Tasks D and E below). A *Revised Task G Stage I Remedial Action Plan for Dissolved-Phase Petroleum Hydrocarbons in Groundwater* will be submitted to DEQ for review and approval in spring 2015.
Task I: Basement VOC Gas Investigation and Removal	No post-remedial action monitoring/maintenance in-place in 2014.	No work was required by DEQ under Task I in 2014.	DEQ review and approval of *Task I Supplemental Investigation Report* (Kennedy/Jenks Consultants 2009b) dated 12 June 2009 is pending. Additional indoor air/soil gas sampling will be conducted by WET on behalf of the LRG in 2015. Investigation/remediation activities performed by WET are not part of the Spring 2005 SOW, and are being reported to DEQ under separate cover.
Task J: Surface Soil Polynuclear Aromatic Hydrocarbon (PAH) and Surface Soil Petroleum Investigation	No post-remedial action monitoring/maintenance in-place in 2014.	**Remedial Action** • Completed the additional Task J surface soil sampling-related activities that were conducted at the end of 2013 in the former MRL debris pile area after Task M remedial action activities by MRL (see Task M below). – MRL excavated surface soil from two 25 by 25-foot grids (FPD-1 and FPE-1) in the former MRL debris pile area on 3 December 2013. Soil was excavated to 1 foot below ground surface (bgs) in Grid FPE-1 and 2 feet bgs in Grid FPD-1. – Kennedy/Jenks Consultants collected a 5-point composite confirmation sample from the base of the excavations on 3 December 2013 for analysis of PAHs. – PAHs were not detected in the post-excavation confirmation soil samples. – Recalculated exposure point concentrations (EPC) for total carcinogenic PAHs (cPAHs) in DEQ Exposure Area E, replacing the pre-excavation surface soil sampling data (September 2013) for Grids FPD-1 and FPE-1 with the post excavation confirmation soil sampling data (December 2013). The EPC for total cPAHs in DEQ Exposure Area E decreased from 5.0 milligrams per kilogram (mg/kg) (pre-excavation) to 3.6 mg/kg (post-excavation), which is below the *Record of Decision* (ROD) cleanup level of 4 mg/kg (DEQ 2001). • Submitted post-excavation soil sample results to DEQ in an email from Kennedy/Jenks Consultants dated 6 January 2014. – In an email to Kennedy/Jenks Consultants and MRL dated 7 January 2014, DEQ concurred that no additional surface soil excavation in the former debris pile area was required and the grids could be backfilled. • In a conference call on 7 January 2014, DEQ agreed that the Task J and Task M remedial action reports could be prepared. • MRL backfilled the two grids on 8 January 2014 in accordance with the backfill specifications required for the Task J remedial action. • Submitted *Task J Remedial Action Report for Surface Soil (*Kennedy/Jenks Consultants 2014c) to DEQ for review and approval on 6 May 2014.	DEQ review and approval of *Task J Remedial Action Report for Surface Soil* dated 6 May 2014 is pending.

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SUMMARY OF WORK PERFORMED IN 2014 – SPRING 2005 SOW[(a)]
Burlington Northern Livingston Shop Complex

Spring 2005 SOW Task	Post-Remedial Action Monitoring/Maintenance Required (Yes/No)	Summary of Activities Conducted in 2014	Comments
Task L: Investigation of VOCs in Bedrock Aquifers	No post-remedial action monitoring/maintenance in-place in 2014.	In December 2012, DEQ combined the Task F (alluvial aquifer) and Task L (bedrock) groundwater monitoring programs. • Conducted quarterly and semiannual groundwater sampling of Task L bedrock wells in December 2013/January 2014, February 2014, June 2014, and September 2014. See Facility-wide Alluvial Aquifer/Bedrock Groundwater Monitoring Program below for information regarding groundwater sampling conducted in 2014. **Task L Supplemental Groundwater Sampling** • In an email to DEQ dated 16 April 2014, Kennedy/Jenks Consultants on behalf of BNSF, proposed conducting supplemental groundwater sampling at selected bedrock and alluvial aquifer wells to support the groundwater modeling effort and assess potential effects of air rotary drilling on VOC concentrations in the alluvial aquifer in proximity to bedrock well 13-9, as follows: – Collecting monthly groundwater samples from bedrock/alluvial aquifer well pair 10-2/ISCO-2 for 3 months, starting in April 2014 for analysis of VOCs. – Collecting groundwater samples from wells E-7, 13-3, and 92-1 in April 2014 for analysis of VOCs with additional monthly sampling to be conducted based on the April 2014 data. • DEQ agreed to the supplemental sampling in an email to Kennedy/Jenks Consultants dated 18 April 2014. – DEQ required that well 13-9 be included in the supplemental sampling. • Collected groundwater samples from wells 10-2, ISCO-2, 13-3, 13-9, E-7, and 92-1 on 28 April 2014 and15 May 2014, and during the June 2014 Facility-wide sampling event. **Slug Tests** • Conducted slug test on bedrock wells 10-2, 13-8, 13-9, and 13-10 between 7 and 13 February 2014 to acquire hydraulic conductivity estimates. **Transducers (Addendum No. 2 and No. 3)** • Continued collection of water level data from pressure transducers installed in the following bedrock/alluvial wells pairs on 28 June 2013 in accordance with *Addendum No. 2 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s)* (Addendum No. 2) (Kennedy/Jenks Consultants 2013a): – 10-1/ISCO-24R, 10-2/ISCO-1 and ISCO-2, 10-3/12-7, 10-4/12-8, 10-7/12-9, and 12-1/12-10. The loggers were calibrated and set to read twice daily at 11:00 a.m. and 11:00 p.m. MST. – In June 2014, the 1 year of data collection from these wells was completed; in discussions with DEQ, it was decided to continue data collection from these wells. • Installed pressure transducers in the following bedrock/alluvial wells pairs on 22 January 2014 in accordance with *Addendum No. 3 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s)* (Addendum No. 3) (Kennedy/Jenks Consultants 2013d): – 13-8/13-1, 13-9/E-7, and 13-10/13-5. The loggers were calibrated and set to read twice daily at 11:00 a.m. and 11:00 p.m. MST. • Downloaded transducer data on 3, 14, and 31 January 2014; 11 February 2014; 6 and 18 March 2014; 3 and 17 April 2014; 2 May 2014; 2 and 17 June 2014; 9 and 31 July 2014; 18 August 2014; 11 and 25 September 2014; 8 and 22 October 2014; 20 November 2014; and 5 and 18 December 2014. – Electronically submitted raw data (direct output from each transducer), tabulated water level data, and data plots of collected water levels data to DEQ on periodic basis.	In January 2015, DEQ approved the following modifications to the transducer monitoring program in an email to Kennedy/Jenks Consultants dated 9 January 2015: • Removing existing transducers from well pairs 10-7/12-9, 10-4/12-8, 10-3/12-7, and 12-1/12-10 for use in the new 14-series well pairs (14-2/ISCO-7, 14-3/13-4, 14-4/14-5, and 14-6/89-3). Note: The transducers in FLUTe™ well 12-1 cannot be removed without damaging the well; however, data are no longer being collected. As such, one new transducer was added to the existing group to complete monitoring of the 14-series well pairs. • Increasing the data collection frequency from every 12 hours to every 4 hours to enhance resolution and assist in temporal trend analysis. • Collecting monthly hand measurements to ensure the transducers are accurately calibrated. Transducer data will continue to be collected from the following wells pairs in 2015: • 10-1/ISCO-24R • 10-2/ISCO-1 and ISCO-2 • 13-8/13-1 • 13-9/E-7 • 13-10/13-5 • 14-2/ISCO-7 • 14-3/13-4 • 14-4/14-5 • 14-6/89-3

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SUMMARY OF WORK PERFORMED IN 2014 – SPRING 2005 SOW[(a)]
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Spring 2005 SOW Task	Post-Remedial Action Monitoring/Maintenance Required (Yes/No)	Summary of Activities Conducted in 2014	Comments
Task L: Investigation of VOCs in Bedrock Aquifers (continued)	No post-remedial action monitoring/maintenance in-place in 2014.	**Addendum No. 4** • Based on a review of Task L supplemental investigation data obtained to date and technical discussions between DEQ/CDM Smith, BNSF/Kennedy/Jenks Consultants, and Dr. Bernie Kueper, it was agreed to construct four additional bedrock wells (14-2, 14-3, 14-4, and 14-6) and one new alluvial aquifer well (14-5). • Submitted *Addendum No. 4 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s)* (Addendum No. 4) to DEQ for review and approval on 30 September 2014. – Received DEQ comments in its letter to BNSF dated 16 October 2014. DEQ's comment letter required resubmittal of Addendum No, 4on or before 31 October 2014 (DEQ 2014g). – DEQ comments were discussed in a conference call between DEQ/CDM Smith, BNSF/Kennedy/Jenks Consultants, and Dr. Bernie Kueper on 28 October 2014. – As agreed in the conference call, redline revisions to Addendum No. 4 reflecting the agreed upon changes to the scope of work were submitted to DEQ on 31 October 2014. Specifically, bedrock wells 14-2, 14-4, and 14-6 would be single-cased wells constructed in shallow bedrock and well 14-3 would be a double-cased well constructed in deeper bedrock (similar to other bedrock wells constructed under Task L.) – In an email to Kennedy/Jenks Consultants dated 3 November 2014, DEQ indicated it had minor comments and well construction activities could proceed. – Received DEQ's comments on the redline revisions in an email to Kennedy/Jenks Consultants dated 6 November 2014. • Submitted *Revised Addendum No. 4 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s)* (Revised Addendum No. 4) (Kennedy/Jenks Consultants 2014i) to DEQ for review and approval on 26 November 2014. • Received DEQ's approval of Revised Addendum No. 4 in a letter to BNSF dated 23 December 2014 (DEQ 2014n). **Addendum No. 4 – Bedrock Well Construction** • Identified proposed Task L alluvial aquifer/bedrock well locations (14-2 through 14-6) during a field reconnaissance on 8 November 2014. – Conducted underground utility clearances on 17 November 2014, and concrete coring and pot holing activities were completed on 17 and 18 November 2014. • Constructed three new shallow single-cased bedrock wells (14-2, 14-4, and 14-6), one deeper double-cased bedrock well (14-3), and one new alluvial aquifer well (14-5) between 4 and 21 December 2014 in accordance with Revised Addendum No. 4. – Collected soil and a reconnaissance groundwater samples in accordance with Revised Addendum No. 4. • Developed newly constructed 14-series wells between 18 and 21 December 2014. **Mass Discharge Modeling** During 2014, Br. Bernie Kueper conducted mass discharge modeling. Dr. Kueper is currently preparing a report summarizing the evaluation of tetrachloroethene (PCE) mass discharge between bedrock and the alluvial aquifer at the Facility. That report, along with an updated conceptual site model (CSM), will be submitted to DEQ in the *Task L Supplemental Investigation Report for Bedrock Aquifer(s)*. See Section 5.0 for additional information.	Revised Addendum No. 4 identified the wells as 14-1 through 14-5; however, at the time of the well construction activities, DEQ notified BNSF that WET on behalf of the LRG, had constructed a well identified as 14-1; therefore, shallow bedrock well 14-1 located inside the Former Electric Shop was renumbered as well 14-6. The following Revised Addendum No. 4 activities were conducted in January 2015: • Sampled newly constructed 14-series wells on 8 January 2015 in accordance with Revised Addendum No. 4 and DEQ's Revised Groundwater Monitoring Program Directive No. 2 (GWMD-2R). • Installed pressure transducers in bedrock/alluvial wells pairs 14-2/ISCO-7, 14-3/13-4, 14-4/14-5, and 14-6/89-3. • Performed slug test on bedrock wells 14-2, 14-3, 14-4, and 14-6 between 11 and 12 February 2015. Performed an additional slug test on bedrock well 14-2 between 24 and 28 February 2015. *Task L Supplemental Investigation Report for Bedrock Aquifer(s)* will be submitted to DEQ on or before 23 April 2015 (see Section 5.5.1).

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SUMMARY OF WORK PERFORMED IN 2014 – SPRING 2005 SOW[(a)]
Burlington Northern Livingston Shop Complex

Spring 2005 SOW Task	Post-Remedial Action Monitoring/Maintenance Required (Yes/No)	Summary of Activities Conducted in 2014	Comments
Facility-wide Alluvial Aquifer/Bedrock Groundwater Monitoring Program	No post-remedial action monitoring/maintenance in-place in 2014.	**Groundwater Monitoring Program Directive No. 2 (GWMD-2) (effective 12 December 2013)** • Received DEQ's Groundwater Monitoring Program Directive No. 2 (GWMD-2) in a letter to BNSF dated 16 December 2013 (DEQ 2013d). • Conducted quarterly groundwater sampling of wells 13-1 through 13-7 in December 2013 in accordance with GWMD-2. Due to winter weather conditions, bedrock wells (13-8 through 13-10) were still being constructed at the time of the December 2013 sampling event. GWMD-2 requires groundwater samples to be analyzed for VOCs and general water chemistry parameters (selected wells only). – Sampled bedrock wells 13-8 through 13-10 in January 2014. • Conducted quarterly/semiannual groundwater sampling event (including liquid-level measurements) in February 2014 in accordance with GWMD-2. GWMD-2 requires groundwater samples to be analyzed for VOCs and general water chemistry parameters (selected wells only). During the February 2014 sampling event, groundwater samples were unable to be collected from the following wells: – Wells 90-2B and #11: Wells considered dry during this monitoring event. Insufficient water to purge and sample. – Well 13-6: Wellhead could not be located (due to winter weather conditions). • Collected groundwater samples from wells E-6, E-8, and ISCO-1 during the February 2014 sampling event as required by GWMD-2; sampling of these wells is not required in subsequent sampling events under GWMD-2. • Conducted quarterly/semiannual groundwater sampling event (including liquid-level measurements) in June 2014 in accordance with GWMD-2. • Conducted quarterly groundwater sampling event in September 2014 in accordance with GWMD-2. • Upon completion of four quarters of quarterly sampling under GWMD-2, submitted *Groundwater Monitoring Program Directive No. 2 – Proposal for Modification of Groundwater Sampling Frequency and Analyses* (Kennedy/Jenks Consultants 2014k) to DEQ for review and approval on 3 December 2014. – Proposal included reducing the sampling frequency of selected wells from quarterly to semiannual and removing analysis of groundwater samples for general groundwater chemistry parameters – Proposal also incorporated the new Task L 14-series wells (to be sampled for VOCs and general groundwater chemistry parameters on a quarterly basis for a minimum of 1 year, per Revised Addendum No. 4). • Received DEQ's verbal approval to modify the groundwater monitoring program on 9 December 2014 and received a formal approval in DEQ's letter to BNSF dated 23 December 2014 (DEQ 2014l). See Section 6.0 for additional information.	In December 2012, DEQ combined the Task F (alluvial aquifer) and Task L (bedrock) groundwater monitoring programs. The scope of the combined ongoing groundwater monitoring program at the Facility is determined through directives issued by DEQ. Conducted quarterly sampling of the Task L 14-series wells (14-2 through 14-6) on 8 January 2015 in accordance with Revised Addendum No. 4 and DEQ's Revised Groundwater Monitoring Program Directive No. 2 (GWMD-2R).
Other Spring 2005 SOW Activities Conducted in 2014			
Well Inventory (Tasks F, G, and L)	Not Applicable. Requires at a minimum annual updates. Updates are also required as part of Task F, Task G, and Task L deliverables.	• Submitted the 2014 annual update of the private and public well inventory [*Private and Public Well Inventory – 2014 Update (Revision No. 9)* (Kennedy/Jenks Consultants 2015)] to DEQ for review and approval on 29 January 2015. See Section 7.0 for additional information.	
Offsite Disposal Information and No Longer Contained-In Decisions	Not Applicable. Annual reporting required by Facility-Wide SAP.	• The following requests for no longer contained-in decisions were submitted to DEQ in 2014: – Task L - Addendum No. 3 soil cuttings and weir tank residual sediments generated during well construction activities (HRO#51 and HRO#52) – submitted 21 July 2014 (Kennedy/Jenks Consultants 2014f). DEQ's no longer contained-in determination was received on 29 August 2014 (DEQ 2014e). • No Offsite Disposal Notifications were submitted to DEQ in 2014. • No materials were shipped offsite in 2014 for disposal and/or recycling at an appropriately permitted disposal/recycling facility. • The following materials were landspread in the DEQ-approved landspread area (former C&P Packing pit) in 2014: – Task L soil cuttings contained in roll-off bins HRO#51 through HRO#52 were landspread on 11 September 2014, after receipt of DEQ's no longer contained-in determination dated 29 August 2014. – As required by DEQ, DEQ was notified via email on 15 September 2014 that the material had been landspread. The quantity of materials landspread was estimated at approximately 13 cubic yards. • See Section 8.0 for additional information.	Roll-off Bin HRO#50: Due to the concentrations of lead above the residential cleanup level of 400 mg/kg, DEQ will not allow the soil contained in roll-off bin HRO#50 to be landspread in the DEQ-approved landspread area (i.e., former C&P Packing pit) until BNSF places an institutional control on the property where the soil would be placed restricting future residential use. The soil may be disposed of at an offsite permitted Subtitle D disposal facility. Roll-off bin HRO#50 is currently being stored in the secured roll-off bin storage area pending disposal. Roll-of Bin HRO#53: Soil cuttings from the 2014 Task L well construction activities (Revised Addendum No. 4) are contained in roll-off bin HRO#53. HRO$53 was sampled 5 February 2015; a request for a no-longer contained-in determination has been submitted to DEQ. Roll-off bin HRO#53 is currently being stored in the secured roll-off bin storage area pending disposal.

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SUMMARY OF WORK PERFORMED IN 2014 – SPRING 2005 SOW[(a)]
Burlington Northern Livingston Shop Complex

Spring 2005 SOW Task	Post-Remedial Action Monitoring/Maintenance Required (Yes/No)	Summary of Activities Conducted in 2014	Comments
Annual Monitoring and Maintenance Report	Not Applicable. Required on annual basis.	• Submitted *2013 Annual Monitoring and Maintenance Report* (Kennedy/Jenks Consultants 2014b) to DEQ for review and approval on 28 March 2014.	
Facility Inspection	Not Applicable. Required on annual basis.	• Annual Facility inspection was conducted in September 2014. – Some of the annual inspection activities were completed as part of other DEQ-required activities and were not repeated in September 2014 (i.e., cinder pile inspection). – Conducted well maintenance activities, as necessary, based on the annual inspection and/or other field activities. See Section 9.0 for additional information.	
Other Activities Conducted at the Facility in 2014 (not related to Spring 2005 SOW)			
Tasks A and H	Not Applicable.	No work was required by DEQ in 2013 under Tasks A and H. Work by BNSF on Tasks A and H is currently on-hold pending direction from DEQ.	DEQ review and approval of the *Tasks A and H: Comprehensive Interim Action and Confirmation Sampling Summary Report* (Kennedy/Jenks Consultants 2008b) submitted to DEQ on 17 April 2008 is pending.
Tasks D and E	No post-remedial action monitoring/maintenance in-place in 2014. Remedial system was operated in 2014 in accordance with DEQ's Operation Directives (#70 through #77). System maintenance was performed in accordance with the O&M Manual.	**Ongoing Task D/E Remediation System Activities** • Conducted O&M in accordance with DEQ directives. • Submitted monthly Montana Pollutant Discharge Elimination System (MPDES) reports to DEQ in accordance with Permit #MTG790013 for the BNSF Livingston Shop Complex petroleum remediation system GWTP. • A broken valve at MUW-33 located on the mainline section of the Task D/E remediation system resulted in a release of extracted groundwater to surface on 4 December 2013. The Task D/E Remediation system was temporarily shut down and the valve repaired. – In a letter to BNSF dated 12 December 2013, DEQ required sampling to confirm that the soil within the release area had not been impacted by F001 and F002-listed wastes above the ROD cleanup levels (DEQ 2013c). Since MUW-33 was not an operating well at the time of the release, Kennedy/Jenks Consultants requested that the effluent sample be collected from the nearest operational well PMW-5. DEQ agreed that the effluent sample could be collected from well PMW-5 in a conference call on 18 December 2013. – Collected effluent sample from PMW-5 on 20 December 2014. – Submitted *Task D/E: MUW-33 Valve Break – Request for No Further Action* for the release from the MUW-33 valve break to DEQ on 4 February 2014 (Kennedy/Jenks Consultants 2014a). – Received DEQ's No Further Action approval for the release in a letter to BNSF dated 19 March 2014 (DEQ 2014a). • Submitted the *2012/2013 Combined Task D/E Annual Report* to DEQ for review and approval on 24 June 2014. • Submitted the *Task D/E Phase II Remedial Action – 2012 Construction Completion Report* to DEQ for review and comment on 19 September 2014. • Received DEQ comments on *2012/2013 Combined Task D/E Annual Report* in its letter to BNSF dated 29 October 2014 (DEQ 2014h). • Submitted the *Draft Procedures for LNAPL Recovery System Shutdown and Proposed Post-Shutdown LNAPL Monitoring – Task D/E Remedial Action* (Draft Shutdown Procedures) to DEQ on 3 November 2014. • Met with DEQ on 13 November 2014 to discuss shutdown of the Task D/E Dual-Level Pumping System and expansion of the Task D/E bioventing system. – DEQ agreed that O&M data indicated the dual-level pumping system has achieved its mass removal objectives and approved interim shutdown of the system. DEQ retains the alternative to re-start the system pending post-shutdown field results. No modifications to the Task D/E bioventing system will be made until post-shutdown field results are evaluated, and groundwater samples are collected and analyzed for petroleum hydrocarbons. • Received DEQ comments on *Task D/E Phase II Remedial Action – 2012 Construction Completion Report* in its letter to BNSF dated 14 November 2014 (DEQ 2014j). • Received DEQ comments on Draft Shutdown Procedures in its letter to BNSF dated 14 November 2014 (DEQ 2014k). • Submitted *Revised Procedures for LNAPL Recovery System Shutdown and Proposed Post-Shutdown LNAPL Monitoring – Task D/E Remedial Action* (Revised Shutdown Procedures) (Kennedy/Jenks Consultants 2014j) to DEQ for review and approval on 26 November 2014. • Submitted replacement pages to *2012/2013 Combined Task D/E Annual Report* I (Kennedy/Jenks Consultants 2014e) in response to DEQ comments dated 29 October 2014. Replacement pages were submitted on 26 November 2014.	*2014 Task D/E Annual Report* will be submitted to DEQ under separate cover in 2015. DEQ review and approval of the *2012/2013 Combined Task D/E Annual Report* (with replacement pages) submitted to DEQ on 26 November 2014 and *Task D/E Phase II Remedial Action – 2012 Construction Completion Report* (with replacement pages) submitted on 8 December 2014 is pending.

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SUMMARY OF WORK PERFORMED IN 2014 – SPRING 2005 SOW[(a)]
Burlington Northern Livingston Shop Complex

Spring 2005 SOW Task	Post-Remedial Action Monitoring/Maintenance Required (Yes/No)	Summary of Activities Conducted in 2014	Comments
Tasks D and E (continued)	No post-remedial action monitoring/maintenance in-place in 2014. Remedial system was operated in 2014 in accordance with DEQ's Operation Directives (#70 through #77). System maintenance was performed in accordance with the O&M Manual.	• Submitted replacement pages to *Task D/E Phase II Remedial Action – 2012 Construction Completion Report* (Kennedy/Jenks Consultants 2014h) in response to DEQ's comments dated 14 November 2014. Replacement pages were submitted on 8 December 2014. • Received DEQ's approval on the Revised Shutdown Procedures in its letter to BNSF dated 23 December 2014 (DEQ 2014m). The letter formally approved shutdown of the Task D/E dual-level pumping LNAPL recovery system. • Task D/E dual-level pumping LNAPL recovery system was shutdown on 8 December 2014, as documented in an email from Kennedy/Jenks Consultants to DEQ on 19 December 2014. **Biovent Extraction/Injection System** • Continued implementation of Long-Term Monitoring Plan for existing bioventing wells (BVWs). • Conducted semiannual respirometry testing in March and July 2014, as required by DEQ. • Bioventing wells BVW-88 through BVW-91 located in the City of Livingston alleyway were shut down on 8 November 2013; bioventing system operation was modified per Operation Directive #69 to repair bioventing piping and associated moisture trap assembly. – Proposed repair activities were provided in an email to the DEQ from Kennedy/Jenks Consultants dated 16 March 2014. – The proposed approach was approved in an email from DEQ to Kennedy/Jenks Consultants dated 17 March 2014. • In March 2014, Kennedy/Jenks Consultants, on behalf of BNSF, worked with the Task D/E Phase II construction contractor (Kinley Construction, Inc.) to repair the bioventing piping and associated moisture trap assembly. – Bioventing operations in the City alleyway were resumed in April 2014 under DEQ's OD No. 73. • DEQ issued the *Bioventing System Configuration Testing Work Plan to Assess Options for Expanding Operation into Previously Untreated Areas at the Burlington Northern Livingston Shop Complex and Procedures for Product Recovery Shut Down* in its letter to BNSF dated 3 October 2014 (DEQ 2014f). • DEQ agreed during the 13 November 2014 project meeting that expansion of the bioventing system was not warranted until Task D/E dual-level pumping system post-shutdown field and analytical laboratory results, monitoring the presence of LNAPL and petroleum hydrocarbons in groundwater, have been evaluated.	**NOTE**: To avoid confusion with DEQ records, total volumes of LNAPL recovered in 2014 and the volume of groundwater treated at the Task D/E GWTP in 2014 will be reported to DEQ in the *2014 Task D/E Annual Report*. **NOTE**: To avoid confusion with DEQ records, estimated total amount of LNAPL degraded via bioventing will be reported to DEQ in the *2014 Task D/E Annual Report*.
Task K	Groundwater and Soil Lead Investigation	No Task K activities were conducted in 2014. In 2010, DEQ added lead to Task J surface soil sampling program. In October/November 2012, approximately 13.4 cubic yards of lead-containing soil was excavated from the drip zone around the home on Yard 2 at the Iron Horse Mobile Home Park as part of Task J remedial action activities. • *Task J Remedial Action Report for Surface Soil (*Kennedy/Jenks Consultants 2014c) was submitted to DEQ for review and approval on 6 May 2014.	DEQ review and approval of *Task J Remedial Action Report for Surface Soil* dated 6 May 2014 is pending.
Task M (Asbestos)	Investigation of Newly-Identified Potential Source Areas, Newly-Identified Potential COC-Affected Areas, Newly-Identified Potential COC-Affected Media and Newly-Identified Potential Contaminants of Concern	**Asbestos-Containing Materials (ACM)** • Completed additional surface soil sampling activities (see Task J) associated with removal of the MRL debris piles. • Submitted *Task M Remedial Action Report for Asbestos-Containing Materials* to DEQ for review and approval on 6 May 2014. • Received DEQ comments on the *Task M Remedial Action Report for Asbestos-Containing Materials* in its letter to BNSF dated 5 November 2014 (DEQ 2014i). • Submitted replacement pages to *Task M Remedial Action Report for Asbestos-Containing Materials* (Kennedy/Jenks Consultants 2014d) in response to DEQ comments dated 5 November 2014. Replacement pages were submitted on 18 December 2014.	One of the tasks (removal of the MRL debris piles) identified in the Task M RAP was conducted by MRL's asbestos contractor in 2012. Post removal confirmation surface soil sampling was not performed by MRL at the time of the debris pile removal (see Task J above). Based on the concentrations of PAHs detected in the former MRL debris piles, DEQ required confirmation surface soil sampling in the former MRL debris pile area for PAHs. DEQ review and approval of the *Task M Remedial Action Report for Asbestos-Containing Materials* (with replacement pages) submitted to DEQ on 18 December 2014 is pending.

Note:
(a) *Statement of Work for Spring 2005 Activities* (Spring 2005 SOW) prepared by Montana Department of Environmental Quality dated 9 August 2005 (DEQ 2005).

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TASK F STAGE I - PART 1: PRIVATE WELL MONITORING SCHEDULE - 2014
Burlington Northern Livingston Shop Complex

Well Designation	Annual Private Well Monitoring Event[a]	Analyses	Comments
	June 2014	VOCs (524.2)[b]	
Task F Stage I - Part 1 Private Wells			
Private Wells Identified In Task F SI-P1 RAP (DEQ Version) dated April 2007. Wells confirmed inside April 2007 DEQ-defined sampling boundary[a].			
12R02	**X**[c]	●[d]	**Sampled 9 June 2014.**
5P01	X --- ns	●	"ns" - no sample collected in June 2014. Well could not be located during field reconnaissance of property.
7L01	**X**	●	**Sampled 6 June 2014.**
7L02	X --- ns	●	"ns" - no sample collected in June 2014. Well could not be located during field reconnaissance of property. Well reportedly destroyed during building construction activities. In June 2012, POTW representative indicated the well was closed (i.e., filled with concrete) prior to paving.
7L03	X --- ns	●	"ns" - no sample collected in June 2014. Well was operational and operating a sprinkler system in 2007 when private well monitoring program was initiated. No sample was collected in 2007 as no spigot was available to collect a representative sample. Since that time, the well was reported as "destroyed during construction activities at City of Livingston POTW". In June 2012, the well was located and found to be again operating a sprinkler system. No sample was collected in June/July 2013 as no spigot was available to collect a representative sample.
7L07	X --- ns	●	"ns" - no sample collected in June 2014. BNSF property. Well could not be located during field reconnaissance of property.
7L08	X --- ns	●	"ns" - no sample collected in June 2014. BNSF property. Well confirmed inoperable - no sample required per Task F SI-P1 RAP (DEQ Version).
7M11	X --- ns	●	"ns" - no sample collected in June 2014. BNSF property. Well could not be located during field reconnaissance of property.
7M12	X --- ns	●	"ns" - no sample collected in June 2014. BNSF property. Well confirmed inoperable - no sample required per Task F SI-P1 RAP (DEQ Version).
7N01	X --- ns	●	"ns" - no sample collected in June 2014. MRL property. Well could not be located during field reconnaissance of property.
7N02	X --- ns	●	"ns" - no sample collected in June 2014. MRL property. Well could not be located during field reconnaissance of property.
7P09	X --- ns	●	"ns" - no sample collected in June 2014. Well confirmed inoperable - no sample required per Task F S-P1 RAP (DEQ Version).
7P10	**X**	●	**Sampled 10 June 2014.**
7P11	X --- ns	●	"ns" - no sample collected in June 2014. Well confirmed inoperable - no sample required per Task F SI-P1 RAP (DEQ Version).
7P12	X --- ns	●	"ns" - no sample collected in June 2014. Well could not be located during field reconnaissance of property.
7P13	X --- ns	●	"ns" - no sample collected in June 2014. Well could not be located during field reconnaissance of property.
7Q01	**X**	●	**Sampled 5 June 2014.**
18D01	X --- ns	●	"ns" - no sample collected in June 2014. Well confirmed inoperable - no sample required per Task F SI-P1 RAP (DEQ Version).
18D02	X --- ns	●	"ns" - no sample collected in June 2014. Well confirmed inoperable - no sample required per Task F SI-P1 RAP (DEQ Version).
18D03	X --- ns	●	"ns" - no sample collected in June 2014. Well confirmed inoperable - no sample required per Task F SI-P1 RAP (DEQ Version).
18D04	**X**	●	**Sampled 5 June 2014.**
18D05	X --- ns	●	"ns" - no sample collected in June 2014. Unable to contact property owner. Well historically non-operational.
Private Wells Added To Private Well Monitoring Program in 2007 - Per Table 7 of Task F SI-P1 RAP (DEQ Version) - Wells confirmed inside April 2007 DEQ-defined private well sampling boundary[a].			
7P17	**X**	●	Additional well identified within DEQ-defined sampling boundary in 2007. Incorporated into the private well sampling program per Task F SI-P1 RAP (DEQ Version). **Sampled 5 June 2014.**
18C05	X --- ns	●	Additional well identified within DEQ-defined sampling boundary in 2007. Incorporated into the private well sampling program per Task F SI-P1 RAP (DEQ Version). "ns" - no sample collected in June 2014. Well confirmed inoperable - no sample required per Task F SI-P1 RAP (DEQ Version).
Private Wells Added To Private Well Monitoring Program in 2010 - Based on information obtained from 2009/2010 private well survey and/or property owners' legal representative. Wells Confirmed inside October 2009 DEQ-defined sampling boundary[a].			
7P18	X --- ns	●	"ns" - no sample collected in June 2014. Well could not be located during field reconnaissance of property.
7P19	X --- ns	●	"ns" - no sample collected in June 2014. Well could not be located during field reconnaissance of property.
18C06	X --- ns	●	"ns" - no sample collected in June 2014. Well confirmed inoperable - no sample required per Task F SI-P1 RAP (DEQ Version).
18C08	X --- ns	●	"ns" - no sample collected in June 2014. Well confirmed inoperable - no sample required per Task F SI-P1 RAP (DEQ Version).
18D12	X --- ns	●	"ns" - no sample collected in June 2014. Unable to contact property owner. Well historically non-operational.
18D13	X --- ns	●	"ns" - no sample collected in June 2014. Unable to contact property owner. Well historically non-operational.
Private Wells Added To Private Well Monitoring Program in 2010 - Based on information from DEQ and/or October 2009 DEQ-defined private well sampling boundary (per DEQ email dated 21 May 2010)[a].			
18C03	X --- ns	●	This well was removed from the private well monitoring program in 2007, as it was located outside the April 2007 DEQ-defined private well sampling boundary identified in Task F SI-P1 RAP (DEQ Version). This well was added back into the sampling program in 2010. Unable to contact property owner (called at house and left phone messages). Well historically operational.
18D06	**X**	●	**Sampled 6 June 2014.**
18D08	X --- ns	●	"ns" - no sample collected in June 2014. Well could not be located during field reconnaissance of property.
18D10	X --- ns	●	"ns" - no sample collected in June 2014. Well confirmed inoperable - no sample required per Task F SI-P1 RAP (DEQ Version).
18D11	**X**	●	**Sampled 16 June 2014.**
Private Well Added to Private Well Monitoring Program in 2011. Wells confirmed inside May 2011 DEQ-defined private well sampling boundary[a].			
12R06	**X**	●	**Sampled 5 June 2014.**
8C01	X --- ns	●	"ns" - no sample collected in June 2014. Well could not be located during field reconnaissance of property.

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TASK F STAGE I - PART 1: PRIVATE WELL MONITORING SCHEDULE - 2014
Burlington Northern Livingston Shop Complex

Well Designation	Annual Private Well Monitoring Event[a]	Analyses	Comments
	June 2014	VOCs (524.2)[b]	
Private Well Identified in Task F SI-P1 RAP (DEQ Version). Removed from private well monitoring program - Per Table 7 of Task F SI-P1 RAP (DEQ Version). Well confirmed outside May 2011 DEQ-defined private well sampling boundary[a].			
7L06	NA		Well removed from program in 2012. Well is located outside current (May 2011) DEQ-defined sampling boundary.
18C01	NA		Well removed from program in 2011. Well is located outside current (May 2011) DEQ-defined sampling boundary.
18C02	NA		Well removed from program in 2007. Well is located outside 2007 and 2009 DEQ-defined sampling boundaries. Well was located within August 2010 DEQ-defined sampling boundary, but is outside the current (May 2011) DEQ-defined sampling boundary.
13B01 (formerly identified as 12Q01)	NA		Well removed from the program in 2010. Well is also located outside October 2009, August 2010, and current (May 2011) DEQ-defined sampling boundaries.
12Q02	NA		Well removed from the program in 2010. Well is also located outside October 2009, August 2010, and current (May 2011) DEQ-defined sampling boundaries.
Private Well Identified in Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s) - DEQ Version (August 2010). Removed From Private Well Monitoring Program - Per Table 7 of Task F SI-P1 RAP - DEQ Version. Well Confirmed Outside May 2011 DEQ-Defined Sampling Boundary[a].			
18C04	NA		Well removed from program in 2011. Well is located outside current (May 2011) DEQ-defined sampling boundary.
18C07	NA		Well removed from program in 2011. Well is located outside current (May 2011) DEQ-defined sampling boundary.
18D09	NA		Well removed from program in 2011. Well is located outside current (May 2011) DEQ-defined sampling boundary.
Private Well Identified In Task F SI-P1 RAP (DEQ Version). Wells properly abandoned and removed from private well monitoring program.			
7P01	NA		Formerly Rainbow Motel. Well abandoned by a Montana licensed well driller on 23 February 2010.
12R07	NA		One well (02S/09E 12R07) previously identified as serving the property at 416 North K Street was removed from the well inventory based on additional information obtained in 2010. No well exists at this property. The well that previously served this property has been accounted for in the well inventory and is designated 02S/09E 12R03. Well 02S/09E 12R03 was abandoned by a licensed well drilling contractor in 2007.
12R03	NA		Well abandoned by a Montana licensed well driller on 8 October 2007.

Notes:

(a) Annual private well monitoring event conducted in accordance with Table 7 of Task F Stage I - Part 1 Remedial Action Plan for VOC-Containing Alluvial Aquifer Groundwater [Task F SI-P1 RAP (DEQ Version)] dated April 2007.
The private well sampling boundary identified in the Task F SI-P1 RAP (DEQ Version) has been modified by DEQ in 2009, 2010, and 2011 (see below).
The DEQ-defined private well sampling boundaries are as follows:
- April 2007 boundary - as defined in Task F SI-P1 RAP (DEQ Version) dated April 2007. This boundary was used for annual private well sampling events in 2007, 2008, and 2009.
- October 2009 boundary - as defined by the "Limit of Detected Tetrachloroethene (PCE) Dissolved in Groundwater" identified on the Petroleum Free-Product Plume and Dissolved Tetrachloroethylene (PCE) Plume 2009 map posted on DEQ's website dated October 2009. DEQ required this boundary be used in its email to Kennedy/Jenks Consultants dated 21 May 2010. This boundary was used for the annual private well sampling event in July 2010.
- August 2010 boundary - as defined in Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s) - DEQ Version [Task L SI Work Plan (DEQ Version)] dated August 2010. DEQ required that the annual private well monitoring program be updated to reflect DEQ's "<0.5 micrograms per liter Tetrachloroethene Plume (PCE)" boundary as depicted on DEQ-provided Figure 3 in Task L SI Work Plan (DEQ Version). This boundary was subsequently superseded by the May 2011 boundary.
- May 2011 boundary - as defined in the Private and Public Well Inventory (Revision No. 5) dated January 2011 (updated May 2011) using DEQ's "estimated area where PCE is expected to be present above the DEQ-7 required reporting limit of 0.5 ug/L" as depicted on DEQ-provided Figure 2 in the updated well inventory. This boundary was used for the annual private well sampling event in June 2011, June 2012, and June/July 2013.

(b) Samples were analyzed for VOCs using EPA Method 524.2.

(c) "X" denotes well is scheduled to be included in the monitoring event. "X---ns" denotes no sample collected for the reason stated in the comments section.

(d) "•" denotes samples scheduled to be analyzed for indicated analytes.

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TABLE 3

TASK F STAGE I - PART 1: PRIVATE WELL ANALYTICAL RESULTS (JUNE 2014)
Burlington Northern Livingston Shop Complex

Well/Sample ID	ROD Cleanup Level (µg/L)[a]	DEQ-7 Standard (µg/L)[b]	12R02	12R06	7L01		7P10	7P17	7Q01	18D04	18D06	18D11
					Maintenance/ Washing	(duplicateof 7L01)						
Well Water Usage			Irrigation	Irrigation			Irrigation	Irrigation	Irrigation	Irrigation	Irrigation	Irrigation
Date			9-Jun-14	5-Jun-14	6-Jun-14	6-Jun-14	10-Jun-14	5-Jun-14	5-Jun-14	5-Jun-14	6-Jun-14	16-Jun-14
Volatile Organic Compounds (VOCs) (µg/L)[c]												
Benzene	--[d]	5	<0.50[e]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	**0.32J**[f]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	**0.34J**	<0.50	<0.50	<0.50	**0.43J**	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	**0.18J**	**0.20J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		**0.23J**	<0.50	**10**	**9.9**	**0.53**	**0.44J**	<0.50	**0.51**	<0.50	<0.50
Toluene	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		<0.50	<0.50	**0.44J**	**0.44J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15[g]		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Notes:

(a) Cleanup levels from *Record of Decision* (ROD) [Montana Department of Environmental Quality (DEQ) 2001].
ROD cleanup levels based on *Circular WQB-7, Montana Numeric Water Quality Standards* (WQB-7 standards) dated September 1999, now called DEQ-7 standards.

(b) DEQ-7 standards dated October 2012.

(c) Samples were analyzed for volatile organic compounds (VOCs) using EPA Method 524.2.

(d) "--" denotes ROD cleanup level/DEQ-7 standard not established.

(e) "<" denotes analyte was not detected at the indicated method reporting limit.

(f) "J" indicates estimated value. The analyte is present but at a concentration less than the limit of quantitation.

(g) The required reporting limit of 0.4 µg/L will be used for vinyl chloride during remedial design/remedial action (RD/RA) work.

Detected values shown in bold

µg/L - micrograms per liter

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TABLE 4

NATURAL SOURCE ZONE DEPLETION - ANALYTICAL RESULTS (SEPTEMBER/OCTOBER 2013 AND FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

	Upgradient					Within Plume					Downgradient				
Sample ID	**07-1**	**L-88-9**	**EX-1**	**EX-3**	**EX-20**	**L-87-4**	**L-87-7**	**95-1**	**EX-8**	**EX-13**	**L-88-10**	**L-87-6**	**EX-4**	**EX-22**	**EX-28**
Date Sampled	**9/20/2013**	**9/26/2013**	**9/26/2013**	**9/26/2013**	**9/26/2013**	**9/30/2013**	**9/30/2013**	**9/30/2013**	**10/1/2013**	**10/1/2013**	**9/26/2013**	**9/26/2013**	**9/27/2013**	**9/27/2013**	**9/27/2013**
Extractable Petroleum Hydrocarbons (EPH) - Screen (µg/L)[a]															
Total Extractable Hydrocarbons	<300 [b]	<300	<300	<300	<300	NA-sheen[c]	NA-sheen	<300	NA-sheen	NA-sheen	**1,480**	**2,050**	**2,550**	**3,140**	<300
Extractable Petroleum Hydrocarbons (µg/L)[d]															
C9 to C18 Aliphatics	NA [c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	<300	<300	<300	<300	NA
C19 to C36 Aliphatics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<300	<300	<300	<300	NA
C11 to C22 Aromatics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<300	<300	<300	<300	NA
Total Extractable Hydrocarbons	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<300	<300	<300	<300	NA
Polynuclear Aromatic Hydrocarbons (PAHs) (µg/L) [e]															
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Benzo(a)anthracene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Benzo(a)pyrene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Benzo(b)fluoranthene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Benzo(k)fluoranthene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Chrysene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Dibenzo(a,h)anthracene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Indeno(1,2,3-cd)pyrene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	NA
Inorganics (mg/L)[g]															
Alkalinity, Total as CaCO3	**239**	**224**	**225**	**229**	**206**	**251**	**255**	**233**	**230**	**249**	**366**	**314**	**321**	**350**	**256**
Bicarbonate as HCO3	**291**	**273**	**275**	**279**	**251**	**306**	**311**	**284**	**281**	**304**	**446**	**383**	**392**	**428**	**312**
Carbonate as CO3	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Sulfate	**48**	**37**	**37**	**40**	**32**	**51**	**72**	**55**	**46**	**66**	**119**	**97**	**95**	**114**	**58**
Sulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nutrients (mg/L)[h]															
Nitrogen, Nitrate+Nitrite as N	**1.35**	**0.88**	**0.86**	**1.15**	**0.64**	**0.07**	**0.24**	**1.30**	**1.12**	**0.68**	**0.41**	**0.11**	<0.01	<0.01	**1.40**
Metals, Dissolved (mg/L)[i]															
Iron (ferrous)	<0.03	<0.01	<0.01	<0.01	<0.01	**0.32**	**0.23**	<0.01	<0.01	<0.01	<0.01	<0.01	**0.08**	<0.01	<0.01
Manganese	<0.01	<0.001	**0.001**	**0.003**	**0.002**	**0.952**	**0.407**	<0.001	**0.002**	**0.013**	**0.946**	**0.448**	**0.752**	**1.46**	**0.001**
Organic Characteristics (mg/L)[j]															
Methane	**0.0018**	<0.0010	<0.0010	<0.0010	<0.0010	**0.0022**	**0.0039**	**0.0016**	<0.0010	**0.0018**	**0.0019**	<0.0010	**0.0030**	**0.0031**	<0.0010
Ethane	<0.0010	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	NA	NA	NA	NA
Ethene	<0.0010	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	NA	NA	NA	NA	NA

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NATURAL SOURCE ZONE DEPLETION - ANALYTICAL RESULTS (SEPTEMBER/OCTOBER 2013 AND FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

		Extraction Wells																		
		Zone 5								Zone 7			Zone 8							
Sample ID	Total Influent	MUW-28	MUW-1	PMW-5	PMW-5	PMW-2	PMW-3	PMW-3	MUW-29	MUW-38	MUW-39	MUW-40	MUW-41	MUW-41	MUW-42	MUW-43	MUW-44	MUW-45	MUW-46	MUW-47
Date Sampled	10/16/2013	10/15/2013	10/15/2013	10/15/2013	2/27/2014	10/15/2013	10/15/2013	2/27/2014	10/15/2013	10/16/2013	10/16/2013	10/16/2013	10/15/2013	2/27/2014	10/15/2013	10/15/2013	10/15/2013	10/15/2013	10/15/2013	10/15/2013
Extractable Petroleum Hydrocarbons (EPH) - Screen (µg/L)[a]																				
Total Extractable Hydrocarbons	**637**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Extractable Petroleum Hydrocarbons (µg/L)[d]																				
C9 to C18 Aliphatics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C19 to C36 Aliphatics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C11 to C22 Aromatics	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Extractable Hydrocarbons	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polynuclear Aromatic Hydrocarbons (PAHs) (µg/L) [e]																				
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/L)[g]																				
Alkalinity, Total as CaCO3	**256**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bicarbonate as HCO3	**312**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbonate as CO3	<4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	**59**	NA	NA	NA	**46**	NA	NA	**50**	NA	NA	NA	NA	NA	**50**	NA	NA	NA	NA	NA	NA
Sulfide	NA	NA	NA	NA	<0.04	NA	NA	<0.04	NA	NA	NA	NA	NA	<0.04	NA	NA	NA	NA	NA	NA
Nutrients (mg/L)[h]																				
Nitrogen, Nitrate+Nitrite as N	**0.74**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals, Dissolved (mg/L)[i]																				
Iron (ferrous)	NA	**0.10**	**0.36**	**0.25**	**0.08**	**0.43**	**1.27**	**0.30**	<0.01	**0.01**	<0.01	**0.01**	**0.20**	**0.04**	<0.01	<0.01	<0.01	**0.03**	<0.01	<0.01
Manganese	NA	**0.118**	**0.501**	**0.471**	**0.200**	**0.473**	**0.910**	**0.415**	**0.153**	**0.007**	**0.004**	**0.002**	**0.352**	**0.303**	**0.306**	**0.172**	**0.001**	**0.226**	**0.287**	**0.007**
Organic Characteristics (mg/L)[j]																				
Methane	NA	NA	NA	**0.0054**	**0.0065**	NA	NA	**0.0041**	NA	NA	<0.0010	NA	**0.0026**	**0.0022**	NA	NA	NA	NA	<0.0010	NA
Ethane	NA	NA	NA	<0.0010	NA	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	NA	NA	NA	<0.0010	NA
Ethene	NA	NA	NA	<0.0010	NA	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	NA	NA	NA	NA	NA	<0.0010	NA

Notes:
(a) Samples screened for extractable petroleum hydrocarbons (EPH) using EPA Method 8015 modified. The EPH screening method is a screening technique for EPH analysis via the Montana Method. Samples with EPH Screen results greater than 1,000 micrograms per liter (µg/L) were also analyzed for EPH fractions and polynuclear aromatic hydrocarbons (PAHs).
(b) "<" denotes analyte was not detected at the indicated method reporting limit.
(c) "NA" denotes not analyzed. "NA-sheen" denotes not analyzed due to the presence of iridescent sheen on groundwater.
(d) Samples analyzed for EPH fractions using Massachusetts Department of Environmental Protection (MADEP) EPH Method.
(e) Samples analyzed for PAHs using EPA Method 8270 in selected ion monitoring (SIM) mode.
(f) Carcinogenic PAHs (cPAH).
(g) Samples analyzed for inorganic parameters as follows:
- Alkalinity Total as CaCO3, Bicarbonate as HCO3, Carbonate as CO3 using SM A2320B
- Sulfate using EPA Method 300.0
- Sulfide using Standard Method 4500-S D.
(h) Samples analyzed for nitrogen, nitrate nitrite as N using EPA Method 353.2.
(i) Samples analyzed for dissolved iron and manganese using EPA Method 6020 or 200.7. Sample was field filtered using an 0.45 micron in-line filter.
(j) Samples analyzed for methane, ethane, and ethane using modified EPA Method 8015.

Detected values are shown in bold.
µg/L - micrograms per liter
mg/L - milligrams per liter

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TABLE 5

BEDROCK AND ALLUVIAL AQUIFER WELL PAIRS - TRANSDUCER DATA SUMMARY
Burlington Northern Livingston Shop Complex

Well Pair	Bedrock Average H [(a)]	Alluvial Average H	Net or Bulk Δh [(b)]	Vertical Gradient [(c)]	Interpreted Vertical Flow Direction	Transducer Installation Date	Comment
10-1 and ISCO-24R	4476.77	4476.99	-0.22	-0.0109	Down	June-13	1-year data collection completed
10-2 and ISCO-2	4475.45	4475.48	-0.03	-0.0024	Down	June-13	1-year data collection completed
13-8 and 13-1	4476.06	4475.79	0.27	0.0131	Up	October-13	In progress
13-9 and E-7	4474.85	4475.01	-0.16	-0.0074	Down	October-13	In progress
13-10 and 13-5	4474.50	4474.53	-0.04	-0.0015	Down	October-13	In progress
10-3 and 12-7	4469.93	4470.08	-0.16	-0.0060	Variable	June-13	Decomissioned January 2015
10-4 and 12-8	4468.87	4468.79	0.08	0.0030	Up	June-13	Decomissioned January 2015
10-7 and 12-9	4458.17	4458.29	-0.12	-0.0055	Down	June-13	Decomissioned January 2015
12-1-5 and 12-10	4462.34	4462.58	-0.24	-0.0037	Down	June-13	Decomissioned January 2015

Notes:

(a) Average head is taken as the mean of all available transducer data, with the exception of knowingly non-representitive data (e.g., sampling low conductivity wells, slug testing, etc.).

(b) Bulk head gradient is computed by subtracting average alluvial head from average bedrock head. Positive values indicate upward flow (bedrock to alluvial) and negative values indicate downward flow (alluvial to bedrock).

(c) Vertical gradient is the head difference divided by the difference in elevation of the well screen, using the midpoint of the wet screen of each well as a reference elevation.
The value represents the average of vertical gradients calculated for each pair of validated data, excluding knowingly non-representative data (e.g., during sampling, slug testing, etc.).

Summary includes data through the transducer download event through December 2014.

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TASK L: SUPPLEMENTAL GROUNDWATER SAMPLING ANALYTICAL RESULTS (APRIL, MAY, AND JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	10-2											
Sampling Event			Task L	Task L	Task L	Task L	GWMD-1	GWMD-1	GWMD-1	GWMD-1	GWMD-2	Task L	Task L	GWMD-2/Task L
Alluvial/Bedrock Well			Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Date Sampled			20-Sep-11	20-Dec-11	17-Feb-12	23-Jun-12	18-Dec-12	28-Feb-13	13-Jun-13	25-Sep-13	28-Feb-14	28-Apr-14	15-May-14	11-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]														
Benzene	-- [d]	5	**0.15J** [e]	**0.77**	**0.72**	**0.48J**	<0.50 [f]	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Chlorobenzene	100		**0.34J**	**0.26J**	**0.25J**	**0.25J**	**0.34J**	**0.44J**	<5.0	<5.0	<10	**0.13J**	**0.12J**	<10
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,2-Dibromoethane	--	0.004	<0.50	<0.50	<0.50	<0.50	<0.50	<0.30	<3.0	<3.0	<6.0	<0.30	<0.30	<6.0
2-Chlorotoluene	--	--	**6.9**	**3.6**	**3.9**	**2.0**	**8.0**	**7.2**	**6.0**	**5.1**	**4.0J**	**0.36J**	**0.66**	**4.1J**
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	**0.30J**	**0.25J**	<5.0	<5.0	<10	<0.50	<0.50	<10
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,2-Dichlorobenzene	--	600	**0.62**	**0.32J**	**0.31J**	**0.17J**	**0.56**	**0.62**	<5.0	<5.0	<10	<0.50	<0.50	<10
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50	<0.50	**0.18J**	<5.0	<5.0	<10	<0.50	<0.50	<10
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	**0.12J**	<5.0	<5.0	<10	<0.50	<0.50	<10
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,1-Dichloroethene	--	7	**0.28J**	**0.26J**	**0.28J**	**0.12J**	**0.30J**	**0.35J**	<5.0	<5.0	<10	**0.15J**	**0.22J**	<10
cis-1,2-Dichloroethene	70		**1.4**	**1.4**	**1.5**	**1.2**	**1.4**	**1.7**	**2.4J**	**2.6J**	**3.5J**	**2.4**	**2.5**	**3.8J**
trans-1,2-Dichloroethene	--	100	**0.17J**	**0.26J**	**0.41J**	**0.45J**	**0.29J**	**0.38J**	<5.0	<5.0	<10	**0.81**	**1.1**	<10
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
trans-1,3-Dichloropropene	--	2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.30	<5.0	<3.0	<6.0	<0.30	<0.30	<6.0
Ethylbenzene	--	700	**0.41J**	**0.30J**	**0.31J**	**0.18J**	**0.35J**	**0.40J**	<5.0	<5.0	<10	<0.50	<0.50	<10
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	**1.8J**	<10	<0.50	<0.50	<10
Naphthalene	--	100	**0.67**	**1.4**	**1.1**	**0.98**	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Tetrachloroethene	5.0		**9,480**	**5,520**	**4,540**	**3,100**	**9,080**	**9,760**	**8,720**	**8,320**	**6,980**	**2,700**	**2,480**	**8,720**
Toluene	--	1,000	**1.0**	**1.6**	**1.4**	**0.81**	**0.29J**	**0.23J**	<5.0	<5.0	<10	**0.13J**	<0.50	<10
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Trichloroethene	5.0		**87**	**71**	**84**	**49**	**90J**	**110**	**125**	**196**	**283**	**216**	**218**	**239**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<10	<0.50	<0.50	<10
Vinyl chloride	0.15 [g]		<0.50	<0.50	<0.50	<0.50	<0.50	**0.14J**	<4.0	<4.0	<8.0	<0.40	**0.13J**	<8.0
m+p-Xylenes	--	10,000	**0.43J**	**0.45J**	**0.47J**	**0.27J**	**0.25J**	**0.32J**	<5.0	<5.0	<10	<0.50	<0.50	<10
o-Xylene	--	10,000	**0.60**	**0.51**	**0.51**	**0.29J**	**0.39J**	**0.51**	<5.0	<5.0	<10	<0.50	<0.50	<10
Xylenes, Total	--	10,000	**1.0**	**0.96**	**0.98**	**0.56**	**0.65**	**0.84**	<5.0	<5.0	<10	<0.50	<0.50	<10

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TASK L: SUPPLEMENTAL GROUNDWATER SAMPLING ANALYTICAL RESULTS (APRIL, MAY, AND JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	ISCO-2								
Sampling Event			GWMD-1	GWMD-1	GWMD-1	GWMD-1	GWMD-2	Task L	Task L	GWMD-2/Task L	
Alluvial/Bedrock Well			Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	(duplicate of ISCO-2)
Date Sampled			17-Dec-12	28-Feb-13	14-Jun-13	24-Sep-13	20-Feb-14	28-Apr-14	15-May-14	10-Jun-14	10-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]											
Benzene	-- [d]	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.50	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.50	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		**82**	**40**	**75**	**92**	**50**	**85**	**95**	**97**	**102**
Toluene	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		**0.94**	**1.0**	**0.37J**	**0.32J**	**0.35J**	**0.44J**	**0.39J**	**0.41J**	**0.41J**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

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TASK L: SUPPLEMENTAL GROUNDWATER SAMPLING ANALYTICAL RESULTS (APRIL, MAY, AND JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	13-9						
Sampling Event			GWMD-2	GWMD-2	Task L		Task L	GWMD-2/Task L	
Alluvial/Bedrock Well			Bedrock	Bedrock	Bedrock	(duplicate of 13-9)	Bedrock	Bedrock	(duplicate of 13-9)
Date Sampled			17-Jan-14	28-Feb-14	28-Apr-14	28-Apr-14	15-May-14	10-Jun-14	10-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]									
Benzene	-- [d]	5	<0.50	<25	<10	<10	<10	<25	<25
Bromobenzene	--	--	<0.50	<25	<10	<10	<10	<25	<25
Bromochloromethane	--	--	<0.50	<25	<10	<10	<10	<25	<25
Bromodichloromethane	--	10	<0.50	<25	<10	<10	<10	<25	<25
Bromoform	--	80	<0.50	<25	<10	<10	<10	<25	<25
Bromomethane	--	10	<0.50	<25	<10	<10	<10	<25	<25
Carbon tetrachloride	--	3	<0.50	<25	<10	<10	<10	<25	<25
Chlorobenzene	100		**2.3**	<25	<10	<10	<10	<25	<25
Chlorodibromomethane	--	4.0	<25	<25	<10	<10	<10	<25	<25
Chloroethane	--	--	<0.50	<25	<10	**3.8J**	<10	<25	<25
Chloroform	--	70	<0.50	<25	<10	<10	<10	<25	<25
Chloromethane	--	30	<0.50	<25	<10	<10	<10	<25	<25
1,2-Dibromoethane	--	0.004	<0.30	<15	<6.0	<6.0	<6.0	<15	<15
2-Chlorotoluene	--	--	**20**	**12J**	**14**	**13**	**16**	**17J**	**15J**
4-Chlorotoluene	--	--	**0.40J**	<25	<10	<10	<10	<25	<25
Dibromomethane	--	--	<0.50	<25	<10	<10	<10	<25	<25
1,2-Dichlorobenzene	--	600	**0.92**	<25	<10	<10	<10	<25	<25
1,3-Dichlorobenzene	--	600	<0.50	<25	<10	<10	<10	<25	<25
1,4-Dichlorobenzene	75		**0.48J**	<25	<10	<10	<10	<25	<25
Dichlorodifluoromethane	--	1,000	<0.50	<25	<10	<10	<10	<25	<25
1,1-Dichloroethane	--	--	**0.51**	<25	<10	<10	<10	<25	<25
1,2-Dichloroethane	--	4	<0.50	<25	<10	<10	<10	<25	<25
1,1-Dichloroethene	--	7	**3.0**	<25	**2.6J**	**2.7J**	**3.8J**	<25	<25
cis-1,2-Dichloroethene	70		**2.0**	<25	**2.4J**	**2.4J**	**2.3J**	<25	<25
trans-1,2-Dichloroethene	--	100	**0.41J**	<25	<10	<10	<10	<25	<25
1,2-Dichloropropane	--	5	<0.5	<25	<10	<10	<10	<25	<25
1,3-Dichloropropane	--	--	<25	<25	<10	<10	<10	<25	<25
2,2-Dichloropropane	--	--	<0.50	<25	<10	<10	<10	<25	<25
1,1-Dichloropropene	--	--	<0.50	<25	<10	<10	<10	<25	<25
cis-1,3-Dichloropropene	--	4	<0.50	<25	<10	<10	<10	<25	<25
trans-1,3-Dichloropropene	--	2	<0.30	<15	<6.0	<6.0	<6.0	<15	<15
Ethylbenzene	--	700	**3.6**	<25	<10	<10	<10	<25	<25
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<25	<10	<10	<10	<25	<25
Methylene chloride	--	5	<0.50	<25	<10	<10	<10	<25	<25
Naphthalene	--	100	**0.97**	<25	<10	<10	<10	<25	<25
Styrene	--	100	<0.50	<25	<10	<10	<10	<25	<25
1,1,1,2-Tetrachloroethane	--	--	<0.50	<25	<10	<10	<10	<25	<25
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<25	<10	<10	<10	<25	<25
Tetrachloroethene	5.0		**52,400**	**35,400**	**52,200**	**55,600**	**44,200**	**38,600**	**40,400**
Toluene	--	1,000	**0.53**	<25	<10	<10	<10	<25	<25
1,1,1-Trichloroethane	--	200	<0.50	<25	<10	<10	<10	<25	<25
1,1,2-Trichloroethane	--	3	<25	<25	<10	<10	<10	<25	<25
Trichloroethene	5.0		**100**	**91**	**104**	**102**	**102**	**115**	**110**
Trichlorofluoromethane	--	10,000	<0.50	<25	<10	<10	<10	<25	<25
1,2,3-Trichloropropane	--	--	<0.50	<25	<10	<10	<10	<25	<25
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<25	<10	<10	<10	<25	<25
Vinyl chloride	0.15 [g]		**0.56**	<20	<8.0	<8.0	<8.0	<20	<20
m+p-Xylenes	--	10,000	**0.24J**	<25	<10	<10	<10	<25	<25
o-Xylene	--	10,000	**2.4**	<25	<10	<10	<10	<25	<25
Xylenes, Total	--	10,000	**2.6**	<25	<10	<10	<10	<25	<25

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TASK L: SUPPLEMENTAL GROUNDWATER SAMPLING ANALYTICAL RESULTS (APRIL, MAY, AND JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	13-3							E-7					
Sampling Event			Initial	GWMD-2	GWMD-2	Task L	Task L	GWMD-2/Task L		ISCO Pilot Testing	GWMD-2	Task L	Task L		GWMD-2/Task L
Alluvial/Bedrock Well			Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	(duplicate of 13-3)	Alluvial	Alluvial	Alluvial	Alluvial	(duplicate of E-7)	Alluvial
Date Sampled			23-Jul-13	19-Dec-13	26-Feb-14	28-Apr-14	15-May-14	10-Jun-14	10-Jun-14	May 11 - Feb 12	21-Feb-14	28-Apr-14	15-May-14	15-May-14	7-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]															
Benzene	-- [d]	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na[h]	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	na	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	na	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		**62**	**670**	**378**	**1,010**	**746**	**768**	**747**	**24 - 185**	**1,000**	**650**	**406**	**422**	**306**
Toluene	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		**0.48J**	**2.5**	**1.8**	**3.8**	**2.8**	**2.6**	**2.5**	na	**1.5**	**1.4**	**0.53**	**0.56**	**0.37J**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	na	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50

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TASK L: SUPPLEMENTAL GROUNDWATER SAMPLING ANALYTICAL RESULTS (APRIL, MAY, AND JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	92-1								
Sampling Event			Task F SI-P1	Task F SI-P1	Task F SI-P1	Task F SI-P1	GWMD-1	GWMD-1	Task L	Task L	Task L
Alluvial/Bedrock Well			Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial
Date Sampled			17-Mar-11	Jun-11	21-Feb-12	23-Jun-12	22-Feb-13	5-Jun-13	28-Apr-14	15-May-14	7-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]											
Benzene	-- [d]	5	<0.50	NS-ISCO	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	**0.12J**	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.50	NS	<0.50	<0.50	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.50	NS	<0.50	<0.50	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		**60**	NS	**13**	**38**	**48**	**35**	**35**	**19**	**30**
Toluene	--	1,000	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		**0.060J**	NS	**0.44J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	--	10,000	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.50	NS	<0.50	<0.50	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Notes:
(a) Cleanup levels from Record of Decision (ROD) (DEQ 2001).
ROD cleanup levels based on Circular WQB-7, Montana Numeric Water Quality Standards (WQB-7 standards) dated September 1999, now called DEQ-7 standards.
(b) DEQ-7 standards dated October 2012.
(c) Samples analyzed for volatile organic compounds (VOCs) using EPA Method 8260.
(d) "--" denotes ROD cleanup level/DEQ-7 standard not established.
(e) "J" indicates estimated value. The analyte is present but at a concentration less than the limit of quantitation.
(f) "<" denotes analyte was not detected at the indicated method reporting limit.
(g) DEQ's required reporting limit of 0.4 µg/L will be used for vinyl chloride during remedial design/remedial action (RD/RA) groundwater monitoring program.
(h) "na" denotes not analyzed.

Detected values are shown in bold.
Duplicate data only shown for most recent sampling events.
µg/L - micrograms per liter

Bedrock Well

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TASK L - ADDENDUM NO. 4: WELL CONSTRUCTION - CASING RINSATE AND RECONNAISSANCE GROUNDWATER SAMPLE ANALYTICAL RESULTS
Burlington Northern Livingston Shop Complex

Sample Type	Casing Rinsate[a]				Reconnaissance Groundwater[b]
Well ID	14-3		14-4	14-6	14-3
Alluvial Aquifer/Bedrock Well	Bedrock		Shallow Bedrock	Shallow Bedrock	Bedrock
Sample ID	14-3-R1	14-3-R2	14-4-R1	14-6-R1	14-3-G
Date Sampled	10-Dec-14	17-Dec-14	10-Dec-14	11-Dec-14	15-Dec-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]					
Benzene	<0.50[d]	<0.50	<0.50	<0.50	<2.5
Bromobenzene	<0.50	<0.50	<0.50	<0.50	<2.5
Bromochloromethane	<0.50	<0.50	<0.50	<0.50	<2.5
Bromodichloromethane	1.2U[e]	0.76U	0.96U	1.2U	<2.5
Bromoform	1.6U	1.5U	1.7U	1.7U	<2.5
Bromomethane	<0.50	<0.50	<0.50	<0.50	<2.5
Carbon tetrachloride	<0.50	<0.50	<0.50	<0.50	<2.5
Chlorobenzene	<0.50	<0.50	<0.50	<0.50	<2.5
Chlorodibromomethane	2.3U	1.7U	2.1U	2.2U	<2.5
Chloroethane	<0.50	<0.50	<0.50	<0.50	<2.5
Chloroform	0.50U	0.50U	0.50U	0.50U	<2.5
Chloromethane	<0.50	<0.50	<0.50	<0.50	<2.5
1,2-Dibromoethane	<0.30	<0.30	<0.30	<0.30	<1.5
2-Chlorotoluene	<0.50	<0.50	<0.50	<0.50	<2.5
4-Chlorotoluene	<0.50	<0.50	<0.50	<0.50	<2.5
Dibromomethane	<0.50	<0.50	<0.50	<0.50	<2.5
1,2-Dichlorobenzene	<0.50	<0.50	<0.50	<0.50	<2.5
1,3-Dichlorobenzene	<0.50	<0.50	<0.50	<0.50	<2.5
1,4-Dichlorobenzene	<0.50	<0.50	<0.50	<0.50	<2.5
Dichlorodifluoromethane	<0.50	<0.50	<0.50	<0.50	<2.5
1,1-Dichloroethane	<0.50	<0.50	<0.50	<0.50	<2.5
1,2-Dichloroethane	<0.50	<0.50	<0.50	<0.50	<2.5
1,1-Dichloroethene	<0.50	<0.50	<0.50	<0.50	<2.5
cis-1,2-Dichloroethene	<0.50	<0.50	<0.50	<0.50	<2.5
trans-1,2-Dichloroethene	<0.50	<0.50	<0.50	<0.50	<2.5
1,2-Dichloropropane	<0.50	<0.50	<0.50	<0.50	<2.5
1,3-Dichloropropane	<0.50	<0.50	<0.50	<0.50	<2.5
2,2-Dichloropropane	<0.50	<0.50	<0.50	<0.50	<2.5
1,1-Dichloropropene	<0.50	<0.50	<0.50	<0.50	<2.5
cis-1,3-Dichloropropene	<0.50	<0.50	<0.50	<0.50	<2.5
trans-1,3-Dichloropropene	<0.30	<0.30	<0.30	<0.30	<1.5
Ethylbenzene	<0.50	<0.50	<0.50	<0.50	<2.5
Methyl tert-butyl ether (MTBE)	<0.50	<0.50	<0.50	<0.50	<2.5
Methylene chloride	<0.50	<0.50	<0.50	<0.50	<2.5
Naphthalene	<0.50	<0.50	<0.50	<0.50	<2.5
Styrene	<0.50	<0.50	<0.50	<0.50	<2.5
1,1,1,2-Tetrachloroethane	<0.50	<0.50	<0.50	<0.50	<2.5
1,1,2,2-Tetrachloroethane	<0.50	<0.50	<0.50	<0.50	<2.5
Tetrachloroethene	<0.50	<0.50	<0.50	<0.50	**14**
Toluene	<0.50	<0.50	<0.50	<0.50	<2.5
1,1,1-Trichloroethane	<0.50	<0.50	<0.50	<0.50	<2.5
1,1,2-Trichloroethane	<0.50	<0.50	<0.50	<0.50	<2.5
Trichloroethene	<0.50	<0.50	<0.50	<0.50	<2.5
Trichlorofluoromethane	<0.50	<0.50	<0.50	<0.50	<2.5
1,2,3-Trichloropropane	<0.50	<0.50	<0.50	<0.50	<2.5
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.50	<0.50	<0.50	<0.50	<2.5
Vinyl chloride	<0.40	<0.40	<0.40	<0.40	<2.0
m+p-Xylenes	<0.50	<0.50	<0.50	<0.50	<2.5
o-Xylene	<0.50	<0.50	<0.50	<0.50	<2.5
Xylenes, Total	<0.50	<0.50	<0.50	<0.50	<2.5

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TASK L - ADDENDUM NO. 4: WELL CONSTRUCTION - CASING RINSATE AND RECONNAISSANCE GROUNDWATER SAMPLE ANALYTICAL RESULTS
Burlington Northern Livingston Shop Complex

Notes:
(a) Rinsate sample collected after flushing casing.
(b) Reconnaisance groundwater collected from bedrock immediately below outer conductor casing, prior to advancing borehole of inner casing construction.
(c) Samples analyzed for volatile organic compounds (VOCs) using EPA Method 8260.
(d) "<" denotes analyte was not detected at the indicated method reporting limit.
(e) “U” indicates that the value has been qualified as undetected (at the method reporting limit or at the detected concentration if the result was above the reporting limit) due to blank contamination.

Detected values are shown in bold.
µg/L - micrograms per liter

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TABLE 8

TASK L - ADDENDUM NO. 4: WELL CONSTRUCTION - SOIL SAMPLE ANALYTICAL RESULTS
Burlington Northern Livingston Shop Complex

Well ID	ROD Cleanup Level (mg/kg)[a]	14-2					14-3					14-4					14-5				14-6						
Alluvial Aquifer/Bedrock Well		Shallow Bedrock					Bedrock					Shallow Bedrock					Alluvial Aquifer				Shallow Bedrock						
Sample ID		14-2-12	14-2-17	14-2-23	14-2-28	14-2-31.5	14-3-11.5	14-3-14	14-3-23	14-3-24	14-3-25	14-4-17.5	14-4-20	14-4-23	14-4-31	14-4-33	14-5-15	14-5-18	14-5-28	14-5-31	14-6-16	14-6-20	14-6-26	14-6-28.5	14-6-30	14-6-32	14-6-33[b]
Date Sampled		6-Dec-14	6-Dec-14	6-Dec-14	6-Dec-14	6-Dec-14	8-Dec-14	8-Dec-14	8-Dec-14	8-Dec-14	8-Dec-14	5-Dec-14	5-Dec-14	5-Dec-14	5-Dec-14	5-Dec-14	4-Dec-14	4-Dec-14	4-Dec-14	4-Dec-14	9-Dec-14	9-Dec-14	9-Dec-14	9-Dec-14	9-Dec-14	9-Dec-14	9-Dec-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (mg/kg)[c]																											
Benzene	--[d]	<0.0051[e]	NA[f]	<0.0052	<0.0054	<0.0060	<0.0051	NA	<0.0052	<0.0053	<0.0055	<0.0052	NA	<0.0052	<0.0054	<0.0056	NA	<0.0052	<0.0053	<0.0053	NA	<0.0052	NA	<0.0055	<0.0054	<0.0056	<0.0054
Bromobenzene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Bromochloromethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Bromodichloromethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Bromoform	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Bromomethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Carbon tetrachloride	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	124	<0.0051	NA	<0.0052	<0.0054	<0.0060	<0.0051	NA	<0.0052	<0.0053	<0.0055	<0.0052	NA	<0.0052	<0.0054	<0.0056	NA	<0.0052	<0.0053	<0.0053	NA	<0.0052	NA	<0.0055	<0.0054	<0.0056	<0.0054
Chloroethane	--	0.050UJ[g]	NA	0.050UJ	0.050UJ	0.050UJ	0.050UJ	NA	0.050UJ	0.050UJ	0.050UJ	0.050UJ	NA	0.050UJ	0.050UJ	0.050UJ	NA	0.050UJ	0.050UJ	0.050UJ	NA	0.050UJ	NA	0.050UJ	0.050UJ	0.050UJ	0.050UJ
2-Chloroethyl vinyl ether	--	<0.051	NA	<0.052	<0.054	<0.060	<0.051	NA	<0.052	<0.053	<0.055	<0.052	NA	<0.052	<0.054	<0.056	NA	<0.052	<0.053	<0.053	NA	<0.052	NA	<0.055	<0.054	<0.056	<0.054
Chloroform	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Chloromethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
2-Chlorotoluene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
4-Chlorotoluene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Chlorodibromomethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,2-Dibromoethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Dibromomethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	264	<0.0051	NA	<0.0052	<0.0054	<0.0060	<0.0051	NA	<0.0052	<0.0053	<0.0055	<0.0052	NA	<0.0052	<0.0054	<0.0056	NA	<0.0052	<0.0053	<0.0053	NA	<0.0052	NA	<0.0055	<0.0054	<0.0056	<0.0054
Dichlorodifluoromethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
cis-1,2-Dichloroethene	14	<0.0051	NA	<0.0052	<0.0054	<0.0060	<0.0051	NA	<0.0052	<0.0053	<0.0055	<0.0052	NA	<0.0052	<0.0054	<0.0056	NA	<0.0052	<0.0053	<0.0053	NA	<0.0052	NA	<0.0055	<0.0054	<0.0056	<0.0054
1,1-Dichloroethene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
trans-1,2-Dichloroethene	--	<0.0051	NA	<0.0052	<0.0054	<0.0060	<0.0051	NA	<0.0052	<0.0053	<0.0055	<0.0052	NA	<0.0052	<0.0054	<0.0056	NA	<0.0052	<0.0053	<0.0053	NA	<0.0052	NA	<0.0055	<0.0054	<0.0056	<0.0054
1,2-Dichloropropane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,3-Dichloropropane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
2,2-Dichloropropane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,1-Dichloropropene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
trans-1,3-Dichloropropene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether (MTBE)	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Methylene chloride	--	<0.051	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Naphthalene	--	<0.052	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Styrene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Tetrachloroethene	4	**0.62**	NA	**0.34**	**0.012**	<0.0060	<0.0051	NA	**0.17**	**0.011**	**0.017**	**0.019**	NA	**0.051**	**0.048**	**0.0088**	NA	**0.036**	**0.038**	<0.0053	NA	**0.041**	NA	**0.43**	**0.49**	**0.042**	**5.6**
Toluene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,1,1-Trichloroethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Trichloroethene	2	**0.16**	NA	<0.0052	<0.0054	<0.0060	<0.0051	NA	**0.010**	<0.0053	<0.0055	<0.0052	NA	<0.0052	<0.0054	<0.0056	NA	<0.0052	<0.0053	<0.0053	NA	<0.0052	NA	**0.018**	**0.040**	<0.0056	**0.15**
Trichlorofluoromethane	--	0.050UJ	NA	0.050UJ	0.050UJ	0.050UJ	0.050UJ	NA	0.050UJ	0.050UJ	0.050UJ	0.050UJ	NA	0.050UJ	0.050UJ	0.050UJ	NA	0.050UJ	0.050UJ	0.050UJ	NA	0.050UJ	NA	0.050UJ	0.050UJ	0.050UJ	0.050UJ
1,1,2-Trichloro-1,2,2-trifluoroethane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
1,2,3-Trichloropropane	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Vinyl chloride	0.02	<0.0051	NA	<0.0052	<0.0054	<0.0060	<0.0051	NA	<0.0052	<0.0053	<0.0055	<0.0052	NA	<0.0052	<0.0054	<0.0056	NA	<0.0052	<0.0053	<0.0053	NA	<0.0052	NA	<0.0055	<0.0054	<0.0056	<0.0056
m+p-Xylenes	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
o-Xylene	--	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	<0.050	<0.050	NA	<0.050	NA	<0.050	<0.050	<0.050	<0.050
Chemical Characteristic (Organic Matter) (%)[h]																											
Organic Matter	--	NA	4.10	9.41	0.17	0.26	NA	0.12	0.59	0.26	0.17	NA	0.45	0.19	0.36	0.26	0.55	NA	0.31	0.28	0.14	NA	0.43	NA	0.33	NA	NA

Notes:
(a) Cleanup levels from Record of Decision, Burlington Northern Livingston Shop Complex (ROD) [Montana Department of Environmental Quality (DEQ) 2001].
(b) Sample collected from shallow bedrock. All other samples collected from the alluvium.
(c) Soil samples analyzed for volatile organic compounds (VOCs) using EPA Method 8260.
(d) "--" denotes a ROD cleanup level not established.
(e) "<" denotes analyte was not detected at the indicated method reporting limit.
(f) "NA" denotes sample was not analyzed for the chemical constituent.
(g) "UJ" denotes analyte was not detected at the indicated method reporting limit; however, the reporting limit is approximate and may be inaccurate or imprecise.
(h) Soil samples analyzed for organic matter using Method ASA29-3.2

Detected values shown in bold. Sample results reported on dry-weight basis.
mg/kg - milligrams per kilogram

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GWMD-2: QUARTERLY GROUNDWATER ANALYTICAL RESULTS (13- SERIES WELLS)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [b]	DEQ-7 Standard (µg/L) [c]	13-1					13-2					13-3								
Event [a]			Initial	GWMD-2	GWMD-2	GWMD-2	GWMD-2	Initial	GWMD-2	GWMD-2	GWMD-2	GWMD-2	Initial	GWMD-2	GWMD-2		Task L Supplemental[d]		GWMD-2		GWMD-2
Alluvial/Bedrock Well			Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	(duplicate of 13-3)	Alluvial	Alluvial	Alluvial	(duplicate of 13-3)	Alluvial
Date Sampled			23-Jul-13	19-Dec-13	28-Feb-14	9-Jun-14	17-Sep-14	23-Jul-13	18-Dec-13	28-Feb-14	9-Jun-14	15-Sep-14	23-Jul-13	19-Dec-13	26-Feb-14	26-Feb-14	28-Apr-14	15-May-14	10-Jun-14	10-Jun-14	15-Sep-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [e]																					
Benzene	-- [f]	5	<0.50[g]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		<0.50	<0.50	**0.12J[h]**	<0.50	<0.50	**5.8J**	**7.4**	**7.0**	**1.8**	**0.63**	**62J**	**670**	**378**	**378**	**1,010**	**746**	**768**	**747**	**473**
Toluene	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.48J**	**2.5**	**1.8**	**1.7**	**3.8**	**2.8**	**2.6**	**2.5**	**2.1**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [i]		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY																					
Physical Properties (mg/L) [j]																					
Solids, Total Dissolved TDS @ 180 C	--	--	NR[k]	**480**	**481**	**435**	**480**	NR	**393**	**365**	**394**	**444**	NR	**447**	**449**	**464**	NR	NR	**436**	**434**	**430**
Inorganics (mg/L) [l]																					
Alkalinity, Total as CaCO3	--	--	NR	**241**	**241**	**238**	**238**	NR	**241**	**236**	**232**	**241**	NR	**239**	**239**	**239**	NR	NR	**233**	**232**	**235**
Bicarbonate as HCO3	--	--	NR	**294**	**294**	**290**	**290**	NR	**293**	**288**	**284**	**294**	NR	**291**	**291**	**291**	NR	NR	**284**	**282**	**286**
Carbonate as CO3	--	--	NR	<4	<4	<4	<4	NR	<4	<4	<4	<4	NR	<4	<4	<4	NR	NR	<4	<4	<4
Chloride	--	--	NR	**20**	**19**	**22**	**22**	NR	**16**	**17**	**20**	**21**	NR	**19**	**18**	**18**	NR	NR	**21**	**21**	**23**
Sulfate	--	--	NR	**134**	**175**	**100**	**135**	NR	**80**	**84**	**73**	**103**	NR	**114**	**139**	**139**	NR	NR	**104**	**103**	**127**
Hardness as CaCO3	--	--	NR	**286**	**333**	**277**	**321**	NR	**256**	**261**	**267**	**301**	NR	**275**	**305**	**303**	NR	NR	**280**	**283**	**307**
Nutrients (mg/L) [m]																					
Nitrogen, Nitrate+Nitrite as N	--	10	NR	**1.91**	**2.24**	**2.82**	**2.90**	NR	**1.61**	**1.66**	**2.50**	**2.72**	NR	**1.93**	**2.07**	**2.08**	NR	NR	**2.69**	**2.68**	**2.83**
Metals, Dissolved (mg/L) [n]																					
Calcium	--	--	NR	**82**	**95**	**79**	**92**	NR	**73**	**76**	**77**	**88**	NR	**79**	**87**	**87**	NR	NR	**80**	**81**	**89**
Iron	--	--	NA	<0.03	<0.03	<0.03	<0.03	NR	<0.03	**0.05**	<0.03	<0.03	NR	<0.03	<0.03	<0.03	NR	NR	<0.03	<0.03	<0.03
Magnesium	--	--	NA	**20**	**23**	**19**	**22**	NR	**18**	**18**	**18**	**20**	NR	**19**	**21**	**21**	NR	NR	**20**	**20**	**21**
Potassium	--	--	NA	**2**	**2**	**2**	**2**	NR	**2**	**2**	**2**	**2**	NR	**2**	**2**	**2**	NR	NR	**2**	**2**	**2**
Sodium	--	--	NR	**50**	**58**	**49**	**51**	NR	**41**	**42**	**42**	**44**	NR	**44**	**51**	**51**	NR	NR	**48**	**48**	**48**

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GWMD-2: QUARTERLY GROUNDWATER ANALYTICAL RESULTS (13- SERIES WELLS)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [b]	DEQ-7 Standard (µg/L) [c]	13-4						13-5					13-6					13-7				
Event [a]			Initial	GWMD-2		GWMD-2	GWMD-2	GWMD-2	Initial	GWMD-2	GWMD-2	GWMD-2	GWMD-2	Initial	GWMD-2	GWMD-2	GWMD-2	GWMD-2	Initial	GWMD-2	GWMD-2	GWMD-2	GWMD-2
Alluvial/Bedrock Well			Alluvial	Alluvial	(duplicate of 13-4)	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial
Date Sampled			23-Jul-13	18-Dec-13	18-Dec-13	28-Feb-14	9-Jun-14	15-Sep-14	23-Jul-13	18-Dec-13	24-Feb-14	9-Jun-14	15-Sep-14	23-Jul-13	18-Dec-13	Feb-14	9-Jun-14	15-Sep-14	23-Jul-13	18-Dec-13	28-Feb-14	9-Jun-14	15-Sep-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [e]																							
Benzene	-- [f]	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS[g]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	NS	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	NS	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		**9.7J**	**36**	**36**	**39**	**18**	**5.0**	**14J**	**13**	**10**	**14**	**16**	**15J**	**20**	NS	**21**	**23**	**22J**	**24**	**19**	**25**	**21**
Toluene	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		**0.13J**	**0.20J**	**0.20J**	**0.18J**	**0.22J**	<0.50	**0.15J**	**0.14J**	**0.13J**	**0.17J**	**0.19J**	**0.20J**	**0.20J**	NS	**0.22J**	**0.25J**	**0.43J**	**0.51**	**0.36J**	**0.46J**	**0.47J**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [i]		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	NS	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY																							
Physical Properties (mg/L) [j]																							
Solids, Total Dissolved TDS @ 180 C	--	--	NR	**444**	**446**	**452**	**435**	**472**	NR	**386**	**371**	**368**	**426**	NR	**376**	NS	**378**	**351**	NR	**327**	**325**	**357**	**374**
Inorganics (mg/L) [l]																							
Alkalinity, Total as CaCO3	--	--	NR	**244**	**243**	**241**	**236**	**238**	NR	**242**	**239**	**229**	**245**	NR	**238**	NS	**228**	**236**	NR	**231**	**238**	**228**	**237**
Bicarbonate as HCO3	--	--	NR	**297**	**296**	**294**	**289**	**291**	NR	**295**	**292**	**279**	**299**	NR	**290**	NS	**278**	**288**	NR	**282**	**290**	**278**	**289**
Carbonate as CO3	--	--	NR	<4	<4	<4	<4	<4	NR	<4	<4	<4	<4	NR	<4	NS	<4	<4	NR	<4	<4	<4	<4
Chloride	--	--	NR	**18**	**18**	**18**	**20**	**23**	NR	**16**	**16**	**20**	**22**	NR	**16**	NS	**17**	**20**	NR	**13**	**14**	**16**	**18**
Sulfate	--	--	NR	**109**	**109**	**134**	**93**	**123**	NR	**77**	**82**	**73**	**101**	NR	**68**	NS	**66**	**74**	NR	**51**	**54**	**55**	**66**
Hardness as CaCO3	--	--	NR	**288**	**287**	**303**	**285**	**310**	NR	**259**	**261**	**266**	**303**	NR	**239**	NS	**256**	**271**	NR	**240**	**243**	**250**	**273**
Nutrients (mg/L) [m]																							
Nitrogen, Nitrate+Nitrite as N	--	10	NR	**1.91**	**1.95**	**2.27**	**3.87**	**3.12**	NR	**1.51**	**1.54**	**2.53**	**2.80**	NR	**1.51**	NS	**2.36**	**2.64**	NR	**1.49**	**1.29**	**2.46**	**2.09**
Metals, Dissolved (mg/L) [n]																							
Calcium	--	--	NR	**82**	**82**	**87**	**82**	**89**	NR	**74**	**75**	**77**	**88**	NR	**69**	NS	**75**	**79**	NR	**71**	**72**	**74**	**81**
Iron	--	--	NR	<0.03	<0.03	<0.03	<0.03	<0.03	NR	<0.03	**0.65**	<0.03	<0.03	NR	<0.03	NS	<0.03	<0.03	NR	<0.03	<0.03	<0.03	<0.03
Magnesium	--	--	NR	**20**	**20**	**21**	**20**	**21**	NR	**18**	**18**	**18**	**20**	NR	**16**	NS	**17**	**18**	NR	**15**	**16**	**16**	**17**
Potassium	--	--	NR	**2**	**2**	**2**	**2**	**2**	NR	**2**	**2**	**2**	**2**	NR	**3**	NS	**2**	**2**	NR	**2**	**2**	**2**	**2**
Sodium	--	--	NR	**46**	**46**	**49**	**45**	**46**	NR	**41**	**42**	**41**	**44**	NR	**36**	NS	**38**	**38**	NR	**33**	**35**	**35**	**36**

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GWMD-2: QUARTERLY GROUNDWATER ANALYTICAL RESULTS (13- SERIES WELLS)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [b]	DEQ-7 Standard (µg/L) [c]	13-8				13-9										13-10			
Event [a]			GWMD-2	GWMD-2	GWMD-2	GWMD-2	GWMD-2	GWMD-2		Task L Supplemental[d]			GWMD-2		GWMD-2		GWMD-2	GWMD-2	GWMD-2	GWMD-2
Alluvial/Bedrock Well			Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	(duplicate of 13-9)	Bedrock	(duplicate of 13-9)	Bedrock	Bedrock	(duplicate of 13-9)	Bedrock	(duplicate of 13-9)	Bedrock	Bedrock	Bedrock	Bedrock
Date Sampled			17-Jan-14	27-Feb-14	9-Jun-14	17-Sep-14	17-Jan-14	28-Feb-14	28-Feb-14	28-Apr-14	28-Apr-14	15-May-14	10-Jun-14	10-Jun-14	17-Sep-14	17-Sep-14	17-Jan-14	28-Feb-14	6-Jun-14	18-Sep-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [e]																				
Benzene	-- [f]	5	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<0.50	<0.50	**2.3**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<25	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	**3.8J**	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<15	<15	<6.0	<6.0	<6.0	<15	<15	<15	<15	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	**20**	**12J**	**12J**	**14**	**13**	**16**	**17J**	**15J**	**8.1J**	**8.1J**	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	**0.40J**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	**0.92**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50	**0.48J**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	**0.51**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	**3.0**	<25	<25	**2.6J**	**2.7J**	**3.8J**	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	<0.50	<0.50	**2.0**	<25	<25	**2.4J**	**2.4J**	**2.3J**	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<0.50	<0.50	**0.41J**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.5	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<25	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<15	<15	<6.0	<6.0	<6.0	<15	<15	<15	<15	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	**3.6**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	**0.97**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		<0.50	<0.50	<0.50	<0.50	**52,400**	**35,400**	**36,000**	**52,200**	**55,600**	**44,200**	**38,600**	**40,400**	**40,600**	**37,400**	<0.50	<0.50	<0.50	<0.50
Toluene	--	1,000	<0.50	<0.50	<0.50	<0.50	**0.53**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<25	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		<0.50	<0.50	<0.50	<0.50	**100**	**91**	**94**	**104**	**102**	**102**	**115**	**110**	**99**	**101**	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [i]		<0.40	<0.40	<0.40	<0.40	**0.56**	<20	<20	<8.0	<8.0	<8.0	<20	<20	<25	<25	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	**0.24J**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	**2.4**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	**2.6**	<25	<25	<10	<10	<10	<25	<25	<25	<25	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY																				
Physical Properties (mg/L) [j]																				
Solids, Total Dissolved TDS @ 180 C	--	--	**542**	**508**	**442**	**468**	**476**	**428**	**469**	NR	NR	NR	**493**	**492**	**421**	**472**	**267**	**237**	**255**	**252**
Inorganics (mg/L) [l]																				
Alkalinity, Total as CaCO3	--	--	**238**	**239**	**236**	**242**	**237**	**239**	**240**	NR	NR	NR	**236**	**237**	**240**	**239**	**138**	**129**	**122**	**122**
Bicarbonate as HCO3	--	--	**290**	**292**	**288**	**296**	**289**	**292**	**293**	NR	NR	NR	**288**	**289**	**293**	**291**	**139**	**132**	**128**	**130**
Carbonate as CO3	--	--	<4	<4	<4	<4	<4	<4	<4	NR	NR	NR	<4	<4	<4	<4	**15**	**12**	**10**	**9**
Chloride	--	--	**20**	**20**	**21**	**22**	**21**	**20**	**20**	NR	NR	NR	**21**	**21**	**22**	**22**	**13**	**13**	**13**	**14**
Sulfate	--	--	**172**	**196**	**105**	**141**	**142**	**147**	**147**	NR	NR	NR	**152**	**154**	**150**	**149**	**69**	**69**	**69**	**70**
Hardness as CaCO3	--	--	**335**	**341**	**279**	**335**	**309**	**319**	**315**	NR	NR	NR	**322**	**328**	**336**	**330**	**30**	**27**	**25**	**27**
Nutrients (mg/L) [m]																				
Nitrogen, Nitrate+Nitrite as N	--	10	**2.32**	**2.48**	**2.82**	**3.19**	**0.74**	**0.72**	**0.77**	NR	NR	NR	**0.49**	**0.55**	**0.64**	**0.53**	**0.05**	<0.01	<0.01	**0.06**
Metals, Dissolved (mg/L) [n]																				
Calcium	--	--	**96**	**97**	**79**	**96**	**88**	**91**	**90**	NR	NR	NR	**92**	**93**	**96**	**95**	**10**	**9**	**8**	**9**
Iron	--	--	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	NR	NR	NR	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Magnesium	--	--	**23**	**24**	**20**	**23**	**22**	**22**	**22**	NR	NR	NR	**23**	**23**	**23**	**23**	**1**	**1**	**1**	**1**
Potassium	--	--	**2**	**2**	**2**	**2**	**3**	**3**	**3**	NR	NR	NR	**3**	**3**	**3**	**3**	<1	<1	<1	<1
Sodium	--	--	**55**	**58**	**51**	**54**	**48**	**48**	**48**	NR	NR	NR	**46**	**47**	**49**	**47**	**93**	**92**	**88**	**92**

Notes:

(a) Initial sampling event (wells 13-1 through 13-7) conducted after well construction in accordance with Addendum No. 2 to DEQ Version of Task L Supplemental Investigation Work Plan for Bedrock Aquifer(s) dated May 2013. Subsequent sampling events conducted in accordance with the Montana Department of Environmental Quality's (DEQ's) Groundwater Monitoring Program Directive No. 2, dated December 2013 (GWMD-2).
(b) Cleanup levels from Record of Decision (ROD) (DEQ 2001). ROD cleanup levels based on Circular WQB-7, Montana Numeric Water Quality Standards (WQB-7 standards) dated September 1999, now called DEQ-7 standards.
(c) DEQ-7 standards dated October 2012.
(d) Supplemental sampling conducted as part of Task L.
(e) Samples analyzed for volatile organic compounds (VOCs) using EPA Method 8260.
(f) "--" denotes ROD cleanup level/DEQ-7 standard not established.
(g) "<" denotes analyte was not detected at the indicated method reporting limit.
(h) "J" indicates a estimated value based on either the analytical instrument response below the limit of quantitation or data validation findings.
(i) DEQ's required reporting limit of 0.4 µg/L will be used for vinyl chloride during remedial design/remedial action (RD/RA) groundwater monitoring program.
(j) Samples analyzed for total dissolved solids (TDS) at 180 C using Standard Method (SM) A2540C.
(k) "NR" denotes analysis not required per Addendum No. 2 and Task L.
(l) Samples analyzed for inorganic parameters as follows:
- Alkalinity Total as CaCO3, Bicarbonate as HCO3, Carbonate as CO3 using SM A2320B
- Chloride using EPA Method 300.0
- Sulfate using EPA Method 300.0
- Hardness as CaCO3 using SM A2340B.
(m) Samples analyzed for nitrogen, nitrate+nitrite as N using EPA Method 353.2.
(n) Samples analyzed for dissolved metals using EPA Method 6010. Samples were field filtered using an 0.45 micron in-line filter.
(o) "NS" denotes not sampled; well not accessible.
Detected values are shown in bold.
µg/L - micrograms per liter
mg/L - milligrams per liter

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	10-1	ISCO-24R	10-2	ISCO-2	10-3	12-7	10-4	12-8	10-5	L-88-13	10-7	12-9	10-8	92-2
Alluvial/Bedrock Well			Bedrock	Alluvial	Bedrock	Alluvial	Bedrock	Alluvial	Bedrock	Alluvial	Bedrock	Alluvial	Bedrock	Alluvial	Bedrock	Alluvial
Date Sampled			28-Feb-14	28-Feb-14	28-Feb-14	20-Feb-14	26-Feb-14	26-Feb-14	27-Feb-14	24-Feb-14	27-Feb-14	21-Feb-14	19-Feb-14	19-Feb-14	27-Feb-14	27-Feb-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]																
Benzene	-- [d]	5	<0.50[e]	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<10	<0.50	**0.89**	**0.94**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<6.0	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	**4.0J[f]**	<0.50	<0.50	**0.54**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<10	<0.50	**0.40J**	**0.19J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<10	<0.50	**0.12J**	**0.52**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<10	<0.50	**0.83**	**2.1**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	**3.5J**	<0.50	**6.7**	**8.0**	**0.38J**	<0.50	**0.44J**	**0.22J**	**0.38J**	**0.35J**	**0.10J**	**0.30J**
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<10	<0.50	**0.16J**	**0.24J**	<0.50	<0.50	<0.50	<0.50	**0.12J**	**0.17J**	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<6.0	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		**12**	**75**	**6,980**	**50**	**32**	**9.0**	**37**	**39**	<0.50	**4.4**	**22**	**20**	**0.17J**	**14**
Toluene	--	1,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		**0.85**	**0.30J**	**283**	**0.35J**	**4.6**	**7.0**	**2.1**	**0.60**	<0.50	**1.0**	**1.5**	**1.6**	<0.50	**0.77**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	<8.0	<0.40	<0.40	**0.13J**	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY																
Physical Properties (mg/L) [h]																
Solids, Total Dissolved TDS @ 180 C	--	--	NR[i]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Inorganics (mg/L) [j]																
Alkalinity, Total as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bicarbonate as HCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbonate as CO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chloride	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulfate	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hardness as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nutrients (mg/L) [k]																
Nitrogen, Nitrate+Nitrite as N	--	10	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals, Dissolved (mg/L) [l]																
Calcium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Iron	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Magnesium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Potassium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sodium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	11-1	07-1	12-1 Port 1 (42-50')	12-1 Port 2 (54-59')	12-1 Port 3 (64-69')	12-1 Port 4 (72-77')	12-1 Port 5 (89-94')	12-10	12-5	07-11	12-2	12-3	12-4	DI_021914	12-6	10-6
Alluvial/Bedrock Well			Bedrock	Alluvial	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Alluvial	Bedrock	Alluvial	Bedrock	Bedrock	Bedrock	(duplicate of 12-4)	Bedrock	Bedrock
Date Sampled			19-Feb-14	19-Feb-14	21-Feb-14	21-Feb-14	21-Feb-14	21-Feb-14	21-Feb-14	21-Feb-14	22-Feb-14	22-Feb-14	27-Feb-14	26-Feb-14	19-Feb-14	19-Feb-14	19-Feb-14	27-Feb-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]																		
Benzene	-- [d]	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.24J**	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	**0.14J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.25J**	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	**0.90**	**0.98**	**0.88**	**1.1**	**1.0**	**0.49J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	**0.42J**	**0.39J**	**0.26J**	**0.30J**	**0.12J**	**0.26J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		<0.50	<0.50	**20**	**20**	**22**	**20**	**31**	**22**	<0.50	**0.66**	<0.50	<0.50	<0.50	<0.50	<0.50	**10**
Toluene	--	1,000	<0.50	<0.50	**0.64**	**0.14J**	**0.13J**	**0.46J**	**0.21J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		<0.50	<0.50	**2.9**	**2.6**	**2.3**	**2.4**	**2.1**	**2.1**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.30J**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY																		
Physical Properties (mg/L) [h]																		
Solids, Total Dissolved TDS @ 180 C	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Inorganics (mg/L) [i]																		
Alkalinity, Total as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bicarbonate as HCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbonate as CO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chloride	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulfate	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hardness as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nutrients (mg/L) [k]																		
Nitrogen, Nitrate+Nitrite as N	--	10	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals, Dissolved (mg/L) [l]																		
Calcium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Iron	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Magnesium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Potassium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sodium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	13-8	13-1	13-9	D2_022814	E-7	13-10	13-5	13-2	13-3	D3_022614	13-4	13-6	13-7	#3	#5	#6	#11	89-1
Alluvial/Bedrock Well			Bedrock	Alluvial	Bedrock	(duplicate of 13-9)	Alluvial	Bedrock	Alluvial	Alluvial	Alluvial	(duplicate of 13-3)	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial
Date Sampled			27-Feb-14	28-Feb-14	28-Feb-14	28-Feb-14	21-Feb-14	28-Feb-14	24-Feb-14	28-Feb-14	26-Feb-14	26-Feb-14	28-Feb-14		28-Feb-14	20-Feb-14	20-Feb-14	27-Feb-14		26-Feb-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]																				
Benzene	-- [d]	5	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS[m]	<0.50	<0.50	0.50U[n]	<0.50	dry	<0.50
Bromobenzene	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Bromoform	--	80	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Bromomethane	--	10	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Chlorobenzene	100		<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Chloroethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Chloroform	--	70	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Chloromethane	--	30	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<15	<15	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	NS	<0.30	<0.30	<0.30	<0.30	dry	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	**12J**	**12J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Dibromomethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<15	<15	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	NS	<0.30	<0.30	<0.30	<0.30	dry	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Methylene chloride	--	5	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	0.50U	<0.50	dry	<0.50
Naphthalene	--	100	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Styrene	--	100	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Tetrachloroethene	5.0		<0.50	**0.12J**	**35,400**	**36,000**	**1,000**	<0.50	**10**	**7.0**	**378**	**378**	**39**	NS	**19**	<0.50	<0.50	**0.13J**	dry	**3.0**
Toluene	--	1,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	0.59U[n]	<0.50	dry	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Trichloroethene	5.0		<0.50	<0.50	**91**	**94**	**1.5**	<0.50	**0.13J**	<0.50	**1.8**	**1.7**	**0.18J**	NS	**0.36J**	<0.50	<0.50	<0.50	dry	<0.50
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	<20	<20	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	NS	<0.40	<0.40	<0.40	<0.40	dry	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	dry	<0.50
WATER CHEMISTRY																				
Physical Properties (mg/L) [h]																				
Solids, Total Dissolved TDS @ 180 C	--	--	**508**	**481**	**428**	**469**	NR	**237**	**371**	**365**	**449**	**464**	**452**	NS	**325**	NR	NR	NR	dry	NR
Inorganics (mg/L) [i]																				
Alkalinity, Total as CaCO3	--	--	**239**	**241**	**239**	**240**	NR	**129**	**239**	**236**	**239**	**239**	**241**	NS	**238**	NR	NR	NR	dry	NR
Bicarbonate as HCO3	--	--	**292**	**294**	**292**	**293**	NR	**132**	**292**	**288**	**291**	**291**	**294**	NS	**290**	NR	NR	NR	dry	NR
Carbonate as CO3	--	--	<4	<4	<4	<4	NR	**12**	<4	<4	<4	<4	<4	NS	<4	NR	NR	NR	dry	NR
Chloride	--	--	**20**	**19**	**20**	**20**	NR	**13**	**16**	**17**	**18**	**18**	**18**	NS	**14**	NR	NR	NR	dry	NR
Sulfate	--	--	**196**	**175**	**147**	**147**	NR	**69**	**82**	**84**	**139**	**139**	**134**	NS	**54**	NR	NR	NR	dry	NR
Hardness as CaCO3	--	--	**341**	**333**	**319**	**315**	NR	**27**	**261**	**261**	**305**	**303**	**303**	NS	**243**	NR	NR	NR	dry	NR
Nutrients (mg/L) [k]																				
Nitrogen, Nitrate+Nitrite as N	--	10	**2.48**	**2.24**	**0.72**	**0.77**	NR	<0.01	**1.54**	**1.66**	**2.07**	**2.08**	**2.27**	NS	**1.29**	NR	NR	NR	dry	NR
Metals, Dissolved (mg/L) [l]																				
Calcium	--	--	**97**	**95**	**91**	**90**	NR	**9**	**75**	**76**	**87**	**87**	**87**	NS	**72**	NR	NR	NR	dry	NR
Iron	--	--	<0.03	<0.03	<0.03	<0.03	NR	<0.03	**0.65**	**0.05**	<0.03	<0.03	<0.03	NS	<0.03	NR	NR	NR	dry	NR
Magnesium	--	--	**24**	**23**	**22**	**22**	NR	**1**	**18**	**18**	**21**	**21**	**21**	NS	**16**	NR	NR	NR	dry	NR
Potassium	--	--	**2**	**2**	**3**	**3**	NR	<1	**2**	**2**	**2**	**2**	**2**	NS	**2**	NR	NR	NR	dry	NR
Sodium	--	--	**58**	**58**	**48**	**48**	NR	**92**	**42**	**42**	**51**	**51**	**49**	NS	**35**	NR	NR	NR	dry	NR

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	89-2	89-3	D1_022214	Passive Diffusion Bag Samples[o]			89-6	89-8	89-9	90-2B	90-3	92-4	94-1	94-2	L-87-2	D1_022814	L-87-5
					(duplicate of 89-3)	89-3-PDB-21	89-3-PDB-26	89-3-PDB-30										(duplicate of L-87-2)	
Alluvial/Bedrock Well			Alluvial	Alluvial					Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial		Alluvial
Date Sampled			27-Feb-14	22-Feb-14	22-Feb-14	22-Feb-14	22-Feb-14	22-Feb-14	27-Feb-14	22-Feb-14	22-Feb-14		24-Feb-14	24-Feb-14	22-Feb-14	21-Feb-14	28-Feb-14	28-Feb-14	27-Feb-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]																			
Benzene	-- [d]	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS[m]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	**2.1**	**2.2**	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	NS	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	**20**	**20**	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	**0.42J**	**0.45J**	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	**0.64**	**0.67**	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	**2.6**	**2.8**	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	**7.2**	**7.2**	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	NS	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		<0.50	**49**	**50**	**45**	**46**	**49**	**6.1**	<0.50	**24**	NS	**13**	**14**	**0.75**	**0.12J**	<0.50	<0.50	**18**
Toluene	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	**0.29J**	**0.33J**	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		<0.50	**0.27J**	**0.28J**	**0.24J**	**0.24J**	**1.5**	<0.50	<0.50	**0.46J**	NS	**0.24J**	**1.3**	<0.50	<0.50	**0.22J**	**0.26J**	**0.41J**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	NS	<0.40	<0.40	<0.40	<0.40	**0.94**	**0.94**	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	**0.34J**	**0.34J**	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NS	<0.50	<0.50	<0.50	<0.50	**0.34J**	**0.34J**	<0.50
WATER CHEMISTRY																			
Physical Properties (mg/L) [h]																			
Solids, Total Dissolved TDS @ 180 C	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Inorganics (mg/L) [i]																			
Alkalinity, Total as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Bicarbonate as HCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Carbonate as CO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Chloride	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Sulfate	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Hardness as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Nutrients (mg/L) [k]																			
Nitrogen, Nitrate+Nitrite as N	--	10	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Metals, Dissolved (mg/L) [l]																			
Calcium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Iron	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Magnesium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Potassium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR
Sodium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NS	NR	NR	NR	NR	NR	NR	NR

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	LS-11	MW-5RR	MW-10	EX-22	DI_022614	EX-24	EX-28	EX-58	07-2A	07-5A	07-6	07-7	07-8	07-9	D2_022614	07-12
Alluvial/Bedrock Well			Alluvial	Alluvial	Alluvial	Alluvial	(duplicate of EX-22)	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	(duplicate of 07-9)	Alluvial
Date Sampled			26-Feb-14	25-Feb-14	25-Feb-14	26-Feb-14	26-Feb-14	19-Feb-14	25-Feb-14	19-Feb-14	22-Feb-14	19-Feb-14	21-Feb-14	26-Feb-14	25-Feb-14	26-Feb-14	26-Feb-14	22-Feb-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]																		
Benzene	-- [d]	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		**0.34J**	**0.96**	<0.50	**2.5**	**2.4**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	**0.10J**	<0.50	**3.6**	**3.4**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	**0.14J**	<0.50	**0.38J**	**0.39J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	**0.18J**	<0.50	<0.50	**0.30J**	**0.28J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		**1.9**	**0.51**	<0.50	**1.5**	**1.4**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		**1.6**	**3.8**	<0.50	**6.5**	**6.2**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	**0.14J**	**0.12J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.00	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		**15**	**17**	**1.1**	**3.5**	**3.4**	**0.25J**	**1.4**	<0.50	**4.2**	**0.82**	**0.17J**	<0.50	**0.96**	**7.7**	**7.5**	**0.44J**
Toluene	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		**2.0**	**2.8**	<0.50	**1.9**	**1.8**	**0.13J**	**0.19J**	<0.50	<0.50	<0.50	<0.50	**0.21J**	**0.14J**	**0.29J**	**0.23J**	<0.50
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	**0.10J**	<0.40	<0.40	**0.18J**	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY																		
Physical Properties (mg/L) [h]																		
Solids, Total Dissolved TDS @ 180 C	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Inorganics (mg/L) [i]																		
Alkalinity, Total as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bicarbonate as HCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbonate as CO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chloride	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulfate	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hardness as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nutrients (mg/L) [k]																		
Nitrogen, Nitrate+Nitrite as N	--	10	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals, Dissolved (mg/L) [l]																		
Calcium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Iron	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Magnesium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Potassium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sodium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	E-6	E-8	ISCO-1	D1_022114
			To Be Sampled First Quarter 2014 Only			
Alluvial/Bedrock Well			Alluvial	Alluvial	Alluvial	(duplicate of ISCO-1)
Date Sampled			21-Feb-14	21-Feb-14	21-Feb-14	21-Feb-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]						
Benzene	-- [d]	5	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		**0.53**	**34**	**9.0**	**8.7**
Toluene	--	1,000	<0.50	<0.50	<0.50	**0.30J**
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		<0.50	**0.17J**	<0.50	<0.50
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY						
Physical Properties (mg/L) [h]						
Solids, Total Dissolved TDS @ 180 C	--	--	NR	NR	NR	NR
Inorganics (mg/L) [j]						
Alkalinity, Total as CaCO3	--	--	NR	NR	NR	NR
Bicarbonate as HCO3	--	--	NR	NR	NR	NR
Carbonate as CO3	--	--	NR	NR	NR	NR
Chloride	--	--	NR	NR	NR	NR
Sulfate	--	--	NR	NR	NR	NR
Hardness as CaCO3	--	--	NR	NR	NR	NR
Nutrients (mg/L) [k]						
Nitrogen, Nitrate+Nitrite as N	--	10	NR	NR	NR	NR
Metals, Dissolved (mg/L) [l]						
Calcium	--	--	NR	NR	NR	NR
Iron	--	--	NR	NR	NR	NR
Magnesium	--	--	NR	NR	NR	NR
Potassium	--	--	NR	NR	NR	NR
Sodium	--	--	NR	NR	NR	NR

Notes:
(a) Cleanup levels from Record of Decision (ROD) [Montana Department of Environmental Quality (DEQ) 2001]. ROD cleanup levels based on Circular WQB-7, Montana Numeric Water Quality Standards (WQB-7 standards) dated September 1999, now called DEQ-7 standards.
(b) DEQ-7 standards dated October 2012.
(c) Samples analyzed for volatile organic compounds (VOCs) using EPA Method 8260.
(d) "--" denotes ROD cleanup level/DEQ-7 standard not established.
(e) "<" denotes analyte was not detected at the indicated method reporting limit.
(f) "J" indicates estimated value. The analyte is present but at a concentration less than the limit of quantitation.
(g) DEQ's required reporting limit of 0.4 µg/L will be used for vinyl chloride during remedial design/remedial action (RD/RA) groundwater monitoring program.
(h) Samples analyzed for total dissolved solids (TDS) at 180 C using Standard Method (SM) A2540C.
(i) "NR" denotes analysis not required per DEQ's Groundwater Monitoring Program Directive No. 2 dated December 2013.
(j) Samples analyzed for inorganic parameters as follows:
- Alkalinity Total as CaCO3, Bicarbonate as HCO3, Carbonate as CO3 using SM A2320B
- Chloride using EPA Method 300.0
- Sulfate using EPA Method 300.0
- Hardness as CaCO3 using SM A2340B.
(k) Samples analyzed for nitrogen, nitrate+nitrite as N using EPA Method 353.2.
(l) Samples analyzed for dissolved metals using EPA Method 6010. Samples were field filtered using an 0.45 micron in-line filter.
(m) "NS" denotes no sample collected. No sample collected from well 13-6 as the wellhead could not be located. No sample collected from well 90-2B as the well was purged dry. Well #11 was dry, no sample collected.
(n) "U" indicates that the value has been qualified as undetected (at the method reporting limit or at the detected concentration if the result was above the reporting limit) due to blank contamination.
(o) Passive diffusion bag (PDB) samples. PDB placed in well approximately 2 weeks prior to sample collection.

BEDROCK WELL

Detected values are shown in bold.
µg/L - micrograms per liter
mg/L - milligrams per liter

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	10-1	ISCO-24R	10-2	ISCO-2	D2_061014	10-3	12-7	10-4	12-8	10-5	L-88-13	10-7	12-9	10-8	92-2
Alluvial/Bedrock Well			Bedrock	Alluvial	Bedrock	Alluvial	(duplicate of ISCO-2)	Bedrock	Alluvial	Bedrock	Alluvial	Bedrock	Alluvial	Bedrock	Alluvial	Bedrock	Alluvial
Date Sampled			11-Jun-14	9-Jun-14	11-Jun-14	10-Jun-14	10-Jun-14	3-Jun-14	3-Jun-14	6-Jun-14	6-Jun-14	6-Jun-14	3-Jun-14	3-Jun-14	3-Jun-14	11-Jun-14	10-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]																	
Benzene	-- [d]	5	<0.50[e]	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<10	<0.50	<0.50	**3.6**	**0.81**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<6.0	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	**4.1J**[f]	<0.50	<0.50	<0.50	**0.17J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<10	<0.50	<0.50	**0.62**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<10	<0.50	<0.50	**0.16J**	**0.73**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<10	<0.50	<0.50	**1.0**	**1.9**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	**3.8J**	<0.50	<0.50	**7.8**	**13**	**0.39J**	<0.50	**0.25J**	**0.19J**	**0.48J**	**0.62J**	**0.12J**	**0.13J**
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<10	<0.50	<0.50	**0.25J**	**0.27J**	<0.50	<0.50	<0.50	<0.50	**0.18J**	**0.24J**	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<6.0	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		**17**	**119**	**8,720**	**97**	**102**	**39**	**6.6**	**37**	**39**	<0.50	**4.0**	**23**	**29**	**0.24J**	**8.0**
Toluene	--	1,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		**1.2**	**0.43J**	**239**	**0.41J**	**0.41J**	**5.2**	**4.1**	**2.0**	**0.72**	<0.50	**0.97**	**1.5**	**1.8**	<0.50	**0.39J**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	<8.0	<0.40	<0.40	<0.40	**0.16J**	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY																	
Physical Properties (mg/L) [h]																	
Solids, Total Dissolved TDS @ 180 C	--	--	NR[i]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Inorganics (mg/L) [j]																	
Alkalinity, Total as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bicarbonate as HCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbonate as CO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chloride	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulfate	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hardness as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nutrients (mg/L) [k]																	
Nitrogen, Nitrate+Nitrite as N	--	10	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals, Dissolved (mg/L) [l]																	
Calcium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Iron	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Magnesium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Potassium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sodium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	11-1	07-1	12-1 Port 1 (42-50')	12-1 Port 2 (54-59')	12-1 Port 3 (64-69')	12-1 Port 4 (72-77')	12-1 Port 5 (89-94')	12-10	12-5	07-11	12-2	12-3	12-4	D1_060214	12-6	10-6
Alluvial/Bedrock Well			Bedrock	Alluvial	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Alluvial	Bedrock	Alluvial	Bedrock	Bedrock	Bedrock	(duplicate of 12-4)	Bedrock	Bedrock
Date Sampled			2-Jun-14	2-Jun-14	7-Jun-14	7-Jun-14	7-Jun-14	7-Jun-14	7-Jun-14	7-Jun-14	4-Jun-14	4-Jun-14	5-Jun-14	5-Jun-14	2-Jun-14	2-Jun-14	6-Jun-14	3-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]																		
Benzene	-- [d]	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.38J**	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	**0.47J**	**2.5**	**0.61**	**0.18J**	<0.50	**0.64**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.27J**	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	**0.20J**	**0.70**	**0.27J**	<0.50	<0.50	**1.3**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	**0.19J**	<0.50	<0.50	<0.50	**0.16J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	**0.30J**	**1.6**	**0.95**	<0.50	<0.50	**1.2**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	**2.0**	**1.3**	**1.4**	**1.3**	**1.1**	**3.3**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	**0.56**	**1.4**	**1.0**	**0.75**	**0.21J**	**0.41J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		<0.50	<0.50	**11**	**17**	**22**	**19**	**33**	**18**	<0.50	**0.85**	<0.50	<0.50	<0.50	<0.50	<0.50	**10**
Toluene	--	1,000	<0.50	<0.50	**0.20J**	<0.50	<0.50	**0.71**	**0.33J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		<0.50	<0.50	**3.2**	**3.1**	**3.2**	**2.8**	**2.1**	**2.2**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.30J**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	**0.18J**	**0.19J**	**0.13J**	<0.40	<0.40	**0.32J**	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY																		
Physical Properties (mg/L) [h]																		
Solids, Total Dissolved TDS @ 180 C	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Inorganics (mg/L) [i]																		
Alkalinity, Total as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bicarbonate as HCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbonate as CO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chloride	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulfate	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hardness as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nutrients (mg/L) [k]																		
Nitrogen, Nitrate+Nitrite as N	--	10	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals, Dissolved (mg/L) [l]																		
Calcium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Iron	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Magnesium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Potassium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sodium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	13-8	13-1	13-9	D4_061014	E-7	13-10	13-5	13-2	13-3	D3_061014	13-4	13-6	13-7	#3	#5	#6	#11	89-1
Alluvial/Bedrock Well			Bedrock	Alluvial	Bedrock	(duplicate of 13-9)	Alluvial	Bedrock	Alluvial	Alluvial	Alluvial	(duplicate of 13-3)	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial
Date Sampled			9-Jun-14	9-Jun-14	10-Jun-14	10-Jun-14	7-Jun-14	6-Jun-14	9-Jun-14	9-Jun-14	10-Jun-14	10-Jun-14	9-Jun-14	9-Jun-14	9-Jun-14	2-Jun-14	2-Jun-14	6-Jun-14	3-Jun-14	6-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]																				
Benzene	-- [d]	5	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<15	<15	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	**17J**	**15J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<15	<15	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		<0.50	<0.50	**38,600**	**40,400**	**306**	<0.50	**14**	**1.8**	**768**	**747**	**18**	**21**	**25**	<0.50	<0.50	**1.0**	<0.50	**3.2**
Toluene	--	1,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		<0.50	<0.50	**115**	**110**	**0.37J**	<0.50	**0.17J**	<0.50	**2.6**	**2.5**	**0.22J**	**0.22J**	**0.46J**	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	<20	<20	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<25	<25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY																				
Physical Properties (mg/L) [h]																				
Solids, Total Dissolved TDS @ 180 C	--	--	**442**	**435**	**493**	**492**	NR	**255**	**368**	**394**	**436**	**434**	**435**	**378**	**357**	NR	NR	NR	dry	NR
Inorganics (mg/L) [i]																				
Alkalinity, Total as CaCO3	--	--	**236**	**238**	**236**	**237**	NR	**122**	**229**	**232**	**233**	**232**	**236**	**228**	**228**	NR	NR	NR	dry	NR
Bicarbonate as HCO3	--	--	**288**	**290**	**288**	**289**	NR	**128**	**279**	**284**	**284**	**282**	**289**	**278**	**278**	NR	NR	NR	dry	NR
Carbonate as CO3	--	--	<4	<4	<4	<4	NR	**10**	<4	<4	<4	<4	<4	<4	<4	NR	NR	NR	dry	NR
Chloride	--	--	**21**	**22**	**21**	**21**	NR	**13**	**20**	**20**	**21**	**21**	**20**	**17**	**16**	NR	NR	NR	dry	NR
Sulfate	--	--	**105**	**100**	**152**	**154**	NR	**69**	**73**	**73**	**104**	**103**	**93**	**66**	**55**	NR	NR	NR	dry	NR
Hardness as CaCO3	--	--	**279**	**277**	**322**	**328**	NR	**25**	**266**	**267**	**280**	**283**	**285**	**256**	**250**	NR	NR	NR	dry	NR
Nutrients (mg/L) [k]																				
Nitrogen, Nitrate+Nitrite as N	--	10	**2.82**	**2.82**	**0.49**	**0.55**	NR	<0.01	**2.53**	**2.50**	**2.69**	**2.68**	**3.87**	**2.36**	**2.46**	NR	NR	NR	dry	NR
Metals, Dissolved (mg/L) [l]																				
Calcium	--	--	**79**	**79**	**92**	**93**	NR	**8**	**77**	**77**	**80**	**81**	**82**	**75**	**74**	NR	NR	NR	dry	NR
Iron	--	--	<0.03	<0.03	<0.03	<0.03	NR	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	NR	NR	NR	dry	NR
Magnesium	--	--	**20**	**19**	**23**	**23**	NR	**1**	**18**	**18**	**20**	**20**	**20**	**17**	**16**	NR	NR	NR	dry	NR
Potassium	--	--	**2**	**2**	**3**	**3**	NR	<1	**2**	**2**	**2**	**2**	**2**	**2**	**2**	NR	NR	NR	dry	NR
Sodium	--	--	**51**	**49**	**46**	**47**	NR	**88**	**41**	**42**	**48**	**48**	**45**	**38**	**35**	NR	NR	NR	dry	NR

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	89-2	89-3	D1_061614	Passive Diffusion Bag Samples[m]			89-6	89-8	89-9	90-2B	90-3	92-4	94-1	94-2	L-87-2	D1_061014	L-87-5	D2_060614
Alluvial/Bedrock Well			Alluvial	Alluvial	(duplicate of 89-3)	89-3-PDB-19	89-3-PDB-25	89-3-PDB-31	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	(duplicate of L-87-2)	Alluvial	(duplicate of L-87-5)
Date Sampled			3-Jun-14	16-Jun-14	16-Jun-14	16-Jun-14	16-Jun-14	16-Jun-14	3-Jun-14	7-Jun-14	7-Jun-14	4-Jun-14	4-Jun-14	6-Jun-14	4-Jun-14	3-Jun-14	10-Jun-14	10-Jun-14	6-Jun-14	6-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]																				
Benzene	-- [d]	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**1.9**	**1.9**	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**21**	**20**	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.49J**	**0.48J**	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.62**	**0.64**	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**2.8**	**2.9**	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**1.4**	<0.50	<0.50	<0.50	<0.50	**4.3**	**4.4**	**0.13J**	**0.11J**
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	**0.46J**	**0.43J**	**0.48J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		<0.50	**50**	**44**	**41**	**43**	**53**	**6.8**	<0.50	**19**	**7.0**	**13**	**7.4**	**0.77**	**0.13J**	**0.15J**	**0.11J**	**19**	**26**
Toluene	--	1,000	<0.50	<0.50	<0.50	**0.18J**	**0.16J**	**0.39J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.28J**	**0.27J**	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		<0.50	**0.37J**	**0.40J**	**0.21J**	**0.21J**	**2.3**	<0.50	<0.50	**0.44J**	**1.6**	**0.46J**	**2.0**	<0.50	<0.50	**0.24J**	**0.24J**	**0.60**	**0.57**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	**0.86**	**0.78**	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.42J**	**0.42J**	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.42J**	**0.42J**	<0.50	<0.50
WATER CHEMISTRY																				
Physical Properties (mg/L) [h]																				
Solids, Total Dissolved TDS @ 180 C	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Inorganics (mg/L) [i]																				
Alkalinity, Total as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bicarbonate as HCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbonate as CO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chloride	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulfate	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hardness as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nutrients (mg/L) [k]																				
Nitrogen, Nitrate+Nitrite as N	--	10	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals, Dissolved (mg/L) [l]																				
Calcium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Iron	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Magnesium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Potassium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sodium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	LS-11	MW-5RR	MW-10	EX-22	D2_060214	EX-24	EX-28	EX-58	07-2A	07-5A	07-6	07-7	07-8	07-9	D1_060314	07-12
Alluvial/Bedrock Well			Alluvial	Alluvial	Alluvial	Alluvial	(duplicate of EX-22)	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	Alluvial	(duplicate of 07-9)	Alluvial
Date Sampled			4-Jun-14	7-Jun-14	9-Jun-14	2-Jun-14	2-Jun-14	2-Jun-14	9-Jun-14	2-Jun-14	9-Jun-14	2-Jun-14	3-Jun-14	4-Jun-14	6-Jun-14	3-Jun-14	3-Jun-14	4-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]																		
Benzene	-- [d]	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromobenzene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromochloromethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	--	80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	--	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	100		<0.50	**0.32J**	<0.50	**1.1**	**1.1**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	--	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroform	--	70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	--	0.004	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Chlorotoluene	--	--	<0.50	<0.50	<0.50	**0.11J**	**0.11J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorotoluene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	**0.15J**	**0.15J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	--	600	<0.50	<0.50	<0.50	**0.15J**	**0.12J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	75		<0.50	<0.50	<0.50	**0.64**	**0.61**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	--	7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	70		**0.88**	**2.2**	<0.50	**2.2**	**2.2**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloropropane	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,2-Dichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	--	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	--	2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	--	700	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene chloride	--	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	--	100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	5.0		**8.9**	**11**	**0.30J**	**2.8**	**2.8**	**1.1**	**1.7**	**0.12J**	**2.1**	**0.76**	**0.11J**	**0.26J**	**0.26J**	**20**	**20**	**0.16J**
Toluene	--	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	--	200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	--	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	5.0		**1.1**	**3.2**	<0.50	**1.5**	**1.5**	**0.17J**	**0.23J**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.59**	**0.57**	**0.16J**
Trichlorofluoromethane	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.15 [g]		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m+p-Xylenes	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
o-Xylene	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes, Total	--	10,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WATER CHEMISTRY																		
Physical Properties (mg/L) [h]																		
Solids, Total Dissolved TDS @ 180 C	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Inorganics (mg/L) [i]																		
Alkalinity, Total as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Bicarbonate as HCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbonate as CO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chloride	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sulfate	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hardness as CaCO3	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nutrients (mg/L) [k]																		
Nitrogen, Nitrate+Nitrite as N	--	10	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals, Dissolved (mg/L) [l]																		
Calcium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Iron	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Magnesium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Potassium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sodium	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

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GWMD-2: QUARTERLY/SEMIANNUAL GROUNDWATER ANALYTICAL RESULTS (JUNE 2014)
Burlington Northern Livingston Shop Complex

Well ID/Sample ID	ROD Cleanup Level (µg/L) [a]	DEQ-7 Standard (µg/L) [b]	92-1
			Task L Supplemental
Alluvial/Bedrock Well			Alluvial
Date Sampled			7-Jun-14
VOLATILE ORGANIC COMPOUNDS (VOCs) (µg/L) [c]			
Benzene	-- [d]	5	<0.50
Bromobenzene	--	--	<0.50
Bromochloromethane	--	--	<0.50
Bromodichloromethane	--	10	<0.50
Bromoform	--	80	<0.50
Bromomethane	--	10	<0.50
Carbon tetrachloride	--	3	<0.50
Chlorobenzene	100		<0.50
Chlorodibromomethane	--	4.0	<0.50
Chloroethane	--	--	<0.50
Chloroform	--	70	<0.50
Chloromethane	--	30	<0.50
1,2-Dibromoethane	--	0.004	<0.30
2-Chlorotoluene	--	--	<0.50
4-Chlorotoluene	--	--	<0.50
Dibromomethane	--	--	<0.50
1,2-Dichlorobenzene	--	600	<0.50
1,3-Dichlorobenzene	--	600	<0.50
1,4-Dichlorobenzene	75		<0.50
Dichlorodifluoromethane	--	1,000	<0.50
1,1-Dichloroethane	--	--	<0.50
1,2-Dichloroethane	--	4	<0.50
1,1-Dichloroethene	--	7	<0.50
cis-1,2-Dichloroethene	70		<0.50
trans-1,2-Dichloroethene	--	100	<0.50
1,2-Dichloropropane	--	5	<0.50
1,3-Dichloropropane	--	--	<0.50
2,2-Dichloropropane	--	--	<0.50
1,1-Dichloropropene	--	--	<0.50
cis-1,3-Dichloropropene	--	4	<0.50
trans-1,3-Dichloropropene	--	2	<0.30
Ethylbenzene	--	700	<0.50
Methyl tert-butyl ether (MTBE)	--	30	<0.50
Methylene chloride	--	5	<0.50
Naphthalene	--	100	<0.50
Styrene	--	100	<0.50
1,1,1,2-Tetrachloroethane	--	--	<0.50
1,1,2,2-Tetrachloroethane	--	2.0	<0.50
Tetrachloroethene	5.0		**30**
Toluene	--	1,000	<0.50
1,1,1-Trichloroethane	--	200	<0.50
1,1,2-Trichloroethane	--	3	<0.50
Trichloroethene	5.0		<0.50
Trichlorofluoromethane	--	10,000	<0.50
1,2,3-Trichloropropane	--	--	<0.50
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	<0.50
Vinyl chloride	0.15 [g]		<0.40
m+p-Xylenes	--	10,000	<0.50
o-Xylene	--	10,000	<0.50
Xylenes, Total	--	10,000	<0.50
WATER CHEMISTRY			
Physical Properties (mg/L) [h]			
Solids, Total Dissolved TDS @ 180 C	--	--	NR
Inorganics (mg/L) [j]			
Alkalinity, Total as CaCO3	--	--	NR
Bicarbonate as HCO3	--	--	NR
Carbonate as CO3	--	--	NR
Chloride	--	--	NR
Sulfate	--	--	NR
Hardness as CaCO3	--	--	NR
Nutrients (mg/L) [k]			
Nitrogen, Nitrate+Nitrite as N	--	10	NR
Metals, Dissolved (mg/L) [l]			
Calcium	--	--	NR
Iron	--	--	NR
Magnesium	--	--	NR
Potassium	--	--	NR
Sodium	--	--	NR

Notes:
(a) Cleanup levels from Record of Decision (ROD) [Montana Department of Environmental Quality (DEQ) 2001]. ROD cleanup levels based on Circular WQB-7, Montana Numeric Water Quality Standards (WQB-7 standards) dated September 1999, now called DEQ-7 standards.
(b) DEQ-7 standards dated October 2012.
(c) Samples analyzed for volatile organic compounds (VOCs) using EPA Method 8260.
(d) "--" denotes ROD cleanup level/DEQ-7 standard not established.
(e) "<" denotes analyte was not detected at the indicated method reporting limit.
(f) "J" indicates estimated value. The analyte is present but at a concentration less than the limit of quantitation.
(g) DEQ's required reporting limit of 0.4 µg/L will be used for vinyl chloride during remedial design/remedial action (RD/RA) groundwater monitoring program.
(h) Samples analyzed for total dissolved solids (TDS) at 180 C using Standard Method (SM) A2540C.
(i) "NR" denotes analysis not required per DEQ Groundwater Monitoring Program Directive No. 2 dated December 2013.
(j) Samples analyzed for inorganic parameters as follows:
- Alkalinity Total as CaCO3, Bicarbonate as HCO3, Carbonate as CO3 using SM A2320B
- Chloride using EPA Method 300.0
- Sulfate using EPA Method 300.0
- Hardness as CaCO3 using SM A2340B.
(k) Samples analyzed for nitrogen, nitrate+nitrite as N using EPA Method 353.2.
(l) Samples analyzed for dissolved metals using EPA Method 6010. Samples were field filtered using an 0.45 micron in-line filter.
(m) Passive diffusion bag (PDB) samples. PDB placed in well approximately 2 weeks prior to sample collection.

BEDROCK WELL

Detected values are shown in bold.
µg/L - micrograms per liter
mg/L - milligrams per liter

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WATER LEVEL AND APPARENT LNAPL THICKNESS MEASUREMENTS (FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

Well Designation	Date of Measurement	Monitoring Event	Easting (feet)	Northing (feet)	Survey Reference[a]	Elevation of TOC PVC Casing (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	Apparent LNAPL Thickness (feet)[b]	Elevation of LNAPL (feet MSL)	Elevation of LNAPL-Water Table (feet MSL)	Air-Water Table Elevation (feet MSL)[c]	Depth to Air-Liquid Table (feet bgs)
GWMD-2 Wells													
LS-11	2/21/2014	2/20/2014	1702678.7	521180.8	TOC	4463.77	-	9.99	0.00	-	4453.78	4453.78	8.02
L-87-2 (LPZ-50)	2/21/2014	2/20/2014	1699892.3	519188.1	TOC	4494.99	-	26.99	0.00	-	4468.00	4468.00	25.45
L-87-5	2/19/2014	2/20/2014	1698819.5	518785.3	TOC	4498.59	-	25.95	0.00	-	4472.64	4472.64	24.71
3	2/20/2014	2/20/2014	1700100.8	518565.5	TOC	4488.38	-	20.17	0.00	-	4468.21	4468.21	21.23
5	2/20/2014	2/20/2014	1700998.5	518586.9	TOC	4470.51	-	6.20	0.00	-	4464.31	4464.31	6.79
6	2/20/2014	2/20/2014	1701623.7	519003.3	TOC	4468.53	-	7.20	0.00	-	4461.33	4461.33	8.07
11	Well Dry	2/20/2014	1699997.3	520588.2	TOC	4489.14	NM	NM	NM	NM	NM	NM	NM
89-1	2/22/2014	2/20/2014	1702535.0	521990.3	TOC	4461.74	-	8.58	0.00	-	4453.16	4453.16	6.36
89-2	2/21/2014	2/20/2014	1701643.4	521644.0	TOC	4483.20	-	28.89	0.00	-	4454.31	4454.31	28.09
89-3	2/19/2014	2/20/2014	1698313.9	518704.2	TOC	4496.20	-	20.63	0.00	-	4475.57	4475.57	21.28
89-4	2/20/2014	2/20/2014	1699749.6	519629.6	TOC	4489.97	-	23.09	0.00	-	4466.88	4466.88	23.43
89-6	2/21/2014	2/20/2014	1701840.9	521149.7	TOC	4483.46	-	28.92	0.00	-	4454.54	4454.54	26.36
89-8	2/22/2014	2/20/2014	1698387.1	519091.5	TOC	4496.41	-	21.30	0.00	-	4475.11	4475.11	21.83
89-9	2/21/2014	2/20/2014	1698608.5	518701.8	TOC	4496.52	-	22.61	0.00	-	4473.91	4473.91	23.06
89-10	2/21/2014	2/20/2014	1701890.0	520768.2	TOC	4484.17	-	29.11	0.00	-	4455.06	4455.06	29.24
90-1A	2/21/2014	2/20/2014	1699761.2	519185.8	TOC	4493.16	-	24.63	0.00	-	4468.53	4468.53	24.77
90-1B	2/21/2014	2/20/2014	1699758.5	519185.2	TOC	4493.04	-	24.49	0.00	-	4468.55	4468.55	24.75
90-1C	2/21/2014	2/20/2014	1699755.9	519184.5	TOC	4493.10	-	24.62	0.00	-	4468.48	4468.48	24.82
90-2A	2/21/2014	2/20/2014	1701461.7	520112.5	TOC	4482.25	-	22.39	0.00	-	4459.86	4459.86	20.57
90-2B	2/21/2014	2/20/2014	1701459.5	520110.6	TOC	4482.44	-	21.60	0.00	-	4460.84	4460.84	19.88
90-3	2/21/2014	2/20/2014	1703341.0	521634.6	TOC	4463.44	-	11.01	0.00	-	4452.43	4452.43	8.87
92-1	2/21/2014	2/20/2014	1698714.8	519040.9	TOC	4498.59	-	25.43	0.00	-	4473.16	4473.16	24.04
92-2	2/21/2014	2/20/2014	1703839.2	521578.3	TOC	4461.26	-	9.86	0.00	-	4451.40	4451.40	8.60
92-4	2/21/2014	2/20/2014	1699583.6	519842.0	TOC	4490.35	-	23.65	0.00	-	4466.70	4466.70	23.87
94-1	2/22/2014	2/20/2014	1706017.9	524251.8	TOC	4451.96	-	11.00	0.00	-	4440.96	4440.96	9.24
94-2	2/21/2014	2/20/2014	1704747.5	521787.1	TOC	4459.02	-	9.43	0.00	-	4449.59	4449.59	7.71
07-1	2/19/2014	2/20/2014	1697649.2	518213.4	TOC	4502.27	-	24.00	0.00	-	4478.27	4478.27	21.93

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WATER LEVEL AND APPARENT LNAPL THICKNESS MEASUREMENTS (FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

Well Designation	Date of Measurement	Monitoring Event	Easting (feet)	Northing (feet)	Survey Reference[a]	Elevation of TOC PVC Casing (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	Apparent LNAPL Thickness (feet)[b]	Elevation of LNAPL (feet MSL)	Elevation of LNAPL-Water Table (feet MSL)	Air-Water Table Elevation (feet MSL)[c]	Depth to Air-Liquid Table (feet bgs)
07-2A	2/20/2014	2/20/2014	1698281.5	518684.3	TOC	4496.13	-	20.32	0.00	-	4475.81	4475.81	20.97
07-2B	2/20/2014	2/20/2014	1698275.3	518678.4	TOC	4496.22	-	20.33	0.00	-	4475.89	4475.89	20.93
07-3	2/21/2014	2/20/2014	1702676.3	521186.0	TOC	4465.22	-	11.39	0.00	-	4453.83	4453.83	8.07
07-4	NM	2/20/2014	1701913.6	520433.9	TOC	4473.01	NM	NM	NM	NM	NM	NM	NM
07-5A	2/21/2014	2/20/2014	1702406.1	519556.0	TOC	4467.09	-	9.11	0.00	-	4457.98	4457.98	9.42
07-5B	2/21/2014	2/20/2014	1702408.6	519556.1	TOC	4467.11	-	9.12	0.00	-	4457.99	4457.99	9.41
07-5C	2/21/2014	2/20/2014	1702411.4	519556.2	TOC	4467.04	-	9.11	0.00	-	4457.93	4457.93	9.47
07-6	2/21/2014	2/20/2014	1704340.9	521309.2	TOC	4463.06	-	12.04	0.00	-	4451.02	4451.02	9.18
07-7	2/22/2014	2/20/2014	1707418.0	524798.5	TOC	4447.90	-	11.49	0.00	-	4436.41	4436.41	9.09
07-8	2/21/2014	2/20/2014	1699483.4	520048.1	TOC	4490.17	-	26.49	0.00	-	4463.68	4463.68	26.92
07-9	2/21/2014	2/20/2014	1700275.1	520262.0	TOC	4488.24	-	27.52	0.00	-	4460.72	4460.72	28.18
07-10	2/20/2014	2/20/2014	1702899.7	521615.6	TOC	4463.58	-	10.89	0.00	-	4452.69	4452.69	7.52
07-11	2/22/2014	2/20/2014	1703919.8	522430.3	TOC	4461.50	-	10.73	0.00	-	4450.77	4450.77	7.63
07-12	2/22/2014	2/20/2014	1704308.9	522733.2	TOC	4458.50	-	9.77	0.00	-	4448.73	4448.73	7.37
12-7	2/26/2014	2/20/2014	1699743.4	519243.4	TOC	4494.25	-	25.80	0.00	-	4468.45	4468.45	24.19
12-8	2/24/2014	2/20/2014	1699730.9	519581.9	TOC	4493.77	-	26.71	0.00	-	4467.06	4467.06	25.31
12-9	2/19/2014	2/20/2014	1701825.8	520823.4	TOC	4482.89	-	27.66	0.00	-	4455.23	4455.23	25.59
12-10	2/21/2014	2/20/2014	1701001.8	520190.0	TOC	4488.89	-	29.07	0.00	-	4459.82	4459.82	26.56
13-1	2/27/2014	2/20/2014	1698579.7	519071.3	TOC	4497.15	-	23.04	0.00	-	4474.11	4474.11	23.41
13-2	2/28/2014	2/20/2014	1698615.2	519008.1	TOC	4496.42	-	22.35	0.00	-	4474.07	4474.07	22.79
13-3	2/26/2014	2/20/2014	1698734.3	519062.3	TOC	4496.87	-	23.93	0.00	-	4472.94	4472.94	24.30
13-4	2/28/2014	2/20/2014	1698870.1	519162.2	TOC	4495.80	-	24.07	0.00	-	4471.73	4471.73	24.49
13-5	2/24/2014	2/20/2014	1698770.1	518970.9	TOC	4495.75	-	22.92	0.00	-	4472.83	4472.83	23.38
13-6	Inaccessible	2/20/2014	1698632.2	518830.2	TOC	4496.38	NM	NM	NM	NM	NM	NM	NM
13-7	2/28/2014	2/20/2014	1698675.6	518775.5	TOC	4496.27	-	22.81	0.00	-	4473.46	4473.46	23.38
MW-5RR	2/25/2014	2/20/2014	1702153.6	520324.2	TOC	4465.07	-	8.06	0.00	-	4457.01	4457.01	8.38
MW-10 (Krohne)	2/25/2014	2/20/2014	1702146.1	519692.4	TOC	4467.54	-	9.90	0.00	-	4457.64	4457.64	10.36
MW-11 (O'Connor)	2/21/2014	2/20/2014	1701143.9	520934.1	TOC	4484.90	-	28.49	0.00	-	4456.41	4456.41	29.16
MW-12 (O'Connor)	2/21/2014	2/20/2014	1700864.4	520962.6	TOC	4484.72	-	27.99	0.00	-	4456.73	4456.73	28.27

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EX-22	2/19/2014	2/20/2014	1700734.3	519533.9	TOC	4488.25	-	25.39	0.00	-	4462.86	4462.86	25.61
EX-24	2/19/2014	2/20/2014	1700979.9	519267.9	TOC	4481.32	-	17.96	0.00	-	4463.36	4463.36	18.53
EX-28	2/19/2014	2/20/2014	1701425.8	519619.4	TOC	4470.46	-	9.56	0.00	-	4460.90	4460.90	7.80
ISCO-1	2/21/2014	2/20/2014	1698674.6	519013.6	TOC	4496.72	-	23.09	0.00	-	4473.63	4473.63	23.47
ISCO-2	2/20/2014	2/20/2014	1698633.9	518983.4	TOC	4496.83	-	22.91	0.00	-	4473.92	4473.92	23.28
ISCO-24R	2/28/2014	2/20/2014	1698360.7	518776.8	TOC	4496.42	-	21.15	0.00	-	4475.27	4475.27	21.43
E-6	2/21/2014	2/20/2014	1698630.5	518935.3	TOC	4496.68	-	22.70	0.00	-	4473.98	4473.98	22.92
E-7	2/21/2014	2/20/2014	1698717.6	519048.7	TOC	4496.85	-	23.64	0.00	-	4473.21	4473.21	23.90
E-8	2/21/2014	2/20/2014	1698730.2	519004.6	TOC	4496.20	-	23.21	0.00	-	4472.99	4472.99	23.91
Task F Stage I - Part 2 Wells													
07-13	2/20/2014	2/20/2014	1698304.9	518667.0	TOC	4496.31	-	20.67	0.00	-	4475.64	4475.64	21.20
07-14	2/20/2014	2/20/2014	1698391.3	518678.1	TOC	4496.29	-	21.25	0.00	-	4475.04	4475.04	21.78
07-15	2/20/2014	2/20/2014	1698363.9	518746.0	TOC	4496.25	-	21.00	0.00	-	4475.25	4475.25	21.50
07-16	2/20/2014	2/20/2014	1698243.7	518664.1	TOC	4496.90	-	20.93	0.00	-	4475.97	4475.97	20.63
08-1	2/21/2014	2/20/2014	1698509.1	518762.6	TOC	4496.66	-	22.24	0.00	-	4474.42	4474.42	22.52
08-2	2/20/2014	2/20/2014	1698395.4	518708.2	TOC	4496.45	-	21.46	0.00	-	4474.99	4474.99	21.83
Task D/E Wells													
EX-1	2/18/2014	02/20/2014	1697671.8	517268.8	TOC	4501.27	-	21.23	0.00	-	4480.04	4480.04	21.50
EX-2	2/19/2014	02/20/2014	1697717.4	516913.4	TOC	4499.78	-	19.75	0.00	-	4480.03	4480.03	20.15
EX-3	2/18/2014	02/20/2014	1698012.7	517628.1	TOC	4500.17	-	21.75	0.00	-	4478.42	4478.42	22.28
EX-4	2/19/2014	02/20/2014	1701311.9	519731.0	TOC	4470.54	-	9.67	0.00	-	4460.87	4460.87	8.93
EX-5	2/19/2014	02/20/2014	1700451.9	518709.7	TOC	4486.16	-	19.76	0.00	-	4466.40	4466.40	20.20
EX-6	2/19/2014	02/20/2014	1700737.7	518937.6	TOC	4483.67	-	19.19	0.00	-	4464.48	4464.48	19.42
EX-7	2/20/2014	02/20/2014	1698468.3	518270.6	TOC	4496.97	-	22.15	0.00	-	4474.82	4474.82	22.37
EX-8	2/18/2014	02/20/2014	1698625.1	518087.4	TOC	4497.06	22.53	22.58	0.05	4474.53	4474.48	4474.52	22.87
EX-9	2/18/2014	02/20/2014	1698778.4	518036.1	TOC	4496.10	-	22.44	0.00	-	4473.66	4473.66	22.43
EX-10	Inaccessible	02/20/2014	1698800.5	517877.6	TOC	4493.75	NM	NM	NM	NM	NM	NM	NM
EX-11	2/20/2014	02/20/2014	1698905.3	518695.2	TOC	4496.27	-	24.00	(F) 0.00	-	4472.27	4472.27	24.27
EX-12	2/20/2014	02/20/2014	1698971.2	518498.8	TOC	4496.10	23.79	23.81	0.02	4472.31	4472.29	4472.30	24.19

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EX-13	2/18/2014	02/20/2014	1699151.6	518377.2	TOC	4496.21	-	24.58	(S) 0.00	-	4471.63	4471.63	23.22
EX-14	2/19/2014	02/20/2014	1699178.7	517969.5	TOC	4492.13	-	19.74	0.00	-	4472.39	4472.39	20.26
EX-15	2/18/2014	02/20/2014	1699574.3	518599.2	TOC	4492.68	22.84	22.84	<0.01	4469.84	4469.84	4469.84	23.27
EX-16	2/19/2014	02/20/2014	1699972.4	518739.0	TOC	4491.64	-	22.95	0.00	-	4468.69	4468.69	23.25
EX-17	2/19/2014	02/20/2014	1700139.3	518756.0	TOC	4490.40	-	22.42	0.00	-	4467.98	4467.98	22.75
EX-18	2/19/2014	02/20/2014	1700277.9	519482.8	TOC	4489.66	-	23.99	(F) 0.00	-	4465.67	4465.67	24.53
EX-19	2/19/2014	02/20/2014	1700498.5	519023.1	TOC	4488.70	22.36	22.40	0.04	4466.34	4466.30	4466.34	22.59
EX-20	2/18/2014	02/20/2014	1696724.7	516737.0	TOC	4504.79	-	22.43	0.00	-	4482.36	4482.36	22.86
EX-21	2/18/2014	02/20/2014	1700686.2	519634.2	TOC	4488.23	-	25.24	(F) 0.00	-	4462.99	4462.99	25.61
EX-23	2/19/2014	02/20/2014	1700851.9	519390.2	TOC	4487.01	24.19	24.19	<0.01	4462.82	4462.82	4462.82	24.62
EX-25	2/19/2014	02/20/2014	1701141.5	519624.5	TOC	4485.47	24.30	24.38	0.08	4461.17	4461.09	4461.16	24.71
EX-26	2/19/2014	02/20/2014	1701232.1	519498.8	TOC	4483.96	-	22.45	0.00	-	4461.51	4461.51	22.75
EX-27	2/19/2014	02/20/2014	1701406.8	519897.7	TOC	4483.02	-	22.52	0.00	-	4460.50	4460.50	23.00
EX-29	Well Dry	02/20/2014	1701486.4	519750.8	TOC	4470.15	NM	NM	NM	NM	NM	NM	NM
EX-30	2/20/2014	02/20/2014	1698177.6	517991.5	TOC	4498.82	-	22.28	0.00	-	4476.54	4476.54	22.86
EX-31	2/18/2014	02/20/2014	1698472.5	517970.9	TOC	4497.62	-	22.41	0.00	-	4475.21	4475.21	22.99
EX-32	NM	02/20/2014	1698771.2	518197.0	TOC	4496.17	NM	NM	NM	NM	NM	NM	NM
EX-33	2/20/2014	02/20/2014	1698633.1	518300.1	TOC	4496.63	-	22.29	(S) 0.00	-	4474.34	4474.34	22.56
EX-34	2/20/2014	02/20/2014	1699003.3	518848.9	TOC	4495.37	-	24.78	0.00	-	4470.59	4470.59	25.22
EX-35	2/19/2014	02/20/2014	1699807.9	518696.7	TOC	4492.55	-	23.35	0.00	-	4469.20	4469.20	23.70
EX-36	2/19/2014	02/20/2014	1699686.3	518505.3	TOC	4490.96	-	21.22	0.00	-	4469.74	4469.74	21.46
EX-37	2/19/2014	02/20/2014	1699953.1	518889.2	TOC	4491.91	23.57	23.58	0.01	4468.34	4468.33	4468.34	23.76
EX-40	2/19/2014	02/20/2014	1700142.7	519029.5	TOC	4490.98	-	23.56	(S) 0.00	-	4467.42	4467.42	23.88
EX-41	NM	02/20/2014	1700182.3	519141.8	TOC	4490.89	NM	NM	NM	NM	NM	NM	NM
EX-42	2/19/2014	02/20/2014	1700271.5	518948.3	TOC	4488.80	-	21.48	0.00	-	4467.32	4467.32	21.78
EX-43	2/18/2014	02/20/2014	1700373.5	518813.4	TOC	4486.96	-	19.49	0.00	-	4467.47	4467.47	19.83
EX-44	2/19/2014	02/20/2014	1700512.2	519660.2	TOC	4488.69	23.52	23.53	0.01	4465.17	4465.16	4465.16	23.73
EX-45	2/19/2014	02/20/2014	1700647.2	519454.9	TOC	4489.02	-	25.54	0.00	-	4463.48	4463.48	25.82
EX-47	2/19/2014	02/20/2014	1700753.2	519256.4	TOC	4489.31	25.29	25.29	<0.01	4464.02	4464.02	4464.02	25.58

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EX-48	2/19/2014	02/20/2014	1700819.9	519155.7	TOC	4487.82	-	23.95	0.00	-	4463.87	4463.87	24.33
EX-50	2/19/2014	02/20/2014	1701035.7	519468.5	TOC	4487.30	25.20	25.28	0.08	4462.10	4462.02	4462.09	25.50
EX-51	2/18/2014	02/20/2014	1700141.4	519223.0	TOC	4490.49	-	23.69	0.00	-	4466.80	4466.80	24.00
EX-52	2/19/2014	02/20/2014	1700872.5	519935.3	TOC	4486.06	-	24.53	0.00	-	4461.53	4461.53	24.87
EX-53	2/19/2014	02/20/2014	1701133.6	520155.7	TOC	4484.57	-	24.70	0.00	-	4459.87	4459.87	25.03
EX-54	2/19/2014	02/20/2014	1698035.7	517890.9	TOC	4499.70	-	22.24	0.00	-	4477.46	4477.46	22.90
EX-55	2/20/2014	02/20/2014	1698380.3	518103.7	TOC	4497.86	-	21.95	0.00	-	4475.91	4475.91	22.20
EX-56	2/20/2014	02/20/2014	1698771.9	518362.3	TOC	4496.39	-	22.49	0.00	-	4473.90	4473.90	22.70
EX-57	2/18/2014	02/20/2014	1699030.8	518184.0	TOC	4494.36	-	21.83	0.00	-	4472.53	4472.53	22.28
EX-58	2/19/2014	02/20/2014	1699411.4	518312.3	TOC	4491.98	-	21.16	0.00	-	4470.82	4470.82	21.53
EX-59	2/18/2014	02/20/2014	1699988.3	519107.8	TOC	4491.62	-	23.69	0.00	-	4467.93	4467.93	23.86
EX-60	2/19/2014	02/20/2014	1700136.1	519410.7	TOC	4490.41	-	24.09	(S) 0.00	-	4466.32	4466.32	24.47
EX-61	2/19/2014	02/20/2014	1700372.1	519209.8	TOC	4489.82	-	23.94	0.00	-	4465.88	4465.88	24.23
EX-62	2/19/2014	02/20/2014	1700941.7	519638.3	TOC	4487.33	-	25.30	(S) 0.00	-	4462.03	4462.03	25.51
EX-63	2/19/2014	02/20/2014	1701134.0	519410.7	TOC	4485.43	-	23.45	0.00	-	4461.98	4461.98	23.74
EX-64	2/19/2014	02/20/2014	1701231.1	519851.3	TOC	4485.56	-	24.94	0.00	-	4460.62	4460.62	25.05
PMW-1	2/18/2014	02/20/2014	1698886.4	518170.9	TOC	4497.92	-	24.72	0.00	-	4473.20	4473.20	23.15
PMW-OW-1	2/18/2014	02/20/2014	1698883.4	518166.6	TOC	4498.00	-	24.81	(F) 0.00	-	4473.19	4473.19	23.19
PMW-2	Pump Operating	02/20/2014	1699444.5	518593.1	TOP	4496.52	31.17	31.17	<0.01	4465.35	4465.35	4465.35	27.79
PMW-OW-2	2/18/2014	02/20/2014	1699449.5	518596.9	TOC	4494.61	-	24.69	0.00	-	4469.92	4469.92	23.06
PMW-3	Pump Operating	02/20/2014	1699399.4	518559.0	TOP	4496.70	32.96	32.96	<0.01	4463.74	4463.74	4463.74	29.22
PMW-4	2/18/2014	02/20/2014	1699803.3	518862.5	TOC	4493.12	-	24.06	(F) 0.00	-	4469.06	4469.06	24.99
PMW-OW-4	2/18/2014	02/20/2014	1699800.1	518858.6	TOC	4493.74	-	23.03	(F) 0.00	-	4470.71	4470.71	25.08
PMW-5	Pump Operating	02/20/2014	1699488.6	518626.9	TOP	4496.36	28.52	28.52	<0.01	4467.84	4467.84	4467.84	25.19
PMW-OW-5	2/18/2014	02/20/2014	1699492.9	518630.2	TOC	4494.98	-	25.19	(F) 0.00	-	4469.79	4469.79	23.48
PMW-6	2/18/2014	02/20/2014	1698927.1	518202.6	TOC	4497.99	-	25.19	0.00	-	4472.80	4472.80	23.83
PMW-OW-6	2/18/2014	02/20/2014	1698922.7	518199.6	TOC	4497.99	-	25.19	0.00	-	4472.80	4472.80	23.88
PMW-7 (MUW-1)	2/18/2014	02/20/2014	1699527.5	518655.4	TOP	4496.39	-	25.09	(S) 0.00	-	4471.30	4471.30	21.60
PMW-OW-7	2/18/2014	02/20/2014	1699532.0	518659.1	TOC	4495.10	-	25.09	(S) 0.00	-	4470.01	4470.01	22.89

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MUW-2	2/18/2014	02/20/2014	1699660.7	518770.9	TOC	4492.79	-	23.29	(F) 0.00	-	4469.50	4469.50	22.10
MUW-3	Bioventing	02/20/2014	1699678.6	518880.2	TOC	4491.57	NM	NM	NM	NM	NM	NM	NM
MUW-4	Bioventing	02/20/2014	1699639.0	518850.3	TOC	4491.40	NM	NM	NM	NM	NM	NM	NM
MUW-5	Bioventing	02/20/2014	1699598.8	518820.5	TOC	4491.54	NM	NM	NM	NM	NM	NM	NM
MUW-6	Bioventing	02/20/2014	1699558.9	518790.5	TOC	4491.77	NM	NM	NM	NM	NM	NM	NM
MUW-7	Bioventing	02/20/2014	1699518.6	518760.2	TOC	4491.85	NM	NM	NM	NM	NM	NM	NM
MUW-8	Bioventing	02/20/2014	1699478.8	518730.3	TOC	4492.05	NM	NM	NM	NM	NM	NM	NM
MUW-9	Bioventing	02/20/2014	1699438.8	518700.3	TOC	4492.10	NM	NM	NM	NM	NM	NM	NM
MUW-10	Bioventing	02/20/2014	1699398.8	518670.5	TOC	4492.25	NM	NM	NM	NM	NM	NM	NM
MUW-11	Bioventing	02/20/2014	1699360.8	518641.7	TOC	4492.43	NM	NM	NM	NM	NM	NM	NM
MUW-12	Bioventing	02/20/2014	1699319.6	518610.4	TOC	4492.55	NM	NM	NM	NM	NM	NM	NM
MUW-13	Bioventing	02/20/2014	1699278.8	518580.4	TOC	4492.69	NM	NM	NM	NM	NM	NM	NM
MUW-14	Bioventing	02/20/2014	1699238.7	518550.3	TOC	4492.76	NM	NM	NM	NM	NM	NM	NM
MUW-15	Bioventing	02/20/2014	1699199.1	518520.0	TOC	4492.96	NM	NM	NM	NM	NM	NM	NM
MUW-16	Bioventing	02/20/2014	1699159.6	518490.1	TOC	4493.14	NM	NM	NM	NM	NM	NM	NM
MUW-17	Bioventing	02/20/2014	1699119.0	518460.3	TOC	4493.35	NM	NM	NM	NM	NM	NM	NM
MUW-18	Bioventing	02/20/2014	1699079.0	518430.4	TOC	4493.51	NM	NM	NM	NM	NM	NM	NM
MUW-19	Bioventing	02/20/2014	1699038.9	518400.3	TOC	4493.61	NM	NM	NM	NM	NM	NM	NM
MUW-20	Bioventing	02/20/2014	1698998.9	518370.7	TOC	4493.70	NM	NM	NM	NM	NM	NM	NM
MUW-21	2/18/2014	02/20/2014	1699879.0	518920.0	TOC	4492.81	-	24.11	0.00	-	4468.70	4468.70	22.70
MUW-22	2/18/2014	02/20/2014	1699843.0	518893.0	TOC	4492.93	-	24.11	(F) 0.00	-	4468.82	4468.82	23.18
MUW-23	2/18/2014	02/20/2014	1699767.0	518836.1	TOC	4493.32	-	24.09	(S) 0.00	-	4469.23	4469.23	22.17
MUW-24	2/18/2014	02/20/2014	1699727.0	518805.9	TOC	4493.48	-	24.14	(S) 0.00	-	4469.34	4469.34	21.86
MUW-25	2/18/2014	02/20/2014	1699687.0	518775.9	TOC	4493.50	-	23.97	(S) 0.00	-	4469.53	4469.53	21.57
MUW-26	2/18/2014	02/20/2014	1699647.1	518745.9	TOC	4493.81	-	24.23	(S) 0.00	-	4469.58	4469.58	21.82
MUW-27	Bioventing	02/20/2014	1699607.1	518716.1	TOC	4494.02	NM	NM	NM	NM	NM	NM	NM
MUW-28	Pump Operating	02/20/2014	1699566.8	518685.9	TOP	4496.28	27.39	27.39	<0.01	4468.89	4468.89	4468.89	23.21
MUW-29	Pump Operating	02/20/2014	1699359.0	518529.6	TOP	4496.85	26.09	26.09	<0.01	4470.76	4470.76	4470.76	22.34
MUW-30	2/18/2014	02/20/2014	1699319.5	518499.8	TOC	4495.24	24.07	24.07	<0.01	4471.17	4471.17	4471.17	23.04

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WATER LEVEL AND APPARENT LNAPL THICKNESS MEASUREMENTS (FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

Well Designation	Date of Measurement	Monitoring Event	Easting (feet)	Northing (feet)	Survey Reference[a]	Elevation of TOC PVC Casing (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	Apparent LNAPL Thickness (feet)[b]	Elevation of LNAPL (feet MSL)	Elevation of LNAPL-Water Table (feet MSL)	Air-Water Table Elevation (feet MSL)[c]	Depth to Air-Liquid Table (feet bgs)
MUW-31	2/18/2014	02/20/2014	1699281.2	518467.0	TOC	4495.41	24.16	24.16	<0.01	4471.25	4471.25	4471.25	22.75
MUW-32	2/18/2014	02/20/2014	1699238.6	518439.6	TOC	4495.72	-	24.35	(S) 0.00	-	4471.37	4471.37	23.03
MUW-33	2/18/2014	02/20/2014	1699199.1	518409.6	TOC	4495.73	-	24.12	(S) 0.00	-	4471.61	4471.61	22.89
MUW-34	2/18/2014	02/20/2014	1699159.1	518379.6	TOC	4495.90	-	24.30	(S) 0.00	-	4471.60	4471.60	23.00
MUW-35	Bioventing	02/20/2014	1699119.2	518349.6	TOC	4496.10	NM	NM	NM	NM	NM	NM	NM
MUW-36	2/18/2014	02/20/2014	1699079.2	518319.6	TOC	4496.30	-	24.39	(S) 0.00	-	4471.91	4471.91	22.79
MUW-37	2/18/2014	02/20/2014	1699039.2	518289.6	TOC	4496.41	-	24.42	(S) 0.00	-	4471.99	4471.99	22.91
MUW-38	Pump Operating	02/20/2014	1698678.3	518129.4	TOP	4495.15	21.24	21.24	<0.01	4473.91	4473.91	4473.91	23.36
MUW-39	Pump Operating	02/20/2014	1698638.7	518099.1	TOP	4495.42	21.24	21.24	<0.01	4474.18	4474.18	4474.18	23.16
MUW-40	Pump Operating	02/20/2014	1698598.7	518069.2	TOP	4495.51	21.15	21.15	<0.01	4474.36	4474.36	4474.36	23.05
MUW-41	Pump Operating	02/20/2014	1701014.4	519570.4	TOP	4490.84	31.31	31.31	<0.01	4459.53	4459.53	4459.53	28.20
MUW-42	Pump Operating	02/20/2014	1701043.9	519530.6	TOP	4490.75	28.94	28.94	<0.01	4461.81	4461.81	4461.81	25.69
MUW-43	Pump Operating	02/20/2014	1701073.4	519491.1	TOP	4490.75	30.02	30.02	<0.01	4460.73	4460.73	4460.73	26.50
MUW-44	Pump Operating	02/20/2014	1701104.0	519450.1	TOP	4490.30	29.02	29.02	<0.01	4461.28	4461.28	4461.28	25.57
MUW-45	Pump Operating	02/20/2014	1701092.0	519597.0	TOP	4490.15	29.01	29.01	<0.01	4461.14	4461.14	4461.14	25.73
MUW-46	Pump Operating	02/20/2014	1701120.6	519557.3	TOP	4490.06	29.08	29.08	<0.01	4460.98	4460.98	4460.98	25.89
MUW-47	Pump Operating	02/20/2014	1701165.3	519496.9	TOP	4488.32	27.26	27.26	<0.01	4461.06	4461.06	4461.06	24.19
LB-4	2/20/2014	02/20/2014	1699033.5	518653.4	TOC	4495.92	-	23.96	(S) 0.00	-	4471.96	4471.96	24.40
LB-6	2/18/2014	02/20/2014	1698361.2	517784.9	TOC	4500.57	-	24.37	0.00	-	4476.20	4476.20	22.91
L-87-4	2/18/2014	02/20/2014	1698844.6	518154.7	TOC	4497.81	-	24.53	0.00	-	4473.28	4473.28	23.32
L-87-6	2/18/2014	02/20/2014	1700376.5	519314.3	TOC	4491.95	-	26.39	0.00	-	4465.56	4465.56	24.92
L-87-7	2/18/2014	02/20/2014	1699309.1	518501.6	TOC	4496.21	-	25.09	(S) 0.00	-	4471.12	4471.12	23.79
L-87-8	2/18/2014	02/20/2014	1699776.7	518837.7	TOC	4493.53	24.35	24.49	0.14	4469.18	4469.04	4469.16	22.62
L-88-10	2/19/2014	02/20/2014	1701151.5	519897.8	TOC	4486.67	-	25.71	0.00	-	4460.96	4460.96	24.77
L-88-13	2/18/2014	02/20/2014	1700374.0	519312.3	TOC	4491.48	-	25.97	0.00	-	4465.51	4465.51	24.87
2	2/19/2014	02/20/2014	1699752.6	518416.3	TOC	4489.71	-	20.07	0.00	-	4469.64	4469.64	20.75
95-1	2/20/2014	02/20/2014	1698342.8	518175.3	TOC	4499.19	-	23.83	0.00	-	4475.36	4475.36	22.70
MW-1 (Conoco)	2/19/2014	02/20/2014	1699555.2	518585.7	TOC	4492.84	22.89	22.89	<0.01	4469.95	4469.95	4469.95	23.30
MW-2 (Conoco)	2/19/2014	02/20/2014	1699464.4	518544.1	TOC	4493.67	23.45	23.52	0.07	4470.22	4470.15	4470.21	23.67

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WATER LEVEL AND APPARENT LNAPL THICKNESS MEASUREMENTS (FEBRUARY 2014)
Burlington Northern Livingston Shop Complex

Well Designation	Date of Measurement	Monitoring Event	Easting (feet)	Northing (feet)	Survey Reference[a]	Elevation of TOC PVC Casing (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	Apparent LNAPL Thickness (feet)[b]	Elevation of LNAPL (feet MSL)	Elevation of LNAPL-Water Table (feet MSL)	Air-Water Table Elevation (feet MSL)[c]	Depth to Air-Liquid Table (feet bgs)
RW-3	NM	02/20/2014	1699433.7	518870.6	TOC	4495.75	NM	NM	NM	NM	NM	NM	NM
RW-5	NM	02/20/2014	1699255.6	518756.1	TOC	4495.55	NM	NM	NM	NM	NM	NM	NM
RW-7	2/18/2014	02/20/2014	1699226.4	518418.7	TOC	4496.51	-	25.04	0.00	-	4471.47	4471.47	23.58
RW-8	2/18/2014	02/20/2014	1699783.3	518846.0	TOC	4492.91	-	23.79	(S) 0.00	-	4469.12	4469.12	22.68
RW-9	2/20/2014	02/20/2014	1700025.8	519005.8	TOC	4493.12	-	25.13	0.00	-	4467.99	4467.99	23.72
HR-2W	2/20/2014	02/20/2014	1699854.5	519161.6	TOC	4494.39	26.11	26.14	0.03	4468.28	4468.25	4468.27	24.25
HRO-7	2/18/2014	02/20/2014	1698937.2	518230.3	TOC	4497.94	25.21	25.21	<0.01	4472.73	4472.73	4472.73	23.31
HRO-9	2/20/2014	02/20/2014	1699801.1	519128.2	TOC	4492.83	-	24.32	(S) 0.00	-	4468.51	4468.51	24.60
HRO-13	2/20/2014	02/20/2014	1699518.0	518938.5	TOC	4494.81	-	25.09	0.00	-	4469.72	4469.72	25.22
HRO-21	Well Dry	02/20/2014	1699786.3	518849.9	TOC	4493.29	NM	NM	NM	NM	NM	NM	NM
HRO-22	2/20/2014	02/20/2014	1700021.7	519002.7	TOC	4493.49	-	25.50	0.00	-	4467.99	4467.99	23.87
HRO-23	2/20/2014	02/20/2014	1700033.6	519011.6	TOC	4493.24	-	25.29	0.00	-	4467.95	4467.95	23.66
HRO-24	2/18/2014	02/20/2014	1699217.5	518412.9	TOC	4496.87	-	25.43	(F) 0.00	-	4471.44	4471.44	23.63
LPZ-100	2/20/2014	02/20/2014	1699932.2	519218.6	TOC	4494.99	-	27.90	(S) 0.00	-	4467.09	4467.09	26.18

Yellowstone River Stage	Date of Measurement	Monitoring Event	River Bench Mark	River Bench Mark Elevation (feet MSL)	Elevation of River (feet MSL)
River Stage	Pump Operating	09/5/6552	TOP	26.09	<0.01

Notes:
(a) Survey references are as follows:
TOC = Top of PVC Casing; TOP = Top of Pump Assembly.
(b) The following symbols indicate observed conditions of groundwater:
(S) = sheen; (F) = film.
(c) Water level elevation corrected by adding 88% of light non-aqueous phase liquid (LNAPL) thickness to elevation.
(d) "NM" denotes water level/LNAPL thickness not measured.

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WATER LEVEL AND APPARENT LNAPL THICKNESS MEASUREMENTS (JUNE 2014)
Burlington Northern Livingston Shop Complex

Well Designation	Date of Measurement	Monitoring Event	Easting (feet)	Northing (feet)	Survey Reference[a]	Elevation of TOC PVC Casing (feet MSL)	Depth to LNAPL (feet)	Depth to Water (feet)	Apparent LNAPL Thickness (feet)[b]	Elevation of LNAPL (feet MSL)	Elevation of LNAPL-Water Table (feet MSL)	Air-Water Table Elevation (feet MSL)[c]	Depth to Air-Liquid Table (feet bgs)
GWMD-2 Wells													
LS-11	6/4/2014	6/3/2014	1702678.7	521180.8	TOC	4463.77	-	3.98	0.00	-	4459.79	4459.79	2.01
L-87-2 (LPZ-50)	6/3/2014	6/3/2014	1699892.3	519188.1	TOC	4494.99	-	24.92	0.00	-	4470.07	4470.07	23.38
L-87-5	6/4/2014	6/3/2014	1698819.5	518785.3	TOC	4498.59	-	24.11	0.00	-	4474.48	4474.48	22.87
3	6/2/2014	6/3/2014	1700100.8	518565.5	TOC	4488.38	-	18.10	0.00	-	4470.28	4470.28	19.16
5	6/2/2014	6/3/2014	1700998.5	518586.9	TOC	4470.51	-	3.44	0.00	-	4467.07	4467.07	4.03
6	6/4/2014	6/3/2014	1701623.7	519003.3	TOC	4468.53	-	3.49	0.00	-	4465.04	4465.04	4.36
11	6/4/2014	6/3/2014	1699997.3	520588.2	TOC	4489.14	-	24.32	0.00	-	4464.82	4464.82	24.68
89-1	6/4/2014	6/3/2014	1702535.0	521990.3	TOC	4461.74	-	3.31	0.00	-	4458.43	4458.43	1.09
89-2	6/3/2014	6/3/2014	1701643.4	521644.0	TOC	4483.20	-	23.88	0.00	-	4459.32	4459.32	23.08
89-3	6/4/2014	6/3/2014	1698313.9	518704.2	TOC	4496.20	-	18.11	0.00	-	4478.09	4478.09	18.76
89-6	6/3/2014	6/3/2014	1701840.9	521149.7	TOC	4483.46	-	23.05	0.00	-	4460.41	4460.41	20.49
89-8	6/5/2014	6/3/2014	1698387.1	519091.5	TOC	4496.41	-	19.10	0.00	-	4477.31	4477.31	19.63
89-9	6/7/2014	6/3/2014	1698608.5	518701.8	TOC	4496.52	-	26.36	0.00	-	4470.16	4470.16	26.81
90-1C	6/3/2014	6/3/2014	1699755.9	519184.5	TOC	4493.10	-	22.56	0.00	-	4470.54	4470.54	22.76
90-2B	6/3/2014	6/3/2014	1701459.5	520110.6	TOC	4482.44	-	17.71	0.00	-	4464.73	4464.73	15.99
90-3	6/3/2014	6/3/2014	1703341.0	521634.6	TOC	4463.44	-	4.75	0.00	-	4458.69	4458.69	2.61
92-1	6/7/2014	6/3/2014	1698714.8	519040.9	TOC	4498.59	-	23.07	0.00	-	4475.52	4475.52	21.68
92-2	6/4/2014	6/3/2014	1703839.2	521578.3	TOC	4461.26	-	3.54	0.00	-	4457.72	4457.72	2.28
92-4	6/4/2014	6/3/2014	1699583.6	519842.0	TOC	4490.35	-	21.49	0.00	-	4468.86	4468.86	21.71
94-1	6/4/2014	6/3/2014	1706017.9	524251.8	TOC	4451.96	-	7.54	0.00	-	4444.42	4444.42	5.78
94-2	6/3/2014	6/3/2014	1704747.5	521787.1	TOC	4459.02	-	3.71	0.00	-	4455.31	4455.31	1.99
07-1	6/2/2014	6/3/2014	1697649.2	518213.4	TOC	4502.27	-	21.07	0.00	-	4481.20	4481.20	19.00
07-2A	6/4/2014	6/3/2014	1698281.5	518684.3	TOC	4496.13	-	17.75	0.00	-	4478.38	4478.38	18.40
07-5A	6/4/2014	6/3/2014	1702406.1	519556.0	TOC	4467.09	-	2.88	0.00	-	4464.21	4464.21	3.19
07-6	6/3/2014	6/3/2014	1704340.9	521309.2	TOC	4463.06	-	5.86	0.00	-	4457.20	4457.20	3.00
07-7	6/4/2014	6/3/2014	1707418.0	524798.5	TOC	4447.90	-	8.75	0.00	-	4439.15	4439.15	6.35
07-8	6/4/2014	6/3/2014	1699483.4	520048.1	TOC	4490.17	-	22.42	0.00	-	4467.75	4467.75	22.85

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WATER LEVEL AND APPARENT LNAPL THICKNESS MEASUREMENTS (JUNE 2014)
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07-9	6/3/2014	6/3/2014	1700275.1	520262.0	TOC	4488.24	-	23.72	0.00	-	4464.52	4464.52	24.38
07-11	6/4/2014	6/3/2014	1703919.8	522430.3	TOC	4461.50	-	5.01	0.00	-	4456.49	4456.49	1.91
07-12	6/4/2014	6/3/2014	1704308.9	522733.2	TOC	4458.50	-	4.41	0.00	-	4454.09	4454.09	2.01
12-7	6/3/2014	6/3/2014	1699743.4	519243.4	TOC	4494.25	-	23.73	0.00	-	4470.52	4470.52	22.12
12-8	6/4/2014	6/3/2014	1699730.9	519581.9	TOC	4493.77	-	24.63	0.00	-	4469.14	4469.14	23.23
12-9	6/3/2014	6/3/2014	1701825.8	520823.4	TOC	4482.89	-	21.57	0.00	-	4461.32	4461.32	19.50
12-10	6/4/2014	6/3/2014	1701001.8	520190.0	TOC	4488.89	-	23.88	0.00	-	4465.01	4465.01	21.37
13-1	6/4/2014	6/3/2014	1698579.7	519071.3	TOC	4497.15	-	20.75	0.00	-	4476.40	4476.40	21.12
13-2	6/4/2014	6/3/2014	1698615.2	519008.1	TOC	4496.42	-	20.15	0.00	-	4476.27	4476.27	20.59
13-3	6/4/2014	6/3/2014	1698734.3	519062.3	TOC	4496.87	-	21.75	0.00	-	4475.12	4475.12	22.12
13-4	6/5/2014	6/3/2014	1698870.1	519162.2	TOC	4495.80	-	22.81	0.00	-	4472.99	4472.99	23.23
13-5	6/4/2014	6/3/2014	1698770.1	518970.9	TOC	4495.75	-	20.65	0.00	-	4475.10	4475.10	21.11
13-6	6/4/2014	6/3/2014	1698632.2	518830.2	TOC	4496.38	-	20.79	0.00	-	4475.59	4475.59	21.29
13-7	6/4/2014	6/3/2014	1698675.6	518775.5	TOC	4496.27	-	20.57	0.00	-	4475.70	4475.70	21.14
MW-5RR	6/3/2014	6/3/2014	1702153.6	520324.2	TOC	4465.07	-	1.77	0.00	-	4463.30	4463.30	2.09
MW-10 (Krohne)	6/9/2014	6/3/2014	1702146.1	519692.4	TOC	4467.54	-	3.86	0.00	-	4463.68	4463.68	4.32
EX-22	6/2/2014	6/3/2014	1700734.3	519533.9	TOC	4488.25	-	22.29	(F) 0.00	-	4465.96	4465.96	22.51
EX-24	6/2/2014	6/3/2014	1700979.9	519267.9	TOC	4481.32	-	14.45	0.00	-	4466.87	4466.87	15.02
EX-28	6/3/2014	6/3/2014	1701425.8	519619.4	TOC	4470.46	-	5.15	0.00	-	4465.31	4465.31	3.39
ISCO-1	6/10/2014	6/3/2014	1698674.6	519013.6	TOC	4496.72	-	20.83	0.00	-	4475.89	4475.89	21.21
ISCO-2	6/4/2014	6/3/2014	1698633.9	518983.4	TOC	4496.83	-	20.71	0.00	-	4476.12	4476.12	21.08
ISCO-24R	6/4/2014	6/3/2014	1698360.7	518776.8	TOC	4496.42	-	18.67	0.00	-	4477.75	4477.75	18.95
E-7	6/4/2014	6/3/2014	1698717.6	519048.7	TOC	4496.85	-	21.70	0.00	-	4475.15	4475.15	21.96
Task D/E Wells													
EX-1	6/3/2014	06/3/2014	1697671.8	517268.8	TOC	4501.27	-	18.15	0.00	-	4483.12	4483.12	18.42
EX-2	6/3/2014	06/3/2014	1697717.4	516913.4	TOC	4499.78	-	16.67	0.00	-	4483.11	4483.11	17.07
EX-3	6/3/2014	06/3/2014	1698012.7	517628.1	TOC	4500.17	-	18.78	0.00	-	4481.39	4481.39	19.31
EX-4	6/3/2014	06/3/2014	1701311.9	519731.0	TOC	4470.54	-	5.39	0.00	-	4465.15	4465.15	4.65
EX-5	6/3/2014	06/3/2014	1700451.9	518709.7	TOC	4486.16	-	17.22	0.00	-	4468.94	4468.94	17.66

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EX-6	6/3/2014	06/3/2014	1700737.7	518937.6	TOC	4483.67	-	16.31	0.00	-	4467.36	4467.36	16.54
EX-7	6/3/2014	06/3/2014	1698468.3	518270.6	TOC	4496.97	-	19.71	(F) 0.00	-	4477.26	4477.26	19.93
EX-8	6/3/2014	06/3/2014	1698625.1	518087.4	TOC	4497.06	20.28	20.30	0.02	4476.78	4476.76	4476.78	20.62
EX-9	6/3/2014	06/3/2014	1698778.4	518036.1	TOC	4496.10	-	20.35	0.00	-	4475.75	4475.75	20.34
EX-10	Inaccessible	06/3/2014	1698800.5	517877.6	TOC	4493.75	NM	NM	NM	NM	NM	NM	NM
EX-11	6/3/2014	06/3/2014	1698905.3	518695.2	TOC	4496.27	-	22.12	0.00	-	4474.15	4474.15	22.39
EX-12	6/3/2014	06/3/2014	1698971.2	518498.8	TOC	4496.10	21.90	21.93	0.03	4474.20	4474.17	4474.19	22.30
EX-13	6/2/2014	06/3/2014	1699151.6	518377.2	TOC	4496.21	-	22.93	0.00	-	4473.28	4473.28	21.57
EX-14	6/3/2014	06/3/2014	1699178.7	517969.5	TOC	4492.13	-	17.81	0.00	-	4474.32	4474.32	18.33
EX-15	6/3/2014	06/3/2014	1699574.3	518599.2	TOC	4492.68	20.99	20.99	<0.01	4471.69	4471.69	4471.69	21.42
EX-16	6/3/2014	06/3/2014	1699972.4	518739.0	TOC	4491.64	-	21.00	0.00	-	4470.64	4470.64	21.30
EX-17	6/3/2014	06/3/2014	1700139.3	518756.0	TOC	4490.40	-	20.30	0.00	-	4470.10	4470.10	20.63
EX-18	6/3/2014	06/3/2014	1700277.9	519482.8	TOC	4489.66	-	21.99	(F) 0.00	-	4467.67	4467.67	22.53
EX-19	6/3/2014	06/3/2014	1700498.5	519023.1	TOC	4488.70	-	19.90	(F) 0.00	-	4468.80	4468.80	20.13
EX-20	6/3/2014	06/3/2014	1696724.7	516737.0	TOC	4504.79	-	18.28	0.00	-	4486.51	4486.51	18.71
EX-21	6/3/2014	06/3/2014	1700686.2	519634.2	TOC	4488.23	-	22.19	0.00	-	4466.04	4466.04	22.56
EX-23	6/3/2014	06/3/2014	1700851.9	519390.2	TOC	4487.01	21.00	21.00	(S) 0.00	4466.01	4466.01	4466.01	21.43
EX-25	6/3/2014	06/3/2014	1701141.5	519624.5	TOC	4485.47	20.25	20.25	<0.01	4465.22	4465.22	4465.22	20.66
EX-26	6/3/2014	06/3/2014	1701232.1	519498.8	TOC	4483.96	-	18.21	(F) 0.00	-	4465.75	4465.75	18.51
EX-27	6/3/2014	06/3/2014	1701406.8	519897.7	TOC	4483.02	-	18.10	0.00	-	4464.92	4464.92	18.58
EX-29	6/3/2014	06/3/2014	1701486.4	519750.8	TOC	4470.15	-	5.09	0.00	-	4465.06	4465.06	3.24
EX-30	6/4/2014	06/3/2014	1698177.6	517991.5	TOC	4498.82	-	19.57	0.00	-	4479.25	4479.25	20.15
EX-31	6/3/2014	06/3/2014	1698472.5	517970.9	TOC	4497.62	-	19.98	(S) 0.00	-	4477.64	4477.64	20.56
EX-32	6/3/2014	06/3/2014	1698771.2	518197.0	TOC	4496.17	-	20.26	0.00	-	4475.91	4475.91	20.79
EX-33	6/4/2014	06/3/2014	1698633.1	518300.1	TOC	4496.63	-	19.71	(F) 0.00	-	4476.92	4476.92	19.98
EX-34	6/3/2014	06/3/2014	1699003.3	518848.9	TOC	4495.37	-	21.94	0.00	-	4473.43	4473.43	22.38
EX-35	6/3/2014	06/3/2014	1699807.9	518696.7	TOC	4492.55	-	21.49	0.00	-	4471.06	4471.06	21.84
EX-36	6/3/2014	06/3/2014	1699686.3	518505.3	TOC	4490.96	-	19.31	0.00	-	4471.65	4471.65	19.55
EX-37	6/3/2014	06/3/2014	1699953.1	518889.2	TOC	4491.91	21.67	21.67	<0.01	4470.24	4470.24	4470.24	21.86

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EX-40	6/3/2014	06/3/2014	1700142.7	519029.5	TOC	4490.98	-	21.41	0.00	-	4469.57	4469.57	21.73
EX-41	NM	06/3/2014	1700182.3	519141.8	TOC	4490.89	NM	NM	NM	NM	NM	NM	NM
EX-42	6/3/2014	06/3/2014	1700271.5	518948.3	TOC	4488.80	-	19.26	0.00	-	4469.54	4469.54	19.56
EX-43	6/3/2014	06/3/2014	1700373.5	518813.4	TOC	4486.96	-	17.21	0.00	-	4469.75	4469.75	17.55
EX-44	6/3/2014	06/3/2014	1700512.2	519660.2	TOC	4488.69	-	22.32	0.00	-	4466.37	4466.37	22.53
EX-45	6/3/2014	06/3/2014	1700647.2	519454.9	TOC	4489.02	-	22.75	0.00	-	4466.27	4466.27	23.03
EX-47	6/3/2014	06/3/2014	1700753.2	519256.4	TOC	4489.31	-	22.37	(F) 0.00	-	4466.94	4466.94	22.66
EX-48	6/3/2014	06/3/2014	1700819.9	519155.7	TOC	4487.82	-	20.95	0.00	-	4466.87	4466.87	21.33
EX-50	6/3/2014	06/3/2014	1701035.7	519468.5	TOC	4487.30	-	21.49	(S) 0.00	-	4465.81	4465.81	21.79
EX-51	6/3/2014	06/3/2014	1700141.4	519223.0	TOC	4490.49	-	21.56	0.00	-	4468.93	4468.93	21.87
EX-52	6/3/2014	06/3/2014	1700872.5	519935.3	TOC	4486.06	-	20.87	0.00	-	4465.19	4465.19	21.21
EX-53	6/3/2014	06/3/2014	1701133.6	520155.7	TOC	4484.57	-	19.76	0.00	-	4464.81	4464.81	20.09
EX-54	6/4/2014	06/3/2014	1698035.7	517890.9	TOC	4499.70	-	19.24	0.00	-	4480.46	4480.46	19.90
EX-55	6/4/2014	06/3/2014	1698380.3	518103.7	TOC	4497.86	-	19.43	0.00	-	4478.43	4478.43	19.68
EX-56	6/3/2014	06/3/2014	1698771.9	518362.3	TOC	4496.39	-	20.45	(F) 0.00	-	4475.94	4475.94	20.66
EX-57	6/4/2014	06/3/2014	1699030.8	518184.0	TOC	4494.36	-	19.96	0.00	-	4474.40	4474.40	20.41
EX-58	6/3/2014	06/3/2014	1699411.4	518312.3	TOC	4491.98	-	19.31	0.00	-	4472.67	4472.67	19.68
EX-59	6/3/2014	06/3/2014	1699988.3	519107.8	TOC	4491.62	-	21.55	0.00	-	4470.07	4470.07	21.72
EX-60	6/3/2014	06/3/2014	1700136.1	519410.7	TOC	4490.41	-	22.09	(F) 0.00	-	4468.32	4468.32	22.47
EX-61	6/3/2014	06/3/2014	1700372.1	519209.8	TOC	4489.82	-	21.59	0.00	-	4468.23	4468.23	21.88
EX-62	6/3/2014	06/3/2014	1700941.7	519638.3	TOC	4487.33	-	21.69	(S) 0.00	-	4465.64	4465.64	21.90
EX-63	6/3/2014	06/3/2014	1701134.0	519410.7	TOC	4485.43	-	19.52	0.00	-	4465.91	4465.91	19.81
EX-64	6/3/2014	06/3/2014	1701231.1	519851.3	TOC	4485.56	-	20.60	0.00	-	4464.96	4464.96	20.71
PMW-1	6/3/2014	06/3/2014	1698886.4	518170.9	TOC	4497.92	-	22.76	0.00	-	4475.16	4475.16	21.19
PMW-OW-1	6/3/2014	06/3/2014	1698883.4	518166.6	TOC	4498.00	-	22.84	0.00	-	4475.16	4475.16	21.22
PMW-2	6/3/2014	06/3/2014	1699444.5	518593.1	TOP	4496.52	-	22.49	(F) 0.00	-	4474.03	4474.03	19.11
PMW-OW-2	6/3/2014	06/3/2014	1699449.5	518596.9	TOC	4494.61	-	22.49	(F) 0.00	-	4472.12	4472.12	20.86
PMW-3	6/3/2014	06/3/2014	1699399.4	518559.0	TOP	4496.70	-	22.29	(F) 0.00	-	4474.41	4474.41	18.55
PMW-4	Pump Operating	06/3/2014	1699803.3	518862.5	TOC	4493.12	28.15	28.15	<0.01	4464.97	4464.97	4464.97	29.08

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PMW-OW-4	6/3/2014	06/3/2014	1699800.1	518858.6	TOC	4493.74	-	21.89	(F) 0.00	-	4471.85	4471.85	23.94
PMW-5	6/3/2014	06/3/2014	1699488.6	518626.9	TOP	4496.36	22.52	22.62	0.10	4473.84	4473.74	4473.83	19.19
PMW-OW-5	6/3/2014	06/3/2014	1699492.9	518630.2	TOC	4494.98	-	23.06	(F) 0.00	-	4471.92	4471.92	21.35
PMW-6	6/3/2014	06/3/2014	1698927.1	518202.6	TOC	4497.99	-	23.26	(S) 0.00	-	4474.73	4474.73	21.90
PMW-OW-6	6/3/2014	06/3/2014	1698922.7	518199.6	TOC	4497.99	-	23.25	(S) 0.00	-	4474.74	4474.74	21.94
PMW-7 (MUW-1)	6/3/2014	06/3/2014	1699527.5	518655.4	TOP	4496.39	22.64	22.64	(S) 0.00	4473.75	4473.75	4473.75	19.15
PMW-OW-7	6/3/2014	06/3/2014	1699532.0	518659.1	TOC	4495.10	-	23.37	(S) 0.00	-	4471.73	4471.73	21.17
MUW-2	6/3/2014	06/3/2014	1699660.7	518770.9	TOC	4492.79	-	22.81	0.00	-	4469.98	4469.98	21.62
MUW-3	Bioventing	06/3/2014	1699678.6	518880.2	TOC	4491.57	NM	NM	NM	NM	NM	NM	NM
MUW-4	Bioventing	06/3/2014	1699639.0	518850.3	TOC	4491.40	NM	NM	NM	NM	NM	NM	NM
MUW-5	Bioventing	06/3/2014	1699598.8	518820.5	TOC	4491.54	NM	NM	NM	NM	NM	NM	NM
MUW-6	Bioventing	06/3/2014	1699558.9	518790.5	TOC	4491.77	NM	NM	NM	NM	NM	NM	NM
MUW-7	Bioventing	06/3/2014	1699518.6	518760.2	TOC	4491.85	NM	NM	NM	NM	NM	NM	NM
MUW-8	Bioventing	06/3/2014	1699478.8	518730.3	TOC	4492.05	NM	NM	NM	NM	NM	NM	NM
MUW-9	Bioventing	06/3/2014	1699438.8	518700.3	TOC	4492.10	NM	NM	NM	NM	NM	NM	NM
MUW-10	Bioventing	06/3/2014	1699398.8	518670.5	TOC	4492.25	NM	NM	NM	NM	NM	NM	NM
MUW-11	Bioventing	06/3/2014	1699360.8	518641.7	TOC	4492.43	NM	NM	NM	NM	NM	NM	NM
MUW-12	Bioventing	06/3/2014	1699319.6	518610.4	TOC	4492.55	NM	NM	NM	NM	NM	NM	NM
MUW-13	Bioventing	06/3/2014	1699278.8	518580.4	TOC	4492.69	NM	NM	NM	NM	NM	NM	NM
MUW-14	Bioventing	06/3/2014	1699238.7	518550.3	TOC	4492.76	NM	NM	NM	NM	NM	NM	NM
MUW-15	Bioventing	06/3/2014	1699199.1	518520.0	TOC	4492.96	NM	NM	NM	NM	NM	NM	NM
MUW-16	Bioventing	06/3/2014	1699159.6	518490.1	TOC	4493.14	NM	NM	NM	NM	NM	NM	NM
MUW-17	Bioventing	06/3/2014	1699119.0	518460.3	TOC	4493.35	NM	NM	NM	NM	NM	NM	NM
MUW-18	Bioventing	06/3/2014	1699079.0	518430.4	TOC	4493.51	NM	NM	NM	NM	NM	NM	NM
MUW-19	Bioventing	06/3/2014	1699038.9	518400.3	TOC	4493.61	NM	NM	NM	NM	NM	NM	NM
MUW-20	Bioventing	06/3/2014	1698998.9	518370.7	TOC	4493.70	NM	NM	NM	NM	NM	NM	NM
MUW-21	6/3/2014	06/3/2014	1699879.0	518920.0	TOC	4492.81	-	22.31	0.00	-	4470.50	4470.50	20.90
MUW-22	6/3/2014	06/3/2014	1699843.0	518893.0	TOC	4492.93	-	22.38	0.00	-	4470.55	4470.55	21.45
MUW-23	Pump Operating	06/3/2014	1699767.0	518836.1	TOC	4493.32	27.51	27.51	<0.01	4465.81	4465.81	4465.81	25.59

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MUW-24	Pump Operating	06/3/2014	1699727.0	518805.9	TOC	4493.48	27.19	27.19	<0.01	4466.29	4466.29	4466.29	24.91
MUW-25	Pump Operating	06/3/2014	1699687.0	518775.9	TOC	4493.50	26.72	26.72	<0.01	4466.78	4466.78	4466.78	24.32
MUW-26	Pump Operating	06/3/2014	1699647.1	518745.9	TOC	4493.81	24.92	24.92	<0.01	4468.89	4468.89	4468.89	22.51
MUW-27	Bioventing	06/3/2014	1699607.1	518716.1	TOC	4494.02	NM	NM	NM	NM	NM	NM	NM
MUW-28	6/3/2014	06/3/2014	1699566.8	518685.9	TOP	4496.28	22.63	22.63	<0.01	4473.65	4473.65	4473.65	18.45
MUW-29	6/3/2014	06/3/2014	1699359.0	518529.6	TOP	4496.85	-	22.29	0.00	-	4474.56	4474.56	18.54
MUW-30	6/3/2014	06/3/2014	1699319.5	518499.8	TOC	4495.24	-	23.43	0.00	-	4471.81	4471.81	22.40
MUW-31	Pump Operating	06/3/2014	1699281.2	518467.0	TOC	4495.41	24.45	24.45	<0.01	4470.96	4470.96	4470.96	23.04
MUW-32	Pump Operating	06/3/2014	1699238.6	518439.6	TOC	4495.72	24.73	24.73	<0.01	4470.99	4470.99	4470.99	23.41
MUW-33	6/3/2014	06/3/2014	1699199.1	518409.6	TOC	4495.73	-	22.59	(F) 0.00	-	4473.14	4473.14	21.36
MUW-34	Pump Operating	06/3/2014	1699159.1	518379.6	TOC	4495.90	24.52	24.52	<0.01	4471.38	4471.38	4471.38	23.22
MUW-35	Bioventing	06/3/2014	1699119.2	518349.6	TOC	4496.10	NM	NM	NM	NM	NM	NM	NM
MUW-36	6/3/2014	06/3/2014	1699079.2	518319.6	TOC	4496.30	-	22.64	(F) 0.00	-	4473.66	4473.66	21.04
MUW-37	6/3/2014	06/3/2014	1699039.2	518289.6	TOC	4496.41	-	22.56	(F) 0.00	-	4473.85	4473.85	21.05
MUW-38	Pump Operating	06/3/2014	1698678.3	518129.4	TOP	4495.15	18.95	18.95	<0.01	4476.20	4476.20	4476.20	21.07
MUW-39	Pump Operating	06/3/2014	1698638.7	518099.1	TOP	4495.42	19.00	19.00	<0.01	4476.42	4476.42	4476.42	20.92
MUW-40	Pump Operating	06/3/2014	1698598.7	518069.2	TOP	4495.51	18.93	18.93	<0.01	4476.58	4476.58	4476.58	20.83
MUW-41	Pump Operating	06/3/2014	1701014.4	519570.4	TOP	4490.84	26.06	26.06	<0.01	4464.78	4464.78	4464.78	22.95
MUW-42	Pump Operating	06/3/2014	1701043.9	519530.6	TOP	4490.75	25.09	25.09	<0.01	4465.66	4465.66	4465.66	21.84
MUW-43	Bioventing	06/3/2014	1701073.4	519491.1	TOP	4490.75	NM	NM	NM	NM	NM	NM	NM
MUW-44	6/3/2014	06/3/2014	1701104.0	519450.1	TOP	4490.30	22.48	22.48	<0.01	4467.82	4467.82	4467.82	19.03
MUW-45	Bioventing	06/3/2014	1701092.0	519597.0	TOP	4490.15	NM	NM	NM	NM	NM	NM	NM
MUW-46	6/3/2014	06/3/2014	1701120.6	519557.3	TOP	4490.06	22.63	22.63	<0.01	4467.43	4467.43	4467.43	19.44
MUW-47	6/3/2014	06/3/2014	1701165.3	519496.9	TOP	4488.32	20.69	20.69	<0.01	4467.63	4467.63	4467.63	17.62
LB-4	6/3/2014	06/3/2014	1699033.5	518653.4	TOC	4495.92	-	22.21	0.00	-	4473.71	4473.71	22.65
LB-6	6/3/2014	06/3/2014	1698361.2	517784.9	TOC	4500.57	-	21.94	0.00	-	4478.63	4478.63	20.48
L-87-4	6/3/2014	06/3/2014	1698844.6	518154.7	TOC	4497.81	-	22.49	0.00	-	4475.32	4475.32	21.28
L-87-6	6/3/2014	06/3/2014	1700376.5	519314.3	TOC	4491.95	-	24.17	0.00	-	4467.78	4467.78	22.70
L-87-7	6/3/2014	06/3/2014	1699309.1	518501.6	TOC	4496.21	-	23.39	0.00	-	4472.82	4472.82	22.09

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L-87-8	6/3/2014	06/3/2014	1699776.7	518837.7	TOC	4493.53	22.95	22.95	<0.01	4470.58	4470.58	4470.58	21.22
L-88-10	6/3/2014	06/3/2014	1701151.5	519897.8	TOC	4486.67	-	21.63	0.00	-	4465.04	4465.04	20.69
L-88-13	6/3/2014	06/3/2014	1700374.0	519312.3	TOC	4491.48	-	23.69	0.00	-	4467.79	4467.79	22.59
2	6/3/2014	06/3/2014	1699752.6	518416.3	TOC	4489.71	-	18.00	0.00	-	4471.71	4471.71	18.68
95-1	6/4/2014	06/3/2014	1698342.8	518175.3	TOC	4499.19	-	21.30	0.00	-	4477.89	4477.89	20.17
MW-1 (Conoco)	6/3/2014	06/3/2014	1699555.2	518585.7	TOC	4492.84	21.11	21.11	<0.01	4471.73	4471.73	4471.73	21.52
MW-2 (Conoco)	6/3/2014	06/3/2014	1699464.4	518544.1	TOC	4493.67	22.50	22.50	<0.01	4471.17	4471.17	4471.17	22.72
RW-3	No Access	06/3/2014	1699433.7	518870.6	TOC	4495.75	NM	NM	NM	NM	NM	NM	NM
RW-5	No Access	06/3/2014	1699255.6	518756.1	TOC	4495.55	NM	NM	NM	NM	NM	NM	NM
RW-7	6/3/2014	06/3/2014	1699226.4	518418.7	TOC	4496.51	-	23.50	(F) 0.00	-	4473.01	4473.01	22.04
RW-8	6/3/2014	06/3/2014	1699783.3	518846.0	TOC	4492.91	-	22.43	0.00	-	4470.48	4470.48	21.32
RW-9	6/3/2014	06/3/2014	1700025.8	519005.8	TOC	4493.12	-	23.12	0.00	-	4470.00	4470.00	21.71
HR-2W	6/3/2014	06/3/2014	1699854.5	519161.6	TOC	4494.39	24.10	24.13	0.03	4470.29	4470.26	4470.28	22.24
HRO-7	6/3/2014	06/3/2014	1698937.2	518230.3	TOC	4497.94	23.28	23.30	0.02	4474.66	4474.64	4474.66	21.38
HRO-9	6/3/2014	06/3/2014	1699801.1	519128.2	TOC	4492.83	-	22.29	0.00	-	4470.54	4470.54	22.57
HRO-13	6/3/2014	06/3/2014	1699518.0	518938.5	TOC	4494.81	-	23.21	0.00	-	4471.60	4471.60	23.34
HRO-21	6/3/2014	06/3/2014	1699786.3	518849.9	TOC	4493.29	-	22.76	0.00	-	4470.53	4470.53	21.47
HRO-22	6/3/2014	06/3/2014	1700021.7	519002.7	TOC	4493.49	-	22.51	0.00	-	4470.98	4470.98	20.88
HRO-23	6/3/2014	06/3/2014	1700033.6	519011.6	TOC	4493.24	-	22.56	0.00	-	4470.68	4470.68	20.93
HRO-24	6/3/2014	06/3/2014	1699217.5	518412.9	TOC	4496.87	-	23.87	(S) 0.00	-	4473.00	4473.00	22.07
LPZ-100	6/3/2014	06/3/2014	1699932.2	519218.6	TOC	4494.99	-	25.02	(S) 0.00	-	4469.97	4469.97	23.30

Yellowstone River Stage	Date of Measurement	Monitoring Event	River Bench Mark	River Bench Mark Elevation (feet MSL)	Elevation of River (feet MSL)
River Stage	06/3/2014	09/5/6552	TOP	-	0.00

Notes:
(a) Survey references are as follows:
TOC = Top of PVC Casing; TOP = Top of Pump Assembly.
(b) The following symbols indicate observed conditions of groundwater:
(S) = sheen; (F) = film.
(c) Water level elevation corrected by adding 88% of light non-aqueous phase liquid (LNAPL) thickness to elevation.
(d) "NM" denotes water level/LNAPL thickness not measured.

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TABLE 14

CONCEPTUAL SITE MODEL SUMMARY (REVISION NO. 2 - MARCH 2014)
Burlington Northern Livingston Shop Complex

CONCEPTUAL MODEL INFORMATION	UNITS	FACILITY AREAS: FORMER DEPOT AREA	FACILITY AREAS: FORMER ELECTRIC SHOP & FREIGHT TRAIN REFUELING AREA (FTRA)	FACILITY AREAS: AREA SURROUNDING RAILYARD	COMMENTS
PHYSICAL SETTING					
Land Use		Operating Railyard	Operating Railyard/Commercial	Commercial/Residential	
Physical Description		Tracks and Buildings, Restricted Access	Buildings, Roadways, Public Access	Buildings, Roadways, Public Access, Lower River Terrace	
UNCONSOLIDATED GEOLOGIC SETTING					
Subsurface Lithology		Unconsolidated sandy gravel, poorly graded			
Grain Size Analyses	%Gravel / %Sand / %Fines	48 to 81% / 19 to 51% / 1 to 4%			Appendix H (K/J 2007)[a]
Depth of Fill Materials	feet bgs	0 to 8.5			
Depth to Bedrock (Unconsolidated Material Thickness)	feet bgs	15.5 to 71			
CONSOLIDATED GEOLOGIC SETTING					
Subsurface Lithology		Bedrock at alluvium contact beneath the majority of the Facility predominantly Cokedale Formation; Eagle Sandstone/Telegraph Creek Formations south of the railyard; and Miner Creek Formation near to and west of Yellowstone River			
Sedimentary Rock Type		Miner Creek: Alternating beds of mudstone (80%) and sandstone (20%) Cokedale: Gradationally alternating siltstone (+/-50%), sandstone (35%) and mudstone (15%) Eagle Sandstone/Telegraph Creek Formations: Primarily crossbedded sandstone grading with depth to primarily shale and mudstone			
Depth of Exploration	feet bgs	~100			
HYDROGEOLOGIC SETTING					
Depth to Groundwater	feet bgs	17.5 to 23.0	17.5 to 26.5	16.5 to 28 feet 1 to 9.5 in lower terrace	Based on 2004 to 2013 data for representative wells
Saturated Thickness-Average	feet	15 to 40			Decreases toward river
Groundwater Flow Direction		Northeast			Flow toward river
Groundwater Gradient	feet/feet	0.004 to 0.005			
Depth to Seasonal Low Water Table (avg.)	feet bgs	21.3	22.9	22.4 7.5 in lower terrace	Based on mean of annual maximum water depths 2004 to 2013 for representative wells
Depth to Seasonal High Water Table (avg.)	feet bgs	18.5	21.1	20.0 3.9 in lower terrace	Based on mean of annual minimum water depths 2004 to 2013 for representative wells
Seasonal Groundwater Fluctuation	feet	1 to 4	1 to 4	1 to 7	Based on annual maximum fluctuations for 2004 to 2013 for representative wells
Alluvial Aquifer/Well Properties					
Specific Capacity	gpm/ft of dd	7.4 to 90.1			
Transmissivity (gpd/ft)	gpd/ft	2,090 to 135,000			Todd Engineers[b]
Hydraulic Conductivity	gpd/ft^2	171 to 11,600			Todd Engineers[b]
Saturated Zone Total Porosity (estimated)	%	0.35			Fetter 1988[c]
		0.3609			CDM Smith 2012[d]
Groundwater Pumping Rates (Tasks D/E)	gpm	N/A	10 to 45 per well	N/A	Groundwater pumping rates are for LNAPL recovery wells and are limited by the capacity of the Task D/E groundwater treatment plant
Bedrock Water-Bearing Zone					
Total Porosity	%	13.8 to 22.8			
Vertical Hydraulic Conductivity - Laboratory	gpd/ft^2	0.00560 to 0.0458			API Recommended Practice 40 and EPA Method 9100
Horizontal Hydraulic Conductivity - Laboratory	gpd/ft^2	0.00982 to 0.0100			API Recommended Practice 40 and EPA Method 9100
Mean Hydraulic Conductivity - Field Slug Tests	gpd/ft^2	0.0479 to 923			Range of means
		0.0893 to 1,890			CDM Smith analysis Range of geometric means
Fraction of Organic Carbon (TOC) (foc)	g/g	1.10E-3 to 2.65E-3			Walkley-Black
LNAPL CHARACTERISTICS					
LNAPL Properties					
Fuel Type		Weathered Diesel	Weathered Diesel	Weathered Diesel	
Viscosity	cSt	N/A	4.2 to 29.4	8.8 to 16.8	Increases toward the northeast
Specific Gravity	g/cc	N/A	0.8688 to 0.939	0.901 to 0.964	Increases toward the northeast
Surface Tension	dyn/cm	N/A	24.9 to 34.3	NA	
Solvent Concentrations	mg/L	N/A	< 2 mg/L PCE	NA	K/J 2007[a]
FREE LNAPL Summary					
Coverage Area (Acres)	acres	`	17.4	5.9	K/J 2007[a]
		N/A	28.1	10.9	CDM Smith 2012[d]
Maximum Apparent Thickness	feet	N/A	2.6	1.49	Based on maximum LNAPL thicknesses from 2004 to 2013
Average Thickness	feet	N/A	0.12	0.15	Mean of LNAPL thicknesses from wells with measurable LNAPL observed from 2003 to 2012
Recoverable Volume Estimate	gallons	N/A	6,000	615	Estimate based on November 2006 Facility-wide liquid-level monitoring data
			14,000 (4th Quarter 2009) 225,000 (maximum thicknesses)	18,000 (4th Quarter 2009) 90,000 (maximum thicknesses)	CDM Smith 2012[d]
Residual LNAPL Summary					
Coverage Area	acres	10	40	13	K/J 2007[a]
		9.0	28.1	11.3	CDM Smith 2012[d]
Maximum Apparent Thickness	feet	5.5	19.9	8.1	Maximum thicknesses for wells and borings used in model (K/J 2007)[a]
Average Thickness	feet	3.0	4.9	4.4	Mean of thicknesses for wells and borings used in model (K/J 2007)[a]
Petroleum-Containing Soil Volume Estimate - cubic feet (assumed smear zone thickness in parenthesis)	ft^3	1,218,500	9,100,000	2,600,000	Model Estimate (K/J 2007)[a]
		1,950,000 (5') 3,120,000 (8')	6,128,000 (5') 9,804,000 (8')	2,457,000 (5') 3,931,000 (8')	CDM Smith 2012[d]
Petroleum-Containing Soil Volume Estimate - cubic yards (assumed smear zone thickness in parenthesis)	yd^3	45,130	337,000	96,000	Model Estimate (K/J 2007)[a]
		72,000 (5') 116,000 (8')	227,000 (5') 363,000 (8')	91,000 (5') 146,000 (8')	CDM Smith 2012[d]
PCE Summary					
Coverage Area (approximate area)	acres	~400			Provided by DEQ
Possible source types			Vapor phase in vadose zone; residual separate phase and/or adsorbed/comingled PCE; aqueous phase (dissolved) PCE; DNAPL		

Notes:

NA - Not available
N/A - Not applicable
PCE - Tetrachlorothene
DNAPL - Dense non-aqueous phase liquid
LNAPL - Light non-aqueous phase liquid
cSt - centistokes

dyn/cm - dynes per centimeter
feet bgs - feet below ground surface
ft^3 = cubic feet
g/g = grams per gram
g/cc = grams per cubic centimeter
gpm = gallons per minute

gpm/ft of dd = gpm per foot of draw down
gpd/ft = gallons per day per foot
gpd/ft^2 = gpd per square foot
mg/L = milligrams per liter
yd^3 = cubic yard

(a) *Task D/E Steps 1 & 2 Report and Step 3 Work Plan, Burlington Northern Livingston Shop Complex, Livingston, Montana* prepared by Kennedy/Jenks Consultants (K/J) dated February 2007.
(b) *Technical Memo; Analysis of Pumping Tests Conducted at the Burlington Northern Shop Complex, Livingston, MT* prepared by Todd Engineers dated February 2007. Included as Appendix I in K/J 2007.
(c) *Applied Hydrogeology. 2nd Ed* Fetter, C.W. 1988
(d) *Burlington Northern Livingston Shop Complex, Phase II Remedial Action Work Plan for Task D and E*, prepared by CDM Smith dated February 2012.

Numerical data provided by the Montana Department of Environmental Quality (DEQ) is highlighted blue.
Other information revised since last submittal is highlighted yellow.

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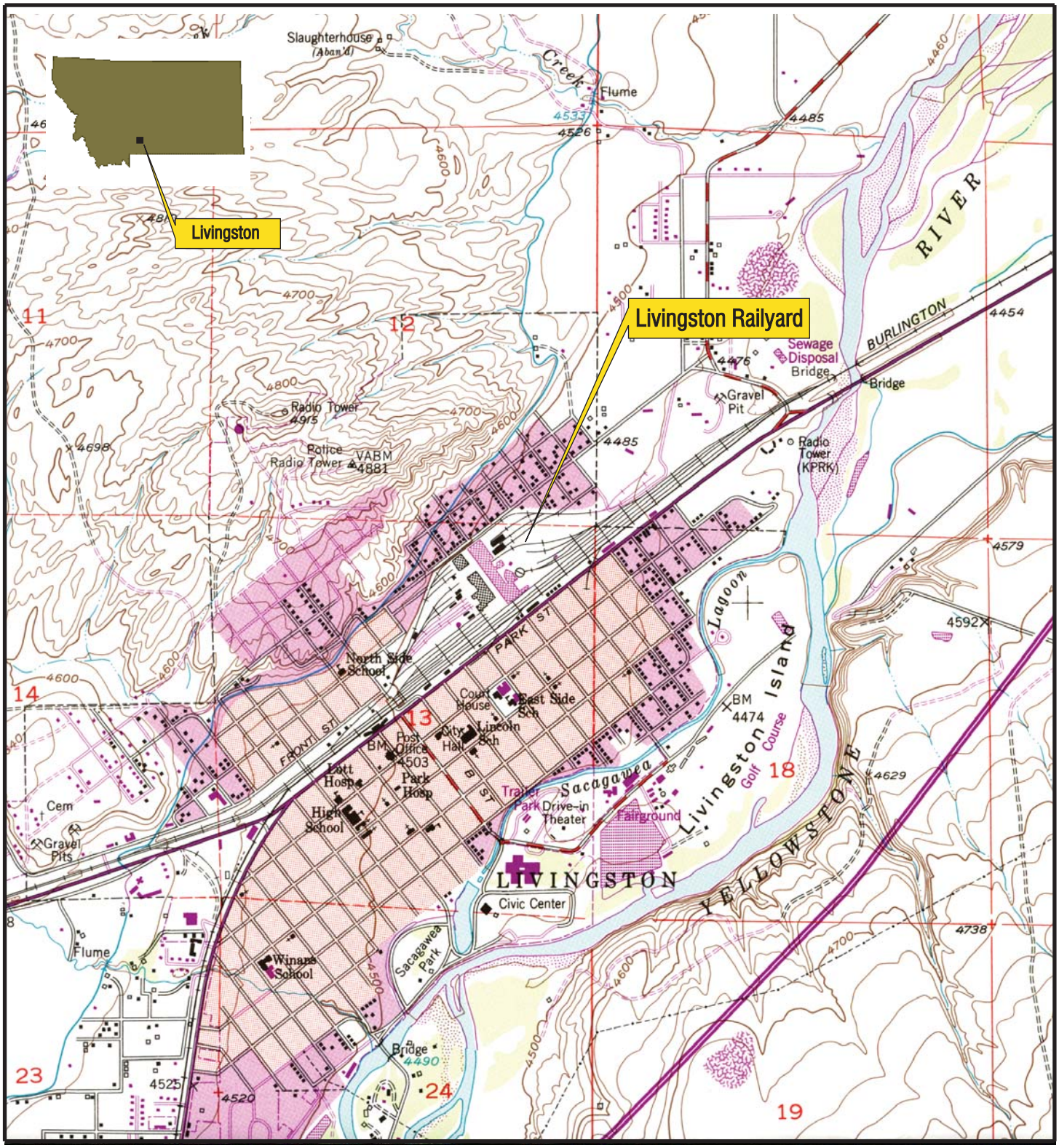
Figures



0 1000 2000 4000

Approximate Scale in Feet

N

Reference: USGS 7.5' Topographic Quadrangle Livingston, Montana 1951 Photo Revised 1981

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Burlington Northern Livingston Shop Complex – Livingston, Montana

Facility Location Map

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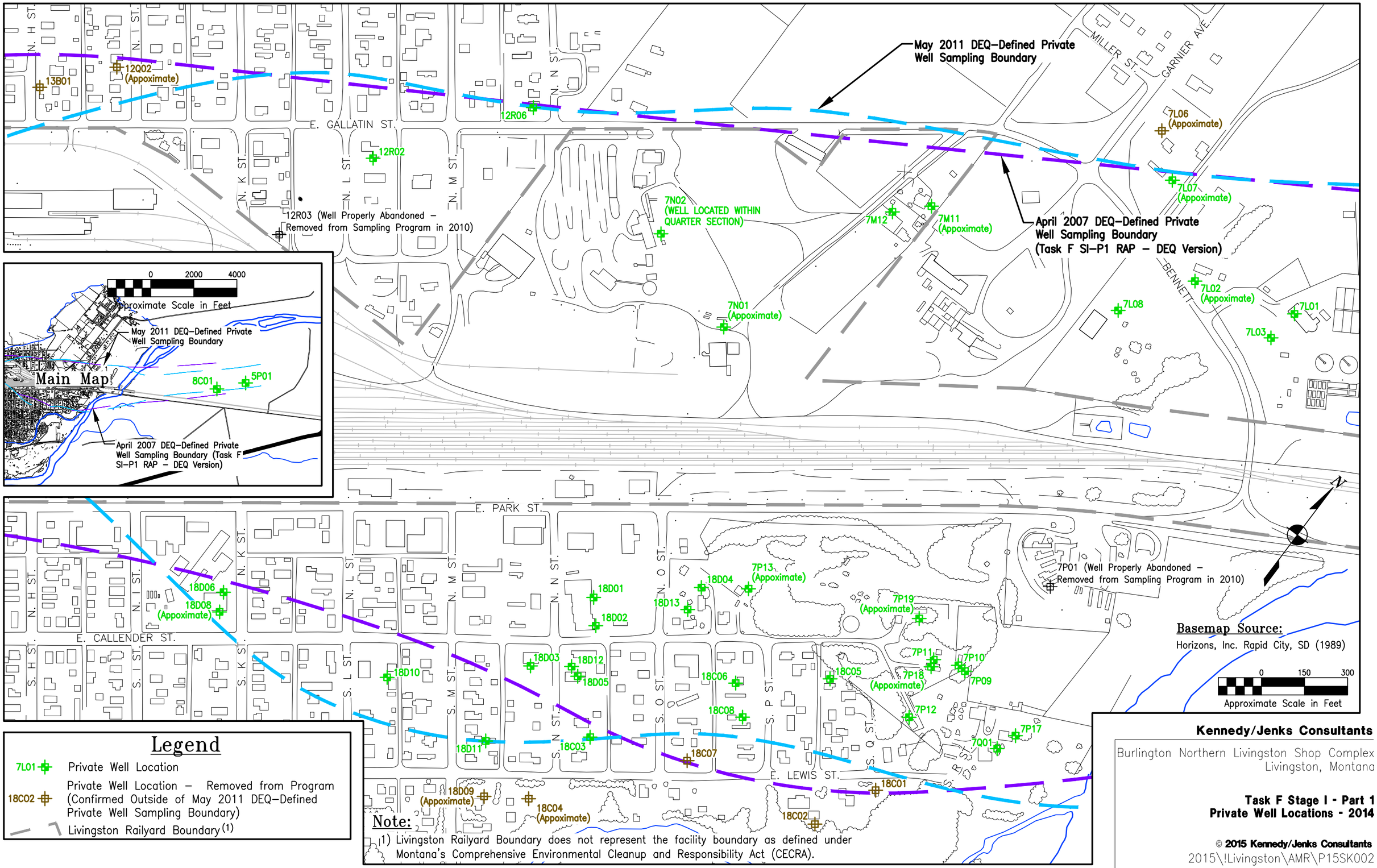
Figure 1



Basemap Source:
Horizons, Inc. Rapid City, SD (1989)

Legend

- 7L01 — Private Well Location
- 18C02 — Private Well Location – Removed from Program (Confirmed Outside of May 2011 DEQ-Defined Private Well Sampling Boundary)
- Livingston Railyard Boundary (1)

Note:
1) Livingston Railyard Boundary does not represent the facility boundary as defined under Montana's Comprehensive Environmental Cleanup and Responsibility Act (CECRA).

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Burlington Northern Livingston Shop Complex
Livingston, Montana

Task F Stage I - Part 1
Private Well Locations - 2014

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Figure 2

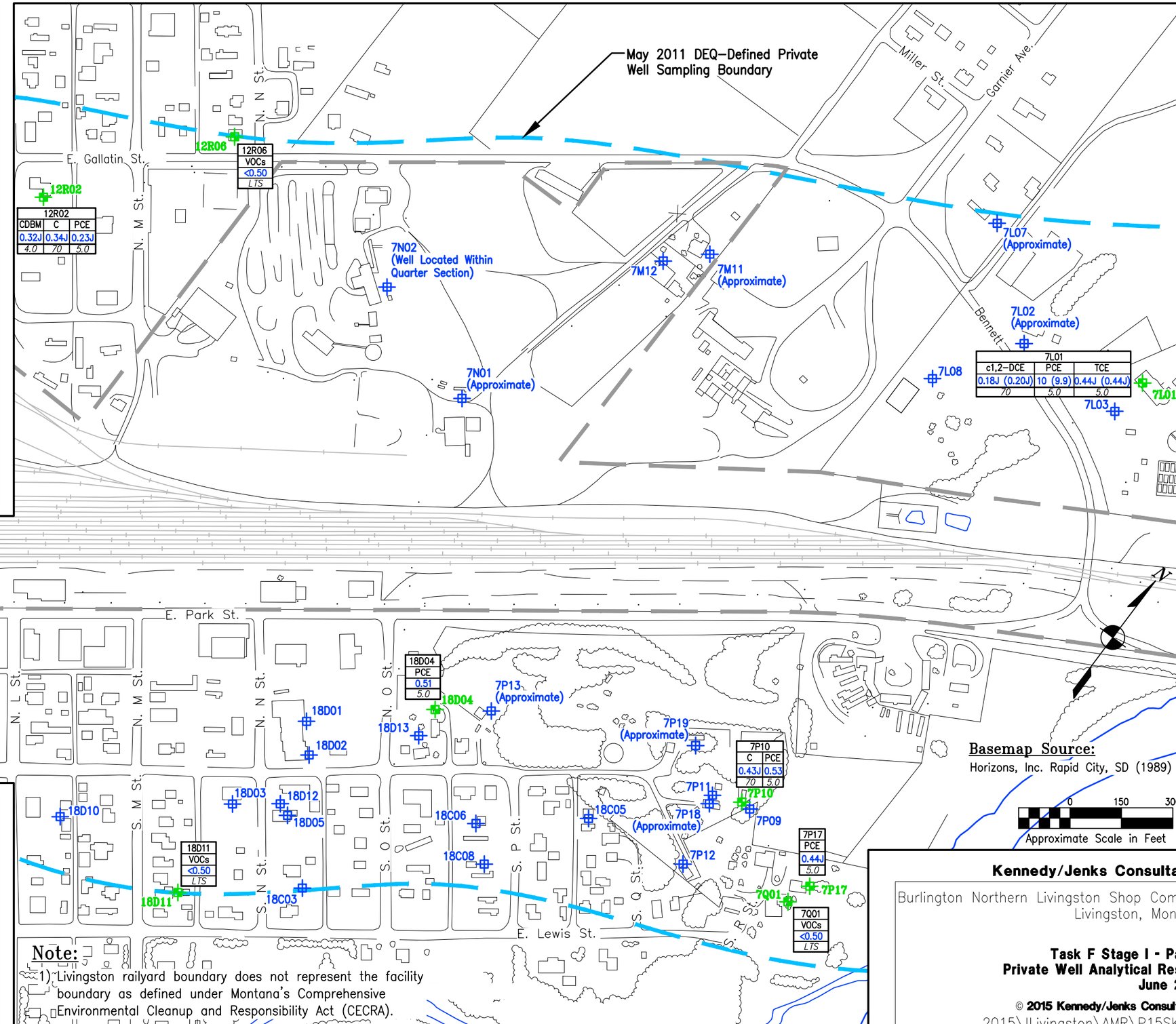
Legend

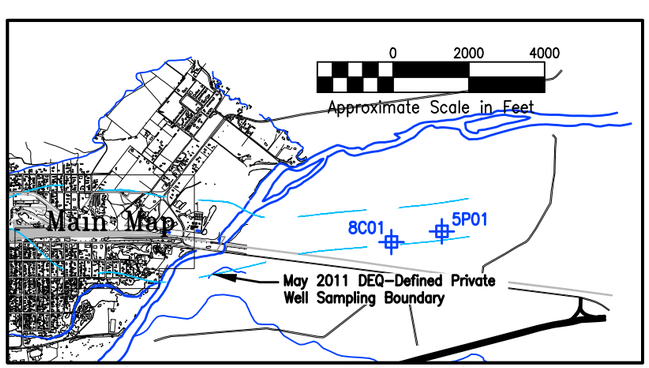
12R02		
CDMB	C	PCE
0.32J	0.34J	0.23J
4.0	70	5.0

Well Designation with Reported VOCs (ug/L), for the June 2014 Sampling Event Unless Otherwise Noted.

Montana Department of Environmental Quality (DEQ) Record of Decision (ROD) Cleanup Levels and DEQ-7 Standards are Shown Separately Below Results Where Concentrations of Analytes Have Been Detected.

VOCs	volatile organic compounds
c1,2-DCE	cis-1,2-dichloroethene
CDBM	chlorodibromomethane
C	chloroform
PCE	tetrachloroethene
TCE	trichloroethene
LTS	Denotes that no Analytes in the Suite of Constituents Analyzed were Detected and that Detection Limits were Below Available Rod Cleanup Levels/DEQ-7 Standards and/or MCLs.
J	Indicates Estimated Value
	Private/Public Well Location – Operable
	Private/Public Well Location – Inoperable
7L01	Private Well Sample Location
7N02	Not Sampled per Task F SI-P1 RAP (DEQ VERSION)
	Livingston Railyard Boundary (1)





Note:

1) Livingston railyard boundary does not represent the facility boundary as defined under Montana's Comprehensive Environmental Cleanup and Responsibility Act (CECRA).

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Burlington Northern Livingston Shop Complex
Livingston, Montana

Task F Stage I - Part 1
Private Well Analytical Results
June 2014

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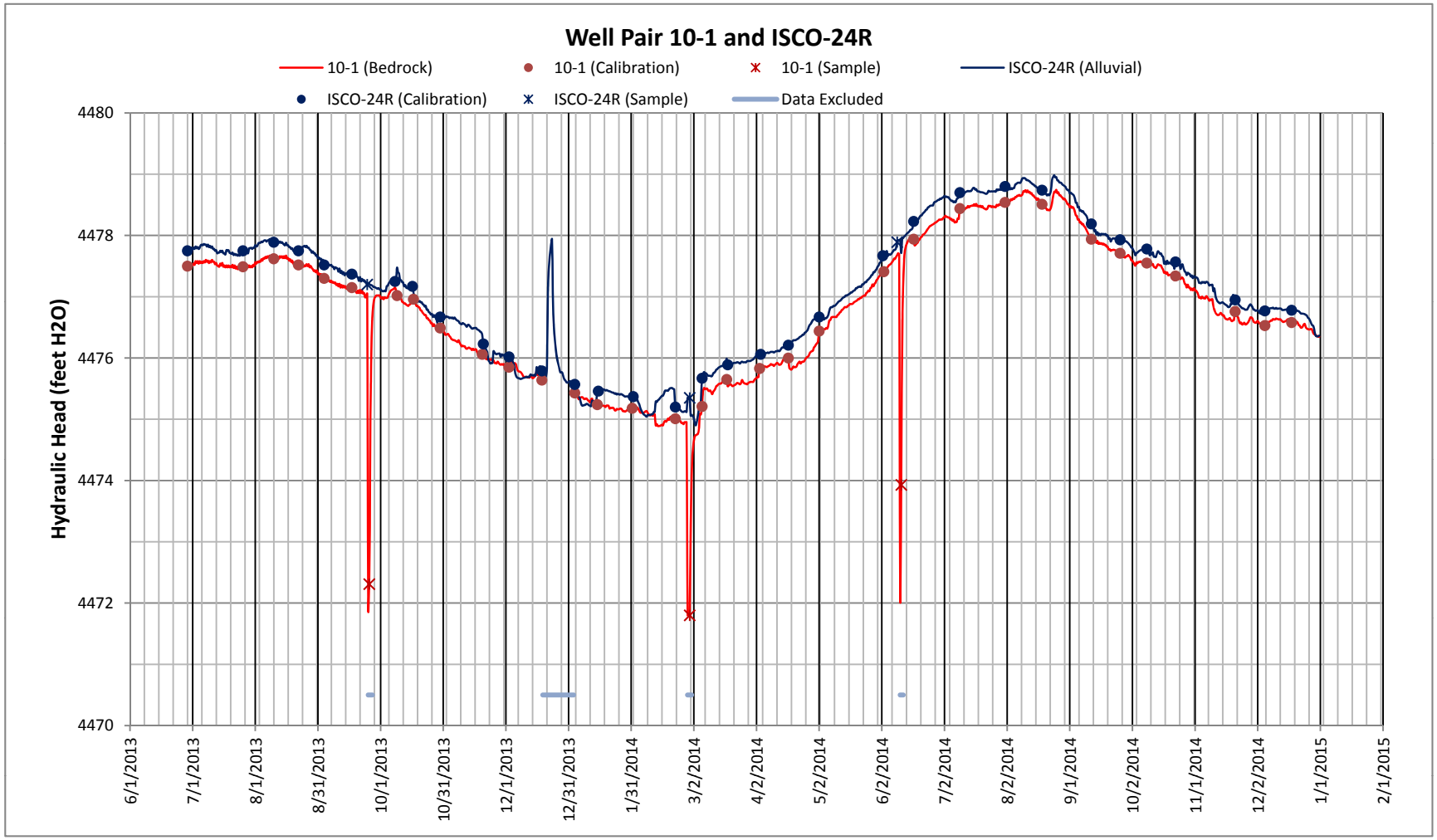
Figure 3



Note:

Data Excluded indicates time ranges of data that are excluded from vertical gradient calculations because of disturbance by groundwater sampling events, transducer malfunction, or other anomalies.

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Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Transducer Data
Well Pair 10-1 and ISCO-24R

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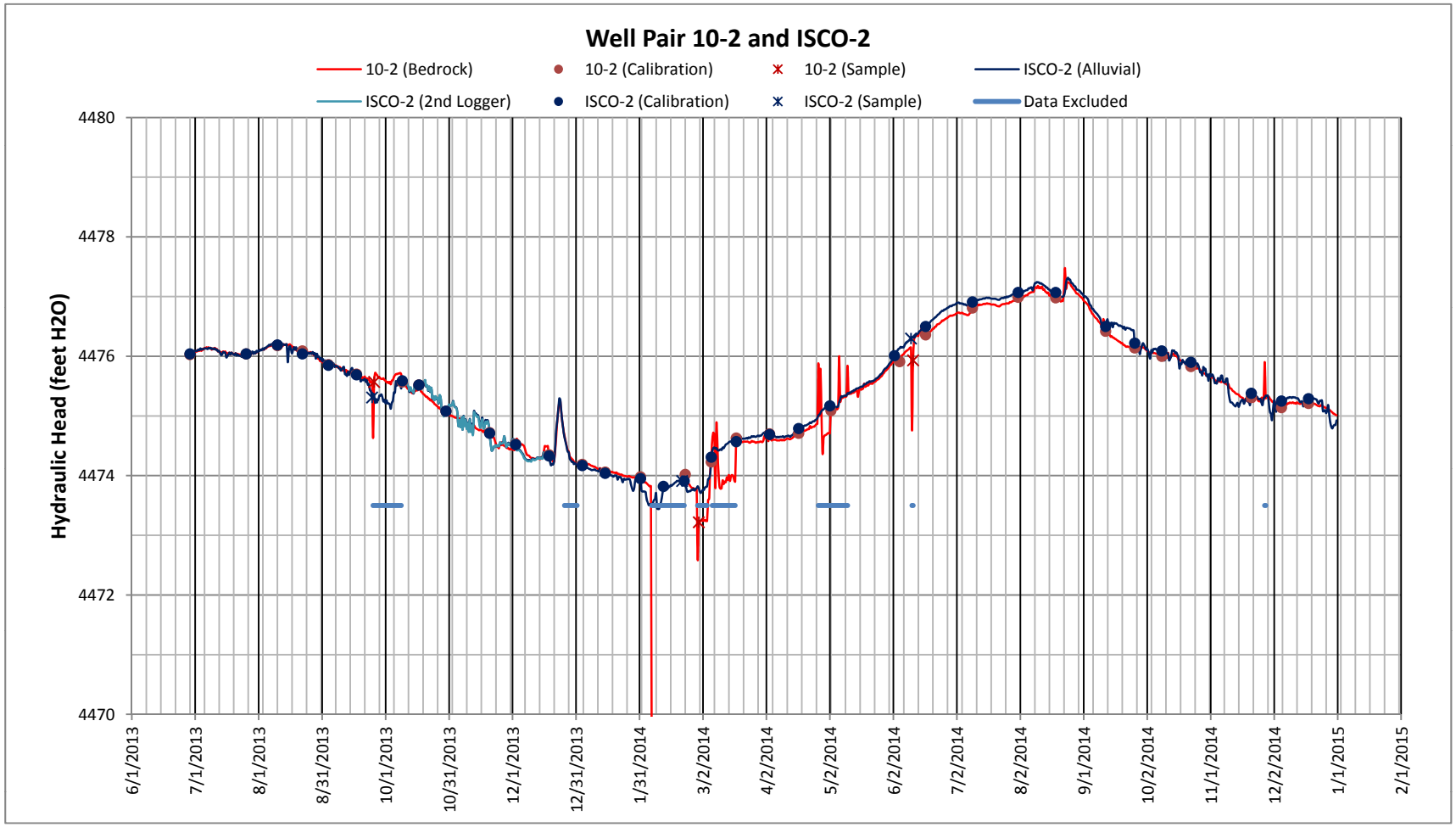
Figure 4

N:\Projects\2014\!Livingston\Task L\Transducer Data\Livingston Coupled Well Monitoring Data



Note:

Data Excluded indicates time ranges of data that are excluded from vertical gradient calculations because of disturbance by groundwater sampling events, transducer malfunction, or other anomalies.

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Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Transducer Data
Well Pair 10-2 and ISCO-2

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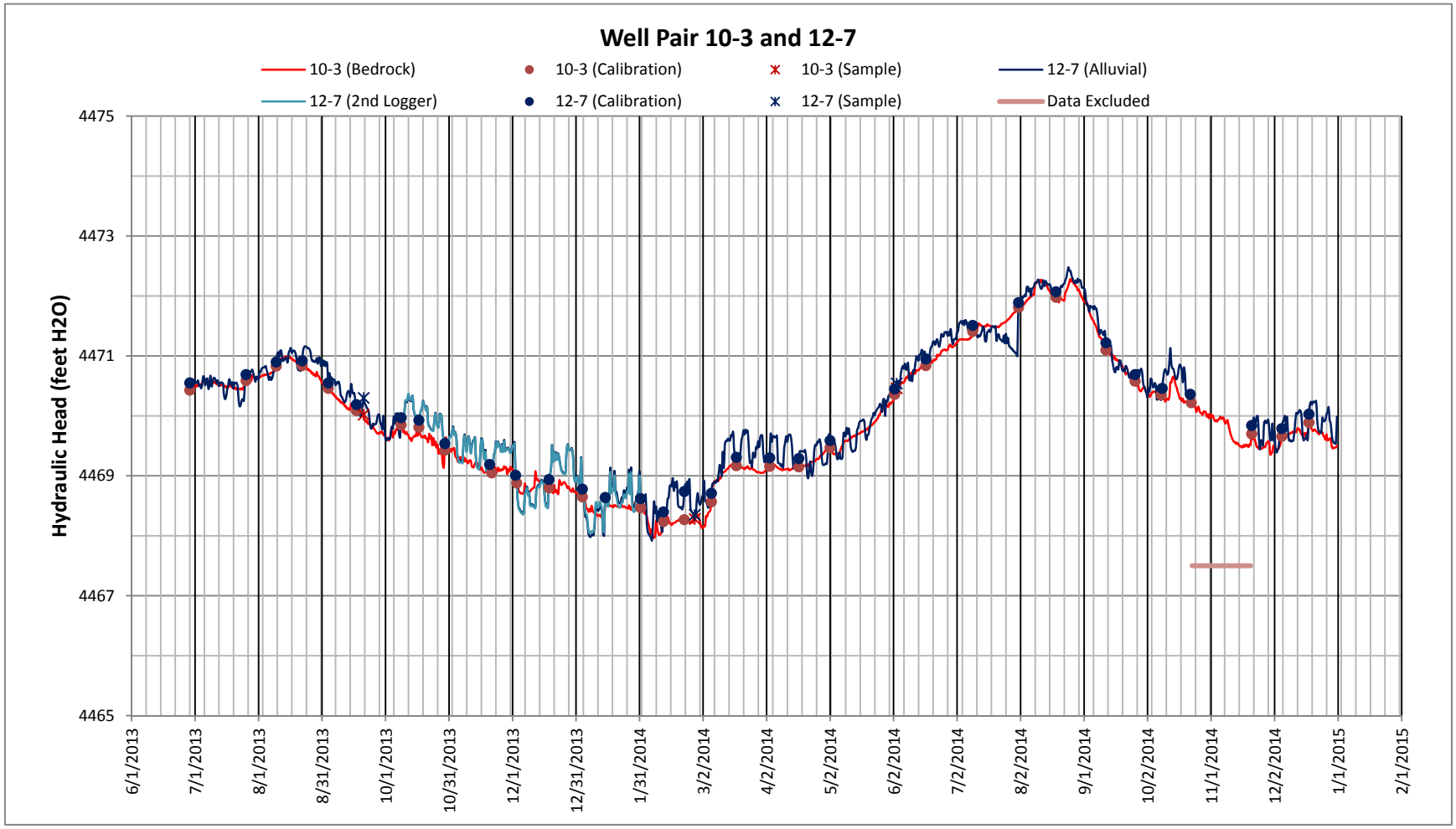
Figure 5

N:\Projects\2014\!Livingston\Task L\Transducer Data\Livingston Coupled Well Monitoring Data



Note:

Data Excluded indicates time ranges of data that are excluded from vertical gradient calculations because of disturbance by groundwater sampling events, transducer malfunction, or other anomalies.

The weekly fluctuation in 12-7 data is consistent with the bioventing schedule at the Site, suggesting that water levels in 12-7 are influenced by the remedial action.

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Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Transducer Data
Well Pair 10-3 and 12-7

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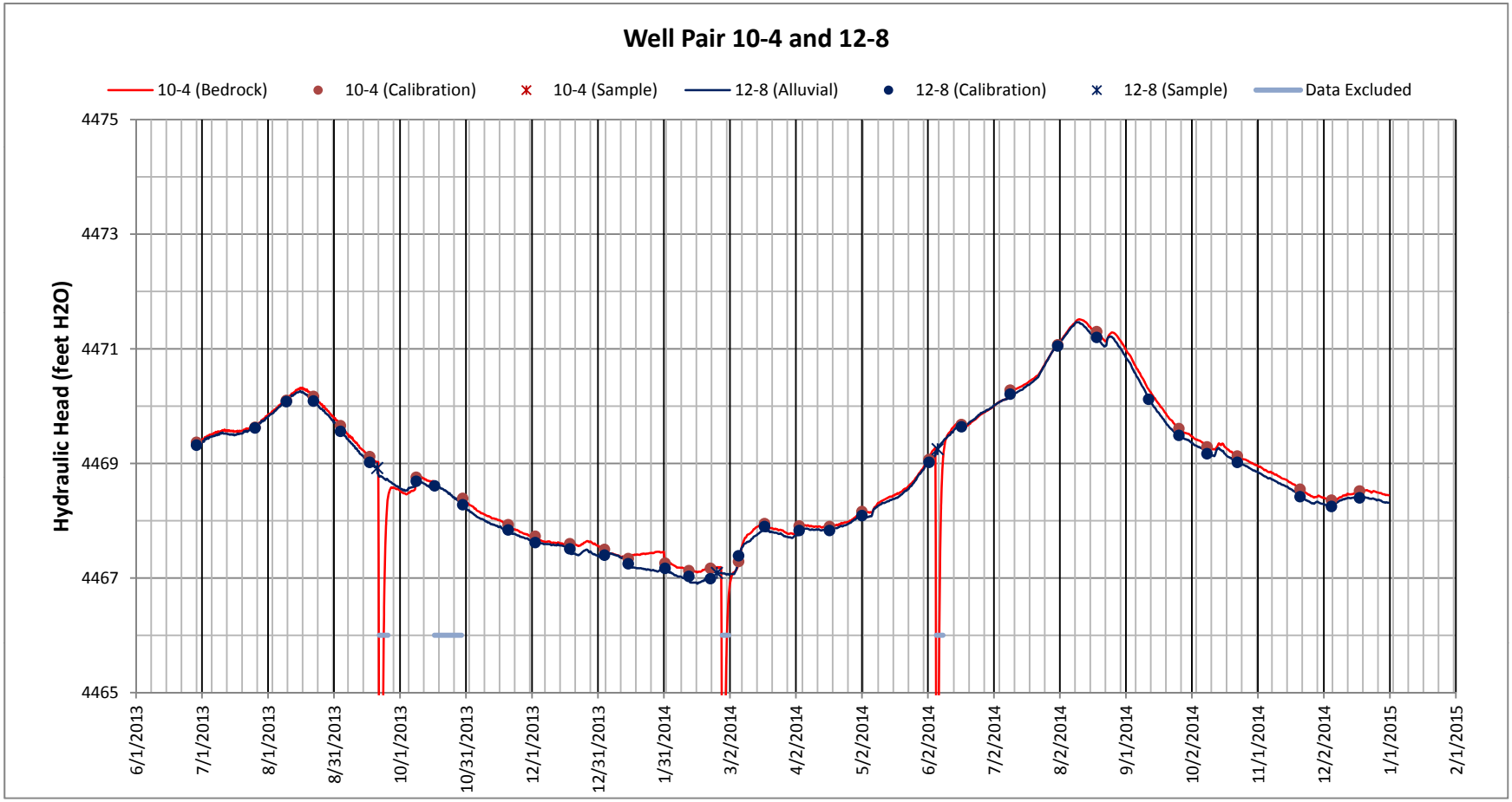
Figure 6

N:\Projects\2014\!Livingston\Task L\Transducer Data\Livingston Coupled Well Monitoring Data



Note:

Data Excluded indicates time ranges of data that are excluded from vertical gradient calculations because of disturbance by groundwater sampling events, transducer malfunction, or other anomalies.

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Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Transducer Data
Well Pair 10-4 and 12-8

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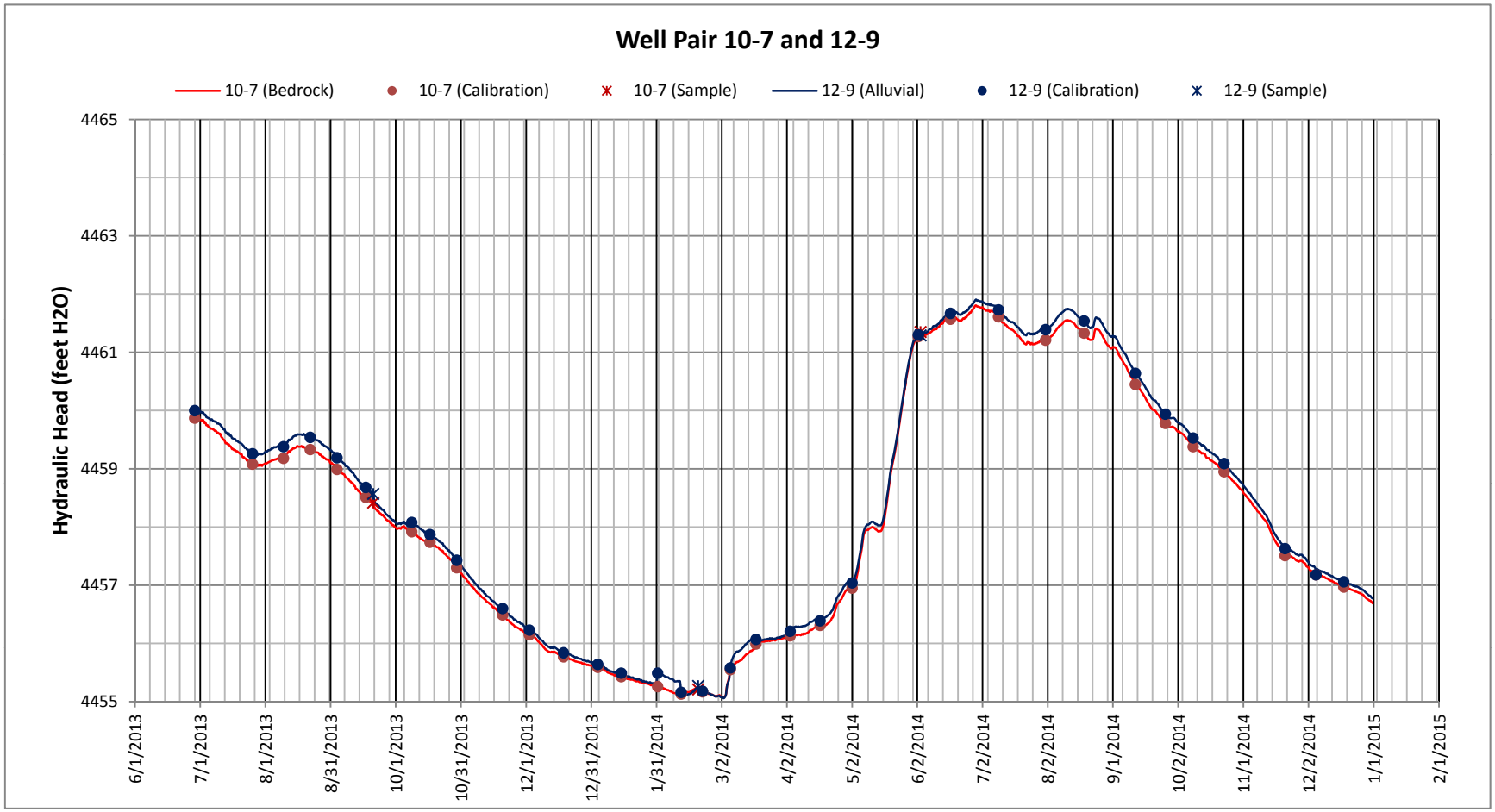
Figure 7

N:\Projects\2014\!Livingston\Task L\Transducer Data\Livingston Coupled Well Monitoring Data



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Burlington Northern Livingston Shop
Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Transducer Data
Well Pair 10-7 and 12-9

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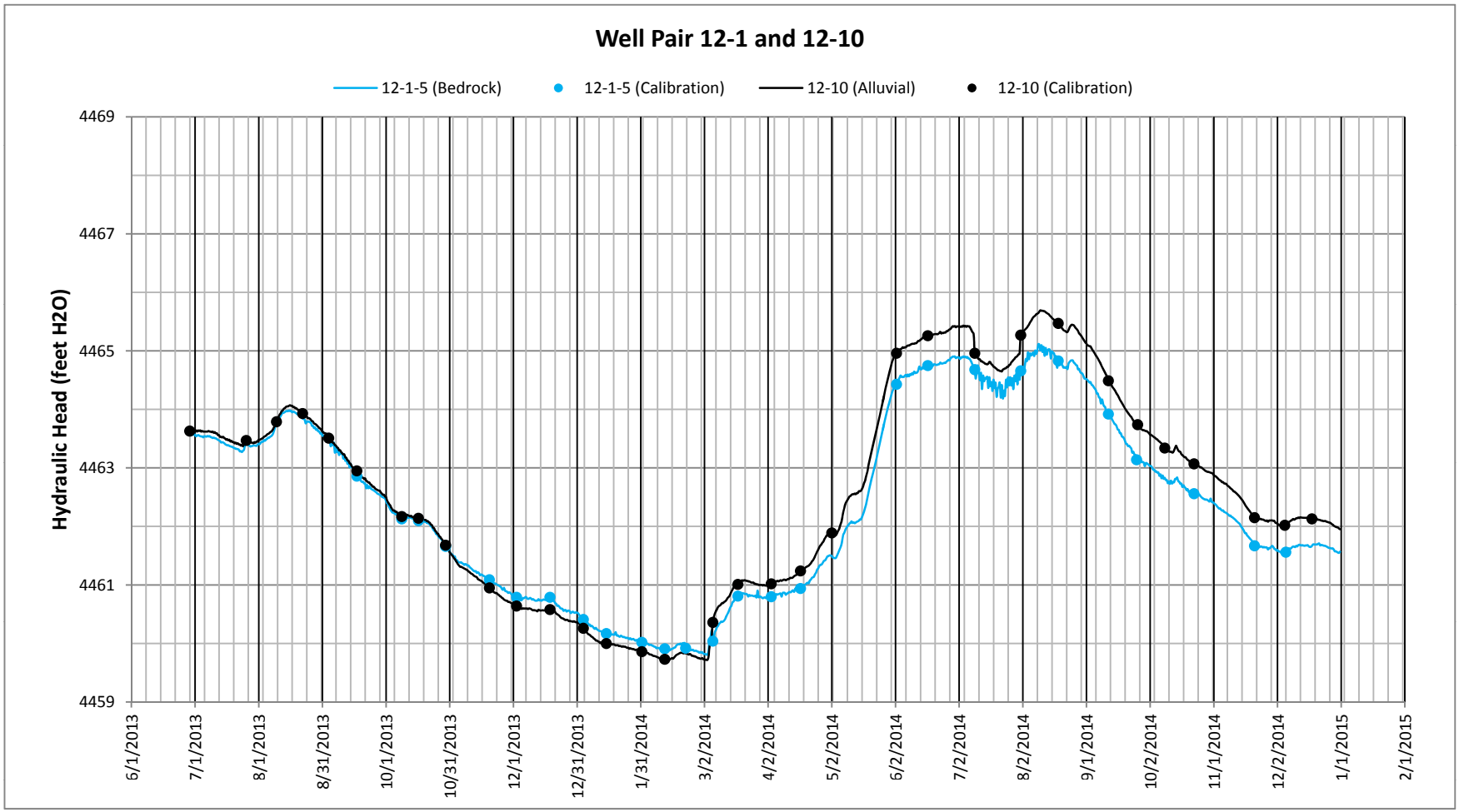
Figure 8

N:\Projects\2014\!Livingston\Task L\Transducer Data\Livingston Coupled Well Monitoring Data



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Burlington Northern Livingston Shop
Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Transducer Data
Well Pair 12-1 (Flute Well) and 12-10

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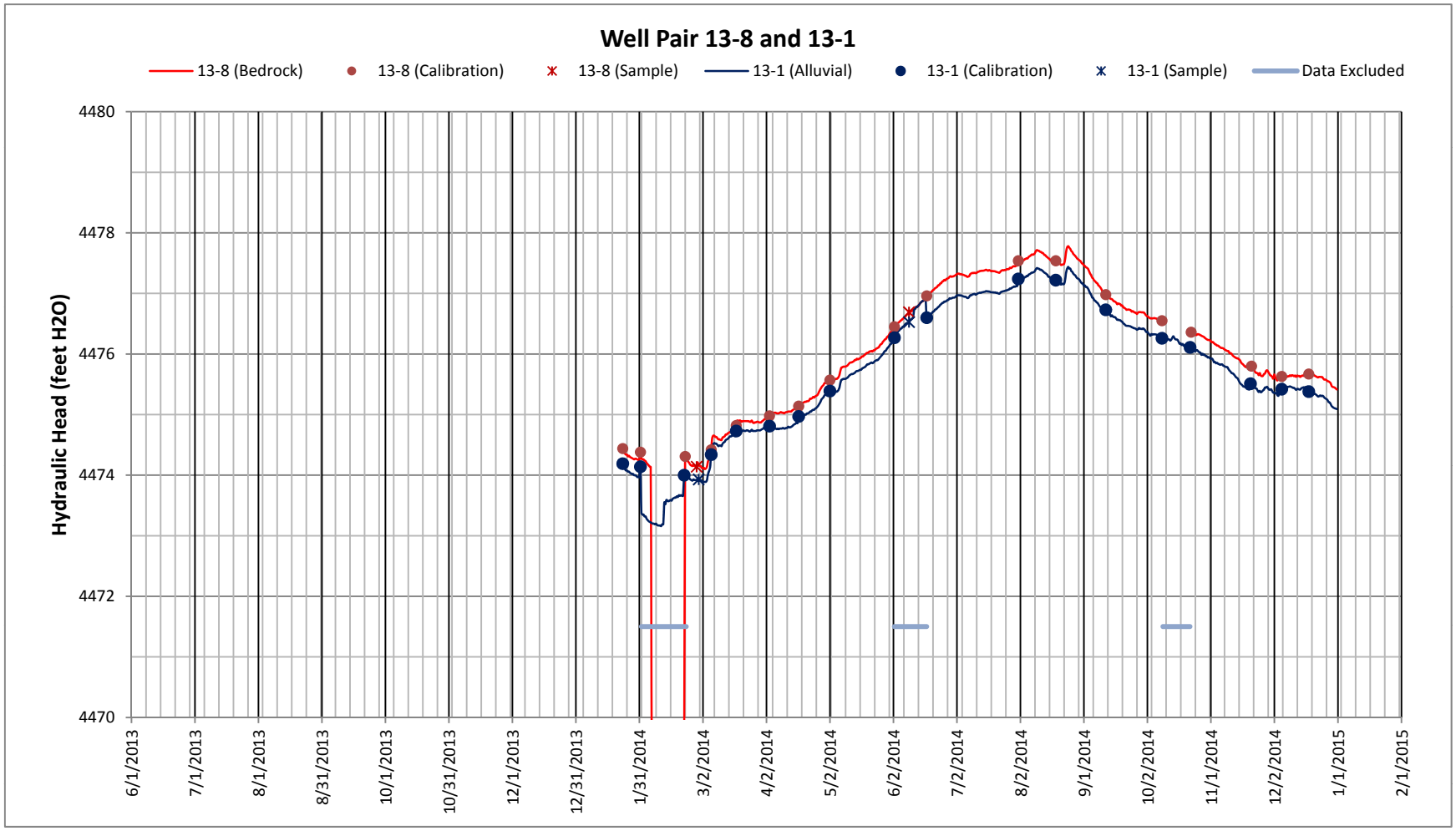
Figure 9

N:\Projects\2014\!Livingston\Task L\Transducer Data\Livingston Coupled Well Monitoring Data



Note:

Data Excluded indicates time ranges of data that are excluded from vertical gradient calculations because of disturbance by groundwater sampling events, transducer malfunction, or other anomalies.

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Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Transducer Data
Well Pair 13-8 and 13-1

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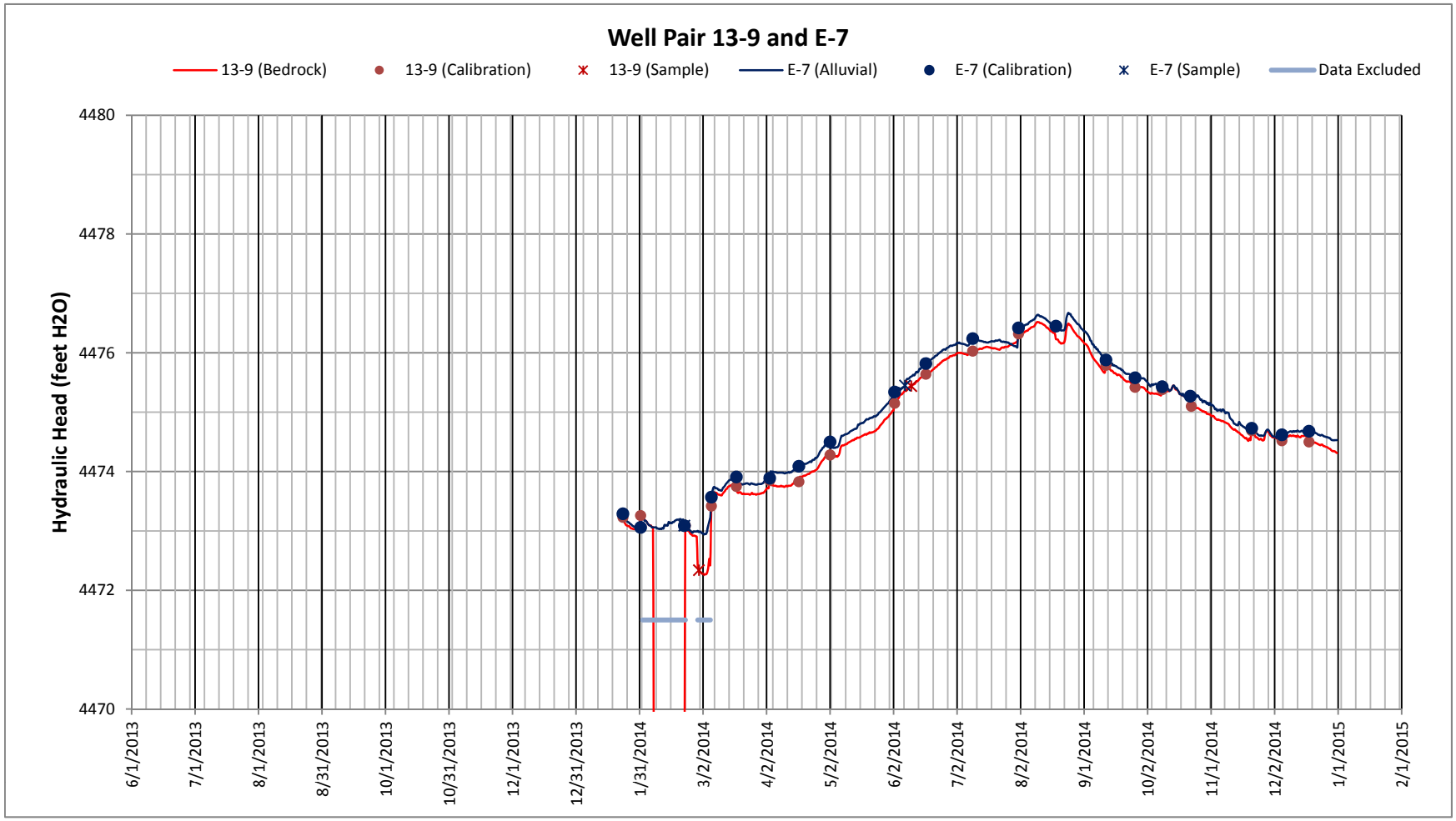
Figure 10

N:\Projects\2014\!Livingston\Task L\Transducer Data\Livingston Coupled Well Monitoring Data



Note:

Data Excluded indicates time ranges of data that are excluded from vertical gradient calculations because of disturbance by groundwater sampling events, transducer malfunction, or other anomalies.

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Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Transducer Data
Well Pair 13-9 and E-7

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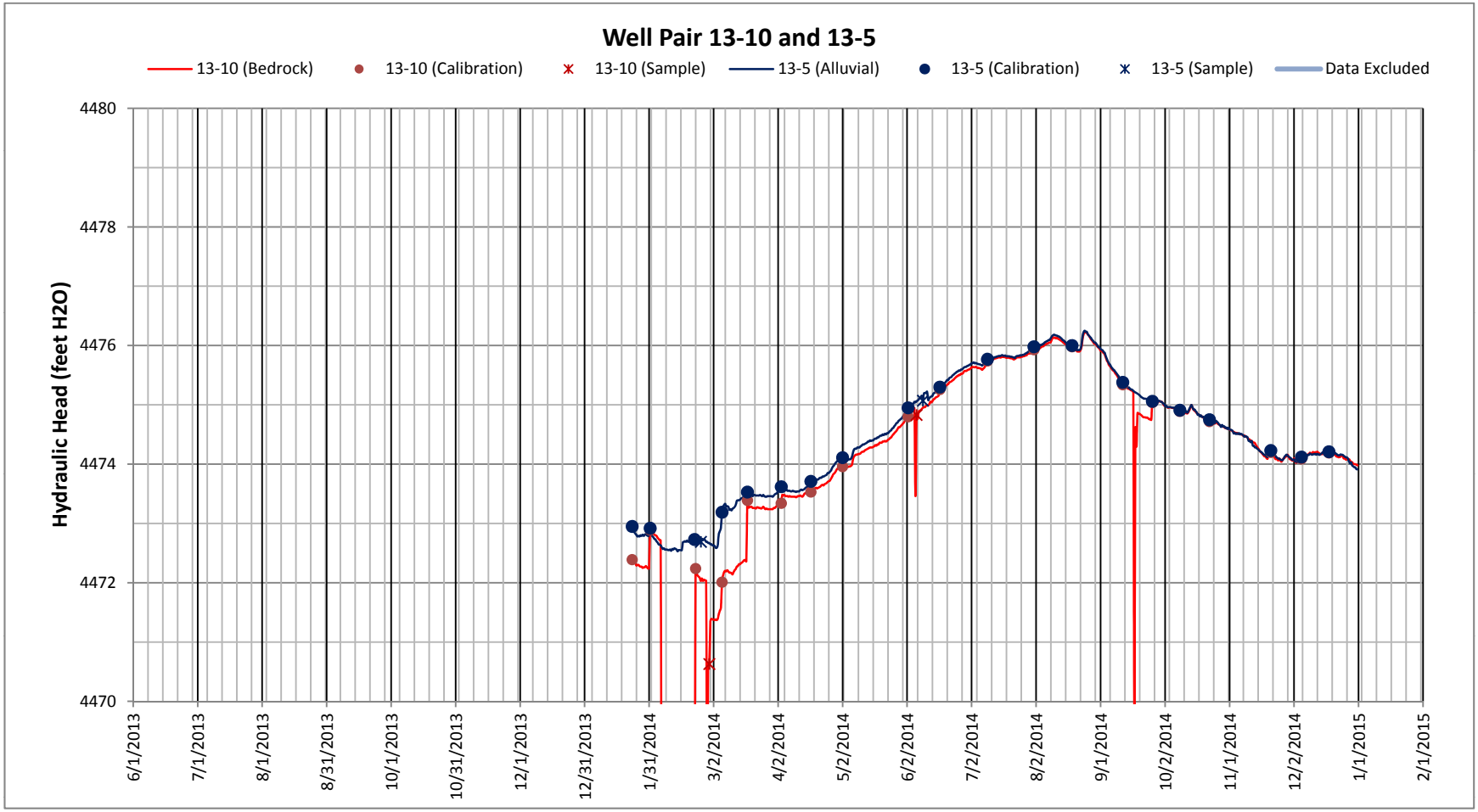
Figure 11

N:\Projects\2014\!Livingston\Task L\Transducer Data\Livingston Coupled Well Monitoring Data



Note:

Data Excluded indicates time ranges of data that are excluded from vertical gradient calculations because of disturbance by groundwater sampling events, transducer malfunction, or other anomalies.

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Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Transducer Data
Well Pair 13-10 and 13-5

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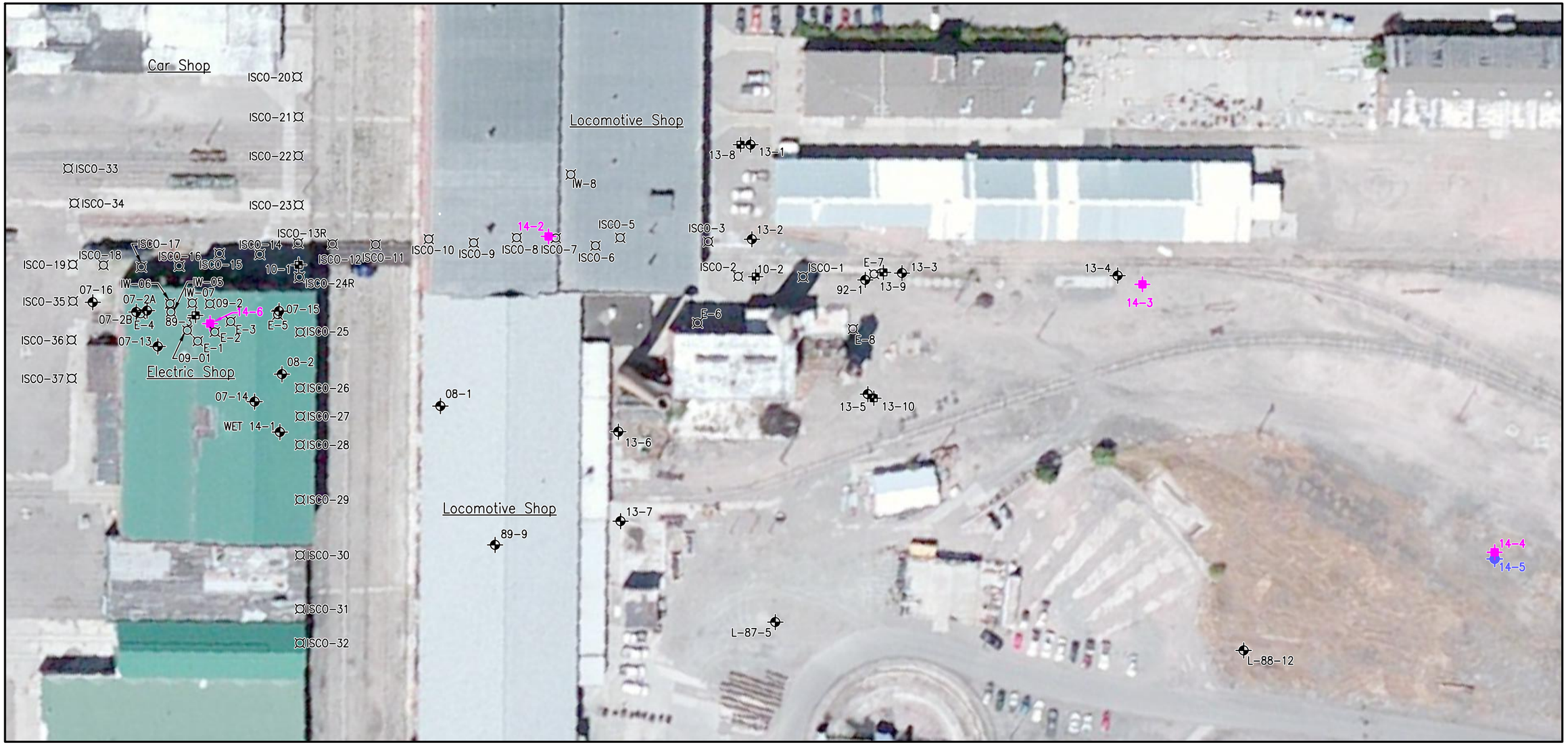
Figure 12

N:\Projects\2014\!Livingston\Task L\Transducer Data\Livingston Coupled Well Monitoring Data



Legend

14-4	2014 Bedrock Monitoring Well Location
14-5	2014 Alluvial Aquifer Monitoring Well Location
13-10	Bedrock Monitoring Well Location
13-4	Alluvial Aquifer Monitoring Well Location
E-8	ISCO Well Location

N

0 50 100

Approximate Scale in Feet

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Burlington Northern Livingston Shop Complex
Livingston, Montana

2014 Task L Alluvial Aquifer and Bedrock Groundwater Monitoring Well Locations

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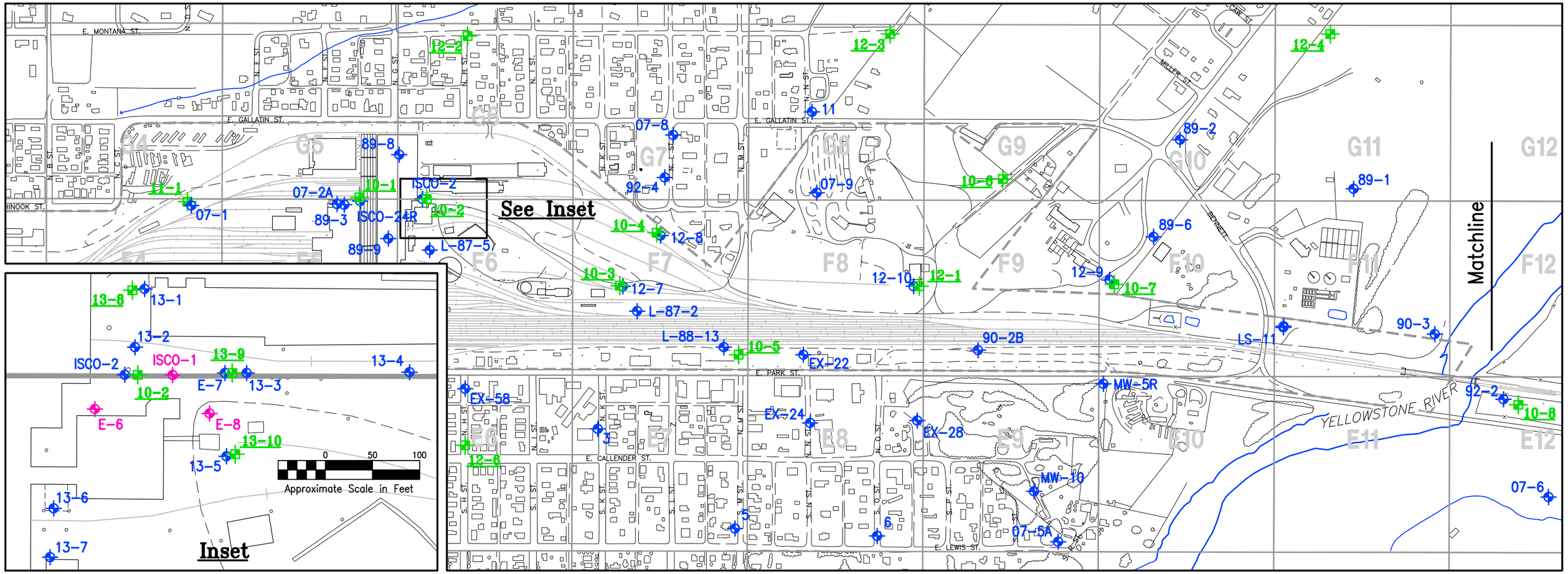
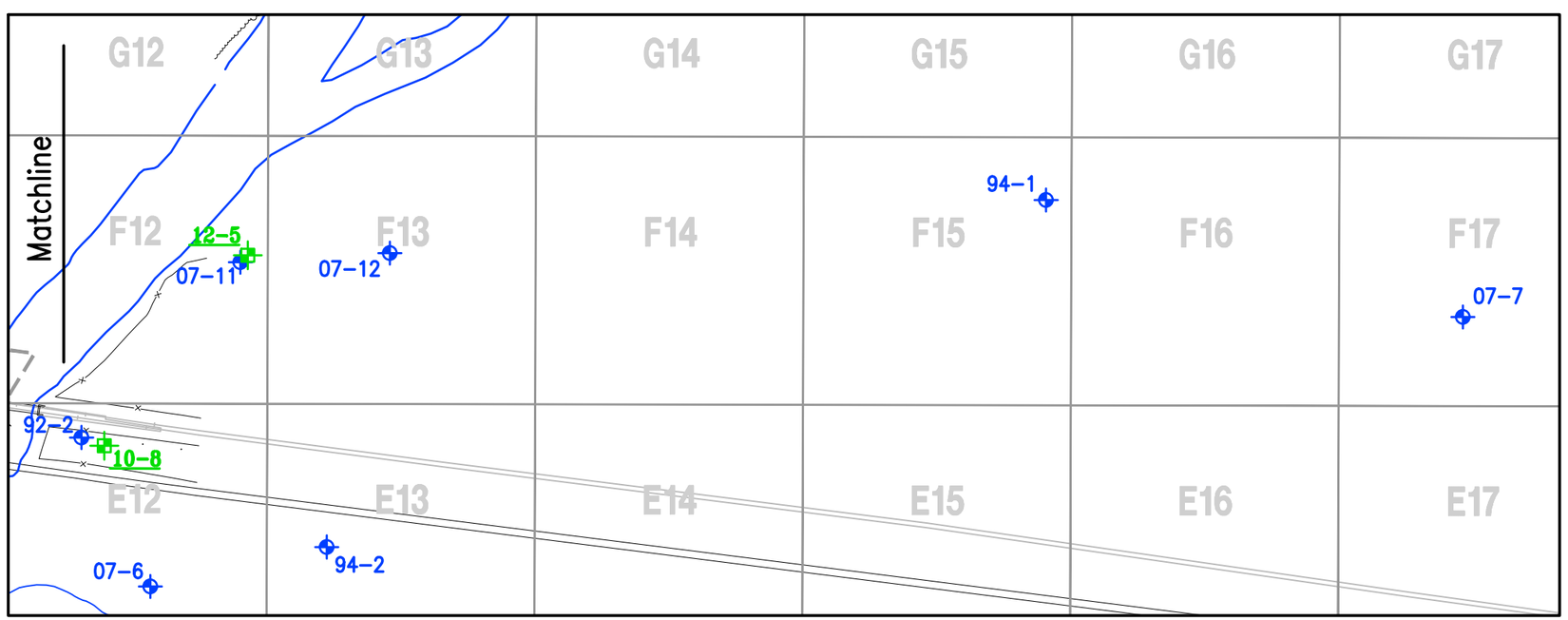
Figure 13





Legend

L-87-2	Alluvial Aquifer Monitoring Well Location
13-10	Bedrock Monitoring Well Location
E-6	Alluvial Aquifer Monitoring Well Location Sample during 1st Quarter 2014
	Livingston Railyard Boundary (1)

Note:

1) Livingston railyard boundary does not represent the facility boundary as defined under Montana's Comprehensive Environmental Cleanup and Responsibility Act (CECRA).

Basemap Source:

Horizons, Inc. Rapid City, SD (1989)

N

0 250 500

Approximate Scale in Feet

Kennedy/Jenks Consultants

Burlington Northern Livingston Shop Complex
Livingston, Montana

DEQ'S Groundwater Monitoring Program Directive No. 2 (GWMD-2) Well Locations

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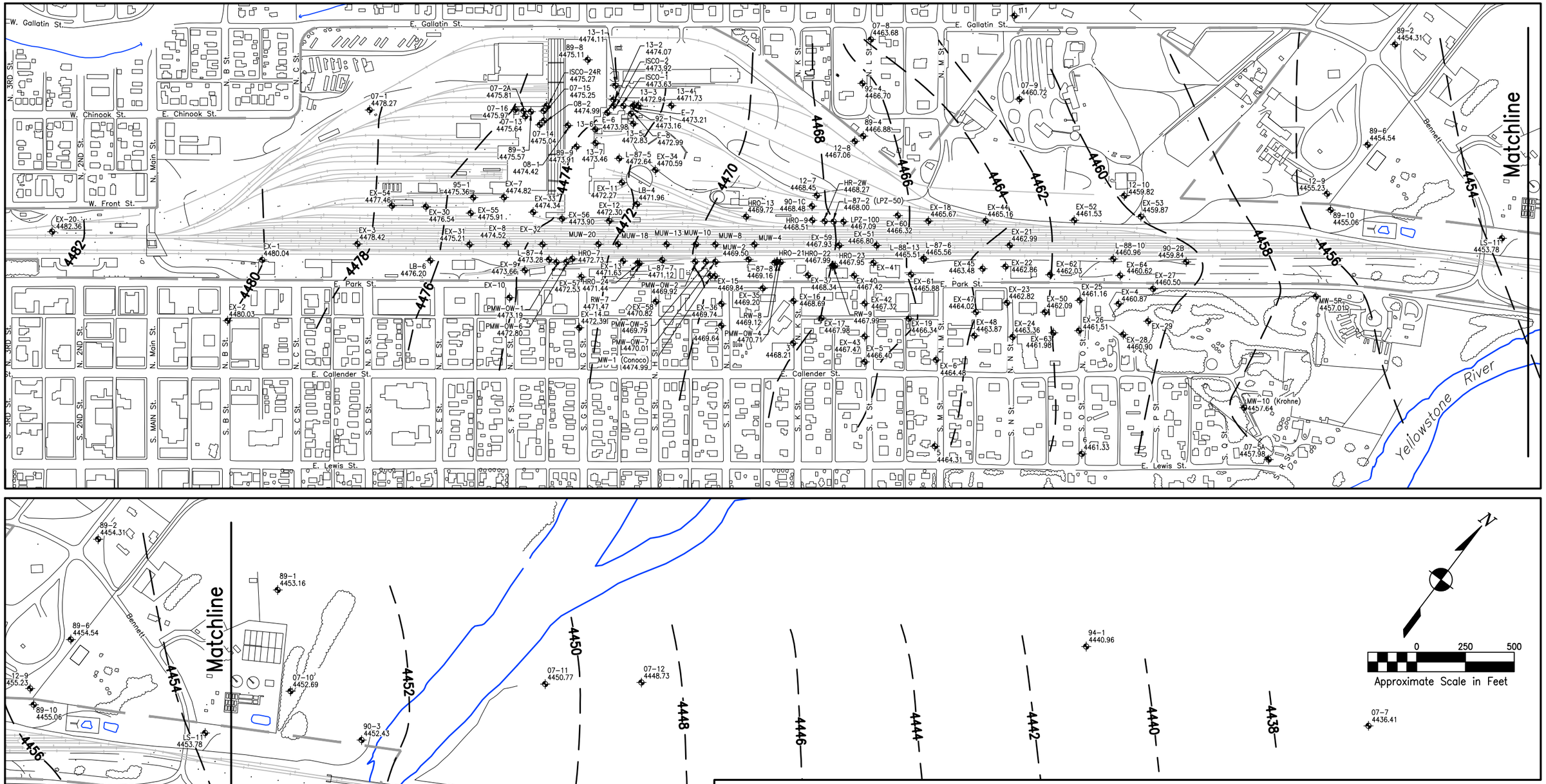
Figure 14



Legend

94-2 4449.59 — Monitoring Well Location and Water Level Elevation (Feet Above MSL)

4472 — Approximate Potentiometric Surface Elevation Contours Based on Measurements Taken 19 – 28 February 2014 Interpolation Based on Triangulated Irregular Network using Arcinfo 10 (Feet Above MSL) Dashed Where Inferred

Contour Interval = 2 Feet

Basemap Source:
Horizons, Inc. Rapid City, SD (1989)

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Burlington Northern Livingston Shop Complex
Livingston, Montana

Alluvial Aquifer Potentiometric Surface Contours February 2014

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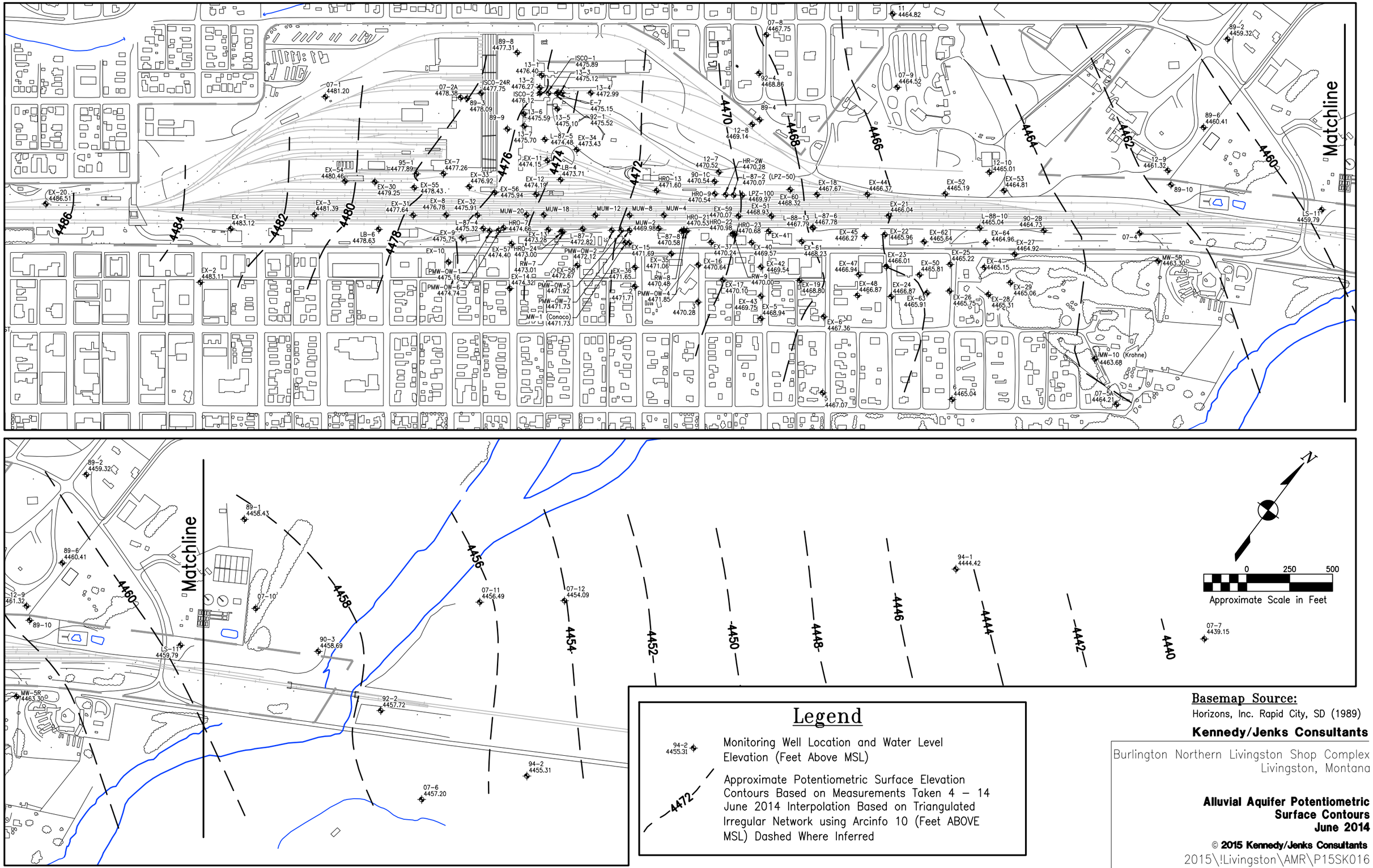
Figure 15



Legend

94-2 4455.31 — Monitoring Well Location and Water Level Elevation (Feet Above MSL)

4472 — Approximate Potentiometric Surface Elevation Contours Based on Measurements Taken 4 – 14 June 2014 Interpolation Based on Triangulated Irregular Network using Arcinfo 10 (Feet ABOVE MSL) Dashed Where Inferred

Contour Interval = 2 Feet

Basemap Source:
Horizons, Inc. Rapid City, SD (1989)

Kennedy/Jenks Consultants

Burlington Northern Livingston Shop Complex
Livingston, Montana

Alluvial Aquifer Potentiometric Surface Contours
June 2014

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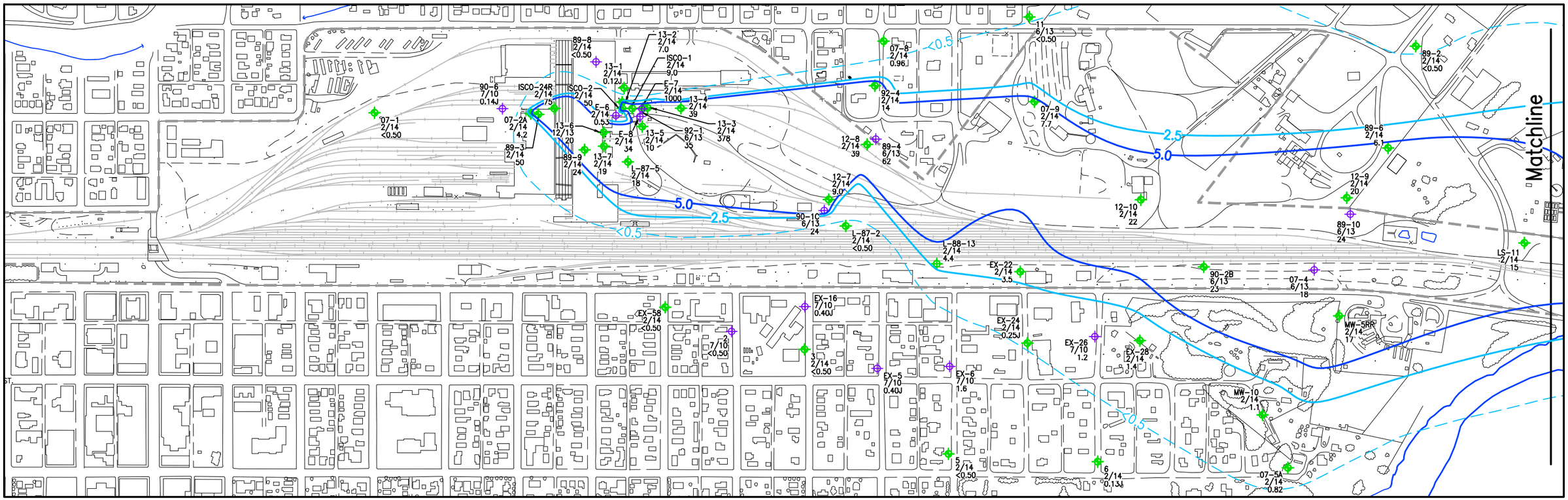
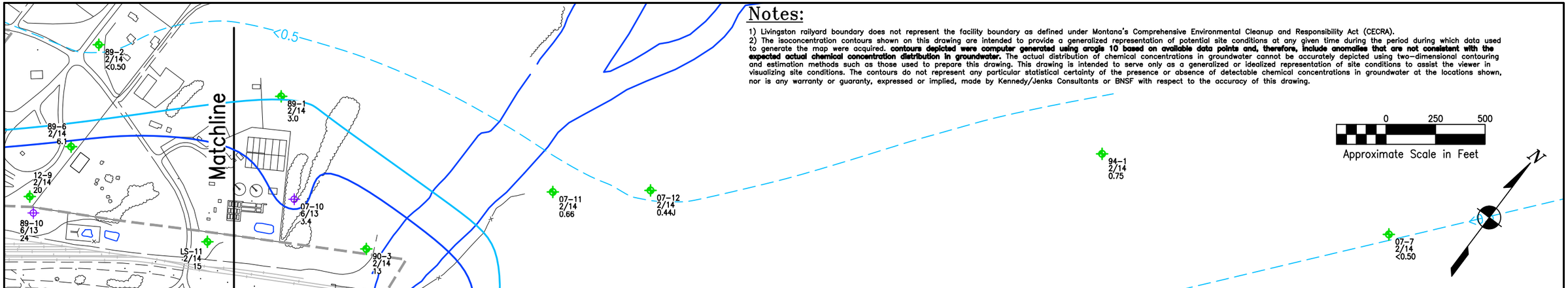
Figure 16





Notes:

1) Livingston railyard boundary does not represent the facility boundary as defined under Montana's Comprehensive Environmental Cleanup and Responsibility Act (CECRA).
2) The isoconcentration contours shown on this drawing are intended to provide a generalized representation of potential site conditions at any given time during the period during which data used to generate the map were acquired. **contours depicted were computer generated using arcgis 10 based on available data points and, therefore, include anomalies that are not consistent with the expected actual chemical concentration distribution in groundwater.** The actual distribution of chemical concentrations in groundwater cannot be accurately depicted using two-dimensional contouring and estimation methods such as those used to prepare this drawing. This drawing is intended to serve only as a generalized or idealized representation of site conditions to assist the viewer in visualizing site conditions. The contours do not represent any particular statistical certainty of the presence or absence of detectable chemical concentrations in groundwater at the locations shown, nor is any warranty or guaranty, expressed or implied, made by Kennedy/Jenks Consultants or BNSF with respect to the accuracy of this drawing.

Legend

89-2 2/14 <0.50	GWMD-2 Semiannual Monitoring Well, Sampling Date, and PCE Concentration in Micrograms per Liter (ug/L)
EX-6 7/10 1.6	Monitoring Well, Sampling Date, and PCE Concentration (ug/L)
<0.5	DEQ Estimated Isoconcentration Contour for the DEQ-7 Standard Required Method Reporting Limit for PCE (ug/L) – February 2014
2.5	Estimated PCE Isoconcentration Contour (ug/L)
5.0	Estimated Isoconcentration Contour for PCE Cleanup Level per the Record of Decision (ug/L)
"<"	Indicates No PCE Detected
J	Indicates Estimated Value
	Livingston Railyard Boundary(1)

Basemap Source:
Horizons, Inc. Rapid City, SD (1989)

Kennedy/Jenks Consultants

Burlington Northern Livingston Shop Complex
Livingston, Montana

Alluvial Aquifer - Tetrachloroethene (PCE) Concentrations and Distribution
February 2014

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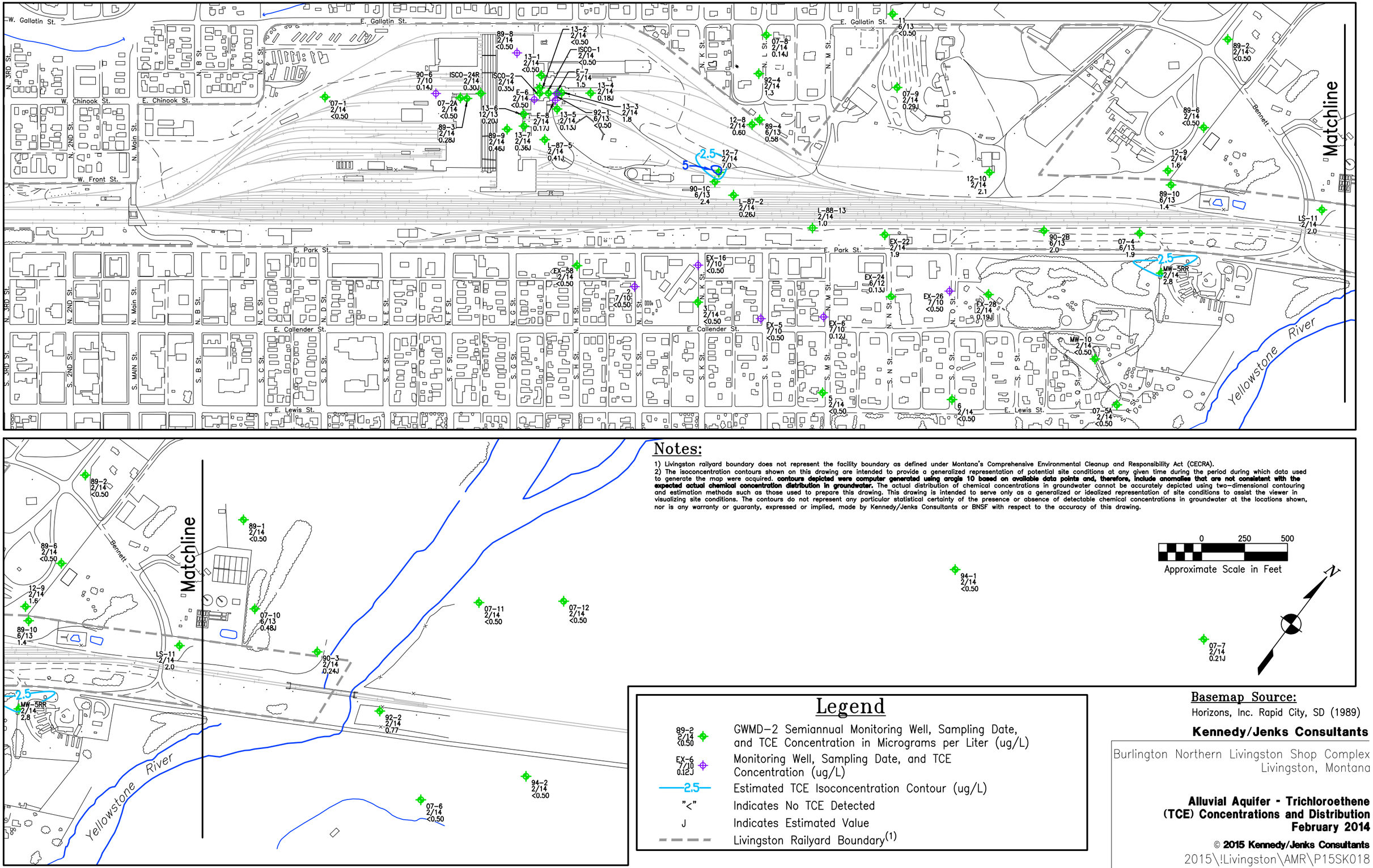
March 2015

Figure 17



Notes:

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2) The isoconcentration contours shown on this drawing are intended to provide a generalized representation of potential site conditions at any given time during the period during which data used to generate the map were acquired. **contours depicted were computer generated using arcgis 10 based on available data points and, therefore, include anomalies that are not consistent with the expected actual chemical concentration distribution in groundwater.** The actual distribution of chemical concentrations in groundwater cannot be accurately depicted using two-dimensional contouring and estimation methods such as those used to prepare this drawing. This drawing is intended to serve only as a generalized or idealized representation of site conditions to assist the viewer in visualizing site conditions. The contours do not represent any particular statistical certainty of the presence or absence of detectable chemical concentrations in groundwater at the locations shown, nor is any warranty or guaranty, expressed or implied, made by Kennedy/Jenks Consultants or BNSF with respect to the accuracy of this drawing.

Legend

89-2 2/14 <0.50	GWMD-2 Semiannual Monitoring Well, Sampling Date, and TCE Concentration in Micrograms per Liter (ug/L)
EX-6 7/10 0.12J	Monitoring Well, Sampling Date, and TCE Concentration (ug/L)
2.5	Estimated TCE Isoconcentration Contour (ug/L)
"<"	Indicates No TCE Detected
J	Indicates Estimated Value
	Livingston Railyard Boundary(1)

Basemap Source:
Horizons, Inc. Rapid City, SD (1989)

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Burlington Northern Livingston Shop Complex
Livingston, Montana

Alluvial Aquifer - Trichloroethene (TCE) Concentrations and Distribution
February 2014

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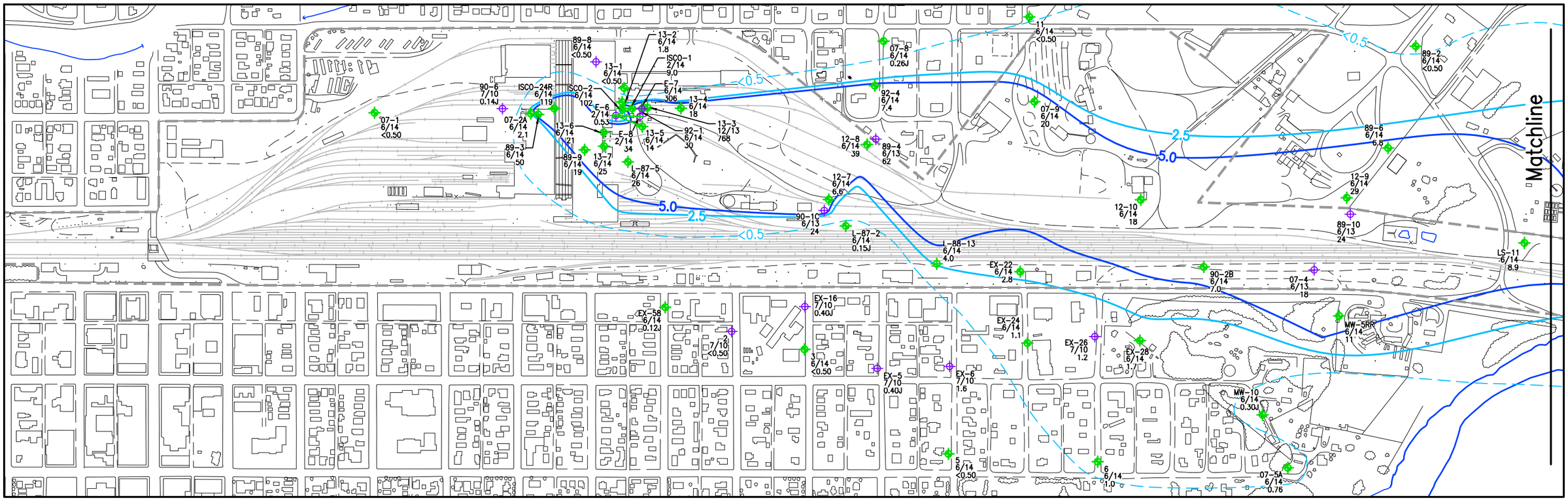
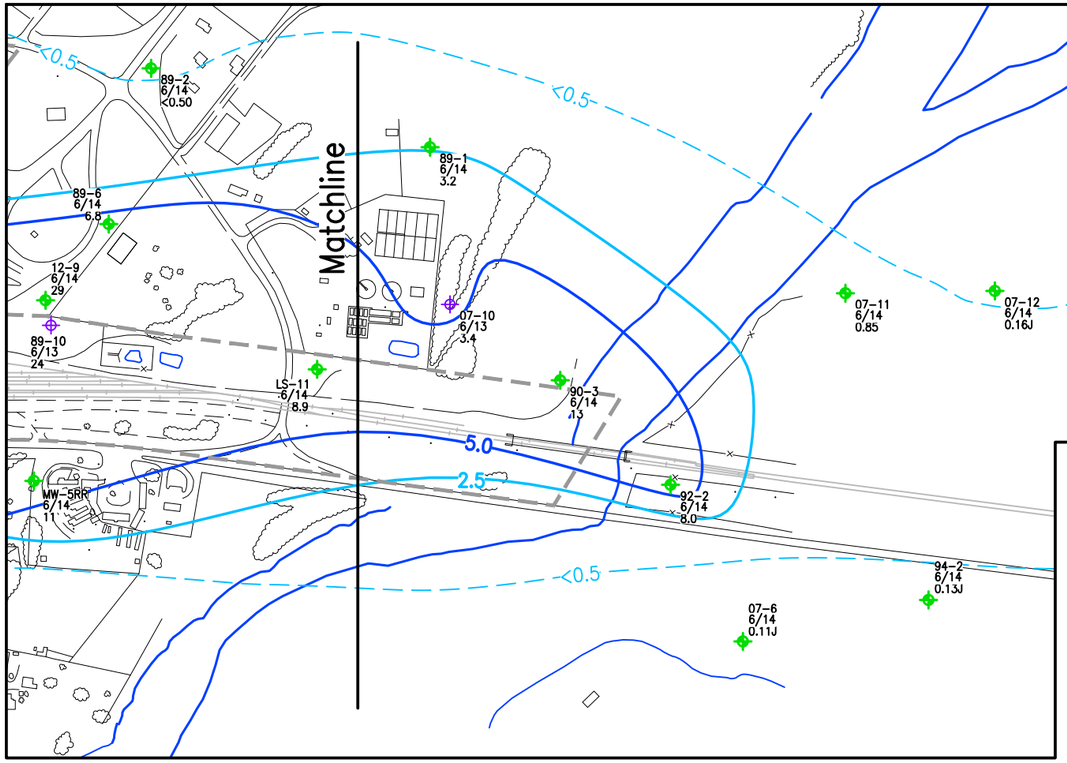
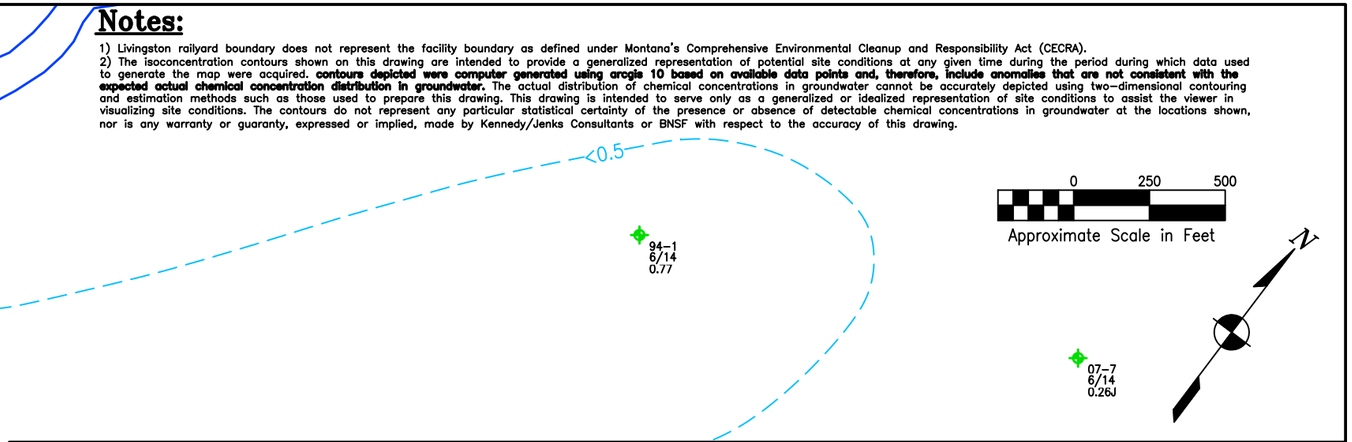
Figure 18





Notes:

1) Livingston railyard boundary does not represent the facility boundary as defined under Montana's Comprehensive Environmental Cleanup and Responsibility Act (CECRA).
2) The isoconcentration contours shown on this drawing are intended to provide a generalized representation of potential site conditions at any given time during the period during which data used to generate the map were acquired. **contours depicted were computer generated using arcgis 10 based on available data points and, therefore, include anomalies that are not consistent with the expected actual chemical concentration distribution in groundwater.** The actual distribution of chemical concentrations in groundwater cannot be accurately depicted using two-dimensional contouring and estimation methods such as those used to prepare this drawing. This drawing is intended to serve only as a generalized or idealized representation of site conditions to assist the viewer in visualizing site conditions. The contours do not represent any particular statistical certainty of the presence or absence of detectable chemical concentrations in groundwater at the locations shown, nor is any warranty or guaranty, expressed or implied, made by Kennedy/Jenks Consultants or BNSF with respect to the accuracy of this drawing.



Legend

89-2 6/14 <0.50	GWMD-2 Semiannual Monitoring Well, Sampling Date, and PCE Concentration in Micrograms per Liter (ug/L)
EX-6 7/10 1.6	Monitoring Well, Sampling Date, and PCE Concentration (ug/L)
<0.5	DEQ Estimated Isoconcentration Contour for the DEQ-7 Standard Required Method Reporting Limit for PCE (ug/L) – June 2014
2.5	Estimated PCE Isoconcentration Contour (ug/L)
5.0	Estimated Isoconcentration Contour for PCE Cleanup Level per the Record of Decision (ug/L)
"<"	Indicates No PCE Detected
J	Indicates Estimated Value
	Livingston Railyard Boundary(1)

Basemap Source:
Horizons, Inc. Rapid City, SD (1989)

Kennedy/Jenks Consultants

Burlington Northern Livingston Shop Complex
Livingston, Montana

Alluvial Aquifer - Tetrachloroethene (PCE) Concentrations and Distribution June 2014

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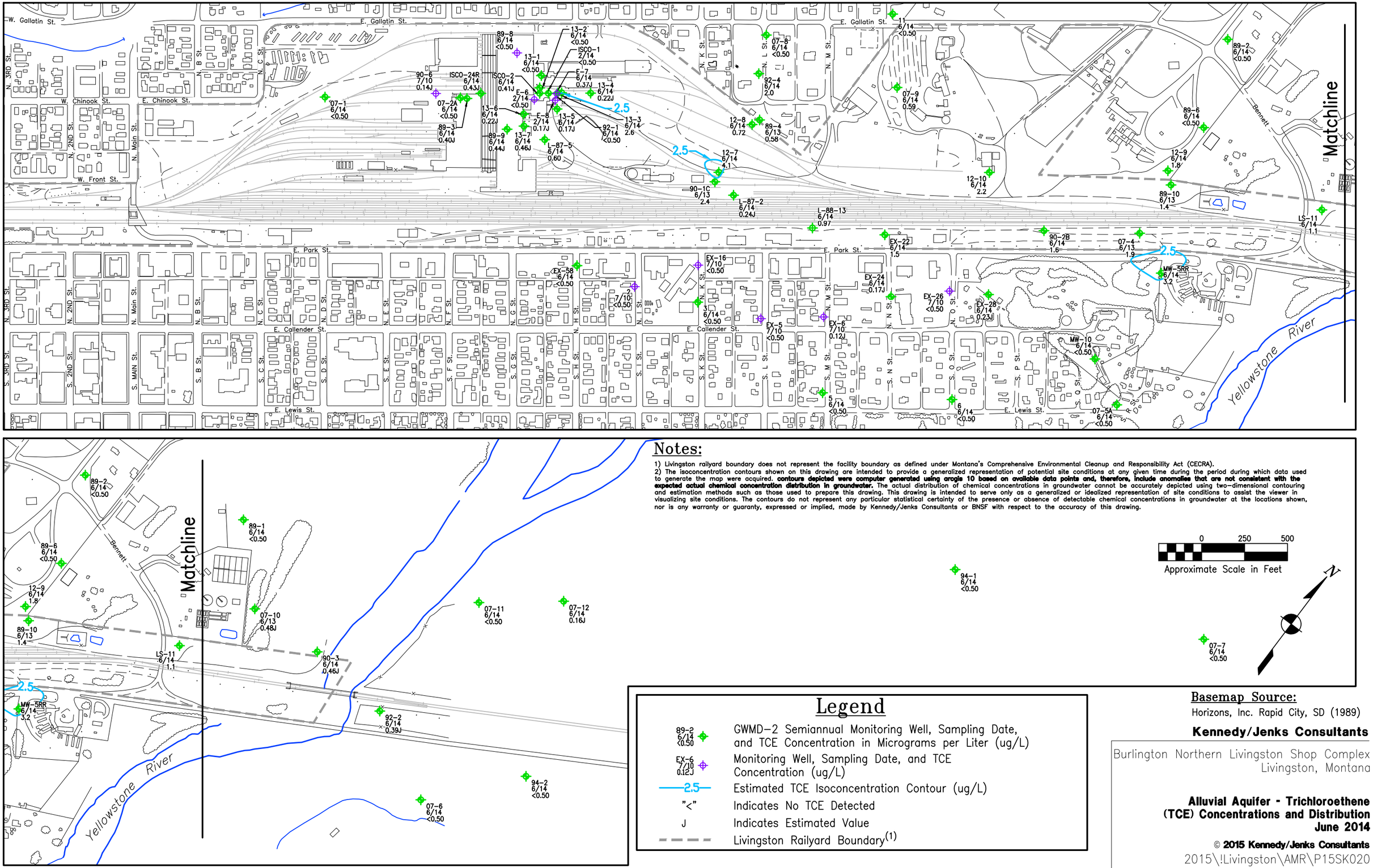
Figure 19



Notes:

1) Livingston railyard boundary does not represent the facility boundary as defined under Montana's Comprehensive Environmental Cleanup and Responsibility Act (CECRA).
2) The isoconcentration contours shown on this drawing are intended to provide a generalized representation of potential site conditions at any given time during the period during which data used to generate the map were acquired. **contours depicted were computer generated using arcgis 10 based on available data points and, therefore, include anomalies that are not consistent with the expected actual chemical concentration distribution in groundwater.** The actual distribution of chemical concentrations in groundwater cannot be accurately depicted using two-dimensional contouring and estimation methods such as those used to prepare this drawing. This drawing is intended to serve only as a generalized or idealized representation of site conditions to assist the viewer in visualizing site conditions. The contours do not represent any particular statistical certainty of the presence or absence of detectable chemical concentrations in groundwater at the locations shown, nor is any warranty or guaranty, expressed or implied, made by Kennedy/Jenks Consultants or BNSF with respect to the accuracy of this drawing.

Legend

89-2 6/14 <0.50	GWMD-2 Semiannual Monitoring Well, Sampling Date, and TCE Concentration in Micrograms per Liter (ug/L)
EX-6 7/10 0.12J	Monitoring Well, Sampling Date, and TCE Concentration (ug/L)
2.5	Estimated TCE Isoconcentration Contour (ug/L)
"<"	Indicates No TCE Detected
J	Indicates Estimated Value
	Livingston Railyard Boundary(1)

Basemap Source:
Horizons, Inc. Rapid City, SD (1989)

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Burlington Northern Livingston Shop Complex
Livingston, Montana

Alluvial Aquifer - Trichloroethene (TCE) Concentrations and Distribution
June 2014

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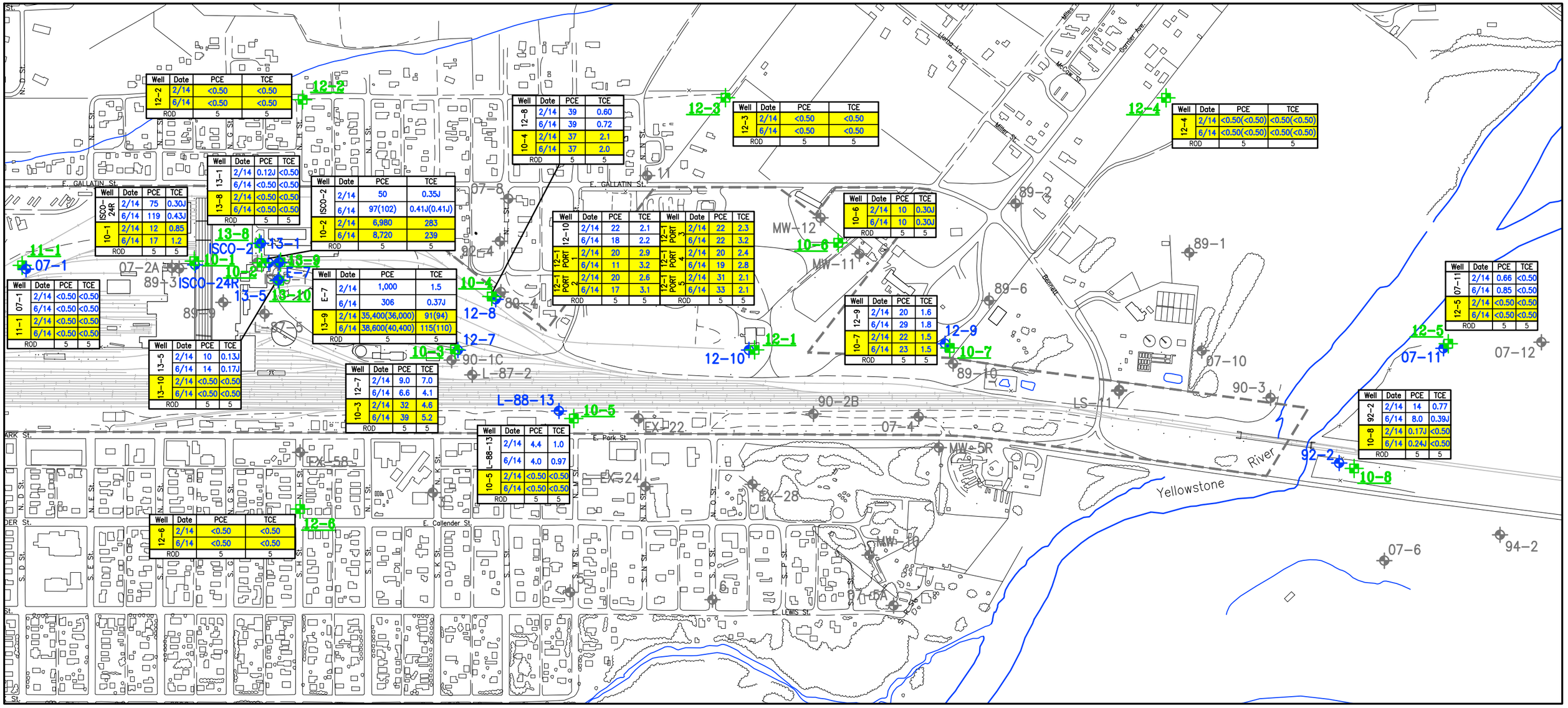
Figure 20



Well	Date	PCE	TCE
12-2	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
ROD		5	5

Well	Date	PCE	TCE
12-8	2/14	39	0.60
	6/14	39	0.72
10-4	2/14	37	2.1
	6/14	37	2.0
ROD		5	5

Well	Date	PCE	TCE
12-3	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
ROD		5	5

Well	Date	PCE	TCE
12-4	2/14	<0.50(<0.50)	<0.50(<0.50)
	6/14	<0.50(<0.50)	<0.50(<0.50)
ROD		5	5

Well	Date	PCE	TCE
13-1	2/14	0.12J	<0.50
	6/14	<0.50	<0.50
13-8	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
ROD		5	5

Well	Date	PCE	TCE
ISCO-24R	2/14	75	0.30J
	6/14	119	0.43J
10-1	2/14	12	0.85
	6/14	17	1.2
ROD		5	5

Well	Date	PCE	TCE
ISCO-2	2/14	50	0.35J
	6/14	97(102)	0.41J(0.41J)
10-2	2/14	6,980	283
	6/14	8,720	239
ROD		5	5

Well	Date	PCE	TCE
12-10	2/14	22	2.1
	6/14	18	2.2
12-1 PORT 1	2/14	20	2.9
	6/14	11	3.2
12-1 PORT 2	2/14	20	2.6
	6/14	17	3.1
ROD		5	5

Well	Date	PCE	TCE
12-1 PORT 3	2/14	22	2.3
	6/14	22	3.2
12-1 PORT 4	2/14	20	2.4
	6/14	19	2.8
12-1 PORT 5	2/14	31	2.1
	6/14	33	2.1
ROD		5	5

Well	Date	PCE	TCE
10-6	2/14	10	0.30J
	6/14	10	0.30J
ROD		5	5

Well	Date	PCE	TCE
07-1	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
11-1	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
ROD		5	5

Well	Date	PCE	TCE
E-7	2/14	1,000	1.5
	6/14	306	0.37J
13-9	2/14	35,400(36,000)	91(94)
	6/14	38,600(40,400)	115(110)
ROD		5	5

Well	Date	PCE	TCE
12-9	2/14	20	1.6
	6/14	29	1.8
10-7	2/14	22	1.5
	6/14	23	1.5
ROD		5	5

Well	Date	PCE	TCE
07-1	2/14	0.66	<0.50
	6/14	0.85	<0.50
12-5	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
ROD		5	5

Well	Date	PCE	TCE
13-5	2/14	10	0.13J
	6/14	14	0.17J
13-10	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
ROD		5	5

Well	Date	PCE	TCE
12-7	2/14	9.0	7.0
	6/14	6.6	4.1
10-3	2/14	32	4.6
	6/14	39	5.2
ROD		5	5

Well	Date	PCE	TCE
L-88-13	2/14	4.4	1.0
	6/14	4.0	0.97
10-5	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
ROD		5	5

Well	Date	PCE	TCE
92-2	2/14	14	0.77
	6/14	8.0	0.39J
10-8	2/14	0.17J	<0.50
	6/14	0.24J	<0.50
ROD		5	5

Well	Date	PCE	TCE
12-6	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
ROD		5	5

Legend

Well	Date	PCE	TCE
12-7	2/14	9.0	7.0
	6/14	6.6	4.1
10-3	2/14	32	4.6
	6/14	39	5.2
ROD		5	5

Well Designation with PCE and TCE (ug/L) for Specified GWMD-2 Semiannual Events

Montana Department of Environmental Quality (DEQ) Record of Decision (ROD) Cleanup Levels are shown Separately Below Results.

PCE Tetrachloroethene

TCE Trichloroethene

J Indicates Estimated Value

10-5 Bedrock Monitoring Well Location

L-88-13 Alluvial Aquifer Monitoring Well Location

L-87-2 Alluvial Aquifer Monitoring Well Location (Not Sampled)

Livingston Railyard Boundary (1)

Notes:

1) Livingston railyard boundary does not represent the facility boundary as defined under Montana's Comprehensive Environmental Cleanup and Responsibility Act (CECRA).

2) Field duplicate sample results are shown in parenthesis.

N

0 250 500

Approximate Scale in Feet

Basemap Source:

Horizons, Inc. Rapid City, SD (1989)

Kennedy/Jenks Consultants

Burlington Northern Livingston Shop Complex
Livingston, Montana

Alluvial Aquifer/Bedrock Groundwater Analytical Results GWMD-2 Semiannual Events

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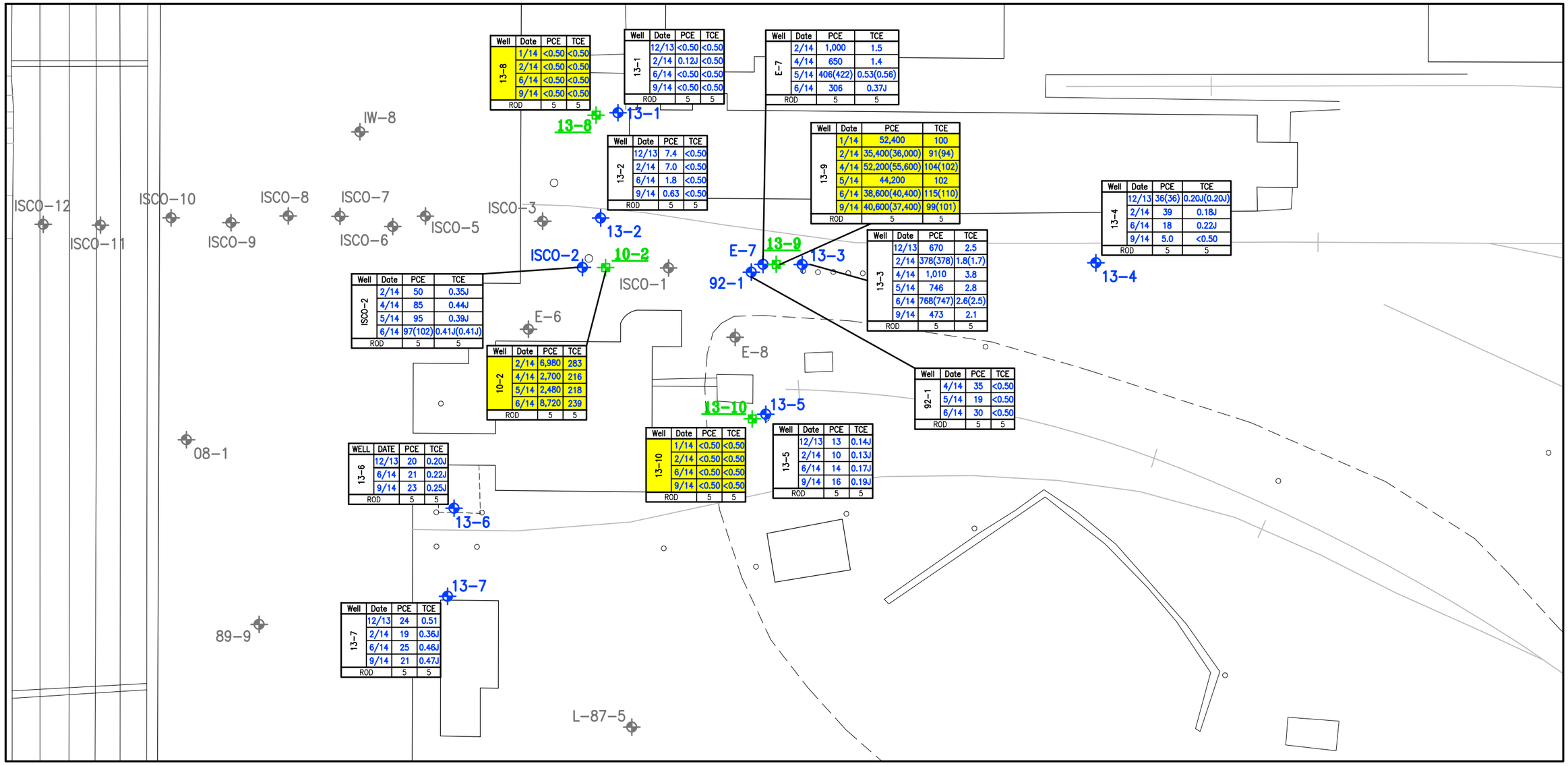
Figure 21



Well	Date	PCE	TCE
13-8	1/14	<0.50	<0.50
	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
	9/14	<0.50	<0.50
ROD		5	5

Well	Date	PCE	TCE
13-1	12/13	<0.50	<0.50
	2/14	0.12J	<0.50
	6/14	<0.50	<0.50
	9/14	<0.50	<0.50
ROD		5	5

Well	Date	PCE	TCE
E-7	2/14	1,000	1.5
	4/14	650	1.4
	5/14	406(422)	0.53(0.56)
	6/14	306	0.37J
ROD		5	5

Well	Date	PCE	TCE
13-2	12/13	7.4	<0.50
	2/14	7.0	<0.50
	6/14	1.8	<0.50
	9/14	0.63	<0.50
ROD		5	5

Well	Date	PCE	TCE
13-9	1/14	52,400	100
	2/14	35,400(36,000)	91(94)
	4/14	52,200(55,600)	104(102)
	5/14	44,200	102
	6/14	38,600(40,400)	115(110)
	9/14	40,600(37,400)	99(101)
ROD		5	5

Well	Date	PCE	TCE
13-4	12/13	36(36)	0.20J(0.20J)
	2/14	39	0.18J
	6/14	18	0.22J
	9/14	5.0	<0.50
ROD		5	5

Well	Date	PCE	TCE
13-3	12/13	670	2.5
	2/14	378(378)	1.8(1.7)
	4/14	1,010	3.8
	5/14	746	2.8
	6/14	768(747)	2.6(2.5)
	9/14	473	2.1
ROD		5	5

Well	Date	PCE	TCE
ISCO-2	2/14	50	0.35J
	4/14	85	0.44J
	5/14	95	0.39J
	6/14	97(102)	0.41J(0.41J)
ROD		5	5

Well	Date	PCE	TCE
10-2	2/14	6,980	283
	4/14	2,700	216
	5/14	2,480	218
	6/14	8,720	239
ROD		5	5

Well	Date	PCE	TCE
92-1	4/14	35	<0.50
	5/14	19	<0.50
	6/14	30	<0.50
ROD		5	5

WELL	DATE	PCE	TCE
13-6	12/13	20	0.20J
	6/14	21	0.22J
	9/14	23	0.25J
ROD		5	5

Well	Date	PCE	TCE
13-10	1/14	<0.50	<0.50
	2/14	<0.50	<0.50
	6/14	<0.50	<0.50
	9/14	<0.50	<0.50
ROD		5	5

Well	Date	PCE	TCE
13-5	12/13	13	0.14J
	2/14	10	0.13J
	6/14	14	0.17J
	9/14	16	0.19J
ROD		5	5

Well	Date	PCE	TCE
13-7	12/13	24	0.51
	2/14	19	0.36J
	6/14	25	0.46J
	9/14	21	0.47J
ROD		5	5

Legend

WELL	DATE	PCE	TCE
13-8	1/14	<0.50	<0.50
ROD		5	5

Well Designation with PCE and TCE (ug/L) for Specified GWMD-2 Quarterly Events
Montana Department of Environmental Quality (DEQ) Record of Decision (ROD) Cleanup Levels are shown Separately Below Results.

PCE Tetrachloroethene
TCE Trichloroethene
J Indicates Estimated Value

13-8 Bedrock Monitoring Well Location
13-1 Alluvial Aquifer Monitoring Well Location
89-9 Alluvial Aquifer Monitoring Well Location (Not Sampled)
Livingston Railyard Boundary

Notes:

1) Livingston railyard boundary does not represent the facility boundary as defined under Montana's Comprehensive Environmental Cleanup and Responsibility Act (CECRA).

2) Field duplicate sample results are shown in parenthesis.

3) Includes Task L supplemental analytical results for sampling conducted in April and May 2014.

N

0 30 60
Approximate Scale in Feet

Basemap Source:
Horizons, Inc. Rapid City, SD (1989)

Kennedy/Jenks Consultants

Burlington Northern Livingston Shop Complex
Livingston, Montana

Alluvial Aquifer/Bedrock Groundwater Analytical Results GWMD-2 Quarterly Events

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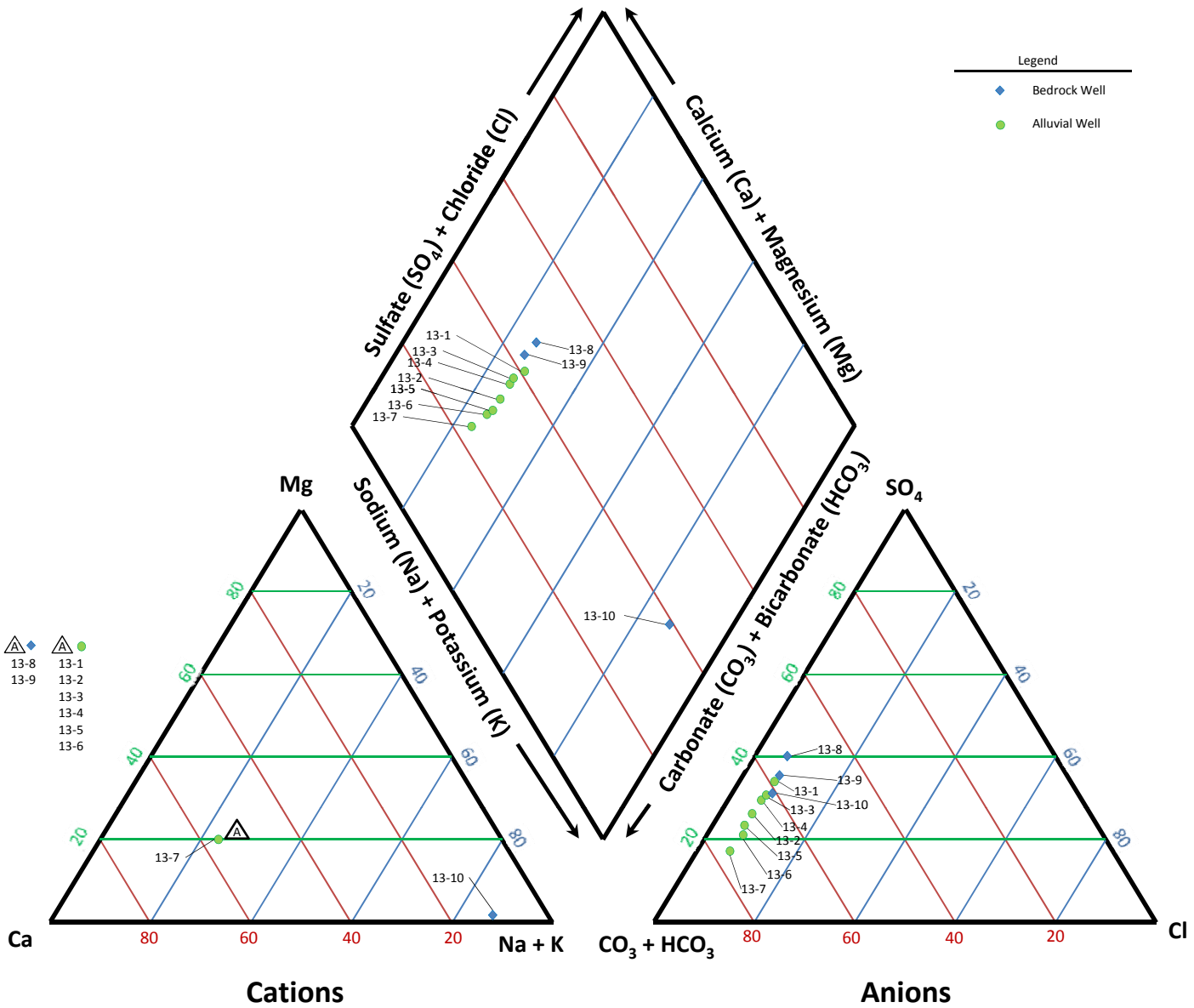
Figure 22



Paired Wells

Bedrock Well	*Alluvial Well*
13-8	13-1
--	13-2
13-9	13-3
--	13-4
13-10	13-5
--	13-6
--	13-7

Notes:

Units are percent milliequivalents per liter.

Data based on groundwater samples collected on 18-19 December 2013 from alluvial wells, and on 17 January 2014 from bedrock wells.

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Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Groundwater Geochemistry GWMD-2 (December 2013/January 2014)

K/J 1596021*16

March 2015

Figure 23

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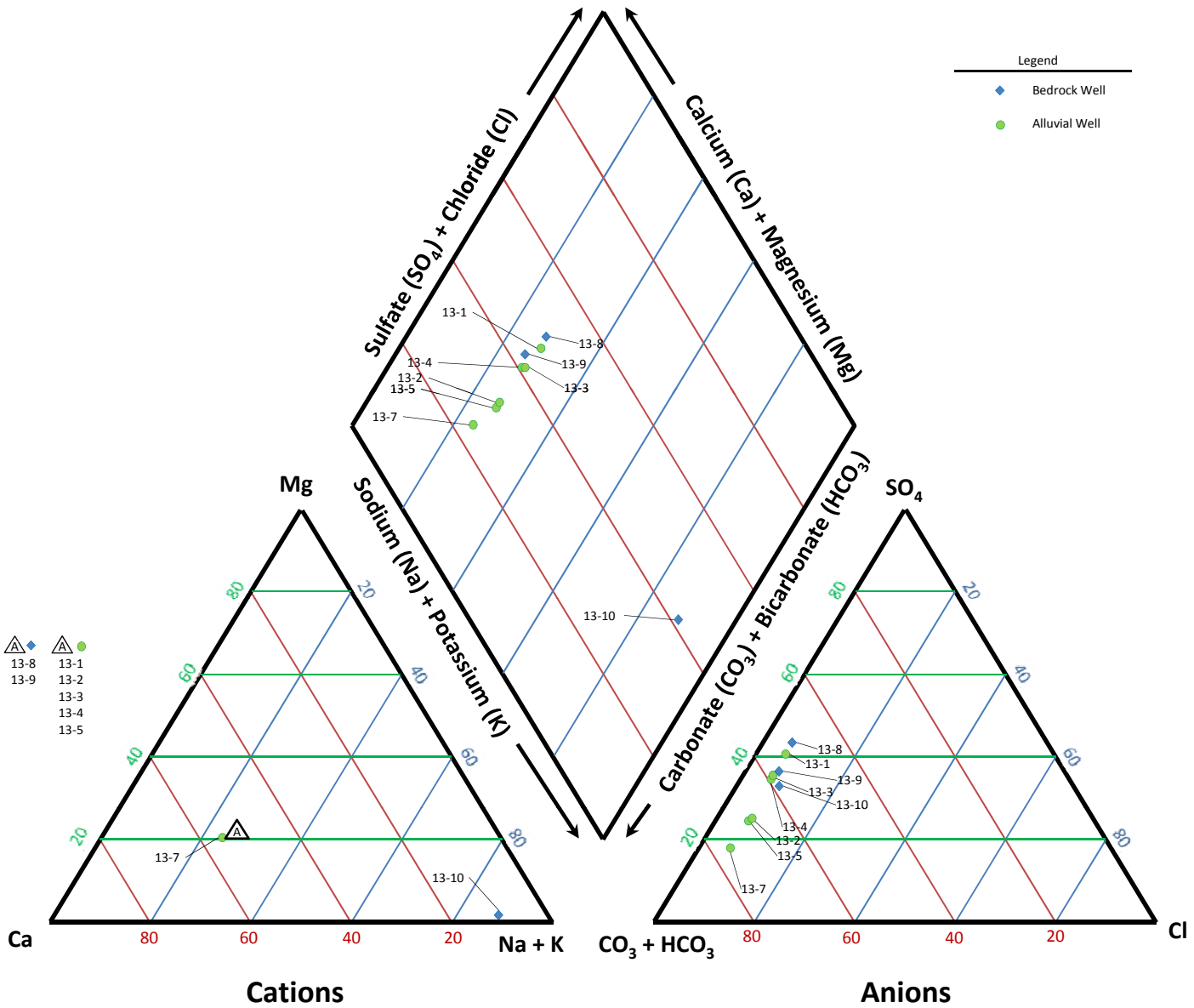

Paired Wells

Bedrock Well	*Alluvial Well*
13-8	13-1
--	13-2
13-9	13-3
--	13-4
13-10	13-5
--	13-6
--	13-7

Notes:

Units are percent milliequivalents per liter.

Data based on groundwater samples collected on 26-28 February 2014.

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Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Groundwater Geochemistry GWMD-2 (February 2014)

K/J 1596021*16

March 2015

Figure 24

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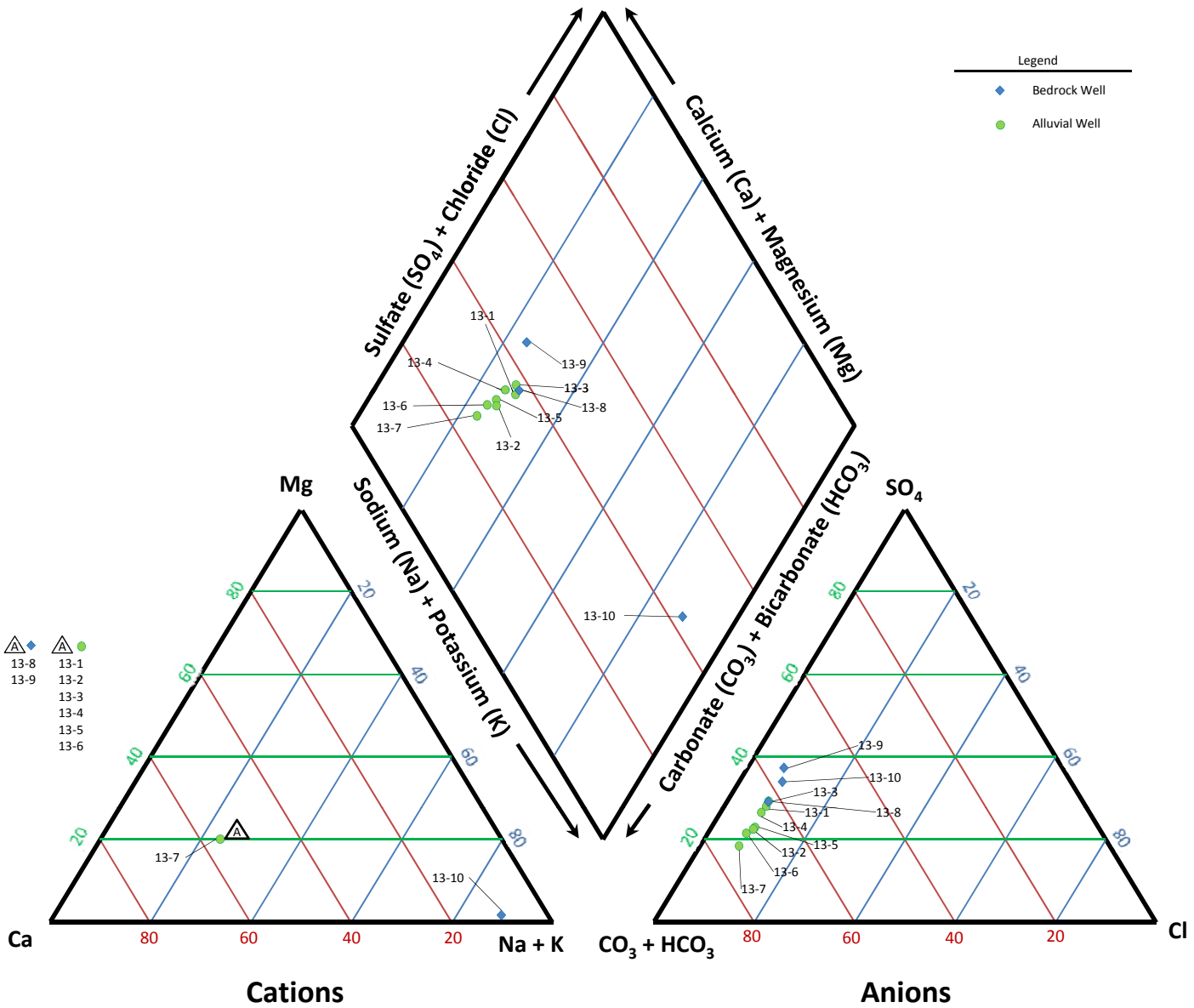

Paired Wells

Bedrock Well	*Alluvial Well*
13-8	13-1
--	13-2
13-9	13-3
--	13-4
13-10	13-5
--	13-6
--	13-7

Notes:

Units are percent milliequivalents per liter.

Data based on groundwater samples collected on 9-10 June 2014.

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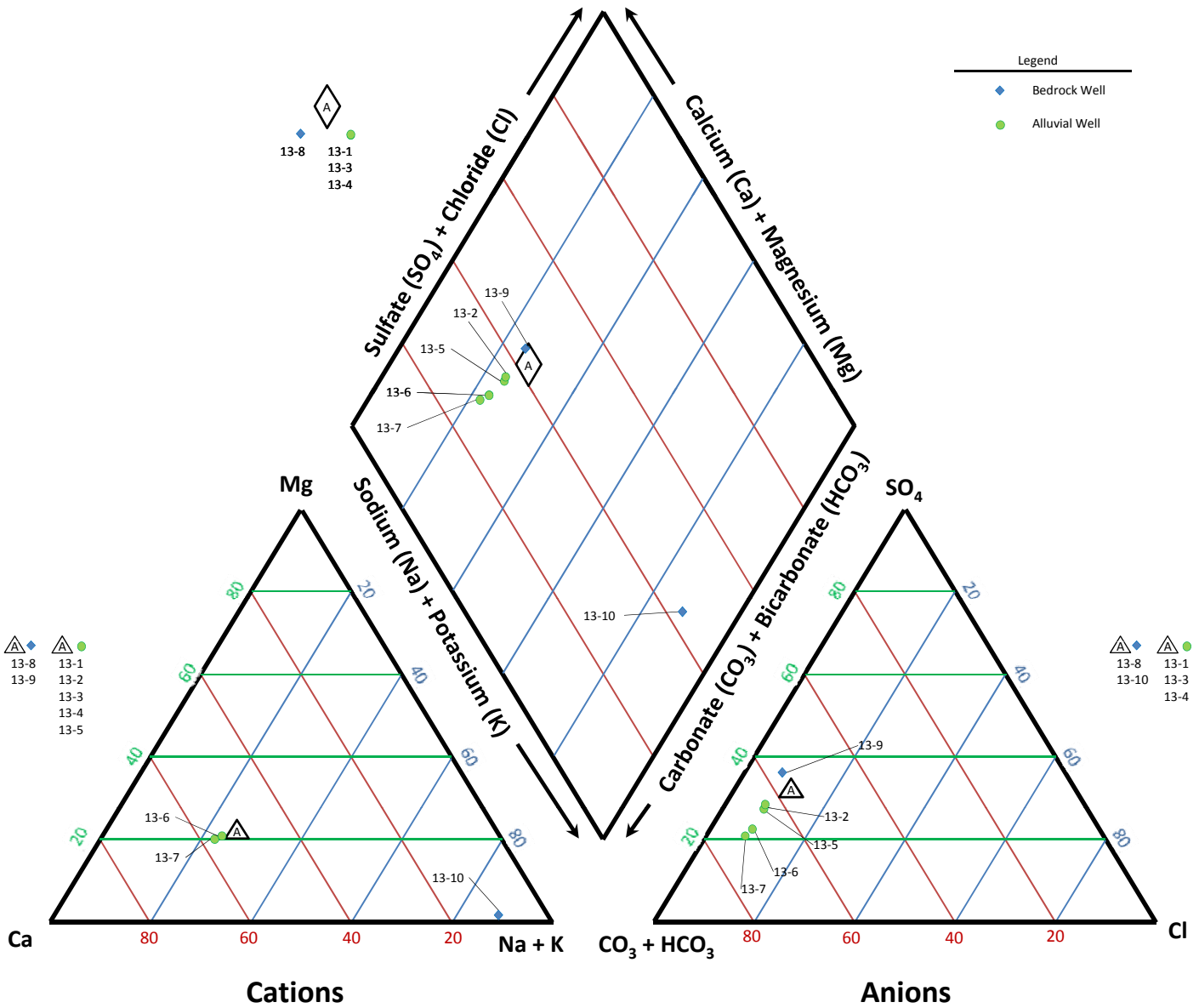
Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Groundwater Geochemistry GWMD-2 (June 2014)

K/J 1596021*16

March 2015

Figure 25



Paired Wells

Bedrock Well	*Alluvial Well*
13-8	13-1
--	13-2
13-9	13-3
--	13-4
13-10	13-5
--	13-6
--	13-7

Notes:

Units are percent milliequivalents per liter.

Data based on groundwater samples collected on 15-18 September 2014.

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Burlington Northern Livingston Shop Complex - Livingston, Montana

Bedrock and Alluvial Aquifer Groundwater Geochemistry GWMD-2 (September 2014)

K/J 1596021*16

March 2015

Figure 26

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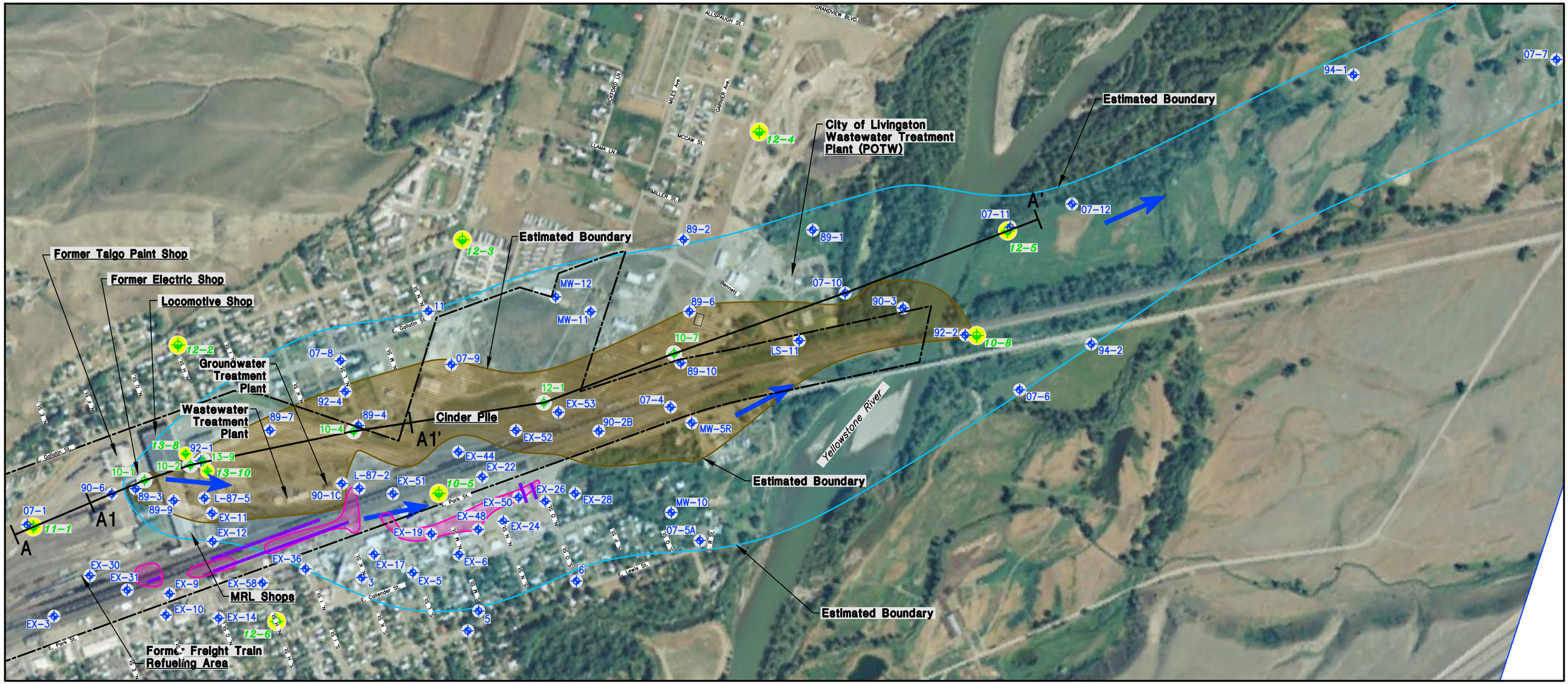

Legend

- Dissolved Tetrachloroethene (PCE) Concentration Above 5 ug/L in Alluvial Aquifer Groundwater – June 2014
- Dissolved PCE Concentration Above the DEQ-7 Standard Required Method Reporting Limit (0.5 ug/L) as Interpreted by DEQ
- DRAINABLE DIESEL FUEL LNAPL AS INTERPRETED BY DEQ
- 10-8 Bedrock Well with Dissolved PCE Concentration Below DEQ-7 Standard Required Method Reporting of 0.5 ug/L
- 10-4 Bedrock Well
- 07-11 Alluvial Aquifer Well
- Lnapl Recovery Well Field
- Generalized Direction of Alluvial Aquifer Groundwater Flow (Varies Seasonally)
- Livingston Railyard Boundary(1)
- A A' Approximate Cross Section Location

Note:

1) Livingston railyard boundary does not represent the facility boundary as defined under Montana's Comprehensive Environmental Cleanup and Responsibility Act (CECRA).

N

0 250 500

Approximate Scale in Feet

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Burlington Northern Livingston Shop Complex
Livingston, Montana

Conceptual Site Model
Plan View

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2015\!Livingston\AMR\P15SK027

March 2015

Figure 27

A1 See Figure 32 A1'

A A'

Former degreaser pit

Electric Shop

Locomotive Shop

Former PCE release pathway (typical)

Potential former PCE release pathway (typical)

Capped cinder pile (former sludge disposal area)

Industrial wastewater line

Approximate BNSF Property Line

City of Livingston Waste Water Treatment Tanks

Yellowstone River

11-1 90-6 10-1 10-2 13-9 89-7 10-4 12-1 10-7 07-10 12-5

Elevation (Feet above Mean Sea Level)

4500 4475 4450 4425 4400 4375

Livingston Alluvial Aquifer
(Unconsolidated sand, gravel, and cobble)

Alluvial GW seepage velocity = 10 to 100 ft/day

Av. K = 7.4 e -2

Conforming geologic contacts

K = 1.6 e -2 Av. Dip = 49

K = 5.3 e -6

K = 2.7 e-5 Av. Dip = 45

K = 3.7 e-3 Av. Dip = 49

K = 2.3 e -6

K = 1.2 e -2 Av. Dip = 38

K = 4.4 e -3 Av. Dip = 45

K = 3.6 e -3 Av. Dip = 46

K = 2.3 e -3 Av. Dip = 39

K = 3.9 e -2 Av. Dip = 35

K = 4.5 e -2

K = 2.1 e -4 Av. Dip = 23

Sulfur Flats Sandstone
Member of Miner Creek Fm
Ridge-forming sandstone

Cokedale Formation
Gradationally alternating siltstone (~50%), sandstone (35%), and mudstone (15%)
Observed fracture apertures predominately less than 1.25 millimeters

Miner Creek Formation
Alternating beds of siltstone (~80%) and sandstone(~20%)

Legend

- Quaternary Yellowstone River Alluvium USCS = GW, SW/GW, SW, GP, SP
- Upper Cretaceous Miner Creek Formation
- Upper Cretaceous Sulphur Flats Member of the Miner Creek Formation
- Upper Cretaceous Cokedale Formation
- Bedrock water table (12/2012)
- Monitoring well casing (dashed line if projected onto cross section line)
- Well screen interval where: PCE conc. = Not detected
- Well screen interval where: PCE conc. < 50 ug/L
- Well screen interval where: PCE conc. > 1,000 ug/L

Notes:
1. Conceptualization is in general conformance with Geological Survey Professional Paper 525-C.
2. Estimated hydraulic conductivity (K) in cm/sec, bedrock K values from slug tests, alluvial aquifer K value is average of multiple pumping tests (Todd Engineers, 2007).
3. Surficial features to horizontal scale, not vertical.
4. Av. dip calculated as average dip (from horizontal) of borehole features with measurable aperture.

All locations approximate. Lithological contacts and general bedding plane dip orientation presented as inferred dip normal to strike orientation. Inferred dip of 40 degrees taken from historical documents/maps, geophysical reports, and/or field observations.

Vertical Scale: Feet 0 25

Vertical Exaggeration = 25 X

Horizontal Scale: Feet 0 350 700

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Burlington Northern Livingston Shop Complex
Livingston, Montana

Interpretive Conceptual Site Model Profile A-A'

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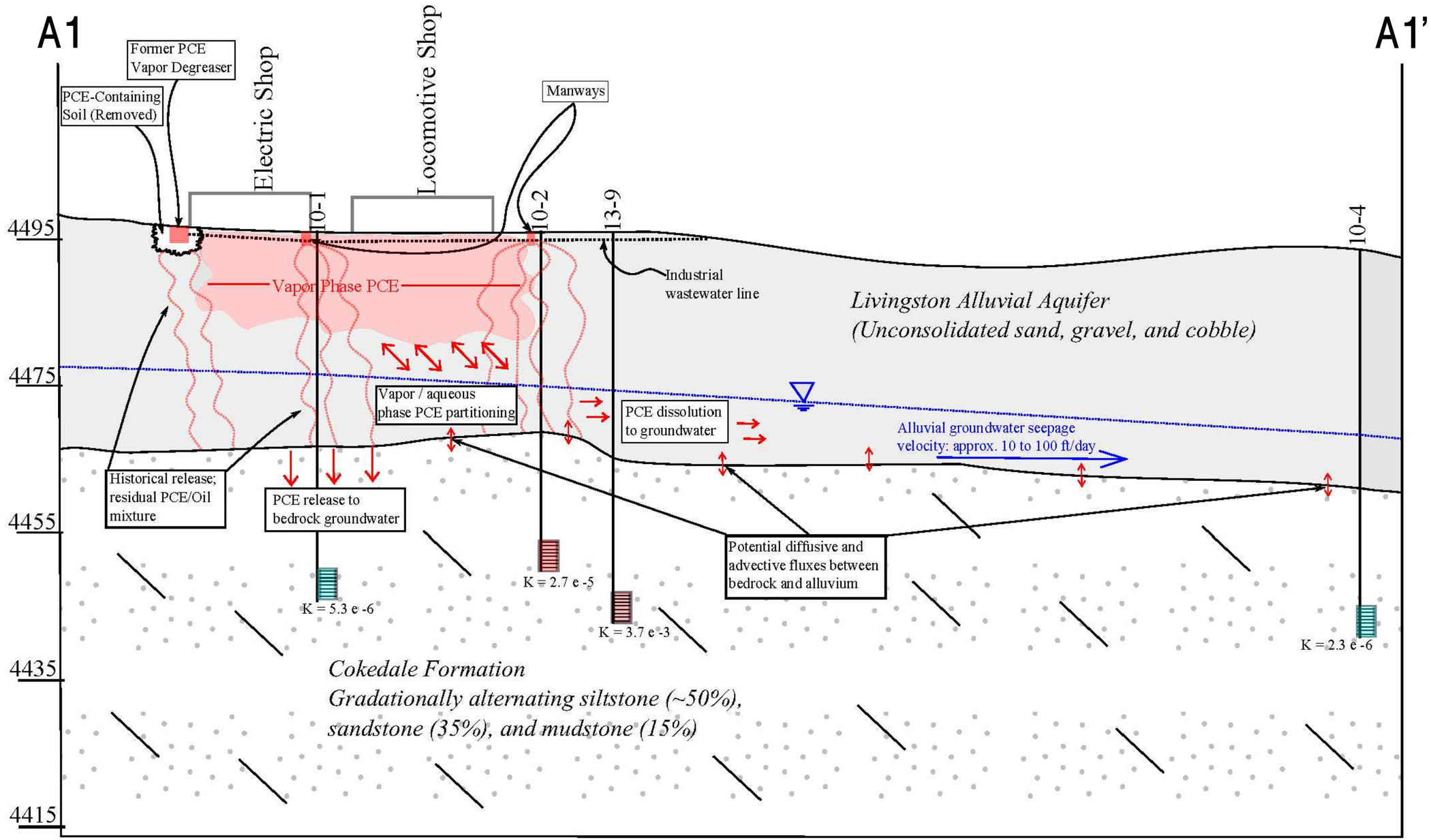
Figure 28



Legend

- Quaternary Yellowstone River Alluvium USCS = GW, SW/GW, SW, GP, SP
- Upper Cretaceous Miner Creek Formation
- Upper Cretaceous Sulphur Flats Member of the Miner Creek Formation
- Upper Cretaceous Cokedale Formation
- Bedrock water table (12/2012)
- Monitoring well casing (dashed line if projected onto cross section line)
- Well screen interval where: PCE conc. = Not detected
- Well screen interval where: PCE conc. < 50 ug/L
- Well screen interval where: PCE conc. >1,000 ug/L

Notes:
1. Conceptualization is in general conformance with Geological Survey Professional Paper 525-C.
2. Estimated hydraulic conductivity (K) in cm/sec, bedrock K values from slug tests, alluvial aquifer K value is average of multiple pumping tests (Todd Engineers, 2007).
3. Surficial features to horizontal scale, not vertical.
4. Av. dip calculated as average dip (from horizontal) of borehole features with measurable aperture.

All locations approximate. Lithological contacts and general bedding plane dip orientation presented as inferred dip normal to strike orientation. Inferred dip of 40 degrees taken from historical documents/maps, geophysical reports, and/or field observations.

Vertical Scale: Feet (0, 10, 20)

Vertical Exaggeration = 10 X

Horizontal Scale: Feet (0, 100, 200)

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Burlington Northern Livingston Shop Complex
Livingston, Montana

Interpretive Conceptual Site Model
Profile A1-A1'

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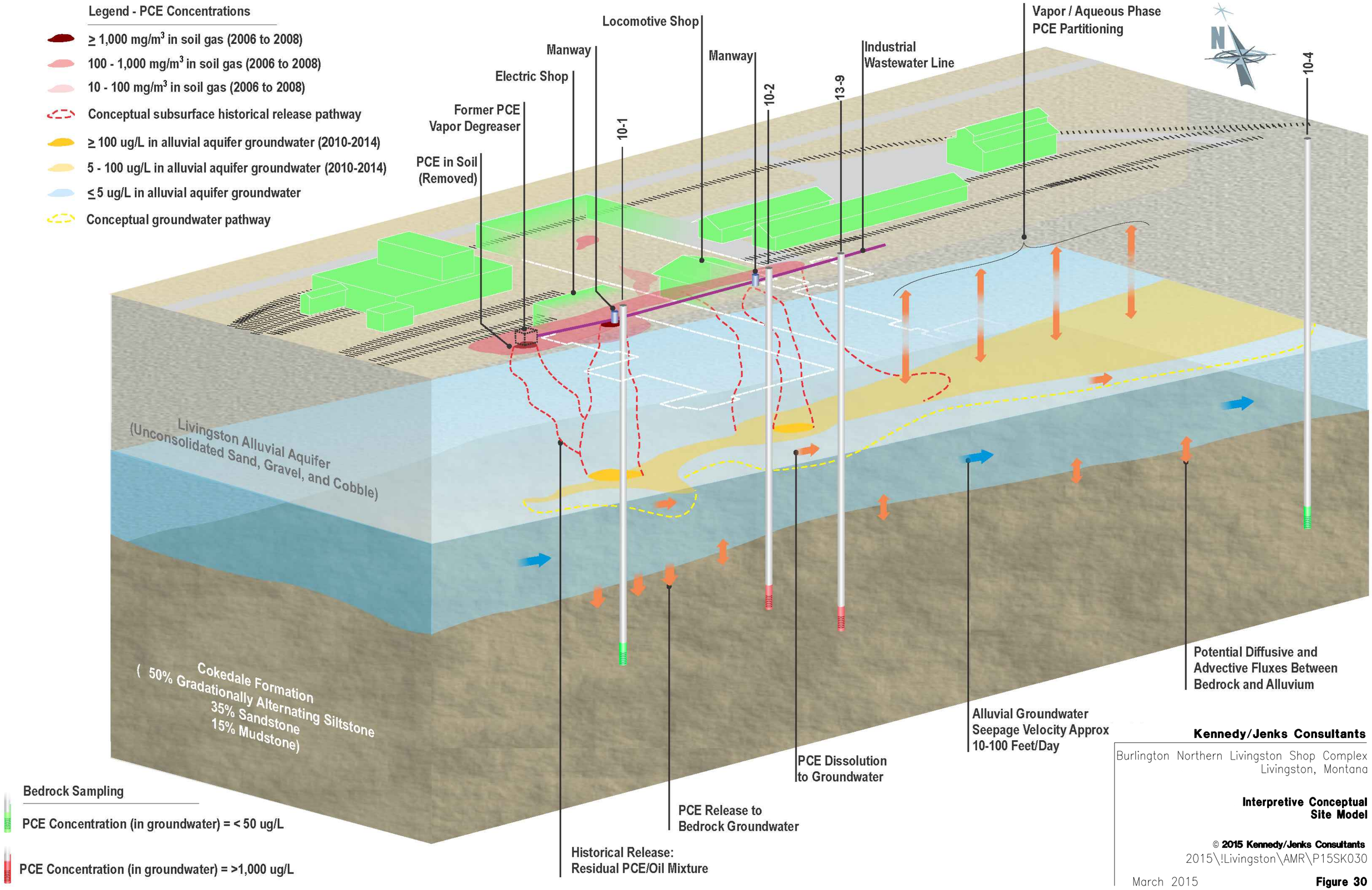
March 2015

Figure 29



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Burlington Northern Livingston Shop Complex
Livingston, Montana

Interpretive Conceptual Site Model

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Figure 30

Appendix A

Cinder Pile Inspection Forms

CINDER PILE INSPECTION – 6 June 2014
Burlington Northern Livingston Shop Complex

PERIMETER FENCE INSPECTION

Walk entire perimeter of fence line, and indicated gaps, damage, loose tension, or poor condition by perimeter location.

Wooden Braces and Corner Posts:

Wooden braces and corner posts appeared intact and in good condition.

Barb Wire "Fabric":

Barbed wire fence appeared in good condition.

Warning Signs along fence (place ~ every 350 feet):

All signs intact and in good condition.

Gate Condition and Security:

Both gates appeared intact, secured, and in good condition.

Signs of Intrusion:

There were no signs of intrusion.

VEGETATIVE COVER INSPECTION

Walk the surface of the Cinder Pile along at least three transects and walk the perimeter paying attention to the following:

Vegetative Bare Spots:

The Park County Weed Inspector (Mr. Clay Williams) said the pile cover surface was "completely vegetated and coverage was excellent".

A small strip or bare ground was observed along the southern fence where MRL personnel applied bare ground treatments that encroach within the fenced area. Mr. Williams recommended broadcasting crested wheatgrass in this area next spring to help re-establish vegetation.

Weed Infestation:

Mr. Clay Williams took no exceptions to the plants that were present on the cinder pile. No listed noxious weeds were found.

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CINDER PILE INSPECTION – 6 June 2014
Burlington Northern Livingston Shop Complex

EROSION INSPECTION

This inspection can be part of the two inspections listed above. Describe location and severity of any cap damage.

Surface depressions that could accumulate water:

None observed.

Excessive Erosion:

Rills and gullies > 2 inches of penetration (include location and degree, i.e., penetration depth):

None observed.

Sloughing slopes:

None observed.

Undermined plant roots:

None observed.

PHOTOGRAPH LOG

Photo Number	Photo Direction	General Location	Comments
1	E	West slope	Shows gate
2	ESE	South slope	
3	E	Top of cap	
4	ENE	North slope	
5	E	Power pole within cap	
6	NE	Northeastern corner	
7	SE	Southeastern corner	
8	W	South slope	
9	W	Top of cap	

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CINDER PILE INSPECTION – 6 June 2014
Burlington Northern Livingston Shop Complex

GENERAL COMMENTS (together with any resolutions):

The cinder pile was walked with Mr. Clay Williams (County Weed Inspector) and Mr. Bob Alexander (CDM Smith).

Mr. Williams recommended the cinder pile be mowed this year.
At the time of this inspection, it is anticipated that the cinder pile will be mowed the week of 9 June 2014.

INSPECTED BY:

Ron L Burke

Ron Burke (on behalf of BNSF)

INSPECTION DATE:

6 June 2014

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CINDER PILE INSPECTION – 6 June 2014
Burlington Northern Livingston Shop Complex

Photo 1: View east. West slope.

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CINDER PILE INSPECTION – 6 June 2014
Burlington Northern Livingston Shop Complex

Photo 2: View east-southeast. South slope.

Photo 3: View east. Top of cap.

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CINDER PILE INSPECTION – 6 June 2014
Burlington Northern Livingston Shop Complex

Photo 4: View east-northeast. North slope.

Photo 5: View east. Power pole within cap.

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CINDER PILE INSPECTION – 6 June 2014
Burlington Northern Livingston Shop Complex

Photo 6: View northeast toward northeastern corner.

Photo 7: View southeast toward southeastern corner.

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CINDER PILE INSPECTION – 6 June 2014
Burlington Northern Livingston Shop Complex

Photo 8: View west. South slope.

Photo 9: View west. Top of cap.

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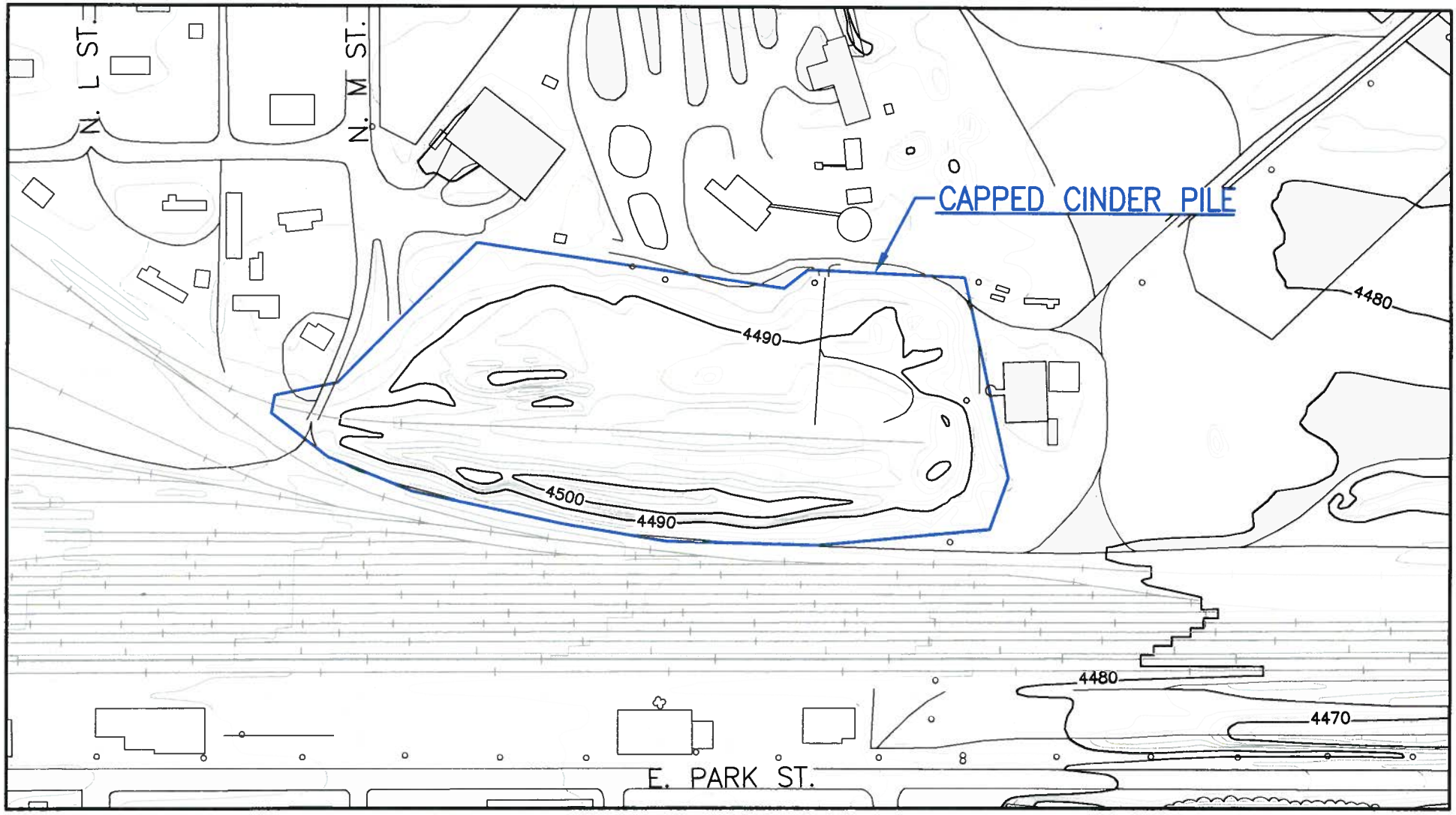

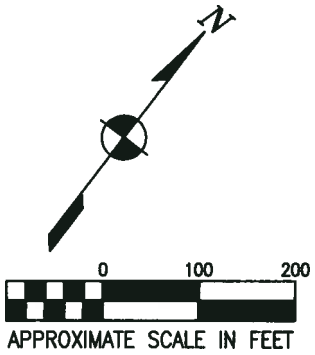

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BURLINGTON NORTHERN LIVINGSTON SHOP COMPLEX – LIVINGSTON, MT

CINDER PILE LOCATION

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1196021.16/Task C/P11SK001

8/11

FIGURE 1

CINDER PILE INSPECTION – 6 June 2014
WEED INSPECTION FORM
Burlington Northern Livingston Shop Complex

Date Inspected:

I. OWNERSHIP AND LOCATION:

A. Name: *Burlington Northern Livingston Shop Complex – Cinder Pile*

Address: *208 Miles Lane South, Livingston, Montana 59047*

Phone: *Dave Smith (BNSF Railway Company) (406) 447-2307*

B. Location: Legal Description: *The cinder pile lies in the southeast quarter of Section 12, Township 2 South, Range 10, east of the Montana Principal Meridian.*

C. Map identifying the cinder pile: *See attached.*

II. NOXIOUS WEED DATA

A. Types of Noxious Weeds and Acres of Infestation by Weed Species (use data key at end of form)

LOCATION	WEED SPECIES	ACRES
1. None.		
2. _____		
3. _____		
4. _____		
5. _____		

PLEASE LOCATE THE ABOVE INFESTATIONS ON YOUR MAP BY NUMBER

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CINDER PILE INSPECTION – 6 June 2014
WEED INSPECTION FORM
Burlington Northern Livingston Shop Complex

III. CONTROL ACTIVITIES

A. Chemical Control: Chemical Per Acre Rate

1. _____ _____
2. _____
3. _____

B. Control Methods:

1. Handgun: _____
2. Ground Boom:_____
3. Aerial Application: _____
4. Other: _____

C. Who will conduct the control activity? (applicator):

1. Self: _____
2. Commercial Applicator: _____
3. Other: _____

IV. OTHER PLANS FOR PRESENT AND FUTURE CONTROL: (Time of control, Herbicides used and application rates, monitoring, etc.)

Next annual cinder pile inspection tentatively scheduled for June 2015.

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CINDER PILE INSPECTION – 6 June 2014
WEED INSPECTION FORM
Burlington Northern Livingston Shop Complex

NOXIOUS WEED DATA KEY

1. Leafy Spurge
2. Spotted Knapweed
3. Diffused Knapweed
4. Houndstongue
5. Canada Thistle
6. White Top
7. Dyer's Woad
8. Sulfur Cinquefoil
9. Dalmation Toadflax
10. Field Bindweed
11. Russian Knapweed
12. Ox-eye Daisy
13. Common Tansy
14. Purple Loosestrife
15. St. Johnswort
16. Tamarisk
17. Orange Hawkweed
18. Yellow Starthistle
19. Tansy Ragwort
20. Common Crupina
21. Rush Skeleton Weed
22. Tall Buttercup
23. Meadow Hawkweed
24. Mullein

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Appendix B

Domestic Water Sampling Records and Groundwater Purge and Sample Forms

Task F Stage I-Part 1 – June 2014
Private Well Domestic Water Sampling Records

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/9/14 Well Designation: **02S/09E-12R02**

Project Number: **1496021*16**

Physical Property Address: **1104 East Gallatin St.**

Sample Location: Inside **Outside** Other:

Explicit Sample Location: IN BACKYARD SOUTH SIDE of HOUSE

Type of Treatment System (if any): N

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CHRIS LADOSE

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
12R02_060914	3	VOA	Hcl	40 ml	N	524.2 + MTBE	1520

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / .75 **(minutes)**

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

1457 Time	14 1502	1505	1508	1511	1514 1515	1517		
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)	11.50	11.50	11.55	11.55	11.55	11.48		
pH	7.44	7.41	7.41	7.41	7.43	7.42		
Sp. Conductance (uS/cm)	597	597	596	596	596	595		
DO (mg/L)	14.24	13.69	13.33	13.37	13.22	13.18		
ORP (mV)	199.7	197.4	195.6	195.5	196.2	198.2		
Turbidity / Color	0.6 CLEAR	0.88	1.76	1.76	0.24	0.60		
Odor	NONE	NOTICED						

Notes:

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/6/14 Well Designation: **02S/10E-7L01**

Project Number: **1496021*16**

Physical Property Address: **330 North Bennett St.**

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any): NONE

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CHRIS LATOSE

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW		DUPLICATE	D1_060614	0800
Other:			TRIP BLANK	TB1_060614	0800

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7L01_060614	3	VOA	Hcl	40 ml	N	524.2 + MTBE	0855

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / 1 (minutes)

Flow Rate = 5 ~~gal~~ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = 100 (gal)

0830 Time	0835	0838	0841	0844	0847	0850		
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)	13.90	13.29	12.93	12.65	12.35	12.18		
pH	7.21	7.20	7.18	7.17	7.15	7.15		
Sp. Conductance (uS/cm)	759	774	781	789	796	802		
DO (mg/L)	9.29	9.38	9.39	9.70	9.20	9.34		
ORP (mV)	34.1	39.9	42.8	45.7	50.1	52.5		
Turbidity / Color CLEAR	12.44	9.44	8.68	7.98	4.67	4.95		
Odor								

Notes:

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/5/14 Well Designation: **02S/10E-7Q01**

Project Number: **1496021*16**

Physical Property Address: **2 Harris Pl.**

Sample Location: Inside **Outside** Other:

Explicit Sample Location: HOSE BIB AT WELL

Type of Treatment System (if any): NONE

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CHRIS LADOSE

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/5/14 0700	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7Q01_060514	3	VOA	Hcl	40 ml	N	524.2 + MTBE	1415

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 (5) **gallons /** .5 **(minutes)**

Flow Rate = 10 (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = 200 (gal)

1352 Time	1357	1400	1403	1406	1409	1412		
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)	10.91	10.96	10.97	10.98	10.98	10.99		
pH	7.32	7.29	7.26	7.23	7.23	7.20		
Sp. Conductance (uS/cm)	569	568	568	567	567	567		
DO (mg/L)	11.79	10.55	10.03	9.66	9.66	9.48		
ORP (mV)	118.7	124.5	126.5	129.3	130.2	131.6		
Turbidity / Color CLEAR	0.24	0.62	0.18	0.25	0.48	0.26		
Odor	NONE	NOTICED						

Notes:

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/5/14 Well Designation: **02S/10E-18D04**

Project Number: **1496021*16**

Physical Property Address: **110 North O St.**

Sample Location: Inside (Outside) Other:

Explicit Sample Location: STORAGE SHED SOUTHEAST OF HOUSE.

Type of Treatment System (if any): NONE

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CHRIS LAROSE

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/5/14 0700			
Turbidity:	Micro TPW		TRIP BLANK	TBI_060514	0800
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D04_060514	3	VOA	Hcl	40 ml	N	524.2 + MTBE	1040

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 (5) **gallons /** 1 **(minutes)**

Flow Rate = 5 (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = 100 (gal)

1017 Time	1022	1025	1028	1031	1034	1037		
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)	10.16	10.23	10.26	10.26	10.27	10.27		
pH	7.19	7.17	7.16	7.08	7.09	7.09		
Sp. Conductance (uS/cm)	797	805	820	840	871	950		
DO (mg/L)	11.81	11.04	10.78	10.35	10.00	9.61		
ORP (mV)	118.9	115.4	114.6	117.6	115.7	118.9		
Turbidity / Color 1.35	CLEAR	1.16	1.09	0.54	0.84	0.90		
Odor	NONE NOTICED							

Notes:

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/5/14 Well Designation: **02S/10E-7P17**

Project Number: **1496021*16**

Physical Property Address: ~~4 Harris Pl.~~ 5 HARRIS PL,

Sample Location: Inside **Outside** Other:

Explicit Sample Location: HOSE BIB AT WELL PUMP

Type of Treatment System (if any): NONE

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CHRIS LATASE

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/5/14 0700	Type	Sample ID	Time
Turbidity:	Micro TPW				1
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7P17_060514	3	VOA	Hcl	40 ml	N	524.2 + MTBE	1335

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 **gallons /** .25 **(minutes)**

Flow Rate = ~~1.25~~ 20 (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = 400 (gal)

1312 Time	1317	1320	1323	1326	1329	1332		
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)	10.44	10.40	10.43	10.43	10.44	10.44		
pH	7.34	7.27	7.26	7.24	7.21	7.20		
Sp. Conductance (uS/cm)	575	576	577	577	577	577		
DO (mg/L) 12.95	~~7.33~~	11.61	11.22	10.87	10.69	10.39		
ORP (mV)	242.0	240.5	238.4	236.6	236.5	235.4		
Turbidity / Color CLEAR	0.38	0.41	0.54	0.21	0.17	0.10		
Odor	NONE	NOTICED						

Notes:

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/6/14 Well Designation: **02S/10E-18D06**

Project Number: **1496021*16**

Physical Property Address: **115 North K St.**

Sample Location: Inside Outside Other:

Explicit Sample Location: HOSE BIB AT NORTHEAST CORNER OF BLDG.

Type of Treatment System (if any): NONE

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CHRIS LaROSE

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D06_060614	3	VOA	Hcl	40 ml	N	524.2 + MTBE	1050

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 (5) **gallons /** 1 **(minutes)**

Flow Rate = 5 (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = 100 (gal)

1027 Time	1032	1035	1038	1041	1044	1047		
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)	10.93	10.96	10.97	10.99	11.00	11.00		
pH	7.14	7.12	7.12	7.11	7.11	7.11		
Sp. Conductance (uS/cm)	515	528	543	551	556	559		
DO (mg/L)	12.52	12.43	12.29	12.22	11.99	11.84		
ORP (mV)	47.4	48.6	50.8	55.0	59.4	62.8		
Turbidity / Color CLEAR	12.13	9.05	7.83	8.40	5.35			
Odor	NONE	NOTICED						

Notes:

Domestic Water Sampling Record

Kennedy/Jenks Consultants

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/16/14

Well Designation: **02S/10E-18D11**

Project Number: 1496021*16

Physical Property Address: 127 South M St.

Sample Location: Inside Outside Other:

Explicit Sample Location: Bathroom sink

Type of Treatment System (if any): See historical

Location of Sample in Relation to Treatment: Upstream Downstream See historical

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: Ben

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/16/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D11_[illegible]	3	VOA	Hcl	40 ml	N	524.2 + MTBE	12[illegible]

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 - 5 gallons / 1 (minutes)

Flow Rate = 1 (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = 11 (gal)

1232 Time	1237	1240	1243					
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)	10.03	10.41	10.41					
pH	7.28	7.29	7.25					
Sp. Conductance (uS/cm)	566	566	569					
DO (mg/L)	10.06	9.34	9.53					
ORP (mV)	80.6	80.6	83.6					
Turbidity / Color	4.13	4.46	0.89					
Odor	None							

Notes:

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/5/14 Well Designation: 025/09E-12R06

Project Number: **1496021*16**

Physical Property Address: 1221 GALLATIN, LIVINGSTON

Sample Location: Inside (Outside) Other:

Explicit Sample Location: NORTH SIDE OF HOUSE, HOSE BIB

Type of Treatment System (if any): NONE

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CHRIS LaROSE

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/5/14 0700	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
12R06_060514	3	VOA	Hcl	40 ml	N	524.2 + MTBE	1215

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 (5) **gallons /** 1.5 **(minutes)**

Flow Rate = 3.3 (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = 66 (gal)

1150 Time	1155	1158	1201	1204	1207	1210		
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)	12.26	12.17	12.06	12.01	11.99	11.99		
pH	7.50	7.48	7.48	7.47	7.43	7.43		
Sp. Conductance (uS/cm)	556	556	557	557	557	557		
DO (mg/L)	13.00	12.77	12.21	11.64	11.36	11.20		
ORP (mV)	207.8	199.2	195.4	189.9	184.1	179.3		
Turbidity / Color CLEAR	0.48	0.04	0.01	0.00	0.00	0.00		
Odor	NONE NOTICED							

Notes:

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/10/14 Well Designation: **02S/10E-7P10**

Project Number: **1496021*16**

Physical Property Address: **1500 E. Callendar St.**

Sample Location: Inside Outside Other:

Explicit Sample Location: SOUTH SIDE OF PUMP SHED, HOSE BIB W/ BALL VLV

Type of Treatment System (if any): NONE

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CHRIS LADOSE

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/10/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7P10_061014	3	VOA	Hcl	40 ml	N	524.2 + MTBE	1520

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 (5) **gallons /** .5 **(minutes)**

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

1455 Time	1500	1503	1506	1509	1512	1515		
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)	9.63	9.62	9.64	9.64	9.64	9.65		
pH	7.28	7.23	7.20	7.20	7.19	7.18		
Sp. Conductance (uS/cm)	583	583	582	582	583	584		
DO (mg/L)	13.72	12.77	12.45	12.40	12.18	12.01		
ORP (mV)	53.0	56.4	59.2	60.4	62.1	63.2		
Turbidity / Color CLEAR	0.35	0.17	0.10	0.10	0.22	0.18		
Odor	NONE	NOTICED						

Notes:

* SPLIT SAMPLE COLLECTED.

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-5P01**

Project Number: **1496021*16**

Physical Property Address: "NOT SAMPLED - UNABLE TO LOCATE"

Sample Location: Inside Outside Other: _____

Explicit Sample Location: _____

Type of Treatment System (if any): _____

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
5P01_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - " Not sampled, unable to locate."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/6/14 Well Designation: **02S/10E-7L02**

Project Number: **1496021*16**

Physical Property Address: **406 North Bennett St.** "NOT SAMPLED – WELL REPORTEDLY CLOSED"

Sample Location: Inside Outside Other: _____

Explicit Sample Location: _____

Type of Treatment System (if any): _____

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7L02_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 "Not sampled, Inoperative. Well reportedly closed."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/6/14 Well Designation: **02S/10E-7L03**

Project Number: **1496021*16**

Physical Property Address: **330 North Bennett St.** "IRRIGATION WELL OPERATING, BUT UNABLE TO SAMPLE (NO TAP)

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7L03_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / (minutes)

Flow Rate = (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Irrigation well operating but unable to sample (No Tap)".**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-7L07**

Project Number: **1496021*16**

Physical Property Address: "WELL NOT FOUND — INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7L07_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Well not found."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-7L08**

Project Number: **1496021*16**

Physical Property Address: **331 North Bennett St.** "NOT SAMPLED - INOPERATIVE"

Sample Location: Inside Outside Other: _____

Explicit Sample Location: _____

Type of Treatment System (if any): _____

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7L08_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Well not found."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-7M11**

Project Number: **1496021*16**

Physical Property Address: **Gallatin St.** "WELL NOT FOUND — INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7M11_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Well not found."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-7M12**

Project Number: **1496021*16**

Physical Property Address: **Gallatin St.** "NOT SAMPLED – INOPERATIVE"

Sample Location: Inside Outside Other: _____

Explicit Sample Location: _____

Type of Treatment System (if any): _____

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7M12_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Well not found."**

Domestic Water Sampling Record — **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/09E-7N01**

Project Number: **1496021*16**

Physical Property Address: **208 Miles Ln.** "WELL NOT FOUND — INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7N01_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Well not found."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/09E-7N02**

Project Number: **1496021*16**

Physical Property Address: **Gallatin St.** "WELL NOT FOUND – INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7N02_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Well not found."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/5/14 Well Designation: **02S/10E-7P09**

Project Number: **1496021*16**

Physical Property Address: **1 Harris Pl.** "INOPERATIVE" NOT SAMPLED

Sample Location: Inside **Outside** Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7P09_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Inoperative."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/10/14 Well Designation: **02S/10E-7P11**

Project Number: **1496021*16**

Physical Property Address: **1500 E. Callendar St.** "NOT SAMPLED – INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7P11_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Inoperative."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/10/14 Well Designation: **02S/10E-7P12**

Project Number: **1496021*16**

Physical Property Address: **1500 E. Callendar St.** "NOT SAMPLED - UNABLE TO LOCATE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7P12_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Unable to locate."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/10/14 Well Designation: **02S/10E-7P13**

Project Number: **1496021*16**

Physical Property Address: **1500 E. Callendar St.** "NOT SAMPLED – UNABLE TO LOCATE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7P13_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Unable to locate."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/10/14 Well Designation: **02S/10E-7P18**

Project Number: **1496021*16**

Physical Property Address: **1500 E. Callendar St.** "NOT SAMPLED – UNABLE TO LOCATE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7P18_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Unable to locate."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/10/14 Well Designation: **02S/10E-7P19**

Project Number: **1496021*16**

Physical Property Address: **1500 E. Callendar St.** "NOT SAMPLED - UNABLE TO LOCATE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
7P19_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Unable to locate."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/6/14 Well Designation: **02S/10E-8C01**

Project Number: **1496021*16**

Physical Property Address: **2705 US Highway 89 S** "NOT SAMPLED - UNABLE TO LOCATE"

Sample Location: Inside Outside Other: _____

Explicit Sample Location: _____

Type of Treatment System (if any): _____

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
8C01_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Unable to locate."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/14/14 Well Designation: **02S/10E-18C03**

Project Number: **1496021*16**

Physical Property Address: **123 South N St.** "NO SAMPLE - UNABLE TO CONTACT OWNER"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18C03_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes:

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-18C05**

Project Number: **1496021*16**

Physical Property Address: **112 South Q St.** "NOT SAMPLED – INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18C05_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Unable to contact owner."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-18C06**

Project Number: **1496021*16**

Physical Property Address: **1424 E. Callendar St.** "NOT SAMPLED – INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18C06_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Inoperative."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-18C08**

Project Number: **1496021*16**

Physical Property Address: **122 South P St.** "NOT SAMPLED – INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18C08_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / (minutes)

Flow Rate = (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Inoperative."**

Domestic Water Sampling Record **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/16/14 Well Designation: **02S/10E-18D01**

Project Number: **1496021*16**

Physical Property Address: **110 North N St.** "NOT SAMPLED – INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D01_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Inoperative."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/6/14 Well Designation: **02S/10E-18D02**

Project Number: **1496021*16**

Physical Property Address: **110 North N St.** "NOT SAMPLED – INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D02_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Inoperative."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-18D03**

Project Number: **1496021*16**

Physical Property Address: **102 South N St.** "NOT SAMPLED – INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D03_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Inoperative."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-18D05**

Project Number: **1496021*16**

Physical Property Address: **117 South N St.** "NOT SAMPLED - UNABLE TO CONTACT OWNER"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D05_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / (minutes)

Flow Rate = (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Unable to contact owner."**

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/6/14 Well Designation: **02S/10E-18D08**

Project Number: **1496021*16**

Physical Property Address: **115 North K St.** "NOT SAMPLED - INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D08_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes:

Domestic Water Sampling Record | **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-18D10**

Project Number: **1496021*16**

Physical Property Address: **113 South L St.** "NOT SAMPLED – INOPERATIVE"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D10_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Inoperative."**

Domestic Water Sampling Record — **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-18D12**

Project Number: **1496021*16**

Physical Property Address: **117 South N St.** "NOT SAMPLED- UNABLE TO CONTACT OWNER"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D12_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Unable to contact owner."**

Domestic Water Sampling Record **Kennedy/Jenks Consultants**

Project Information: BN Livingston Shop Complex, June 2014 Sampling Event

Date: 6/2/14 Well Designation: **02S/10E-18D13**

Project Number: **1496021*16**

Physical Property Address: **110 North O St.** "NOT SAMPLED - UNABLE TO CONTACT OWNER"

Sample Location: Inside Outside Other:

Explicit Sample Location:

Type of Treatment System (if any):

Location of Sample in Relation to Treatment: Upstream Downstream

Location of Sample in Relation to Pressure Tank: Upstream Downstream

Sampling Personnel: CL

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	Sample Time
	No.	Type	Pres.	Vol.			
18D13_	3	VOA	Hcl	40 ml	N	524.2 + MTBE	

Flow Rate = Container volume (gallons) / time to fill container (minutes)

Flow Rate = 1 5 gallons / _____ (minutes)

Flow Rate = _____ (gpm)

Total Volume Flushed = Elapsed Time (minutes) x Flow Rate (gpm)

Total Volume Flushed = _____ (gal)

Time								
Time Elpased (minutes)	5 min.	8 min.	11 min.	14 min.	17 min.	20 min.	min	min
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity / Color								
Odor								

NOT SAMPLED

Notes: **June 2013 - "Not sampled, Unable to contact owner."**

Task G Natural Source Zone Depletion – February 2014
Groundwater Purge and Sample Forms

2-27-14 NSZD - BY Livingston

- 8-16:30 Dewater wells
- Calibrate 550A - YSI 556
Calibrated 8 AM 2-27-14

YSI 556 + 550
were both placed in tap
water
556 DO 7.67 mg/L
550A 7.26 mg/L
- 550A - ELEV set at
5200 FT

Sampled PMW-3_022714
PMW-5_022714
MW-41_022714
Temp/pH/cond/DO 556/DO 550A
ORP/color/odor sheen

FIELD MEASUREMENT FORM
Burlington Northern Livingston Shop Complex

Groundwater Field Parameters - Operating Wells/GWTP Influent — **Kennedy/Jenks Consultants**

Well	MUW-41		MUW-41		PMW-~~B~~3		PMW-~~B~~3		—	
Sample Time	18:50		—		20:00		—		—	
Measurement Time	18:39	18:42	18:45	18:48	19:52	19:55	19:58	—	—	—
Parameter	3 min	3 min	3 min	3 min	3 min	3 min	3 min	— min	— min	— min
Flow Rate (L/min)	8.9	8.9	8.9	8.9	7.7	7.7	7.7	—	—	—
Volume Purged (Liters)	26.5	26.5	26.5	26.5	23	23	23	—	—	—
Temperature (Celsius)	12.23	12.24	12.24	12.25	11.63	11.63	11.64	—	—	—
pH	7.42	7.35	7.27	7.22	7.45	7.39	7.34	—	—	—
Sp. Conductance (uS/cm)	649	644	644	644	602	601	602	—	—	—
DO (mg/L) [YSI-556]	0.06	0.08	0.04	0.07	0.25	0.26	0.39	—	—	—
DO (mg/L) [YSI-550A]	0.30	0.16	0.11	0.10	0.30	0.33	0.25	—	—	—
ORP (mV)	161.5	133.5	104.8	95.3	-46.3	-55.1	-67.0	—	—	—
Color	Slight yellow to colorless	→		→	colorless	→	→	—	—	—
Odor/Evidence of LNAPL	Odor/no sheen	→		→	~~No odor~~ No odor or sheen	→	→	—	—	—

FIELD MEASUREMENT FORM
Burlington Northern Livingston Shop Complex

Groundwater Field Parameters - Operating Wells/GWTP Influent — **Kennedy/Jenks Consultants**

Well	DMW-5									
Sample Time	19:30									
Measurement Time	19:20	19:23	19:26							
Parameter	3 min	3 min	3 min	min	min	min	min	min	min	min
Flow Rate (L/min) Trial	8.9	8.8	8.8							
Volume Purged (Liters)	26.5	26.5	26.5							
Temperature (Celsius)	11.32	11.31	11.32							
pH	7.60	7.52	7.44							
Sp. Conductance (uS/cm)	589	590	590							
DO (mg/L) [YSI-556]	2.47	2.44	2.42							
DO (mg/L) [YSI-550A]	2.58	2.57	2.57							
ORP (mV)	-75.2	-56.4	-48.0							
Color	Colorless slight yellow	→								
Odor/Evidence of LNAPL	None	→								

Task L Supplemental Sampling
Groundwater Purge and Sample Forms

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 4/23/14
Project Name: BNSF-Livingston
Project Number: 1496021*16
Sampling Personnel: L. DEARS
Water Level Meter: Solinst
Purging Equipment: Ded. Bladder
Sampling Equipment: Ded. Bladder
Sampling Time: 1410
Total Discharge (gal): ~~8.5~~ 9.5 TOTAL (NOTE ①)
Water Disposal: GWTP

Well Number: **92-1**
Monument Type: Stickup: 1.4 (ft PVC) Flush: ____
Well Diameter (in): 2
Well Condition: GOOD/INTACT
Total Casing Depth (ft): 35.2
Screened Interval (ft): 25.2 — 35.2
Purge Depth (ft): 31
Depth to Groundwater (ft): 24.82
Depth to LNAPL (ft): N/A
Water Column (ft): 6.18
Reference: TOC

Weather: COOL, WINDY (20 MPH) 34° OVERNIGHT SNOW ~ 2"

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	4/23/14 / 0830 / 1145			
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
92-1-042814	3	VOA	HCl	40mL	N	VOC's by 8260	

Time	1345	1350	1355	1400	1405 ~~1410~~	1410 ~~1415~~		
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	25 ~~30~~ min	min	min
Flow Rate (L/min)	0.5	0.5	0.5	0.5	0.5	0.5		
Volume Purged (Liters)	0	2.5	5.0	7.5	10.0	12.5	= 3.3 GAL	
Water Depth (ft)	24.92	24.83	24.83	24.82	24.82	24.82		
Temperature (Celsius)	9.34	10.80	11.25	11.20	11.24	11.22		
pH	7.14	7.04	7.05	7.06	7.09	7.10		
Sp. Conductance (uS/cm)	728	757	747	727	722	722		
DO (mg/L)	10.60	9.08	8.44	8.30	8.33	8.36		
ORP (mV)	-102.5	-92.3	-76.3	-66.6	-60.9	-57.6		
Turbidity (NTU)	9.30	8.0	60.56	12.71	11.75	12.10		
Color	Clear	Clear	Clear	Clear	Clear	CLEAR		
Odor/Evidence of LNAPL	None	None	None	None	None	None		

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters NOTE ① INITIALLY PURGED & SAMPLED WELL @ 1055. LEFT CAP ON YSI, PURGED AGAIN @ 1105. YSI GIVING NEGATIVE pH READINGS. RETURN TO SHOP TO RECALIBRATE, CALIBRATION DR. ~~[illegible]~~

3.9 Gal + 2.3 GAL + 3.3 = 9.5 TOTAL PURGE

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 4/28/14 Well Number: **ISCO-2**

Project Name: **BN Livingston Shop Complex** Monument Type: Stickup: _____ (ft PVC) Flush: -0.4

Project Number: **1496021*16** Well Diameter (in): 4

Sampling Personnel: L. DEARS Well Condition: GOOD/INTACT

Water Level Meter: Solinst Total Casing Depth (ft): **31.6** **Reference:**

Purging Equipment: Ded. Bladder Screened Interval (ft): **26.6-31.6**

Sampling Equipment: Ded. Bladder Purge Depth (ft): **29.0** **TOC**

Sampling Time: 1555 Depth to Groundwater (ft): 21.86

Total Discharge (gal): 3.3 Depth to LNAPL (ft): N/A

Water Disposal: GWTP Water Column (ft): 7.14

Weather: OVERCAST, COOL, 39° WIND GUSTS-10 MPH. LT. SNOW/RAIN

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	4/28/14 / 0830 / 1145			
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
~~ISCO-2_Date ie;mmddyy~~	~~3~~	~~VOA~~	~~HCL~~	~~40ml~~	~~N~~	~~VOC 8260~~	
ISCO-2-042814	3	VOA	HCL	40 mL	N	VOC 8260	

Time	1530	1535	1540	1545	1550	1555		
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	25 min	min	min
Flow Rate (L/min)	0.5	0.5	0.5	0.5	0.5	0.5		
Volume Purged (Liters)	0	2.5	5.0	7.5	10.0	12.5		
Water Depth (ft)	21.86	21.86	21.86	21.86	21.86	21.86		
Temperature (Celsius)	10.22	10.43	10.60	10.65	10.63	10.58		
pH	7.52	7.44	7.37	7.33	7.35	7.35		
Sp. Conductance (uS/cm)	643	638	634	634	634	634		
DO (mg/L)	10.87	10.11	9.43	8.95	8.96	8.99		
ORP (mV)	-13.2	-14.0	-15.2	-16.9	-17.1	-17.0		
Turbidity (NTU)	2.05	1.11	0.45	0.75	0.41	0.25		
Color	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR		
Odor/Evidence of LNAPL	NONE	NONE	NONE	NONE	NONE	NONE		

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-2: DTW =

ISCO-1: DTW =

Groundwater Purge and Sample Form (Minimal Drawdown) — **Kennedy/Jenks Consultants**

Date:	4/28/14	Well Number:	**10-2**
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.5
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	L. DEARS	Well Condition:	GOOD / INTACT
Water Level Meter:	Solinst	Total Casing Depth (ft):	49.0
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	44 - 49
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	46.6
Sampling Time:	1635	Depth to Groundwater (ft):	22.38
Total Discharge (gal):	1.7	Depth to LNAPL (ft):	N/A
Water Disposal:	GWTP	Water Column (ft):	24.22

Reference: TOC

Weather: OVERCAST, COOL 40°, LT SNOW

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO	YSI 556	4/28/14 / 0930 / 1145			
Turbidity	Micro TPW				
Other					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
~~10-2_Date ie.mmddyy~~	~~3~~	~~VOA~~	~~HCl~~	~~40ml~~	~~N~~	~~VOC 8260~~	
10-2-042814	3	VOA	HCL	40ml	N	VOC 8260	

Time	1605	1610	1615	1620	1625	1630		
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	25 min	min	min
Flow Rate (L/min)	0.5	0.4	0.3	0.1	0.1	0.1		
Volume Purged (Liters)	~~2~~ 0	2.5	4.5	6	6.5	7.0		
Water Depth (ft)	22.38	22.40	22.50	22.58	22.62	22.66		
Temperature (Celsius)	10.56	10.60	10.63	10.53	10.45	10.42		
pH	9.74	10.08	10.08	10.09	10.09	10.10		
Sp Conductance (uS/cm)	561	551	549	548	547	546		
DO (mg/L)	6.48	3.83	3.63	3.92	4.07	4.14		
ORP (mV)	-20.4	-28.2	-30.1	-32.8	-34.1	-35.4		
Turbidity (NTU)	82.10	86.60	79.50	83.48	77.17	74.04		
Color	GRAY	GRAY	~~CLEAR~~ GRAY	GRAY	GRAY	GRAY		
Odor/Evidence of LNAPL	NONE	NONE	NONE	NONE	NONE	NONE		

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters. PERFORMED DNAPL INSPECTION. NO RED COLOR WHEN MIXED WITH OIL-RED-O-DYE (BAILED BOTTOM OF WELL)

ISCO-1: DTW =

ISCO-2: DTW =

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 04/28/14

Project Name: BN Livingston Shop Complex

Project Number: 1496021*16

Sampling Personnel: L. DEARS

Water Level Meter: Solinst

Purging Equipment: SAMPLE PRO/QED

Sampling Equipment: "

Sampling Time: 1855

Total Discharge (gal): 3.3

Water Disposal: GWTP

Weather: OVERCAST, COOL, 40°, LT SNOW/RAIN

Well Number: **E-7**

Monument Type: Stickup: _____ (ft PVC) Flush: ✓

Well Diameter (in): 6" DIA

Well Condition: GOOD/INTACT (MUD ON BOTTOM)

Total Casing Depth (ft): 32'

Screened Interval (ft): 27-32

Purge Depth (ft): ~~30'~~ 29'

Depth to Groundwater (ft): 22.45

Depth to LNAPL (ft): N/A

Water Column (ft): ~~13.28~~ 13.23

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	4/28/14 / 0830/1145	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
~~E-7_Date ie:mmddyy~~	~~3~~	~~VOA~~	~~HCL~~	~~40ml~~	~~N~~	~~VOC 8260~~	
E-7-042814	3	VOA	HCL	40 ml	N	VOC 8260	

Time	1825	1830	1835	1840	1845	1850		
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	25 min	min	min
Flow Rate (L/min)	0.5	0.5	0.5	0.5	0.5	0.5		
Volume Purged (Liters)	0	2.5	5.0	7.5	10.0	12.5		
Water Depth (ft)	22.45	22.45	22.45	22.45	22.45	22.45		
Temperature (Celsius)	10.64	10.52	10.17	10.02	10.08	10.13		
pH	7.49	7.48	7.48	7.48	7.48	7.48		
Sp. Conductance (uS/cm)	757	742	713	710	708	707		
DO (mg/L)	8.07	8.11	8.60	8.81	8.90	8.96		
ORP (mV)	-5.6	-5.4	-4.0	-3.1	-1.9	-1.2		
Turbidity (NTU)	10.53 ①	524.9	154.9	82.10	65.65	47.45		
Color	BROWN ①	BROWN	LT. BRN	LT BRN	LT BRN	GRAY		
Odor/Evidence of LNAPL	NONE	NONE	NONE	NONE	NONE	NONE		

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

① MUD ON BOTTOM, ~~WELL~~ PUMP CLOGGED, RAISED 6" & PUMPED, WATER WAS INITIALLY HIGHLY TURBID. TURBIDITY METER READ 10.53 NTU, 10.56 NTU, AND 10.73 NTU INITIALLY. TURBIDITY DECREASED W/ TIME.

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 4/28/14 Well Number: **13-9**

Project Name: **BN Livingston Shop Complex** Monument Type: Stickup: _____ (ft PVC) Flush: ✓

Project Number: **1496021*16** Well Diameter (in):

Sampling Personnel: L. DEARS Well Condition: GOOD/INTACT

Water Level Meter: Solinst Total Casing Depth (ft): **53.7**

Purging Equipment: DED ~~Sample Pro/QED~~ Screened Interval (ft): **53.5 - 48.5**

Sampling Equipment: ~~Bladder~~ DED. BLADDER Purge Depth (ft): **51.0**

Sampling Time: 1735 Depth to Groundwater (ft): 22.71

Total Discharge (gal): 1.8 Depth to LNAPL (ft): N/A

Water Disposal: GWTP Water Column (ft): 28.29

Reference: TOC

Weather: OVERCAST, COOL, 38°, SCATTERED SNOW STORMS

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	4/28/14 / 0830 / 1145
Turbidity:	Micro TPW	
Other:		

QA/QC Samples		
Type	Sample ID	Time
Duplicate	DI-042814	0800

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
~~13-9_Date ie;mmddyy~~	~~3~~	~~VOA~~	~~HCL~~	~~40ml~~	~~N~~	~~VOC 8260~~	~~NO~~
13-9_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	~~Field Filtered~~ ~~NO~~
~~13-9_Date ie;mmddyy~~	~~1~~	~~PL~~	~~H2SO4~~	~~250ml~~	~~N~~	~~Nitrate+Nitrite~~	~~NO~~
~~13-9_Date ie;mmddyy~~	~~1~~	~~PL~~	~~None~~	~~1Liter~~	~~N~~	~~TDS, Alkalinity, Sulfate, & Chloride~~	~~NO~~
13-9-042814	3	VOA	HCL	40ML	N	VOC 8260	

Time	1705	1710	1715	1720	1725	1730		
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	25 min	min	min
Flow Rate (L/min)	0.3	0.5	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	0	1.5	4.0	5.0	6.0	7.0		
Water Depth (ft)	22.71	22.78	22.76	22.78	22.78	22.78		
Temperature (Celsius)	10.64	10.56	10.59	10.56	10.61	10.58		
pH	7.97	7.85	7.73	7.69	7.66	7.65		
Sp. Conductance (uS/cm)	779	782	784	784	783	783		
DO (mg/L)	5.10	4.04	~~3.7~~ 3.16	2.72	2.38	2.26		
ORP (mV)	-41.0	-35.9	-30.4	-27.5	-25.7	-24.5		
Turbidity (NTU)	4.27	4.39	2.56	2.11	1.08	1.11		
Color	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR		
Odor/Evidence of LNAPL	NONE	NONE	NONE	NONE	NONE	NONE		

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters VOA/VOC ONLY, PERFORMED DNAPL INSPECTION, BAILED BOTTOM OF WELL, NO COLOR WHEN MIXED WITH OIL-RED-O-DYE

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 4/28/14

Project Name: BNSF-Livingston

Project Number: 1396021*16

Sampling Personnel: L. DEARS

Water Level Meter: Solinst

Purging Equipment: SAMPLE PRO/QED

Sampling Equipment: "

Sampling Time: 1820

Total Discharge (gal): 3.3

Water Disposal: GWTP

Well Number: **13-3**

Monument Type: Stickup: _____ (ft PVC) Flush: ____

Well Diameter (in): 4"

Well Condition: GOOD/INTACT

Total Casing Depth (ft): ~~33.5~~ 31.5

Screened Interval (ft): 28.5 – 31.5

Purge Depth (ft): ~~30.5~~ 29.5

Depth to Groundwater (ft): 22.82

Depth to LNAPL (ft): N/A

Water Column (ft): 6.68

Reference: TOC

Weather: OVERCAST, COOL 38°, WINDY LT SNOW

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	4/28/14/0830/1145	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-3-042814	3	VOA	HCL	40ml	N	VOC 8260	

Time	1755	1800	1805	1810	1815	1820		
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	25 min	min	min
Flow Rate (L/min)	0.5	0.5	0.5	0.5	0.5	0.5		
Volume Purged (Liters)	0	2.5	5.0	7.5	10.0	12.5		
Water Depth (ft)	22.81	22.81	22.81	22.81	22.81	22.81		
Temperature (Celsius)	10.62	10.71	10.88	10.48	10.44	10.42		
pH	7.75	7.58	7.50	7.48	7.47	7.48		
Sp. Conductance (uS/cm)	757	752	747	742	737	734		
DO (mg/L)	12.20	9.40	8.60	8.69	8.94	9.13		
ORP (mV)	-14.3	-13.1	-11.2	-9.4	-8.2	-7.9		
Turbidity (NTU)	6.63	6.38	6.95	5.60	6.16	5.96		
Color	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR		
Odor/Evidence of LNAPL	NONE	NONE	NONE	NONE	NONE	NONE		

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 15-May-14

Project Name: BNSF-Livingston
Project Number: 1496021*16

Sampling Personnel: L Dears
Water Level Meter: Solinst
Purging Equipment: Ded. Bladder
Sampling Equipment: Ded. Bladder

Sampling Time: 1145

Total Discharge (gal): 4.0

Water Disposal: GWTP

Weather: Clear, Sunny, light wind to 10mph, 50°

Well Number: **92-1**

Monument Type: Stickup: 1.4 (ft PVC) Flush:
Well Diameter (in): 2

Well Condition: INTACT
Total Casing Depth (ft): 35.2
Screened Interval (ft): 25.2 — 35.2
Purge Depth (ft): 31

Depth to Groundwater (ft): 24.39

Depth to LNAPL (ft): —

Water Column (ft): 10.81

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	15MAY 2014/0910
Turbidity:	Micro TPW	
Other:		

QA/QC Samples		
Type	Sample ID	Time

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
92-1_051514	3	VOA	HCl	40mL	N	VOC's by 8260	

Time	1115	1120	1125	1130	1135	1140	1145	
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	25 min	30 min	min
Flow Rate (L/min)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Volume Purged (Liters)	0	2.5	5.0	7.5	10.0	12.5	15.0	
Water Depth (ft)	24.39	24.39	24.39	24.39	24.39	24.39	24.39	
Temperature (Celsius)	12.45	12.28	12.33	12.54	12.50	12.54	12.55	
pH	7.97	7.89	7.83	7.87	7.87	7.89	7.89	
Sp. Conductance (uS/cm)	768	761	754	748	747	748	748	
DO (mg/L)	21.44	17.25	13.72	13.50	13.53	13.33	13.38	
ORP (mV)	-86.8	-82.1	-74.2	-71.3	-70.6	-68.8	-67.3	
Turbidity (NTU)	1099*	1100*	838	511.3	829.1	811.1	799.0	
Color	TAN	TAN	LT. TAN	LT TAN	LT TAN	LT TAN	LT TAN	
Odor/Evidence of LNAPL	N	N	N	N	N	N	N	

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

* INITIAL DISCHARGE HIGHLY TURBID. TURBIDITY METER ~~Blinking~~ BLINKING, ~~max~~ KEEPS READING 1099 or 1100 WHEN FLASHING.

Groun

Kennedy/Jenks Consultants

ISCO-2

Date: 15-May-14

Well Number: ISCO-2

Project Name: BNSF-Livingston

Project Number: 1496021*16

Sampling Personnel: L Dears

Water Level Meter: Solinst

Purging Equipment: Ded. Bladder

Sampling Equipment: Ded. Bladder

Sampling Time: 1235

Total Discharge (gal): 3.3

Water Disposal: GWTP

Weather: Clear, Sunny, light wind to 10mph, 50°

Monument Type: Stickup: _____ (ft PVC) Flush: ##

Well Diameter (in): 4

Well Condition: INTACT

Total Casing Depth (ft): 31.6

Screened Interval (ft): 26.6-31.6

Purge Depth (ft): 29.0

Depth to Groundwater (ft): 21.45

Depth to LNAPL (ft): —

Water Column (ft): 10.15

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	5/15/14/0910
Turbidity:	Micro TPW	
Other:		

QA/QC Samples		
Type	Sample ID	Time
Duplicate		

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
# ~~CO-2_Date ie;mmdd~~ ISCO-2-051514	3	VOA	HCL	40ml	N	VOC 8260	

Time / Parameter (every 5 min)	1210 / 0 min	1215 / 5 min	1220 / 10 min	1225 / 15 min	1230 / 20 min	1235 / 25 min	min	min
Flow Rate (L/min)	0.5	0.5	0.5	0.5	0.5	0.5		
Volume Purged (Liters)	0	2.5	5.0	7.5	10.0	12.5		
Water Depth (ft)	21.45	21.45	21.45	21.45	21.45	21.45		
Temperature (Celsius)	11.56	11.49	11.39	11.40	11.43	11.45		
pH	7.79	7.75	7.74	7.74	7.73	7.73		
Sp. Conductance (uS/cm)	634	634	634	635	636	636		
DO (mg/L)	17.01	14.03	13.03	12.60	12.35	12.32		
ORP (mV)	-20.0	-24.3	-29.9	-32.3	-33.4	-34.2		
Turbidity (NTU)	3.50	0.82	0.34	0.88	1.01	0.55		
Color	CLEAR →	→	→	→	→	→		
Odor/Evidence of LNAPL	N	N	N	N	N	N		

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-2: DTW = 22.05

ISCO-1: DTW = NOT CHECKED

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 15-May-14

Well Number: **E-7**

Project Name: BNSF-Livingston
Project Number: 1496021*16
Sampling Personnel: L Dears
Water Level Meter: Solinst
Purging Equipment: Sample Pro
Sampling Equipment: Sample Pro
Sampling Time: 1305 (DUP @ 0800)
Total Discharge (gal):
Water Disposal: GWTP
Weather: Clear, Sunny, light wind to 10mph, 50°

Monument Type: Stickup: (ft PVC) Flush: X
Well Diameter (in): 6"
Well Condition:
Total Casing Depth (ft): 32'
Screened Interval (ft): 27'-32'
Purge Depth (ft): 29'
Depth to Groundwater (ft): 22.05
Depth to LNAPL (ft): –
Water Column (ft): 9.95'

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	5/15/14 / 0910	DUPLICATE	D1_051514	0800
Turbidity:	Micro TPW		RINSATE	RB-1_051514	1535
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
~~E-7_Date ie,mmddy~~ E7_051514	3	VOA	HCL	40ml	N	VOC 8260	

Time	1245	1250	1255	1300	1305			
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	min	min	min
Flow Rate (L/min)	0.5	0.5	~~0.5~~ .4	~~0.5~~ .4	~~0.5~~ .4			
Volume Purged (Liters)	0	2.5	4.5	6.5	8.5			
Water Depth (ft)	22.05	22.04	22.05	22.05	22.05			
Temperature (Celsius)	13.41	12.71	13.47	13.66	13.70			
pH	7.83	7.73	7.73	7.73	7.75			
Sp. Conductance (uS/cm)	705	695	691	690	690			
DO (mg/L)	16.51	12.09	11.51	11.30	11.26			
ORP (mV)	-13.9	-15.6	-18.5	-18.6	-19.8			
Turbidity (NTU)	79.8	58.67	36.3	32.21	29.16			
Color	Gray	GRAY	LT GRAY	CLEAR	CLEAR			
Odor/Evidence of LNAPL	NONE	N	N	N	N			

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)
1 US Gallon = 3.8 Liters

DUPLICATE D1_051514 @ 0800
RINSATE SAMPLE ~~R1_051514 @~~ RB-1_051514 @ 1535

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 15-May-14

Well Number: **13-3**

Project Name: BNSF-Livingston
Project Number: 1496021*16
Sampling Personnel: L Dears
Water Level Meter: Solinst
Purging Equipment: SamplePro
Sampling Equipment: SamplePro
Sampling Time: 1345
Total Discharge (gal):
Water Disposal: GWTP
Weather: Clear, Sunny, light wind to 10mph, 50°

Monument Type: Stickup: _____ (ft PVC) Flush: ___
Well Diameter (in): 4
Well Condition: INTACT
Total Casing Depth (ft): 31.5
Screened Interval (ft): 28.5-31.5
Purge Depth (ft): 29.5
Depth to Groundwater (ft): 22.39
Depth to LNAPL (ft): —
Water Column (ft): 9.11

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	~~5/14/14~~ 5/15/14 0910
Turbidity:	Micro TPW	
Other:		

QA/QC Samples		
Type	Sample ID	Time

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-3_051514	3	VOA	HCL	40ml	N	VOC 8260	

Time	1320	1325	1330	1335	1340	1345		
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	25 min	min	min
Flow Rate (L/min)	0.5	0.5	0.5	0.5	0.5	0.5		
Volume Purged (Liters)	0	2.5	5.0	7.5	10.0	12.5		
Water Depth (ft)	22.39	22.39	22.40	22.40	22.40	22.40		
Temperature (Celsius)	13.40	12.64	11.92	11.76	11.79	11.79		
pH	7.79	7.74	7.70	7.69	7.69	7.69		
Sp. Conductance (uS/cm)	724	729	727	718	717	716		
DO (mg/L)	11.73	11.46	11.21	11.23	11.20	11.21		
ORP (mV)	7.1	7.2	6.8	5.1	4.3	3.3		
Turbidity (NTU)	33.48	31.49	34.29	30.67	27.71	20.50		
Color	CLEAR →	→	→	→	→	→		
Odor/Evidence of LNAPL	N	N	N	N	N	N		

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 15-May-14

Well Number: **10-2**

Project Name: BNSF-Livingston
Project Number: 1496021*16
Sampling Personnel: L Dears
Water Level Meter: Solinst
Purging Equipment: Ded. Bladder
Sampling Equipment: Ded. Bladder
Sampling Time: 1425
Total Discharge (gal): 1.5
Water Disposal: GWTP
Weather: Clear, Sunny, light wind to 10mph, 50°

Monument Type: Stickup: _____ (ft PVC) Flush: -0.5
Well Diameter (in): 4
Well Condition: INTACT
Total Casing Depth (ft): 49
Screened Interval (ft): 44-49
Purge Depth (ft): 47
Depth to Groundwater (ft): 21.18
Depth to LNAPL (ft): —
Water Column (ft): 27.82

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	5/15/14/0910			
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
10-2_051514	3	VOA	HCL	40ml	N	VOC 8260	

Time	1400	1405	1410	1415	1420	1425		
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	25 min	min	min
Flow Rate (L/min)	0.5	0.2	0.2	0.1	0.1	0.1		
Volume Purged (Liters)	0	2.5	3.5	4.5	5.0	5.5		
Water Depth (ft)	~~21.18~~ 21.18	~~21.28~~						
Temperature (Celsius)	12.25	21.28	21.71	21.73	21.78	21.84		
pH	10.48	12.80	13.87	14.91	16.11	16.26		
Sp. Conductance (uS/cm)	555	10.55	10.55	10.55	10.55	10.57		
DO (mg/L)	2.98	564	571	575	571	576		
ORP (mV)	-151	6.47	5.71	5.21	6.43	6.10		
Turbidity (NTU)	114.4	-147	-17.2	-19.2	-21.9	-22.8		
Color	CLOUDY	111.4	100.1	102.0	96.61	94.75		
Odor/Evidence of LNAPL	N	CLOUDY	N	N	N	CLOUDY/N		

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 15-May-14

Well Number: **13-9**

Project Name: BNSF-Livingston
Project Number: 1496021*16
Sampling Personnel: L Dears
Water Level Meter: Solinst
Purging Equipment: Ded. Bladder
Sampling Equipment: Ded. Bladder
Sampling Time: 1515
Total Discharge (gal): 2.1
Water Disposal: GWTP
Weather: Clear, Sunny, light wind to 10mph, 50°

Monument Type: Stickup: _____ (ft PVC) Flush: _____
Well Diameter (in): 6"
Well Condition: INTACT - WATER AROUND CASING
Total Casing Depth (ft): 53.7
Screened Interval (ft): 53.5 - 48.5
Purge Depth (ft): 51.0
Depth to Groundwater (ft): 22.31
Depth to LNAPL (ft): —
Water Column (ft): 31.39

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	5/15/14 / 0910
Turbidity:	Micro TPW	
Other:		

QA/QC Samples		
Type	Sample ID	Time
Duplicate		

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
~~3-9_Date ie;mmddy~~ 13-9_051514	3	VOA	HCL	40ml	N	VOC 8260	

Time	1445	1450	1455	1500	1505	1510		
Parameter (every 5 min)	0 min	5 min	10 min	15 min	20 min	25 min	min	min
Flow Rate (L/min)	0.3	0.2	0.3	0.4	0.4	0.4		
Volume Purged (Liters)	0	1.5	2.5	4.0	6.0	8.0		
Water Depth (ft)	22.31	22.33	22.33	22.33	22.81	22.37		
Temperature (Celsius)	12.74	12.84	12.22	12.13	12.52	12.72		
pH	8.07	8.00	7.90	7.88	7.86	7.85		
Sp. Conductance (uS/cm)	787	786	788	787	785	784		
DO (mg/L)	10.44	6.65	4.40	4.21	3.98	3.93		
ORP (mV)	44.4	41.5	38.0	3.48	3.08			
Turbidity (NTU)	11.77	10.85	7.71	→	→	→		
Color	CLEAR	→	→	→	→	→		
Odor/Evidence of LNAPL	N	N	N	N	N	N		

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)
1 US Gallon = 3.8 Liters

DEQ's Groundwater Monitoring Program
Directive No. 2 – December 2013/January 2014
Groundwater Purge and Sample Forms

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	12/19/13	Well Number:	**13-1**
Project Name:	BNSF-Livingston	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1396021*16	Well Diameter (in):	4
Sampling Personnel:	CL/BC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	30.0
Purging Equipment:	QED	Screened Interval (ft):	24.5 - 27.5
Sampling Equipment:	QED	Purge Depth (ft):	26
Sampling Time:	0845	Depth to Groundwater (ft):	22.56
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	4.94

Reference: TOC

Weather: Snow

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	12-19-13	Rinse Blank	RX-12-19-13	0700
Turbidity:	Micro TPW	10-4-13	Trip Blank	TB1-12-19-13	0700
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-1	3	VOA	HCL	40ml	N	VOC 8260	
13-1	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-1	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-1	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

0810 Time	0815	0820	0825	0830	0835	0840		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	22.68	22.68	22.69	22.69	22.70	22.70		
Temperature (Celsius)	9.85	10.39	10.60	10.72	10.52	10.58		
pH	7.65	7.45	7.37	7.32	7.30	7.29		
Sp. Conductance (uS/cm)	744	748	753	751	751	752		
DO (mg/L)	0.92	0.37	0.24	0.21	0.17	0.17		
ORP (mV)	148.6	148.9	145.2	142.7	141.4	140.5		
Turbidity (NTU)	17.14	9.77	7.28	4.83	3.28	3.04		
Color	Clear							
Odor/Evidence of LNAPL	None Noticed							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	12/18/13	Well Number:	**13-2**
Project Name:	BNSF-Livingston	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1396021*16	Well Diameter (in):	4
Sampling Personnel:	CL/BC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	29.2
Purging Equipment:	QED	Screened Interval (ft):	26.2 - 29.2
Sampling Equipment:	QED	Purge Depth (ft):	28
Sampling Time:	1210	Depth to Groundwater (ft):	21.88
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	7.32

Reference: TOC

Weather: Part Cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	12/18/13			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
13-2	3	VOA	HCL	40ml	N	VOC 8260	
13-2	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-2	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-2	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1135 Time	1140	1145	1150	1155	1200	1205		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	21.95	21.95	21.95	21.95	21.95	21.95		
Temperature (Celsius)	10.89	11.20	11.31	11.24	11.29	11.26		
pH	7.65	7.62	7.61	7.60	7.61	7.61		
Sp. Conductance (uS/cm)	654	654	653	653	652	653		
DO (mg/L)	0.16	0.13	0.14	0.13	0.13	0.10		
ORP (mV)	105.3	102.9	100.4	98.3	97.3	96.4		
Turbidity (NTU)	6.54	9.71	9.30	6.06	6.42	5.87		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	12/19/13	Well Number:	**13-3**
Project Name:	BNSF-Livingston	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1396021*16	Well Diameter (in):	4
Sampling Personnel:	CL/BC	Well Condition:	
Water Level Meter:	Solinst	Total Casing Depth (ft):	31.5
Purging Equipment:	QED	Screened Interval (ft):	28.5 - 31.5
Sampling Equipment:	QED	Purge Depth (ft):	30.0
Sampling Time:	0950	Depth to Groundwater (ft):	23.47
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	8.03

Reference: TOC

Weather: Snow

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	12/19/13			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-3	3	VOA	HCL	40ml	N	VOC 8260	
13-3	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-3	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-3	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

0916 Time	0921	0926	0931	0936	0941	0946		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	23.48	23.48	23.48	23.48	23.48	23.48		
Temperature (Celsius)	9.06	9.72	CL ~~7.30~~ 10.06	10.06	10.11	10.13		
pH	7.40	7.31	7.29	7.29	7.29	7.29		
Sp. Conductance (uS/cm)	735	724	716	714	714	713		
DO (mg/L)	0.27	0.20	0.13	0.12	0.10	0.10		
ORP (mV)	146.3	142.5	139.2	137.5	136.1	134.6		
Turbidity (NTU)	20.94	14.55	13.78	11.26	10.19	8.92		
Color	CLEAR, VERY LIGHT TAN							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	12/18/13	Well Number:	**13-4**
Project Name:	BNSF-Livingston	Monument Type:	Stickup: ____ (ft PVC) Flush: X
Project Number:	1396021*16	Well Diameter (in):	4
Sampling Personnel:	CL / BC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	27.5
Purging Equipment:	QED	Screened Interval (ft):	24.5 - 27.5
Sampling Equipment:	QED	Purge Depth (ft):	26.0
Sampling Time:	1105	Depth to Groundwater (ft):	23.64
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	3.86

Reference: TOC

Weather: Part Cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	12/18/13	DUPLICATE	D1-12-18-13	0800
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
13-4	3	VOA	HCL	40ml	N	VOC 8260	
13-4	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-4	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-4	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1030 Time	1035	1040	1045	1050	1055	1100		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2	.2	.2	.2	.2	.2		
Volume Purged (Liters)	1	2	3	4	5	6		
Water Depth (ft)	23.70	23.70	23.70	23.70	23.70	23.70		
Temperature (Celsius)	11.02	11.17	11.21	11.28	11.27	11.27		
pH	7.72	7.63	7.59	7.58	7.59	7.58		
Sp. Conductance (uS/cm)	721	721	722	721	721	721		
DO (mg/L)	0.21	0.17	0.15	0.14	0.14	0.15		
ORP (mV)	86.1	98.3	100.0	99.0	98.8	97.8		
Turbidity (NTU)	19.08	7.05	6.25	4.20	3.13	1.99		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	12/18/13	Well Number:	**13-5**
Project Name:	BNSF-Livingston	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1396021*16	Well Diameter (in):	4
Sampling Personnel:	GL/BC	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	35.5
Purging Equipment:	QED	Screened Interval (ft):	30.75 - 33.75
Sampling Equipment:	QED	Purge Depth (ft):	32.0
Sampling Time:	0935	Depth to Groundwater (ft):	22.38
Total Discharge (gal):	2.316	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.62
Weather:	PRT CLOUDY		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	12/18/13			
Turbidity:	Micro TPW	10/4/13	TRIP BLANK	TBI-12-18-13	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-5	3	VOA	HCL	40ml	N	VOC 8260	
13-5	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-5	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-5	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

0900 Time	0905	0910	0915	0920	0925	0930		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	22.41	22.41	22.41	22.41	22.41	22.41		
Temperature (Celsius)	10.80	10.89	10.92	10.95	10.98	10.87		
pH	8.02	7.71	7.64	7.60	7.57	7.56		
Sp. Conductance (uS/cm)	683	654	652	650	650	651		
DO (mg/L)	0.87	0.34	0.31	0.25	0.20	0.17		
ORP (mV)	144.4	141.7	135.8	130.2	124.9	121.9		
Turbidity (NTU)	17.50	42.80	43.70	49.47	48.50	50.48		
Color	CLEAR	LT GRAY		—		→		
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	12/18/13	Well Number:	**13-6**
Project Name:	BNSF-Livingston	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1396021*16	Well Diameter (in):	4
Sampling Personnel:	CL/BC	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	33.0
Purging Equipment:	QED	Screened Interval (ft):	30.0 - 33.0
Sampling Equipment:	QED	Purge Depth (ft):	31.5
Sampling Time:	1510	Depth to Groundwater (ft):	22.11
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.89

Reference: TOC

Weather: Part Cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	12/18/13	RINSE BLANK	RX-12-18-13	1240
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-6	3	VOA	HCL	40ml	N	VOC 8260	
13-6	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-6	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-6	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1438 Time	1443	1448	1453	1458	1503	1508		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	22.13	22.14	22.14	22.14	22.14	22.14		
Temperature (Celsius)	10.95	11.04	10.97	10.94	10.93	10.81		
pH	7.66	7.60	7.58	7.57	7.57	7.57		
Sp. Conductance (uS/cm)	630	625	625	624	624	624		
DO (mg/L)	0.16	0.15	0.14	0.08	0.11	0.08		
ORP (mV)	95.9	90.3	87.3	85.3	84.3	83.8		
Turbidity (NTU)	5.51	3.67	3.33	3.09	3.25	2.80		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	12/18/13	Well Number:	**13-7**
Project Name:	BNSF-Livingston	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1396021*16	Well Diameter (in):	4
Sampling Personnel:	CL/BC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	32.0
Purging Equipment:	QED	Screened Interval (ft):	29.0 - 32.0
Sampling Equipment:	QED	Purge Depth (ft):	30.5
Sampling Time:	1606	Depth to Groundwater (ft):	22.26
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.74

Reference: TOC

Weather: Part Cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	12/18/13			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-7	3	VOA	HCL	40ml	N	VOC 8260	
13-7	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-7	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-7	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1541 Time	1546	1551	1556	1601	1606	1611		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	22.29	20.29	20.29	20.29	20.29	20.29		
Temperature (Celsius)	10.29	10.39	10.44	10.52	10.53	10.51		
pH	7.64	7.58	7.56	7.55	7.55	7.55		
Sp. Conductance (uS/cm)	583	571	567	568	570	571		
DO (mg/L)	0.05	0.07	0.10	0.06	0.05	0.05		
ORP (mV)	95.7	93.8	91.9	90.5	89.7	89.5		
Turbidity (NTU)	2.72	6.64	6.99	6.53	5.42	4.65		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

Groundwater Purge and Sample Form

Kennedy/Jenks Consultants

Date:	1/17/14	Well Number:	13-8
Project Name:	BNSF-Livingston-Task L	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1396021*16	Well Diameter (in):	4-inch
Sampling Personnel:	JV	Well Condition:	good
Water Level Meter:	GeoTech	Total Casing Depth (ft):	Reference: TOC
Purging Equipment:	Sample Pro	Screened Interval (ft):	44-49
Sampling Equipment:	Sample Pro	Depth to Groundwater (ft):	22.50
Sampling Time:	12:20	Depth to LNAPL (ft):	—
Purge Depth (ft):		Water Column (ft):	
Total Discharge (gal):	2.5 gal	If LNAPL present, was well sampled through LNAPL per SAP? Yes / No / NA	
Water Disposal:	GWTP	Outer LNAPL Casing Depth (ft):	
Weather:	Clear 40°	Inner LNAPL Casing Depth (ft):	

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	1/17/14 8:00
Turbidity:	Micro TPW	1/17/14 8:10
Other:		

QA/QC Samples		
Type	Sample ID	Time

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Turbidity/ Color	Analysis Requested	MS/MSD & Comments
13-8	3	clear	HCL	40ml	N		SW8260B	
13-8	1	plastic	HNO3	250ml	Y		method 6010/Total CaCO3	
13-8	1	plastic	NONE	1L	N		method 300/160.1/CaCO3 SM2320B	
13-8	1	plastic	H2SO4	250mL	Y		method SM2320B TV 353.2	

Time	11:53	11:58	12:03	12:08	12:13	12:18			
Parameter (every 5 min)		5 min	5 min	5 min	5 min	5 min	min	min	min
Flow Rate (L/min)		0.3	0.3	0.3	0.3	0.3			
Volume Purged (Liters)		1.5	3.0	4.5	7.0	8.5			
Water Depth (ft)		22.75	22.76	22.76	22.76	22.76			
Temperature (Celsius)		11.15	11.14	11.20	11.25	11.20			
pH		7.46	7.43	7.39	7.38	7.36			
Sp. Conductance (uS/cm)		831	832	832	832	832			
DO (mg/L)		0.13	0.12	0.11	0.10	0.11			
ORP (mV)		224	223.7	223.0	222.3	221.1			
Turbidity (NTU)		3.72	3.77	3.11	3.76	3.47			
Color		colorless	→						
Odor/Evidence of LNAPL		—	—	—	—	—			

Ferrous Iron: ____ gal (mg/L) * (ml total)/(ml sample) = (mg/L) ____ gal (mg/L) * (ml total)/(ml sample) = (mg/L)

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

SWL 1-16-14 22.59'
1-17-14 22.50'

Groundwater Purge and Sample Form

Kennedy/Jenks Consultants

Date:	JW3-9 1117/14	Well Number:	13-9
Project Name:	BNSF-Livingston-Task L	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1396021*16	Well Diameter (in):	4-inch
Sampling Personnel:	JV	Well Condition:	Good
Water Level Meter:	GeoTech	Total Casing Depth (ft):	54
Purging Equipment:	Sample Pro	Screened Interval (ft):	48.5-53.5
Sampling Equipment:	Sample Pro	Depth to Groundwater (ft):	23.71
Sampling Time:	13:20	Depth to LNAPL (ft):	—
Purge Depth (ft):		Water Column (ft):	
Total Discharge (gal):	1.75 gal	If LNAPL present, was well sampled through LNAPL per SAP? Yes / No / NA	
Water Disposal:	GWTP	Outer LNAPL Casing Depth (ft):	
Weather:	Clear 40°	Inner LNAPL Casing Depth (ft):	

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	1117/14 8:00
Turbidity:	Micro TPW	1117/14 8:10
Other:		

QA/QC Samples		
Type	Sample ID	Time
Field blank	LIV1-17-14	13:25

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Turbidity/ Color	Analysis Requested	MS/MSD & Comments
13-9	3	clear	HCL	40ml	N		SW8260B	
13-9	1	plastic	HNO3	250ml	Y		6010/TOTAL CR03	
13-9	1	plastic	NONE	1L	N		300/1600.1/CRO3SM2320B	
13-9	1	plastic	H2SO4	250ml	N		35302	

12:55 Time	13:03	13:05	13:13	13:15				
Parameter (every 5 min)	5 min	5 min	5 min	5 min	min	min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3				
Volume Purged (Liters)	1.5	3.0	4.5	6.0				
Water Depth (ft)	23.86	23.87	23.87	23.87				
Temperature (Celsius)	11.11	11.10	11.15	11.17				
pH	7.64	7.61	7.61	7.59				
Sp. Conductance (uS/cm)	772	771	772	770				
DO (mg/L)	0.14	0.12	0.10	0.11				
ORP (mV)	224.1	221.6	217.2	218.5				
Turbidity (NTU)	3.46	4.13	3.57	4.24				
Color	colorless	colorless	colorless	colorless				
Odor/Evidence of LNAPL	—	—	—	—				

Ferrous Iron: gal (mg/L) * (ml total)/(ml sample) = (mg/L) gal (mg/L) * (ml total)/(ml sample) = (mg/L)

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

SWL 1-16-14 - 23.10'
1-17-14 23.71

Groundwater Purge and Sample Form

Kennedy/Jenks Consultants

Date:	1-17-14	Well Number:	13-10
Project Name:	BNSF-Livingston-Task L	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1396021*16	Well Diameter (in):	4
Sampling Personnel:	JV	Well Condition:	good
Water Level Meter:	GeoTech	Total Casing Depth (ft):	44-49
Purging Equipment:	Sample Pro	Screened Interval (ft):	53-58
Sampling Equipment:	Sample Pro	Depth to Groundwater (ft):	1-16 22.90 / 1-17-14 24.18'
Sampling Time:	11:30	Depth to LNAPL (ft):	—
Purge Depth (ft):		Water Column (ft):	
Total Discharge (gal):	27 gal	If LNAPL present, was well sampled through LNAPL per SAP? Yes / No / NA	
Water Disposal:	GWTP	Outer LNAPL Casing Depth (ft):	
Weather:	clear 40°	Inner LNAPL Casing Depth (ft):	

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	1/16/14 / 1/17/14 8:20
Turbidity:	Micro TPW	1/17/14 8:00
Other:		

QA/QC Samples		
Type	Sample ID	Time

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Turbidity/ Color	Analysis Requested	MS/MSD & Comments
13-8	3	clear	HCL	40mL	N		SW8260B	
13-8	1	plastic	HNO3	250mL	Y		method 6010 total	CaCO3
13-8	1	plastic	NaOH	1L	N		method 300/160.1	CaCO3 SM2320B
13-8	1	plastic	H2SO4	250mL	N		method 353.2	

1/16/14 21:16 Time	21:21	21:26	21:29	11:08	11:13	11:18	11:23	11:28
Parameter (every 5 min)	5 min	5 min	3 min	5 min	5 min	5 min	5 min	5 min
Flow Rate (L/min)	7.6	7.6	3.80	0.2	0.2	0.2	0.2	0.2
Volume Purged (Liters)	38	50	11.40	1.0	2.0	3.0	4.0	5.0
Water Depth (ft)	33.82	47.90	53.00	24.18	25.90	25.91	26.01	26.13
Temperature (Celsius)	11.45	11.62	—	10.56	10.82	10.09	9.89	9.89
pH	9.35	9.35	—	9.62	9.54	9.52	9.57	9.60
Sp. Conductance (uS/cm)	475	469	—	474	469	467	469	465
DO (mg/L)	0.20	0.18	—	0.45	0.26	0.18	0.17	0.14
ORP (mV)	166.7	167.2	—	173.2	171.2	170.1	169.9	165.6
Turbidity (NTU)	8.18	8.42	—	7.90	4.55	6.92	5.13	5.59
Color	colorless	colorless	—	colorless	colorless	colorless	colorless	colorless
Odor/Evidence of LNAPL	—	—	—	—	—	—	—	—

Ferrous Iron: ____ gal (mg/L) * (ml total)/(ml sample) = (mg/L) ____ gal (mg/L) * (ml total)/(ml sample) = (mg/L)

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

1/17-14 SWL = 24.18'
1-16-14 SWL - 22.90

DEQ's Groundwater Monitoring Program
Directive No. 2 – February 2014
Groundwater Purge and Sample Forms

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: (purge) 2/27 SAMPLE 2/28/14

Project Name: **BN Livingston Shop Complex**

Project Number: **1496021*16**

Sampling Personnel: CL

Water Level Meter: Solinst

Purging Equipment: Ded. Bladder

Sampling Equipment: Ded. Bladder

Sampling Time: 1150

Total Discharge (gal): 18.26 ~~15.26~~ CL

Water Disposal: GWTP

Well Number: **10-1_** 022814

Monument Type: Stickup: _____ (ft PVC) Flush: -0.4

Well Diameter (in): 4

Well Condition: Good

Total Casing Depth (ft): **53.6**

Screened Interval (ft): **48.6 - 53.6**

Purge Depth (ft): **51.3**

Depth to Groundwater (ft): (2/27/14) 21.25 FT SAMPLE 24.41

Depth to LNAPL (ft): —

Water Column (ft): PURGE 32.35 SAMPLE 29.19

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/28/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
10-1_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	0932	0935	0937	0939			2/28/14	1144	1149
Parameter (every 5 min)		3 min	2 min	2 min	min	min	min	min	5 min
Flow Rate (L/min)									.2
Volume Purged (~~Liters~~) gal		5	5	5					1
Water Depth (ft)		30.6	35.5	40.00					24.81
Temperature (Celsius)		10.53	10.55	10.55					6.35
pH		388	388	388					8.40
Sp. Conductance (uS/cm)		7.69	7.87	8.02					436
DO (mg/L)		3.27	3.38	3.39					2.01
ORP (mV)		149.3	150.8	152.5					-86.0
Turbidity (NTU)		6.44	6.78	5.16					7.39
Color		Clear							CLEAR
Odor/Evidence of LNAPL		None							NONE

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

ISCO 24R DTW 21.15 FT 2/27/14 # purged = 18 gal

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 2/28/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	(purge) 2/27 SAMPLE 2/28/14	Well Number:	10-2_ 022814
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.5
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	49.0
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	44 - 49
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	46.6
Sampling Time:	1335	Depth to Groundwater (ft):	22.61' (2-27-14) 2/28/14 23.09
Total Discharge (gal):	61.82	Depth to LNAPL (ft):	
Water Disposal:	GWTP	Water Column (ft):	PURGE 26.39 SAMPLE 25.91
Weather:			

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/28/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-2_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	~~12:11~~ 12:11	~~12:14~~ 12:14	~~12:17~~ 12:17	12:18		2/28/14	1328	1333
Parameter (every 5 min)	~~12:11~~ 2 min	~~12:14~~ 3 min	~~12:17~~ 3 min	1 min	min	min	min	5 min
Flow Rate (L/min)	6.84	6.84	6.84	6.84				.2
Volume Purged (Liters)	13.68	20.52	20.52	6.84				1
Water Depth (ft)	33.20	39.92	43.20	44.00				23.75
Temperature (Celsius)	11.45	11.43	11.45	-				7.08
pH	9.53	9.70	9.70	-				8.11
Sp. Conductance (uS/cm)	~~121.7~~ 679	~~108.1~~ 677	~~105.2~~ 678	-				655
DO (mg/L)	0.22	0.11	0.20	-				2.53
ORP (mV)	121.7	108.1	105.2					-89.1
Turbidity (NTU)	96.03	66.45	65.21					22.56
Color	lightgray →							CLEAR
Odor/Evidence of LNAPL	NONE							NONE

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

* DNAPL TEST = NEG.

2/27/14 ISCO-1 23.05'

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 2/28/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/26/14	Well Number:	10-3_ 022614
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.09 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	58.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	53.6 - 58.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	56.1
Sampling Time:	1735	Depth to Groundwater (ft):	26.20
Total Discharge (gal):	1.8	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	32.40

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/26/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-3_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

17.02 Time	1707	1712	1717	1722	1727	1732		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.15	.15	.15	.15	.15	.15		
Volume Purged (Liters)	.75	1.5	2.25	3	3.75	4.5		
Water Depth (ft)	26.39	26.39	26.40	26.40	26.40	26.40		
Temperature (Celsius)	9.32	9.33	9.20	9.23	9.20	9.21		
pH	7.15	7.14	7.13	7.09	7.13	7.11		
Sp. Conductance (uS/cm)	743	744	747	746	746	747		
DO (mg/L)	1.41	0.86	0.54	0.46	0.50	0.42		
ORP (mV)	11.8	11.8	16.7	19.5	17.8	18.8		
Turbidity (NTU)	0.00	0.00	0.00	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

* PURGE @ 0.15 L/MIN

12-7 DTW = 25.80

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	PURGE 2/26/14 CL. ~~02~~ SAMPLE 02/27/14	Well Number:	10-4_ 022714
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.65 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	60.2
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	55.2 - 60.2
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	57.3
Sampling Time:	1400	Depth to Groundwater (ft):	PURGE 24.59 SAMPLE 34.80
Total Discharge (gal):	3.41	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	PURGE 35.61 SAMPLE 25.40

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
10-4_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1111 Time	1114	1116	1118	1120			1353	1358
Parameter (every 5 min)	min	min	min	min	min	min	min	5 min
Flow Rate (L/min)								.2
Volume Purged (Liters)	3	3	3	3				1
Water Depth (ft)	36.41	44.00	50.00	54.5				
Temperature (Celsius)	11.74	12.08	12.10	12.07				10.47
pH	8.13	8.13	8.13	8.09				7.78
Sp. Conductance (uS/cm)	716	703	681	673				686
DO (mg/L)	0.12	0.50	2.65	3.65				3.14
ORP (mV)	117.9	118.1	117.2	124.9				-2.7
Turbidity (NTU)	7.77	10.58	4.53	—				0.00
Color	CLEAR							CLEAR
Odor/Evidence of LNAPL	NONE	NOTICED						NONE

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

12-8 DTW 26.71

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 2/27/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: PURGE 2/26/14 SAMPLE 02/27/14

Well Number: 10-5_ 022714

Project Name: BN Livingston Shop Complex

Monument Type: Stickup: 0.93 (ft PVC) Flush:

Project Number: 1496021*16

Well Diameter (in): 4

Sampling Personnel: CL

Well Condition: GOOD

Water Level Meter: Solinst

Total Casing Depth (ft): 64.9

Purging Equipment: Ded. Bladder

Screened Interval (ft): 59.9 - 64.9

Sampling Equipment: Ded. Bladder

Purge Depth (ft): 62.9

Reference: TOC

Sampling Time: 1440

Depth to Groundwater (ft): PURGE 24.86 SAMPLE 24.78

Total Discharge (gal): 22.26

Depth to LNAPL (ft): —

Water Disposal: GWTP

Water Column (ft): PURGE 40.04 SAMPLE 40.12

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
10-5_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1214 Time	1217	1220	1223	1225		2/27/14	1433	1438
Parameter (every 5 min)	min	min	min	min	min	min	min	5 min
Flow Rate (L/min)								.25 L/MIN
Volume Purged ~~(Liters)~~ GAL.	5	5	7	5				1 L
Water Depth (ft)	33.00	39.00	44.10	48.50				24.98
Temperature (Celsius)	11.87	12.07	12.14	12.17				10.56
pH	8.83	8.87	8.80	8.85				8.61
Sp. Conductance (uS/cm)	567	577	577	580				563
DO (mg/L)	0.18	0.11	0.31	0.53				2.42
ORP (mV)	126.9	121.1	112.0	98.5				-148.9
Turbidity (NTU)	4.25	5.55	4.18	4.82				
Color	CLEAR							CLEAR
Odor/Evidence of LNAPL	NONE							NONE

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

L-88-13 DTW ~~28.54~~ 26.01 BC FT 2/21 @0830

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 2/27/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	02/27/14	Well Number:	**10-6_** 022714
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.77 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**59.3**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**54.3 - 59.3**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**56.8**
Sampling Time:	1635	Depth to Groundwater (ft):	31.35
Total Discharge (gal):	1.97	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	27.95

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
10-6_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1602 Time	1607	1612	1617	1622	1627	1632		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.25	.25	.25	.25	.25	.25		
Volume Purged (Liters)	1.25	2.5	3.75	5	6.25	7.5		
Water Depth (ft)	31.41	31.41	31.41	31.41	31.41	31.41		
Temperature (Celsius)	10.60	10.57	10.63	10.64	10.67	10.60		
pH	7.45	7.40	7.34	7.34	7.34	7.33		
Sp. Conductance (uS/cm)	580	592	599	605	611	615		
DO (mg/L)	4.28	4.13	4.46	4.81	5.11	5.36		
ORP (mV)	19.4	16.9	20.7	23.9	26.7	29.6		
Turbidity (NTU)	0.00	0.00	0.00	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/19/14	Well Number:	10-7_021914
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.23 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	52.5
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	47.5 - 52.3
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	50.0
Sampling Time:	1105	Depth to Groundwater (ft):	27.83
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	24.47

Reference: TOC

Weather: Sunny ~ 35°F - Wind

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/19/14			
Turbidity:	Micro TPW	10/4/13	Trip Blank	TB2_021914	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-7_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

~~BC 1030~~ Time	~~1035~~ ~~1425~~ BC	1040	1045	1050	1055	1100		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	27.84	27.84	27.84	27.84	27.84	27.84		
Temperature (Celsius)	10.08	10.67	10.83	10.78	10.72	10.74		
pH	8.25	8.16	7.77	7.55	7.38	7.40		
Sp. Conductance (uS/cm)	782	794	799	798	801	799		
DO (mg/L)	3.93	2.78	2.49	2.48	2.58	2.57		
ORP (mV)	184.1	191.1	190.8	188.5	187.9	178.8		
Turbidity (NTU)	0.19	0.29	0.39	0.24	0.34	0.19		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

12-9 @ 1024 : 27.66 FT

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	(Purge) 2/26 (sample) 2/27	Well Number:	10-8_ 022714
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.45 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	BC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	48.5
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	43.5 - 48.5
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	45.4
Sampling Time:	1610	Depth to Groundwater (ft):	(purge) 9.55 (sample) 20.94
Total Discharge (gal):	25.26	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	PURGE 38.95 SAMPLE 27.56

Reference: TOC

Weather: Cloudy - 35°F

Water Quality Meter(s)	Model	tion Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-8_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

0914 (2/26) Time	0917	0921	0923	0925		1603 (2/27)	1608
Parameter (every 5 min)	3 min	7 min	9 min	11 min	min	min	min 5 min
Flow Rate (L/min)						Q (L/min)	0.2
Volume Purged (~~Liters~~) gal	5	10	15	20		# (Liters)	1.0
Water Depth (ft)	16.10	22.70	30.55	37.00			21.57
Temperature (Celsius)	9.69	9.89	10.05	9.85			9.33
pH	8.07	7.98	7.99	7.97			7.53
Sp. Conductance (uS/cm)	525	525	525	525			542
DO (mg/L)	1.52	4.39	4.96	5.25			2.12
ORP (mV)	174.7	175.2	173.4	172.8			131.9
Turbidity (NTU)	2.81	0.87	1.58	1.84			2.06
Color							
Odor/Evidence of LNAPL							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

*92-2 DTW = 9.93 FT 2/26
9.94 FT 2/27

#purged = 25 gal

*UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 2/27/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/19/14	Well Number:	11-1_021914
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.87 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	(good)
Water Level Meter:	Solinst	Total Casing Depth (ft):	56.9
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	51.9 - 56.9
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	54.3
Sampling Time:	1335	Depth to Groundwater (ft):	23.74
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	33.16
Weather:	Sunny Windy ~ 30 °F		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/19/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
11-1_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1300 Time	1305	1310	1315	1320	1325	1330		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	23.78	23.78	23.78	23.78	23.78	23.78		
Temperature (Celsius)	8.87	9.02	9.32	9.29	9.14	9.44		
pH	7.22	7.42	7.42	7.40	7.35	7.35		
Sp. Conductance (uS/cm)	562	568	566	564	561	558		
DO (mg/L)	5.52	4.98	5.08	5.24	7.38	6.24		
ORP (mV)	184.2	172.8	169.8	~~164~~ 169.3 BC	169.6	168.5		
Turbidity (NTU)	4.61	4.81	5.06	6.84	17.27	20.10		
Color	Clear / Very slight grey							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

07-1 @ 1258 : 24.00 FT

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	**12-1 Port 1_ 022114**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.0 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	FLUTe well completion with 5 sampling ports
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**51.0**
Purging Equipment:	FLUTe valve with	Screened Interval (ft):	**43.0 - 51.0**
Sampling Equipment:	compressed Nitrogen	Purge Depth (ft):	**50.5**
Sampling Time:	1021	Depth to Groundwater (ft):	
Total Discharge (gal):		Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14	Type	Sample ID	Time
Turbidity:	Micro TPW	10/4/13	TRIP BLANK	TB1_022114	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-1 Port 1_mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	0910	0932						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (Celsius)	10.44	10.80						
pH	6.92	6.88						
Sp. Conductance (uS/cm)	901	900						
DO (mg/L)	0.84	0.44						
ORP (mV)	-33.1	-48.5						
Turbidity (NTU)	0.95	2.60						
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

12-10: DTW = 29.07 (2/21/14 @ 0845)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 2/21/14

Project Name: **BN Livingston Shop Complex**

Project Number: **1496021*16**

Sampling Personnel: CL

Water Level Meter: Solinst

Purging Equipment: FLUTe valve with

Sampling Equipment: compressed Nitrogen

Sampling Time: 1025

Total Discharge (gal):

Water Disposal: GWTP

Well Number: **12-1 Port 2_** 022114

Monument Type: Stickup: 1.0 (ft PVC) Flush:

Well Diameter (in): FLUTe well completion with 5 sampling ports

Well Condition:

Total Casing Depth (ft): **60.0**

Screened Interval (ft): **55.0 - 60.0**

Purge Depth (ft): **55.5**

Depth to Groundwater (ft):

Depth to LNAPL (ft): —

Water Column (ft):

Reference: **TOC**

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
12-1 Port 2_mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	0915	0937						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (Celsius)	10.99	10.88						
pH	6.93	6.83						
Sp. Conductance (uS/cm)	868	872						
DO (mg/L)	0.56	0.38						
ORP (mV)	-45.1	-47.8						
Turbidity (NTU)	1.13	1.40						
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	12-1 Port 3_ 022114
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.0 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	FLUTe well completion with 5 sampling ports
Sampling Personnel:	CL	Well Condition:	
Water Level Meter:	Solinst	Total Casing Depth (ft):	70.0
Purging Equipment:	FLUTe valve with	Screened Interval (ft):	65.0 - 70.0
Sampling Equipment:	compressed Nitrogen	Purge Depth (ft):	65.5
Sampling Time:	1028	Depth to Groundwater (ft):	
Total Discharge (gal):		Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
12-1 Port 3_mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	0918	0940						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (Celsius)	10.82	10.92						
pH	6.88	6.84						
Sp. Conductance (uS/cm)	853	852						
DO (mg/L)	0.42	0.81						
ORP (mV)	-149.4	-96.4						
Turbidity (NTU)	0.84	11.33						
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	**12-1 Port 4_ 022114**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.0 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	FLUTe well completion with 5 sampling ports
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**78.0**
Purging Equipment:	FLUTe valve with	Screened Interval (ft):	**73.0 - 78.0**
Sampling Equipment:	compressed Nitrogen	Purge Depth (ft):	**73.5**
Sampling Time:	1615	Depth to Groundwater (ft):	
Total Discharge (gal):		Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	

Reference: TOC

Weather:

Water Quality Meter(s)	**Model**	**Calibration Date/Time**	**QA/QC Samples**		
			Type	**Sample ID**	**Time**
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	**Sample Containers**				**Field Filtered**	**Analysis Requested**	**MS/MSD & Comments**
	No.	**Type**	**Pres.**	**Vol.**			
12-1 Port 4_mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	0922	1050						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (Celsius)	10.80	10.85						
pH	6.89	6.96						
Sp. Conductance (uS/cm)	860	863						
DO (mg/L)	0.36	0.43						
ORP (mV)	-93.3	-87.1						
Turbidity (NTU)	0.31	1.40						
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	12-1 Port 5_ 022114
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.0 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	FLUTe well completion with 5 sampling ports
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	95.0
Purging Equipment:	FLUTe valve with	Screened Interval (ft):	90.0 - 95.0
Sampling Equipment:	compressed Nitrogen	Purge Depth (ft):	89.5
Sampling Time:	1031	Depth to Groundwater (ft):	
Total Discharge (gal):		Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
12-1 Port 5_mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	0927	0944						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (Celsius)	10.16	10.91						
pH	6.96	6.97						
Sp. Conductance (uS/cm)	867	867						
DO (mg/L)	0.61	0.50						
ORP (mV)	-59.0	-65.7						
Turbidity (NTU)	0.77	0.94						
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	PURGE 2/26/14 ~~PURGE~~ CL SAMPLE 2/27/14	Well Number:	12-2_ 022714
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	85.0
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	75.0 - 85.0
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	80.0
Sampling Time:	1320	Depth to Groundwater (ft):	PURGE 54.27 ~~PURGE~~ CL 53.88 SAMPLE
Total Discharge (gal):	25.26	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	PURGE 30.73 SAMPLE 31.12

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
12-2_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1019 Time	1021	1023	1025	1030		2/27/14	1312	1317
Parameter (every 5 min)	min	min	min	min	min	min	min	5 min
Flow Rate (L/min)								.2/MIN
Volume Purged ~~(Liters)~~ CL GAL	5	5	5	10				1L
Water Depth (ft)	58.42	61.91	64.00	71.00				54.08
Temperature (Celsius)	12.58	12.88	13.08	13.11				10.38
pH	8.20	8.17	8.18	8.19				7.60
Sp. Conductance (uS/cm)	555	538	532	533				480
DO (mg/L)	0.26	0.15	0.10	0.12				5.42
ORP (mV)	143.2	139.6	135.8	130.0				39.7
Turbidity (NTU)	54.17	71.42	57.90	41.71				3.21
Color	CLEAR							CLEAR
Odor/Evidence of LNAPL	NONE							NONE

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 2/27/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	PURGE 2/25/14 SAMPLE 2/26/14	Well Number:	12-3_ 022614
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	50.0
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	40.0 - 50.0
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	45.0
Sampling Time:	1340	Depth to Groundwater (ft):	SAMPLE – 36.23 CL After 2-25-14 36.19
Total Discharge (gal):	19.26	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	PURGE 13.81 SAMPLE 13.77

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/26/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
12-3_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	17:00	17:04	17:05			2/26/14	1334	1339
Parameter (every 5 min)	2 min	2 min	1 min	min	min	min	min	5 min
Flow Rate ~~(L/min)~~ GPM CL	3.8	3.8	1.9					.2 L/MIN
Volume Purged ~~(Liters)~~ GAL CL	7.6	7.6	3.8					1 L
Water Depth (ft)	37.04	38.90	40.02					36.65
Temperature (Celsius)	11.57	11.58	12.03					10.44
pH	7.70	7.65	7.59					7.54
Sp. Conductance (uS/cm)	570	568	566					564
DO (mg/L)	1.95	1.92	1.98					3.25
ORP (mV)	178	177	177					5.6
Turbidity (NTU)	7.31	8.54	8.12					3.31
Color	colorless							CLEAR
Odor/Evidence of LNAPL	NONE							NONE

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 2/26/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/19/14	Well Number:	12-4_ 021914
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	VAULT FULL of ICE
Water Level Meter:	Solinst	Total Casing Depth (ft):	46.2
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	36.2 - 46.2
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	41.0
Sampling Time:	1455	Depth to Groundwater (ft):	36.17
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.03

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	2/9/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW	10/4/13	DUPLICATE	D1_021914	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-4_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1420 Time	1425	1430	1435	1440	1445	1450		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	.4	.4	.4	.4	.4		
Volume Purged (Liters)	2	4	6	8	10	12		
Water Depth (ft)	36.18	36.18	36.18	36.18	36.18	36.18		
Temperature (Celsius)	9.69	9.92	9.91	9.94	9.91	9.93		
pH	7.27	7.17	7.11	7.11	7.03	7.06		
Sp. Conductance (uS/cm)	590	589	590	589	588	588		
DO (mg/L)	5.59	5.40	5.60	5.46	5.68	5.35		
ORP (mV)	58.8	50.4	46.3	45.0	45.0	44.9		
Turbidity (NTU)	9.00	3.88	2.35	0.92	0.14	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	PURGE 2/22/14 SAMPLE 2/22/14	Well Number:	12-5_ 022214
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: ~2 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	BC/CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	51.5
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	41.5 - 51.5
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	47.0
Sampling Time:	1440	Depth to Groundwater (ft):	PURGE 9.44 / SAMPLE 9.45
Total Discharge (gal):		Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	PURGE 42.06 SAMPLE 42.05

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/22/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
12-5_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

~~1038~~ 1135 BC Time	1143	1150	1157			2/22/14	1434	1439
Parameter (every 5 min)	8 min	7 min	7 min	min	min	min	min	5 min
Flow Rate (~~L/min~~ BC) GPM	1.875							0.2 L/min
Volume Purged (~~Liters~~ CL) GAL	15	30	45	60 CL				1
Water Depth (ft)	26.95	38.70	41.90					9.79
Temperature (Celsius)	8.54	8.48	8.20					6.80
pH	8.32	8.15	8.05					7.83
Sp. Conductance (uS/cm)	368	367	3.76					392
DO (mg/L)	1.25	0.90	4.17					1.62
ORP (mV)	198.1	196.5	190.9					33.1
Turbidity (NTU)	1.82	1.66	2.89					0.00
Color	Clear							CLEAR
Odor/Evidence of LNAPL	None							NONE NOTICED

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

07-11: DTW = 10.76 CL 3

Tubing detached @ 10 gal - restarted @ DTW 9.68 FT

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 2/22/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/19/14	Well Number:	12-6_ 021914
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	VAULT FULL OF ICE / GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	62.7
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	52.7 - 62.7
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	58.0
Sampling Time:	1120	Depth to Groundwater (ft):	19.35
Total Discharge (gal):	0.78	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	43.35

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/19/14 0730	TRIP BLANK	TBI_021914	0800
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-6_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1048 Time	1053	1058	1103	1108	1113	1118		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.1	0.1	0.1	0.1	0.1	0.1		
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0		
Water Depth (ft)	19.48	19.49	19.51	19.53	19.55	19.58		
Temperature (Celsius)	8.72	8.97	8.84	8.76	8.51	8.42		
pH	7.64	7.42	7.40	7.39	7.36	7.35		
Sp. Conductance (uS/cm)	570	561	551	535	528	526		
DO (mg/L)	1.62	1.23	1.02	0.99	0.95	0.91		
ORP (mV)	96.6	62.5	49.3	37.9	31.2	23.8		
Turbidity (NTU)	18.22	2.17	3.07	1.04	1.32	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/27/14	Well Number:	13-8_022714
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: ✓
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	EnC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	48.7
Purging Equipment:	Dedicated	Screened Interval (ft):	43.7 - 48.7
Sampling Equipment:	Dedicated	Purge Depth (ft):	46.0
Sampling Time:	1314	Depth to Groundwater (ft):	22.80
Total Discharge (gal):	2.310	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	25.90

Reference: TOC

Weather: BC + Cloudy ~35°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-8_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
13-8_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-8_Date ie;mmddyy	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-8_Date ie;mmddyy	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1239 Time	1244	1249	1254	1259	1304	1309		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	22.82	22.82	23.82	23.82	23.82	23.83		
Temperature (Celsius)	11.24	11.39	11.40	11.33	11.37	11.33		
pH	8.25	7.87	7.76	7.62	7.55	7.47		
Sp. Conductance (uS/cm)	847	853	854	854	854	855		
DO (mg/L)	7.30	6.96	7.08	6.90	6.80	7.01		
ORP (mV)	169.9	173.1	171.3	167.6	165.1	162.5		
Turbidity (NTU)	5.56	4.29	1.26	1.13	1.03	1.03		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

13-1 SWL: 23.04 FT 2/27 1225

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/28/14	Well Number:	13-9_022814
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: ✓
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	BenC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	53.7
Purging Equipment:	Dedicated	Screened Interval (ft):	53.5 - 48.5
Sampling Equipment:	Dedicated	Purge Depth (ft):	51.0
Sampling Time:	1607	Depth to Groundwater (ft):	23.87
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	29.83

Reference: TOC

Weather: Snowing -8°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/28/14	Duplicate	D2_022814	0800
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-9_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
13-9_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-9_Date ie;mmddyy	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-9_Date ie;mmddyy	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1532 Time	1537	1542	1547	1552	1557	1602		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	~~1.5~~ 1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	23.95	23.95	23.95	23.96	23.96	23.96		
Temperature (Celsius)	8.03	7.98	8.07	8.12	8.18	7.83		
pH	7.75	7.59	7.50	7.41	7.43	7.41		
Sp. Conductance (uS/cm)	729	735	732	732	734	738		
DO (mg/L)	2.94	1.74	1.44	1.54	1.58	1.66		
ORP (mV)	166.8	176.7	179.4	181.3	183.9	183.0		
Turbidity (NTU)	5.93	2.90	3.89	2.48	2.36	1.90		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters DNAPL → DNAPL TEST = NEG.

E7 2/28/14 1518 23.70 FT

92-1 2/28/14 1521 28.46 FT

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	(purge) 2/27 SAMPLE 2/28/14	Well Number:	13-10_ 022814
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	(good)
Water Level Meter:	Solinst	Total Casing Depth (ft):	58.3
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	53.0 - 58.0
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	55.0
Sampling Time:	1100	Depth to Groundwater (ft):	purge (2/27/14) 23.11 SAMPLE 23.13
Total Discharge (gal):	23.26	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	PURGE 35.19 SAMPLE 35.17

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/28/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-10_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
13-10_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-10_Date ie;mmddyy	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-10_Date ie;mmddyy	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1035 Time	1037	1039	1042	1045		2/28/14	1053	1058
Parameter (every 5 min)	2 min	2 min	3 min	3 min	min	min	min	5 min
Flow Rate (L/min)								.2
Volume Purged (~~Liters~~) gal	3	3	8	6				1
Water Depth (ft)	28.80	32.00	40.00	46.00				24.58
Temperature (Celsius)	11.47	11.80	11.93	12.00				7.54
pH	8.78	9.01	9.06	9.08				8.50
Sp. Conductance (uS/cm)	423	424	423	424				467
DO (mg/L)	0.35	0.22	0.20	0.27				3.05
ORP (mV)	136.2	127.8	125.7	125.3				-64.3
Turbidity (NTU)	7.73	6.24	5.83	6.01				1.89
Color								CLEAR
Odor/Evidence of LNAPL								NONE

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

DTW 13-5 1450 2/24 22.92 FT

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 2/28/14 AFTER RECOVERY

Vpurged = 23 gal

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	E-6_022114
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	8
Sampling Personnel:	Ben C	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	32.50
Purging Equipment:	QED	Screened Interval (ft):	
Sampling Equipment:	QED	Purge Depth (ft):	30.00
Sampling Time:	1518	Depth to Groundwater (ft):	22.70
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	–
Water Disposal:	GWTP	Water Column (ft):	9.80
Weather:	Snowing – ~30°F		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14
Turbidity:	Micro TPW	10/4/13
Other:		

QA/QC Samples		
Type	Sample ID	Time
Rinse Blank	RX_022114	1610

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
E-6_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	1443	1448	1453	1458	1503	1508	1513		
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)		0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)		1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)		22.70	22.70	22.70	22.70	22.70	22.70		
Temperature (Celsius)		9.23	9.75	9.85	10.03	10.07	10.10		
pH		7.40	7.36	7.33	7.23	7.27	7.24		
Sp. Conductance (uS/cm)		631	635	636	635	635	635		
DO (mg/L)		6.26	6.52	6.57	6.59	6.60	6.41		
ORP (mV)		234.1	230.1	226.6	232.2	220.5	219.5		
Turbidity (NTU)		1.94	1.65	2.02	1.30	0.81	0.85		
Color		Clear							
Odor/Evidence of LNAPL		None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	E-8_022114
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: ✓
Project Number:	1496021*16	Well Diameter (in):	8
Sampling Personnel:	BnC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	29.45
Purging Equipment:	QED	Screened Interval (ft):	
Sampling Equipment:	QED	Purge Depth (ft):	27.45
Sampling Time:	1406	Depth to Groundwater (ft):	23.21
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	6.24

Reference: TOC

Weather: Cloudy - Flurries ~30°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
E-8_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1331 Time	1336	1341	1346	1351	1356	1401		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.4	0.4	0.4	0.4	0.4	0.4		
Volume Purged (Liters)	2.0	4.0	6.0	8.0	10.0	12.0		
Water Depth (ft)	23.21	23.21	23.21	23.21	23.21	23.21		
Temperature (Celsius)	9.98	10.50	10.59	10.59	10.56	10.44		
pH	7.34	7.30	7.25	7.21	7.17	7.16		
Sp. Conductance (uS/cm)	701	693	691	694	695	695		
DO (mg/L)	6.60	6.67	6.55	6.73	6.80	6.82		
ORP (mV)	202.1	199.6	199.2	197.5	196.9	196.2		
Turbidity (NTU)	55.75	24.63	10.82	8.93	6.36	4.14		
Color	Light Tan / Very Lt tan							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	ISCO-1_022114
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.4
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	29.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	24.6 - 29.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	27.0
Sampling Time:	1135	Depth to Groundwater (ft):	23.09
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	–
Water Disposal:	GWTP	Water Column (ft):	6.51

Reference: TOC

Weather: Snowing - Light Wind

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14	Duplicate	DI-022114	0800
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
ISCO-1_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1100 Time	1105	1110	1115	1120	1125	1130		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	0.4	0.4	0.4	0.4	0.4		
Volume Purged (Liters)	2.0	4.0	6.0	8.0	10.0	12.0		
Water Depth (ft)	23.09	23.09	23.09	23.09	23.09	23.09		
Temperature (Celsius)	9.79	10.55	10.67	10.83	10.88	10.80		
pH	7.46	7.43	7.37	7.34	7.31	7.30		
Sp. Conductance (uS/cm)	669	682	680	681	683	684		
DO (mg/L)	6.85	7.20	6.87	7.07	6.97	7.05		
ORP (mV)	217.1	210.0	207.2	205.4	203.4	201.6		
Turbidity (NTU)	0.45	0.24	0.08	0.22	0.25	0.24		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/20/14	Well Number:	ISCO-2_ 022014
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.4
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	BnC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	31.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	26.6-31.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	29.0
Sampling Time:	1647	Depth to Groundwater (ft):	22.91
Total Discharge (gal):	2.360	Depth to LNAPL (ft):	–
Water Disposal:	GWTP	Water Column (ft):	8.69

Reference: TOC

Weather: ~15°F - windy - cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/20/14			
Turbidity:	Micro TPW	10/4/13	Trip Blank	TBZ_022014	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
ISCO-2_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1612 Time	1617	1622	1627	1632	1637	1642		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	22.91	22.91	22.91	22.91	22.91	22.91		
Temperature (Celsius)	9.32	9.57	9.56	9.64	9.66	9.65		
pH	7.42	7.36	7.35	7.32	7.30	7.29		
Sp. Conductance (uS/cm)	670	670	669	668	667	666		
DO (mg/L)	7.27	7.07	7.10	7.08	7.12	7.09		
ORP (mV)	177.8	179.9	180.4	181.0	180.9	181.2		
Turbidity (NTU)	1.59	2.77	1.17	1.70	0.76	0.77		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

ISCO 1 DTW: 23.08 FT @1430

10-2 DTW: 22.39 FT @1520

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/28/14	Well Number:	ISCO-24R_ 022814
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.3
Project Number:	1496021*16	Well Diameter (in):	6
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	33.7
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	28.7-33.7
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	31.0
Sampling Time:	1255	Depth to Groundwater (ft):	21.15
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	12.55

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/28/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
ISCO-24R_mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1223 Time	1228	1233	1238	1243	1248	1253		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	21.17	21.17	21.17	21.17	21.17	21.17		
Temperature (Celsius)	7.47	7.54	7.72	7.96	7.86	7.88		
pH	7.40	7.32	7.27	7.24	7.22	7.24		
Sp. Conductance (uS/cm)	595	605	606	607	609	609		
DO (mg/L)	6.55	6.55	6.72	7.22	6.94	6.75		
ORP (mV)	-2.9	-0.5	1.8	3.8	5.4	7.0		
Turbidity (NTU)	1.95	0.95	0.61	0.14	1.54	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/22/14	Well Number:	89-8_022214
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.5
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	BenC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	25.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	15.5 - 25.5
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	23.0
Sampling Time:	1520	Depth to Groundwater (ft):	21.30
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	4.30

Reference: TOC

Weather: inside sample - outside ~30°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	2/22/14	Type TB	Sample ID	Time
Turbidity:	Micro TPW	10/4/13	~~Field Blank~~		
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
89-8_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	1445	1450	1455	1500	1505	1510	1515		
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)		0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)		1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)		21.30	21.30	21.30	21.30	21.30	21.30		
Temperature (Celsius)		12.01	12.13	12.18	12.17	12.19	12.19		
pH		7.72	7.66	7.55	7.54	7.49	7.46		
Sp. Conductance (uS/cm)		794	789	789	789	789	789		
DO (mg/L)		6.81	6.65	6.70	6.65	6.59	6.60		
ORP (mV)		191.1	194.3	196.3	194.9	195.2	195.0		
Turbidity (NTU)		6.20	2.94	1.05	0.51	0.48	0.36		
Color		Clear							
Odor/Evidence of LNAPL		None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	L-88-13_022114
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.1 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	Ben C	Well Condition:	
Water Level Meter:	Solinst	Total Casing Depth (ft):	42.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	32.6 - 42.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	34.7
Sampling Time:	0945	Depth to Groundwater (ft):	~~28.34~~ BC 26.01
Total Discharge (gal):	2.3Lo	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	16.59

Reference: TOC

Weather: Cloudy - Windy ~30°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14			
Turbidity:	Micro TPW	10/4/13	Trip Blank	TB2-022114	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
L-88-13_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

0910 Time	0915	0920	0925	0930	0935	0940		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	BC ~~6~~ 7.5	9.0		
Water Depth (ft)	26.01	26.01	26.01	26.01	26.01	26.01		
Temperature (Celsius)	10.31	10.64	10.49	10.33	10.54	10.61		
pH	7.96	7.78	7.59	7.44	7.35	7.27		
Sp. Conductance (uS/cm)	638	BC ~~6~~ 635	635	634	635	635		
DO (mg/L)	1.03	0.57	0.52	0.50	0.49	0.30		
ORP (mV)	203.5	207.6	209.2	209.6	209.1	207.0		
Turbidity (NTU)	0.76	0.59	0.12	0.47	0.11	0.07		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-5 24.82 FT DTW 2/21 @ 0845

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/19/14	Well Number:	EX-58_ 02/914
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	40.5
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	15.5 - 40.5
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	31.0
Sampling Time:	1230	Depth to Groundwater (ft):	21.13
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	19.37

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/19/14 0730			
Turbidity:	Micro TPW	10/4/13	FIELD BLANK	LIV_02/914	1208
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
EX-58_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1155 Time	1200	1205	1210	1215	1220	1225		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	21.13	21.13	21.13	21.13	21.13	21.13		
Temperature (Celsius)	9.93	10.11	10.23	10.08	10.15	10.28		
pH	7.34	7.21	7.15	7.13	7.13	7.12		
Sp. Conductance (uS/cm)	576	577	576	577	577	576		
DO (mg/L)	4.15	4.11	4.03	4.13	4.13	4.10		
ORP (mV)	92.4	70.7	57.3	46.9	41.8	38.2		
Turbidity (NTU)	1.49	0.68	0.25	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: ~~Purge~~ BC 2/26 2/27

Project Name: **BN Livingston Shop Complex**

Project Number: **1496021*16**

Sampling Personnel: Ben C

Water Level Meter: Solinst

Purging Equipment: Ded. Bladder

Sampling Equipment: Ded. Bladder

Sampling Time: 1551

Total Discharge (gal): 3.15

Water Disposal: GWTP

Weather: Cloudy ~40°F

Well Number: **92-2_022714**

Monument Type: Stickup: 1.3 (ft PVC) Flush:

Well Diameter (in): 2

Well Condition: Good - small amounts of plant matter

Total Casing Depth (ft): **26.3**

Screened Interval (ft): **7.3 - 26.3**

Purge Depth (ft): **22.0**

Depth to Groundwater (ft): 9.94

Depth to LNAPL (ft): —

Water Column (ft): 16.36

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
92-2_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1516 Time	1521	1526	1531	1536	1541	1546		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.4	0.4	0.4	0.4	0.4	0.4		
Volume Purged (Liters)	2.0	4.0	6.0	8.0	10.0	12.0		
Water Depth (ft)	9.94	9.94	9.94	9.94	9.94	9.94		
Temperature (Celsius)	10.09	10.11	10.13	10.11	10.13	10.10		
pH	7.26	7.13	7.10	7.08	7.06	7.05		
Sp. Conductance (uS/cm)	664	666	666	666	666	666		
DO (mg/L)	2.14	1.82	1.81	1.71	1.67	1.69		
ORP (mV)	152.2	153.5	153.2	151.2	150.4	149.8		
Turbidity (NTU)	7.61	2.74	1.94	2.01	1.19	3.92		
Color	Clear/Very light yellow							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

* 10-8 DTW = 9.55 FT 2/26
= 21.71 FT 2/27

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/19/14	Well Number:	07-1_021914
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.1 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	33.1
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	23.1 - 33.1
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	30.0
Sampling Time:	1255	Depth to Groundwater (ft):	24.00
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	-
Water Disposal:	GWTP	Water Column (ft):	9.10

Reference: TOC

Weather: Prt Cldy - Windy ~30°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/19/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
07-1_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1220 Time	1225	1230	1235	1240	1245	1250		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	24.00	24.00	24.00	24.00	24.00	24.00		
Temperature (Celsius)	9.10	9.41	9.44	9.57	9.51	9.48		
pH	7.42	7.44	7.41	7.33	7.34	7.32		
Sp. Conductance (uS/cm)	537	543	543	543	543	544		
DO (mg/L)	8.92	8.47	8.57	8.47	8.45	8.28		
ORP (mV)	170.0	162.2	162.3	173.0	170.7	169.3		
Turbidity (NTU)	0.14	0.10	0.27	0.13	0.16	0.07		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

11-1 @1217 : 23.74 FT

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/22/14	Well Number:	07-11_ 022214
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 3.1 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL / RC	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	22.1
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	7.1 - 22.1
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	16.0
Sampling Time:	1035	Depth to Groundwater (ft):	10.73
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	11.37

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/22/14 0800	Trip Blank	TB1_022214	0800
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
07-11_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1002 Time	1007	1012	1017	1022	1027	1032		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	.4	.4	.4	.4	.4		
Volume Purged (Liters)	2	4	6	8	10	12		
Water Depth (ft)	10.73	10.73	10.73	10.73	10.73	10.73		
Temperature (Celsius)	6.85	6.97	6.95	6.91	6.89	6.91		
pH	7.76	7.51	7.34	7.27	7.23	7.21		
Sp. Conductance (uS/cm)	349	348	347	347	347	348		
DO (mg/L)	3.16	2.98	3.07	3.02	2.94	2.92		
ORP (mV)	158.3	140.1	123.2	110.0	99.7	86.1		
Turbidity (NTU)	6.57	8.29	5.69	4.06	1.08	0.43		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

12-5: DTW = 9.44

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/26/14	Well Number:	12-7_ 022614
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.6 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	35.1
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	15.1 - 35.1
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	30.0
Sampling Time:	1650	Depth to Groundwater (ft):	25.80
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.30

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/26/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
12-7_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1618 Time	1623	1628	1633	1638	1643	1648		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	25.81	25.81	25.81	25.81	25.81	25.81		
Temperature (Celsius)	10.92	11.19	11.23	11.24	11.14	11.11		
pH	7.15	6.85	6.79	6.79	6.79	6.80		
Sp. Conductance (uS/cm)	775	779	779	779	779	779		
DO (mg/L)	0.65	0.55	0.38	0.32	0.35	0.34		
ORP (mV)	12.2	-4.7	-29.2	-34.2	-45.2	-50.3		
Turbidity (NTU)	5.14	0.58	0.00	0.55	0.49	0.20		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

~~* PURGE @ .1 L/MIN~~ CL * STABLE WATER LEVEL @ .3 L/MIN

10-3 DTW = 26.20

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/24/14	Well Number:	12-8_ 022414
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.4 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	CL ~~17.9~~ 37.9
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	17.9 - 37.9
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	32.0
Sampling Time:	1550	Depth to Groundwater (ft):	26.71
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	11.19
Weather:	COLD, SNOWING		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/24/14	FIELD BLANK	LIV_022414	1528
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-8_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1516 Time	1521	1526	1531	1536	1541	1546		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	26.71	26.71	26.71	26.71	26.71	26.71		
Temperature (Celsius)	9.66	9.83	9.95	10.06	10.13	10.08		
pH	6.94	6.78	6.74	6.74	6.75	6.75		
Sp. Conductance (uS/cm)	748	745	744	744	744	744		
DO (mg/L)	5.34	5.05	5.13	5.12	5.15	5.12		
ORP (mV)	-12.6	-6.0	0.1	4.6	8.1	11.2		
Turbidity (NTU)	13.47	8.76	3.68	3.11	2.65	1.07		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-4 DTW 27.60 2/24/14 @ 1452

* PULLED XDCR TO CLEAR ICE FROM PUMP DISCHARGE

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/19/14	Well Number:	12-9_021914
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.1 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	33.1
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	18.1 - 33.1
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	30.0
Sampling Time:	1148	Depth to Groundwater (ft):	27.66
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	–
Water Disposal:	GWTP	Water Column (ft):	5.44

Reference: TOC

Weather: Sunny Windy ~30° F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	~~BC 6 112~~ 2/19/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-9_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1113 Time	1118	1123	1128	1133	1138	1143		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	27.66	27.66	27.66	27.66	27.66	27.66		
Temperature (Celsius)	8.35	8.25	7.70	7.27	7.59	~~7~~ BC 8.17		
pH	7.38	7.36	7.19	7.09	7.06	7.12		
Sp. Conductance (uS/cm)	813	824	833	834	833	837		
DO (mg/L)	7.68	7.44	7.46	7.29	7.22	7.11		
ORP (mV)	174.9	175.4	179.2	180.7	178.8	173.5		
Turbidity (NTU)	0.27	0.14	0.08	0.07	0.14	0.28		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-7 @ 1110 : 27.84 FT

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	12-10_ 022114
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.6 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	CL ~~20.1~~ 30.1
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	20.1 - 30.1
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	30.0
Sampling Time:	1215	Depth to Groundwater (ft):	29.07
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	1.03

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14	Field Blank	LIV_022114	1100
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
12-10_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1140 Time	1145	1150	1155	1200	1205	1210		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	29.10	29.10	29.09	29.09	29.09	29.09		
Temperature (Celsius)	10.5	10.18	10.11	10.16	10.17	10.21		
pH	6.80	6.69	6.66	6.63	6.63	6.62		
Sp. Conductance (uS/cm)	901	902	903	903	903	903		
DO (mg/L)	2.19	2.20	2.26	2.09	2.25	2.08		
ORP (mV)	27.5	20.5	18.5	16.5	16.3	15.4		
Turbidity (NTU)	0.00	0.00	0.00	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/27/14	Well Number:	13-1_022714
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: _____
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	30.0
Purging Equipment:	QED	Screened Interval (ft):	24.5 - 27.5
Sampling Equipment:	QED	Purge Depth (ft):	26.0
Sampling Time:	1405	Depth to Groundwater (ft):	23.04
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	–
Water Disposal:	GWTP	Water Column (ft):	6.96

Reference: TOC

Weather: Cloudy ~40°F

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14
Turbidity:	Micro TPW	10/4/13
Other:		

QA/QC Samples		
Type	Sample ID	Time
Rinse Blank	Rx-022714	1230
Trip Blank	TB2-022714	0800

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-1_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
13-1_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-1_Date ie;mmddyy	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-1_Date ie;mmddyy	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1330 Time	1335	1340	1345	1350	1355	~~1360~~ 1400 SC		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	23.15	23.15	23.15	23.15	23.15	23.15		
Temperature (Celsius)	11.31	11.48	11.56	11.61	11.63	11.66		
pH	7.82	7.62	7.38	7.31	7.25	7.22		
Sp. Conductance (uS/cm)	289	425	686	761	806	814		
DO (mg/L)	4.18	4.67	5.69	6.10	6.32	6.43		
ORP (mV)	136.4	144.6	150.6	151.3	150.6	150.3		
Turbidity (NTU)	142.2	149.9	46.23	28.40	15.04	11.24		
Color	Light	tan/tan						
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

13-8 SWL: 22.80 FT 2/27 1225

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/28	Well Number:	**13-2_** 022814
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: _____
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	BnC	Well Condition:	
Water Level Meter:	Solinst	Total Casing Depth (ft):	**29.2**
Purging Equipment:	QED	Screened Interval (ft):	**26.2 - 29.2**
Sampling Equipment:	QED	Purge Depth (ft):	**28.0**
Sampling Time:	1005	Depth to Groundwater (ft):	22.35
Total Discharge (gal):	1.84	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	6.85

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/28/14	Trip Blank	TB2-022814	0800
Turbidity:	Micro TPW	10/4/13	Rinse Blank	RX-022814	0915
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-2_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
13-2_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-2_Date ie;mmddyy	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-2_Date ie;mmddyy	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

0930 Time	0935	0940	0945	0950	0955	1000		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.5	3.0	4.0	5.0	6.0	7.0		
Water Depth (ft)	22.40	22.43	22.36	22.40	22.40	22.40		
Temperature (Celsius)	9.09	9.73	8.90	7.96	8.28	8.34		
pH	6.28	6.64	6.76	6.67	6.74	6.82		
Sp. Conductance (uS/cm)	618	614	621	620	618	619		
DO (mg/L)	6.94	6.69	7.12	6.90	6.72	6.65		
ORP (mV)	175.0	178.5	182.2	194.6	194.0	190.6		
Turbidity (NTU)	14.70	43.21	44.08	43.04	36.22	34.89		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/26/14	Well Number:	13-3_022614
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	BnC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	31.5
Purging Equipment:	QED	Screened Interval (ft):	28.5 - 31.5
Sampling Equipment:	QED	Purge Depth (ft):	30.0
Sampling Time:	1708	Depth to Groundwater (ft):	23.93
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	7.57

Reference: TOC

Weather: Sunny - light wind - ~20°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/26/14			
Turbidity:	Micro TPW	10/4/13	Duplicate	D3-022614	0800
Other:			~~Rinse Blank~~	~~RX-022514~~	~~1615~~

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-3_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
13-3_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-3_Date ie;mmddyy	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-3_Date ie;mmddyy	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1633 Time	1638	1643	1648	1653	1658	1703		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0		
Water Depth (ft)	23.94	23.94	23.94	23.94	23.94	23.94		
Temperature (Celsius)	8.68	9.18	9.45	9.68	9.73	9.76		
pH	7.57	7.51	7.48	7.42	7.39	7.37		
Sp. Conductance (uS/cm)	762	772	773	772	771	770		
DO (mg/L)	6.34	5.98	5.98	6.09	6.25	6.09		
ORP (mV)	183.8	180.9	179.3	177.7	176.7	176.0		
Turbidity (NTU)	19.74	17.48	15.03	11.26	10.90	9.29		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/28/14	Well Number:	13-4_022814
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: ✓
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	BenC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	27.5
Purging Equipment:	QED	Screened Interval (ft):	24.5 - 27.5
Sampling Equipment:	QED	Purge Depth (ft):	26.0
Sampling Time:	1135	Depth to Groundwater (ft):	24.07
Total Discharge (gal):	1.71	Depth to LNAPL (ft):	–
Water Disposal:	GWTP	Water Column (ft):	3.43

Reference: TOC

Weather: Snowing - Wind - 10°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/28/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
13-4_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
13-4_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-4_Date ie;mmddyy	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-4_Date ie;mmddyy	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1100 Time	1105	1110	1115	1120	1125	1130		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.5	2.5	3.5	4.5	5.5	6.5		
Water Depth (ft)	24.16	24.12	24.12	24.11	24.12	24.12		
Temperature (Celsius)	8.61	8.03	7.33	7.18	7.29	7.31		
pH	7.54	7.41	7.31	7.26	7.21	7.16		
Sp. Conductance (uS/cm)	725	728	726	721	718	718		
DO (mg/L)	7.00	6.91	6.90	6.72	6.65	6.57		
ORP (mV)	143.1	162.7	173.2	177.6	180.7	182.3		
Turbidity (NTU)	6.61	5.65	3.50	2.45	1.90	1.57		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/24/14	Well Number:	13-5_022414
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	35.5
Purging Equipment:	QED	Screened Interval (ft):	30.75 - 33.75
Sampling Equipment:	QED	Purge Depth (ft):	32.0
Sampling Time:	1554	Depth to Groundwater (ft):	22.92
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	–
Water Disposal:	GWTP	Water Column (ft):	12.58

Reference: TOC

Weather: 30F - Snowy - Lt Wind

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/24/14			
Turbidity:	Micro TPW	10/4/13	Trip Blank	TB2_022214	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-5_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
13-5_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-5_Date ie;mmddyy	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-5_Date ie;mmddyy	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1519 ~~1507~~ 3c Time	1524	1529	1534	1539	1544	1549		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	22.92	22.95	22.95	22.97	22.97	22.96		
Temperature (Celsius)	8.44	8.65	8.55	9.89	10.28	10.50		
pH	6.93	7.02	7.03	7.04	7.14	7.13		
Sp. Conductance (uS/cm)	656	656	656	658	659	659		
DO (mg/L)	4.83	4.96	4.93	5.62	5.76	5.92		
ORP (mV)	194.6	193.9	192.9	191.9	186.7	186.6		
Turbidity (NTU)	19.18	36.06	37.66	43.69	42.88	49.50		
Color	Clear / None	Vry Lt Tan						
Odor/Evidence of LNAPL								

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

13-10 DTW 1447 2/24 23.19 FT

Problems maintaing stable compressor/controller pressure

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 2/28/14

Well Number: **13-6_**

Project Name: **BN Livingston Shop Complex**

Project Number: **1496021*16**

Monument Type: Stickup: _____ (ft PVC) Flush: _____

Well Diameter (in): 4

Sampling Personnel:

Water Level Meter: Solinst

Purging Equipment:

Sampling Equipment:

Sampling Time:

Total Discharge (gal):

Water Disposal: GWTP

Well Condition:

Total Casing Depth (ft): **33.0**

Screened Interval (ft): **30.0 - 33.0**

Purge Depth (ft): **31.5**

Depth to Groundwater (ft):

Depth to LNAPL (ft):

Water Column (ft):

Reference: **TOC**

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
13-6_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
13-6_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-6_Date ie;mmddyy	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-6_Date ie;mmddyy	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

Time								
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity (NTU)								
Color								
Odor/Evidence of LNAPL								

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

* UNABLE TO LOCATE.

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/28/14	Well Number:	13-7_ 022814
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: K
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	BenC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	32.0
Purging Equipment:	QED	Screened Interval (ft):	29.0 - 32.0
Sampling Equipment:	QED	Purge Depth (ft):	30.5
Sampling Time:	1327	Depth to Groundwater (ft):	22.81
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	–
Water Disposal:	GWTP	Water Column (ft):	9.19

Reference: TOC

Weather: 15°F - Snowing

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/28/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-7_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
13-7_Date ie;mmddyy	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-7_Date ie;mmddyy	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-7_Date ie;mmddyy	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

1252 Time	1257	1302	1307	1312	1317	1322		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	22.81	22.81	22.81	22.81	22.81	22.81		
Temperature (Celsius)	9.16	9.32	9.28	9.39	9.30	9.32		
pH	7.80	7.49	7.45	7.26	7.33	7.20		
Sp. Conductance (uS/cm)	449	499	539	548	552	554		
DO (mg/L)	4.78	5.09	6.19	6.61	6.63	6.68		
ORP (mV)	171.6	195.5	178.1	174.4	174.6	174.8		
Turbidity (NTU)	8.30	20.30	19.15	14.81	11.22	8.38		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/20/14	Well Number:	# 3_ 022014
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -1.1
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL / BC	Well Condition:	GOOD - WATER IN VAULT
Water Level Meter:	Solinst	Total Casing Depth (ft):	23.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	13.6 - 23.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	22.0
Sampling Time:	1130	Depth to Groundwater (ft):	20.17
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	3.43

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/20/14 0730			
Turbidity:	Micro TPW	10/4/13	TRIP BLANK	TB1_022014	0800
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
# 3_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1057 Time	1102	1107	1112	1117	1122	1127		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2	.2	.2	.2	.2	.2		
Volume Purged (Liters)	1	2	3	4	5	6		
Water Depth (ft)	20.18	20.18	20.18	20.18	20.18	20.18		
Temperature (Celsius)	9.71	9.64	9.77	9.76	9.86	10.02		
pH	7.39	7.43	7.40	7.34	7.29	7.26		
Sp. Conductance (uS/cm)	570	573	574	575	574	574		
DO (mg/L)	7.54	7.21	7.10	7.08	7.25	7.22		
ORP (mV)	271.8	259.4	253.8	250.6	246.0	242.0		
Turbidity (NTU)	21.17	11.68	7.57	4.67	3.54	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/20/14	Well Number:	# 5_ 022014
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.6
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	GOOD – VAULT FULL OF ICE
Water Level Meter:	Solinst	Total Casing Depth (ft):	12.7
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	2.7 - 12.7
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	11.0
Sampling Time:	1245	Depth to Groundwater (ft):	6.20
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	6.50

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/20/14 0730			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
# 5_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1213 Time	1218	1223	1228	1233	1238	1243		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	6.20	6.20	6.20	6.20	6.20	6.20		
Temperature (Celsius)	8.53	8.60	8.74	8.78	8.72	8.65		
pH	7.39	7.34	7.27	7.24	7.22	7.18		
Sp. Conductance (uS/cm)	555	555	554	555	555	555		
DO (mg/L)	4.08	3.88	3.93	4.22	4.10	4.36		
ORP (mV)	208.9	209.3	208.6	207.1	206.7	207.0		
Turbidity (NTU)	73.39	45.75	25.70	13.71	11.06	—		
Color	VERY TURBID (BRN) & CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

* SMALL ROOTS NOTICED ON DTW METER UPON REMOVAL

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/20/14	Well Number:	# 6_ 022014
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.9
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	BOLT HEADS BROKEN @ WELL LID
Water Level Meter:	Solinst	Total Casing Depth (ft):	12.4
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	2.4 - 12.4
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	10.0
Sampling Time:	1340	Depth to Groundwater (ft):	7.20
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	5.20
Weather:			

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/20/14			
Turbidity:	Micro TPW	10/4/13	FIELD BLANK	LIV_022014	1330
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
# 6_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1306 Time	1311	1316	1321	1326	1331	1336		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	7.20	7.20	7.20	7.20	7.20	7.20		
Temperature (Celsius)	8.20	8.30	8.31	8.25	8.35	8.42		
pH	7.13	7.15	7.12	7.11	7.13	7.12		
Sp. Conductance (uS/cm)	557	557	557	557	557	557		
DO (mg/L)	6.73	6.36	6.49	6.50	6.48	6.65		
ORP (mV)	208.8	203.5	206.3	202.6	198.8	199.3		
Turbidity (NTU)	0.00	0.00	0.00	0.00	1.33	0.08		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	02/27/14	Well Number:	# 6_ 022714
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.9
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	GOOD (CL NO BOLT HEADS BROKEN)
Water Level Meter:	Solinst	Total Casing Depth (ft):	12.4
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	2.4 - 12.4
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	10.0
Sampling Time:	1025	Depth to Groundwater (ft):	7.34
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	5.06

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14 0730	Trip Blank	TB1_022714	0800
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
# 6_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

0950 Time	0955	1000	1005	1010	1015	1020		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	7.34	7.34	7.34	7.34	7.34	7.34		
Temperature (Celsius)	8.44	8.51	8.54	8.55	8.57	8.53		
pH	6.74	7.01	7.08	7.12	7.13	7.13		
Sp. Conductance (uS/cm)	541	537	536	536	536	536		
DO (mg/L)	6.68	6.58	6.59	6.55	6.50	6.53		
ORP (mV)	166.1	114.6	81.7	68.6	61.6	58.9		
Turbidity (NTU)	0.00	0.00	1.01	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

*NOTE: DESAMPLE

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/24/14	Well Number:	# 11_
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.4
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	28.0
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	18.0 - 28.0
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	27.0
Sampling Time:	NO SAMPLE COLLECTED	Depth to Groundwater (ft):	DRY
Total Discharge (gal):		Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
# 11_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time								
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (Celsius)								
pH								
Sp. Conductance (uS/cm)								
DO (mg/L)								
ORP (mV)								
Turbidity (NTU)								
Color								
Odor/Evidence of LNAPL								

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/26/14	Well Number:	89-1_022614
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.2 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	BenC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	32.2
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	22.2 - 32.2
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	27.0
Sampling Time:	1600	Depth to Groundwater (ft):	8.63
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	23.57

Reference: TOC

Weather: Sunny - light wind ~25°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/26/14			
Turbidity:	Micro TPW	10/4/13	Trip Blank	TB2-022614	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
89-1_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1525 Time	1530	1535	1540	1545	1550	1555		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	8.64	8.64	8.64	8.64	8.64	8.64		
Temperature (Celsius)	9.16	9.32	9.46	9.52	9.48	9.51		
pH	7.86	7.72	7.56	7.52	7.48	7.44		
Sp. Conductance (uS/cm)	SC 608 ~~1777~~	607	605	606	606	605		
DO (mg/L)	4.83	4.82	4.69	4.72	4.65	4.61		
ORP (mV)	177.8	179.0	180.3	179.3	178.7	176.5		
Turbidity (NTU)	28.67	7.08	2.42	2.40	1.90	1.44		
Color	Very light tan							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: 02/27/14

Project Name: **BN Livingston Shop Complex**

Project Number: **1496021*16**

Sampling Personnel: CL

Water Level Meter: Solinst

Purging Equipment: Ded. Bladder

Sampling Equipment: Ded. Bladder

Sampling Time: 1545

Total Discharge (gal): 2.36

Water Disposal: GWTP

Weather:

Well Number: **89-2_** 022714

Monument Type: Stickup: 0.8 (ft PVC) Flush:

Well Diameter (in): 2

Well Condition: Good

Total Casing Depth (ft): **39.8**

Screened Interval (ft): **19.8 - 39.8**

Purge Depth (ft): **36.0**

Depth to Groundwater (ft): 28.97

Depth to LNAPL (ft): —

Water Column (ft): 10.83

Reference: **TOC**

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14
Turbidity:	Micro TPW	10/4/13
Other:		

QA/QC Samples		
Type	Sample ID	Time

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
89-2_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	1511	1516	1521	1526	1531	1536	1541		
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)		.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)		1.5	3	4.5	6	7.5	9		
Water Depth (ft)		28.99	28.99	28.99	28.99	28.99	28.99		
Temperature (Celsius)		10.87	11.09	11.13	11.19	11.17	11.12		
pH		7.55	7.54	7.53	7.51	7.50	7.50		
Sp. Conductance (uS/cm)		544	543	547	547	547	547		
DO (mg/L)		5.96	5.57	5.70	5.73	5.54	5.44		
ORP (mV)		2.6	5.7	10.7	13.8	16.6	18.2		
Turbidity (NTU)		0.00	0.00	0.00	0.00	0.00	0.00		
Color		CLEAR							
Odor/Evidence of LNAPL		NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/22/14	Well Number:	**89-3_022214**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.7
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**33.3**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**13.3 - 33.3**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**31.0**
Sampling Time:	1745	Depth to Groundwater (ft):	~~PDB~~ 20.69 / ~~PURGE~~ 20.69
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	12.61

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	2/22/14	**Type**	**Sample ID**	**Time**
Turbidity:	Micro TPW	10/4/13	DUPLICATE	D1_022214	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
89-3_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
89-3-PDB-21_Date	3	VOA	HCL	40ml	N	VOC 8260	1550
89-3-PDB-26_Date	3	VOA	HCL	40ml	N	VOC 8260	1551
89-3-PDB-30_Date	3	VOA	HCL	40ml	N	VOC 8260	1552

1713 Time	1718	1723	1728	1733	1738	1743		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	20.69	20.70	20.70	20.70	20.70	20.70		
Temperature (Celsius)	9.68	9.86	9.96	9.96	9.98	10.00		
pH	7.40	7.36	7.47	7.36	7.32	7.29		
Sp. Conductance (uS/cm)	582	583	583	583	583	583		
DO (mg/L)	6.96	6.89	6.88	6.83	6.80	6.86		
ORP (mV)	187.3	188.6	178.1	176.8	175.7	175.0		
Turbidity (NTU)	81.52	60.42	38.56	26.67	17.86	—		
Color	BRN TURBID							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	02/27/14	Well Number:	89-6_ 022714
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.6 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	39.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	29.6 - 39.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	35.0
Sampling Time:	1225	Depth to Groundwater (ft):	29.01
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.51
Weather:			

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
89-6_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1154 Time	1159	1204	1209	1214	1219	1224		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	29.02	29.02	29.02	29.02	29.02	29.02		
Temperature (Celsius)	10.77	10.89	10.86	10.76	10.80	10.81		
pH	7.43	7.45	7.43	7.41	7.41	7.41		
Sp. Conductance (uS/cm)	544	535	535	535	536	535		
DO (mg/L)	7.10	6.95	7.01	7.06	6.99	6.92		
ORP (mV)	42.2	42.9	44.5	45.8	46.8	47.6		
Turbidity (NTU)	26.97	7.06	2.01	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/22/14	Well Number:	89-9_022214
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.5
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	BenC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	33.5
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	13.5 - 33.5
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	29.0
Sampling Time:	1352	Depth to Groundwater (ft):	22.63
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.87

Reference: TOC

Weather: Inside - Outside ~30°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/22/14	Trip Blank	TB2_022214	0800
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
89-9_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	1317	1322	1327	1332	1337	1342	1347		
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)		0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)		1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)		22.63	22.63	22.63	22.63	22.63	22.63		
Temperature (Celsius)		11.32	11.47	11.50	11.50	11.47	11.41		
pH		7.88	7.60	7.52	7.49	7.52	7.41		
Sp. Conductance (uS/cm)		595	601	602	603	603	604		
DO (mg/L)		6.49	6.48	6.51	6.02	6.47	6.61		
ORP (mV)		200.3	206.5	206.1	204.7	200.4	201.8		
Turbidity (NTU)		1.36	0.35	0.17	0.01	0.09			
Color		Clear							
Odor/Evidence of LNAPL		None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/25/14	Well Number:	90-2B_022514
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.7 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL/BC	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	24.7
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	14.7 - 24.7
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	24.0
Sampling Time:	1110 - CL	Depth to Groundwater (ft):	22.64
Total Discharge (gal):	0.26	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	2.06
Weather:			

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/25/14 0730	Trip Blank	TBI_022514	0800
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
90-2B_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1057 Time	1042	1047	1052	1057	1102	1107		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2	.2	.2	.2	.2	.2		
Volume Purged (Liters)	1	2	3	4	5	6		
Water Depth (ft)								
Temperature (Celsius)	7.66							
pH	6.97							
Sp. Conductance (uS/cm)	887							
DO (mg/L)	2.14							
ORP (mV)	8.1							
Turbidity (NTU)	0.19							
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

WATER LEVEL BELOW TOP OF PUMP, PURGED ~1.5 LITERS, WELL PURGED DRY, NO SAMPLE COLLECTED. CL

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/24/14	Well Number:	90-3_ 022414
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.1 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	18.1
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	8.1 - 18.1
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	16.0
Sampling Time:	1345	Depth to Groundwater (ft):	11.07
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	7.03

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/24/14	TRIP BLANK	TB1_022414	0800
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
90-3_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1314 Time	1319	1324	1329	1334	1339	1344		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	11.08	11.08	11.07	11.07	11.07	11.07		
Temperature (Celsius)	8.70	8.89	8.94	9.09	9.10	9.04		
pH	6.96	6.86	6.85	6.84	6.85	6.84		
Sp. Conductance (uS/cm)	678	677	677	675	676	677		
DO (mg/L)	1.87	1.57	1.54	1.49	1.47	1.42		
ORP (mV)	-55.3	-56.9	-59.6	-56.0	-50.6	-53.3		
Turbidity (NTU)	15.90	7.77	7.41	5.59	1.51	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	02/24/14	Well Number:	**92-4_** 022414
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.2
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL/BC	Well Condition:	Good (Well Box Full of Ice)
Water Level Meter:	Solinst	Total Casing Depth (ft):	**34.6**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**24.6 - 34.6**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**31.0**
Sampling Time:	~~1655~~ 1723	Depth to Groundwater (ft):	23.64
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.96
Weather:	6° - Wind light - Flurries		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/24/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
92-4_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	
1648		1653	1658	1703	1708	1713 1718	

~~1624~~ Time	~~1629~~	~~1634~~	~~1639~~	~~1644~~	~~1649~~	~~1654~~		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	.4	.4	.4	.4	.4		
Volume Purged (Liters)	2	4	6	8	10	12		
Water Depth (ft)	23.64	23.64	23.64	23.64	23.64	23.64		
Temperature (Celsius)	9.74	10.12	10.29	10.23	10.23	10.19		
pH	7.17	7.15	7.11	7.10	7.08	7.07		
Sp. Conductance (uS/cm)	789	794	796	796	796	796		
DO (mg/L)	5.93	6.06	6.05	6.13	5.93	6.06		
ORP (mV)	194.2	196.3	196.9	196.8	197.6	198.3		
Turbidity (NTU)	8.80	1.46	0.62	0.50	0.53	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/22/14	Well Number:	**94-1_ 022214**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.8 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	
Water Level Meter:	Solinst	Total Casing Depth (ft):	**37.8**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**27.8 - 37.8**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**33.0**
Sampling Time:	1300	Depth to Groundwater (ft):	11.00
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	26.80

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/22/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
94-1_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1229 Time	123A	1239	1244	1249	1254	1259		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	11.00	11.00	11.00	11.00	11.00	11.00		
Temperature (Celsius)	7.66	7.91	7.91	7.87	~~7.88~~ 7.88 CL	7.88		
pH	7.49	7.42	7.39	7.35	CL ~~3.72~~ 7.37	7.30		
Sp. Conductance (uS/cm)	379	375	373	373	372	372		
DO (mg/L)	3.38	2.73	2.65	2.60	2.67	2.53		
ORP (mV)	44.7	33.2	29.2	27.3	27.2	28.0		
Turbidity (NTU)	0.00	0.00	0.00	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	94-2_ 022114
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.7 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	39.2
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	29.2 - 39.2
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	34.0
Sampling Time:	1600	Depth to Groundwater (ft):	9.43
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	29.77

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
94-2_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1528 Time	1533	1538	1543	1548	1553	1558		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	9.43	9.43	9.43	9.43	9.43	9.43		
Temperature (Celsius)	10.17	10.35	10.32	10.26	10.29	10.10		
pH	7.11	7.07	7.04	7.02	7.01	6.99		
Sp. Conductance (uS/cm)	445	449	450	450	451	451		
DO (mg/L)	3.71	3.54	3.48	3.52	3.45	3.35		
ORP (mV)	29.0	26.5	26.0	26.0	26.0	27.6		
Turbidity (NTU)	0.46	0.00	0.00	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	E-7_022114
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: ____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	~~4~~ 6
Sampling Personnel:	Ben C	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	31.40
Purging Equipment:	QED	Screened Interval (ft):	
Sampling Equipment:	QED	Purge Depth (ft):	29.90
Sampling Time:	1305	Depth to Groundwater (ft):	23.64
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	–
Water Disposal:	GWTP	Water Column (ft):	7.76

Reference: TOC

Weather: Cloudy Lt Wind ~30°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
E-7_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1230 Time	1235	1240	1245	1250	1255	1300		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	23.63	23.63	23.63	23.63	23.63	23.63		
Temperature (Celsius)	9.37	10.16	10.18	9.65	9.77	9.90		
pH	7.20	7.37	7.33	7.27	7.23	7.23		
Sp. Conductance (uS/cm)	815	837	836	833	828	821		
DO (mg/L)	6.20	6.28	6.20	6.40	6.31	6.11		
ORP (mV)	222.0	212.4	212.4	214.1	215.6	216.6		
Turbidity (NTU)	151.8	193.3	180.0	159.5	150.9	135.1		
Color	Light Tan/Tan							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/28/14	Well Number:	L-87-2_022814
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.5 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	32.5
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	22.5 - 32.5
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	31.0
Sampling Time:	0955	Depth to Groundwater (ft):	27.06
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	5.44
Weather:	Snowing, Cold		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/28/14	Trip Blank	TB1_022814	0800
Turbidity:	Micro TPW	10/4/13	Duplicate	D1_022814	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
L-87-2_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

0921 Time	0926	0931	0936	0941	0946	0951		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	27.09	27.09	27.09	27.08	27.08	27.07		
Temperature (Celsius)	11.50	11.60	11.88	12.08	12.33	12.15		
pH	6.68	6.73	6.75	6.78	6.79	6.79		
Sp. Conductance (uS/cm)	881	867	867	869	869	869		
DO (mg/L)	0.54	0.46	0.41	0.31	0.29	0.33		
ORP (mV)	-105.4	-117.4	-124.1	120.2	129.1	-142.5		
Turbidity (NTU)	1.67	0.00	0.00	0.00	0.59	1.02		
Color	Clear							
Odor/Evidence of LNAPL	None	Noticed						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

* Very Slt. Sheen observed in EFI.
* Very Heavy Sheen observed on Sounder Probe upon Completion of Sample Collection.

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/19/14	Well Number:	L-87-5_ 021914
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.2 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	Ben C	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	28.2
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	18.2 - 28.2
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	27.0
Sampling Time:	1440	Depth to Groundwater (ft):	*
Total Discharge (gal):	0.80	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	

Reference: TOC

Weather: Windy - ~30°F - Cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/19/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
L-87-5_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

Time	1405	1410	1415	1420	1425	1430	1435		
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)		0.1	0.1	0.1	0.1	0.1	0.1		
Volume Purged (Liters)		0.5	1.0	1.5	2.0	2.5	3.0		
Water Depth (ft)		*	*	*	*	*	*		
Temperature (Celsius)		7.88	8.03	7.93	7.96	7.90	7.97		
pH		7.46	7.40	7.34	7.29	7.27	7.24		
Sp. Conductance (uS/cm)		580	577	579	578	576	575		
DO (mg/L)		8.08	7.68	7.60	7.70	7.55	7.51		
ORP (mV)		163.0	164.4	165.8	166.6	166.1	166.3		
Turbidity (NTU)		7.02	2.78	0.70	0.39	0.34	0.47		
Color		Clear							
Odor/Evidence of LNAPL		None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

*Unable to get SWL ~~due to~~ BC during purge due to purge depth and dedicated pump length. Pulled pump @ 1446 2/19 SWL: 25.95. 2/20 DTW: 25.97 FT @ 1655. 2/20/14 Reinstalled pump @ 1700 2/20/14

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/27/14	Well Number:	L-87-5_ 022714
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 1.2 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	28.2
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	18.2 - 28.2
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	27.0
Sampling Time:	1115	Depth to Groundwater (ft):	*
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/27/14			
Turbidity:	Micro TPW	10/4/13			
Other:			CL ~~Duplicate~~		

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
L-87-5_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1040 Time	1045	1050	1055	1100	1105	1110		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	—	—	—	—	—	—		
Temperature (Celsius)	10.03	10.15	10.25	10.33	10.40	10.46		
pH	7.25	7.22	7.21	7.20	7.17	7.17		
Sp. Conductance (uS/cm)	575	575	575	575	576	574		
DO (mg/L)	6.36	5.89	6.00	5.98	5.43	6.25		
ORP (mV)	48.6	47.1	48.1	47.5	46.4	47.7		
Turbidity (NTU)	0.00	0.00	0.00	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters * UNABLE TO MEAS. DTW. DTW BELOW TOP OF PUMP.

NOTE: RESAMPLE

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	02/26/14	Well Number:	LS-11_022614
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	16.0
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	5.8 - 15.8
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	14.0
Sampling Time:	1125	Depth to Groundwater (ft):	10.09
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	5.91

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/26/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
LS-11_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1050 Time	1055	1100	1105	1110	1115	1120		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	10.09	10.09	10.09	CL ~~10.09~~ 10.09	10.09	10.09		
Temperature (Celsius)	8.96	9.23	9.26	9.29	9.26	9.16		
pH	6.86	6.74	6.72	6.72	6.71	6.71		
Sp. Conductance (uS/cm)	909	905	905	906	905	907		
DO (mg/L)	0.84	0.47	0.39	0.34	0.34	0.33		
ORP (mV)	-16.4	-20.0	-40.0	-42.4	-49.5	-51.0		
Turbidity (NTU)	12.12	6.47	3.79	1.54	1.00			
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters SLT. PLANT WATER OBSERVED IN EFF.

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/25/14	Well Number:	**MW-5RR_** 022514
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.3
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**14.03**
Purging Equipment:	QED	Screened Interval (ft):	**4.03 - 14.03**
Sampling Equipment:	QED	Purge Depth (ft):	**9.0**
Sampling Time:	1630	Depth to Groundwater (ft):	8.06
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	5.97

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/25/14	Rinse Blank	RX_022514	1545
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
MW-5RR_Date ie;mmddy	3	VOA	HCL	40ml	N	VOC 8260	

1555 Time	1600	1605	1610	1615	1620	1625		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	8.10	8.10	8.10	8.10	8.10	8.10		
Temperature (Celsius)	9.16	9.47	9.40	9.44	9.45	9.42		
pH	6.87	6.73	6.78	6.77	6.80	6.82		
Sp. Conductance (uS/cm)	831	835	836	836	836	836 CL		
DO (mg/L)	0.84	0.40	0.48	0.32	0.29	~~7.0~~	0.27	
ORP (mV)	32.6	20.7	11.2	4.6	-1.4	-7.0		
Turbidity (NTU)	5.54	3.90	1.33	0.73	0.04	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/25/14	Well Number:	MW-10_ 022514
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.5
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL/BC	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	14.5
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	4.5 - 14.5
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	14.0
Sampling Time:	1215	Depth to Groundwater (ft):	9.90
Total Discharge (gal):	2.76	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	4.60

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/25/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
MW-10_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1140 Time	1145	1150	1155	1200	1205	1210		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.35	.35	.35	.35	.35	.35		
Volume Purged (Liters)	1.75	3.5	5.25	7	8.75	10.5		
Water Depth (ft)	9.90	9.90	9.90	9.90	9.90	9.90		
Temperature (Celsius)	6.91	7.11	6.89	7.04	7.37	7.38		
pH	7.26	7.17	7.13	7.15	7.05	7.21		
Sp. Conductance (uS/cm)	596	594	595	594	594	594		
DO (mg/L)	5.77	5.53	5.64	5.81	5.75	5.81		
ORP (mV)	20.8	23.5	26.0	27.3	31.3	29.8		
Turbidity (NTU)	78.16	3.88	3.78	4.17	1.78	1.12		
Color	BRN							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

PLANT MATER NOTICED IN WELL CASING

* UNSTABLE FLOW RATES (ATTEMPTED MULTIPLE FLOW RATES). RATES VARIES FROM .15 – .35. CLEANED PLANT MATER FROM PUMP SCREEN

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	02/26/14	Well Number:	EX-22_ ~~022261L~~ CL 022614
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.2
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	34.8
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	19.8 - 34.8
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	29.0
Sampling Time:	1240	Depth to Groundwater (ft):	25 CL ~~26~~.44
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.36

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/26/14			
Turbidity:	Micro TPW	10/4/13			
Other:			DUPLICATE	DI_022614	0800

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
EX-22_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1206 Time	1211	1216	1221	1226	1231	1236		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	CL ~~1.5~~ 3	4.5	6	7.5	9		
Water Depth (ft)	25.44	25.44	25.44	25.44	25.44	25.44		
Temperature (Celsius)	10.61	11.03	11.22	11.28	11.35	11.33		
pH	7.38	6.86	6.80	6.80	6.80	6.81		
Sp. Conductance (uS/cm)	836	845	846	846	847	848		
DO (mg/L)	1.18	0.60	0.46	0.44	0.26	0.33		
ORP (mV)	-2.0	-20.5	-28.3	-34.5	-42.0	-38.9		
Turbidity (NTU)	4.73	3.07	2.54	2.16	0.82	0.74		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/19/14	Well Number:	EX-24_02914
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.6
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	24.4
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	9.4 - 24.4
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	22.0
Sampling Time:	1640	Depth to Groundwater (ft):	17.95
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	6.45

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/19/14 0750			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
EX-24_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1605 Time	1610	1615	1620	1625	1630	1635		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	17.96	17.96	17.96	17.96	17.96	17.96		
Temperature (Celsius)	9.89	9.94	9.84	9.80	9.85	9.80		
pH	7.19	6.99	6.92	6.90	6.88	6.88		
Sp. Conductance (uS/cm)	679	681	681	681	682	682		
DO (mg/L)	1.03	0.62	0.36	0.31	0.31	0.29		
ORP (mV)	69.1	53.5	36.1	21.4	6.4	-8.9		
Turbidity (NTU)	0.00	0.83	1.13	0.88	0.70	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/25/14	Well Number:	EX-28_022514
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.2 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL/BC	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	20.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	5.6 - 20.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	14.0
Sampling Time:	1340	Depth to Groundwater (ft):	9.62
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.98

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/25/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
EX-28_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1305 Time	1310	1315	1320	1325	1330	1335		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	9.65	9.65	9.65	9.65	9.65	9.65		
Temperature (Celsius)	9.23	9.26	9.45	9.29	8.92	9.05		
pH	7.22	7.16	7.18	7.17	7.17	7.18		
Sp. Conductance (uS/cm)	653	651	652	650	651	650		
DO (mg/L)	2.06	1.50	1.30	1.29	1.33	1.30		
ORP (mV)	23.7	16.1	12.5	8.3	9.8	14.4		
Turbidity (NTU)	13.90	11.29	14.45	9.87	11.42	8.16		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/22/14	Well Number:	07-2A_ 022214
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.6
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL / BC	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	24.4
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	14.4 - 24.4
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	24.0
Sampling Time:	1645	Depth to Groundwater (ft):	20.51
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	3.89
Weather:			

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/22/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
07-2A_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1614 Time	1619	1624	1629	1634	1639	1644		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2	.2	.2	.2	.2	.2		
Volume Purged (Liters)	1	2	3	4	5	6		
Water Depth (ft)	20.51	20.51	20.51	20.51	20.51	20.51		
Temperature (Celsius)	8.75	9.18	9.38	9.45	9.44	9.48		
pH	7.65	7.55	7.46	7.40	7.35	7.32		
Sp. Conductance (uS/cm)	620	600	585	579	574	573		
DO (mg/L)	5.53	5.81	6.48	6.46	6.71	6.63		
ORP (mV)	169.7	176.80	176.7	176.7	177.8	178.5		
Turbidity (NTU)	7.67	4.11	3.64	2.76	1.81	2.08		
Color	LT TAN, SLTLY TURBID	CLEAR						
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/19/14	Well Number:	07-5A_02914
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.3
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	14.7
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	4.7 - 14.7
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	13.0
Sampling Time:	1330	Depth to Groundwater (ft):	9.05
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	5.65

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/19/14 0730			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
07-5A_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1255 Time	1300	1305	1310	1315	1320	1325		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	.4	.4	.4	.4	.4		
Volume Purged (Liters)	2	4	6	8	10	12		
Water Depth (ft)	9.06	9.06	9.06	9.06	9.05	9.05		
Temperature (Celsius)	9.49	9.54	9.43	9.51	9.54	9.53		
pH	7.20	7.18	7.12	7.12	7.09	7.07		
Sp. Conductance (uS/cm)	548	548	547	548	548	548		
DO (mg/L)	4.37	4.46	4.28	4.51	4.48	4.37		
ORP (mV)	45.5	40.4	40.3	38.7	37.7	36.3		
Turbidity (NTU)	1.52	5.30	5.30	2.97	4.15	2.79		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/21/14	Well Number:	07-6_ 022114
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.9 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	21.9
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	6.9 - 21.9
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	16.0
Sampling Time:	1510	Depth to Groundwater (ft):	12.04
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.86

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/21/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
07-6_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1435 Time	1440	1445	1450	1455	1500	1505		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	12.04	12.04	12.04	12.04	12.04	12.04		
Temperature (Celsius)	10.87	11.14	11.09	11.10	11.21	11.33		
pH	7.22	7.06	7.06	7.05	7.06	7.07		
Sp. Conductance (uS/cm)	463	465	465	465	465	465		
DO (mg/L)	4.08	4.00	3.79	3.85	3.74	3.67		
ORP (mV)	-3.0	6.9	10.0	12.9	15.5	18.1		
Turbidity (NTU)	0.00	0.00	0.01	1.22	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/22/14	Well Number:	07-7_ 022214
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.4 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:		Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	22.4
Purging Equipment:	~~CL Ded. Bladder~~ QED	Screened Interval (ft):	7.4 - 22.4
Sampling Equipment:	~~CL Ded. Bladder~~ QED	Purge Depth (ft):	15.0
Sampling Time:	1405	Depth to Groundwater (ft):	11.49
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.91

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/22/14	RINSE BLANK	RX_022214	1320
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-7_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1334 Time	1339	1344	1349	1354	1359	1404		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	11.50	11.50	11.50	11.50	11.50	11.50		
Temperature (Celsius)	8.55	8.70	8.80	8.86	8.84	8.76		
pH	7.40	7.38	7.31	7.28	7.26	7.26		
Sp. Conductance (uS/cm)	395	395	394	394	394	394		
DO (mg/L)	3.02	2.98	3.06	3.07	3.09	3.04		
ORP (mV)	73.4	56.8	51.9	48.9	48.4	47.8		
Turbidity (NTU)	2.51	1.41	0.35	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	02/26/14	Well Number:	07-7_ 022614
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.4 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	22.4
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	7.4 - 22.4
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	15.0
Sampling Time:	0955	Depth to Groundwater (ft):	11.50
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.90

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/26/14	Rinse Blank	RX ~~022514~~ CL 022614	~~1615~~ CL 0800
Turbidity:	Micro TPW	10/4/13			
Other:			TRIP BLANK	TBI_022614	0800

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-7_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

0922 Time	0927	0932	0937	0942	0947	0952		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	11.51	11.51	11.51	11.51	11.51	11.51		
Temperature (Celsius)	7.46	7.82	8.20	8.13	8.36	8.22		
pH	7.16	7.16	7.14	7.19	7.20	7.23		
Sp. Conductance (uS/cm)	398	393	390	392	391	392		
DO (mg/L)	3.40	2.86	2.81	2.91	2.87	2.99		
ORP (mV)	162.4	113.6	91.2	70.0	55.6	48.0		
Turbidity (NTU)	8.31	3.99	1.95	0.64	0.49	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	02/25/14	Well Number:	07-8_ 022514
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.4
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	37.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	22.6 - 37.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	31.0
Sampling Time:	1750	Depth to Groundwater (ft):	26.50
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	11.10

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/25/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
07-8_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1715 Time	1720	1725	1730	1735	1740	1745		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	26.50	26.50	26.50	26.50	26.50	26.50		
Temperature (Celsius)	9.78	10.02	10.02	10.06	9.62	9.68		
pH	7.45	7.29	7.26	7.23	7.21	7.23		
Sp. Conductance (uS/cm)	597	601	601	601	597	599		
DO (mg/L)	6.49	6.87	6.07	6.65	6.65	6.14		
ORP (mV)	25.3	26.4	28.5	31.9	33.6	33.9		
Turbidity (NTU)	2.33	2.66	4.49	4.88	2.77	0.97		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/26/14	Well Number:	07-9_ 022614
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.7
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	34.3
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	19.3 - 34.3
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	32.0
Sampling Time:	1545	Depth to Groundwater (ft):	27.54
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	6.76

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/26/14			
Turbidity:	Micro TPW	10/4/13			
Other:			DUPLICATE	D2_022614	0800

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-9_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1514 Time	~~1514~~ 1519 CL	1524	1529	1534	1539	1544		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	27.54	27.54	27.54	27.54	27.54	27.54		
Temperature (Celsius)	9.66	9.80	9.97	10.06	10.14	10.12		
pH	7.25	7.15	7.11	7.11	7.10	7.11		
Sp. Conductance (uS/cm)	661	649	648	649	649	650		
DO (mg/L)	6.88	6.83	6.75	6.76	6.74	6.79		
ORP (mV)	5.3	7.6	11.4	14.3	17.8	20.3		
Turbidity (NTU)	1.69	1.03	2.33	0.37	1.43	1.05		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	2/22/14	Well Number:	07-12_022214
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.4 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	21.9
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	6.4 - 21.9
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	15.0
Sampling Time:	1145	Depth to Groundwater (ft):	9.77
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	12.13

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	2/22/14			
Turbidity:	Micro TPW	10/4/13			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
07-12_Date ie;mmddyy	3	VOA	HCL	40ml	N	VOC 8260	

1112 Time	1117	1122	1127	1132	1137	1142		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	9.77	9.77	9.77	9.77	9.77	9.77		
Temperature (Celsius)	8.26	8.42	8.49	8.54	8.50	8.52		
pH	7.47	7.36	7.36	7.35	7.32	7.31		
Sp. Conductance (uS/cm)	~~3.68~~	~~4.93~~ 371	371	372	372	371		
DO (mg/L)	2.17	1.93	1.84	1.68	1.72	1.71		
ORP (mV)	42.8	32.8	29.0	25.1	23.2	23.5		
Turbidity (NTU)	2.20	1.46	0.85	0.27	1.06	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

DEQ's Groundwater Monitoring Program
Directive No. 2 – June 2014
Groundwater Purge and Sample Forms

Groundwater Purge and Sample Form (Minimal Drawdown) — **Kennedy/Jenks Consultants**

Date:	Gpurge 6/10/14 (SAMPLE) 6/11/14	Well Number:	**10-1**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.4
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	BC / CL	Well Condition:	Good w/lock + l.d
Water Level Meter:	Solinst	Total Casing Depth (ft):	53.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	48.6 - 53.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	51.3
Sampling Time:	6/11/14 — 0820	Depth to Groundwater (ft):	(purge) 18.63 (sample) 22.83
Total Discharge (gal):	20.26	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	Purge – 34.97 (SAMPLE) ~~28.17~~ 30.77
Weather:			

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/11/14 0630			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-1_061114	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 10-1_Date ie;mmddyy

1127 Time	1131	1135	~~1137~~				0813	0818
Parameter (every 5 min)	4 min	4 min	min	min	min	min	min	5 min
Flow Rate (~~L/min~~) gpm	2.5	2.5						2 L/M
Volume Purged (~~Liters~~) gal	10	20						1
Water Depth (ft)	31.40	39.7						23.56
Temperature (Celsius)	10.67	10.64						11.04
pH	8.39	8.37						8.78
Sp. Conductance (uS/cm)	379	379						452
DO (mg/L)	4.81	4.19						8.72
ORP (mV)	182.9	177.4						123.1
Turbidity (NTU)	5.52	6.59						4.01
Color	Clear →							Clear
Odor/Evidence of LNAPL	None →							None Noted

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

ISCO-24R: DTW = 18.50

#start: 5 gal #stop: 25 gal

* UNABLE TO SUSTAIN LOW/FLOW PURGE SAMPLED 6/11/14 AFTER RECOVERY.

Groundwater Purge and Sample Form (Minimal Drawdown) — **Kennedy/Jenks Consultants**

Date:	(Purge) 6/10/14 (SAMPLE) 6/11/14	Well Number:	**10-2**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.5
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	BC / CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**49.0**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**44 - 49**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**46.6**
Sampling Time:	6/11/14 — 0845	Depth to Groundwater (ft):	BC (Purge) ~~23.~~ 20.33 SAMPLE 20.36
Total Discharge (gal):	13.26	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	(PURGE) CL ~~26.27~~ 28.67 (SAMPLE) CL ~~26.24~~ 28.64
Weather:			

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/11/14 0630	~~EB~~ FIELD BLANK	LIV_061114	0830
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-2_061114	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 10-2_Date ie;mmddyy

1318 Time	1320	1322	1324				0835	0840
Parameter (every 5 min)	2 min	2 min	2 min	min	min	min	min	5 min
Flow Rate (L/min)								2 L/M
Volume Purged (Liters)								1
Water Depth (ft)	26.70	32.30	36.80					21.28
Temperature (Celsius)	11.60	11.57	11.56					11.59
pH	10.48	10.45	10.37					8.76
Sp. Conductance (uS/cm)	688	687	687					607
DO (mg/L)	2.26	1.36	1.21					6.45
ORP (mV)	83.6	83.8	80.9					131.0
Turbidity (NTU)	139.4	140.4	144.7					228.8
Color	Grey →							MILKY
Odor/Evidence of LNAPL	None →							NONE NOTICED

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters **Note: DNAPL Test required.** 6/10/14 DNAPL TEST → NEG.

ISCO-1: DTW = 20.83

ISCO-2: DTW = 20.65

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 6/11/14 AFTER RECOVERY

Vsmart: 25 gal Vcal: 38 gal

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**10-3**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.09 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good w/lid & lock
Water Level Meter:	Solinst	Total Casing Depth (ft):	**58.6**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**53.6 - 58.6**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**56.1**
Sampling Time:	1543	Depth to Groundwater (ft):	24.10
Total Discharge (gal):	0.92	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	34.50
Weather:	Pt Cloudy / slight wind		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-3_060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 10-3_Date ie;mmddyy

1508 Time	1513	1518	1523	1528	1533	1538		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2	0.1	0.1	0.1	0.1	0.1		
Volume Purged (Liters)	1.0	1.5	2.0	2.5	3.0	3.5		
Water Depth (ft)	24.22	24.25	24.25	24.25	24.26	24.26		
Temperature (Celsius)	14.86	14.23	14.09	13.97	13.88	13.64		
pH	7.07	7.05	7.04	7.52	7.01	6.98		
Sp. Conductance (uS/cm)	735	737	738	735	734	736		
DO (mg/L)	1.27	0.97	0.90	1.31	0.85	0.83		
ORP (mV)	-0.9	7.4	12.8	39.5	30.4	28.6		
Turbidity (NTU)	0.39	0.05	0.02	0.08	0.07	—		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

12-7: DTW = 23.73

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	(Purge) 6/5/14 (Sample) 6/6/14	Well Number:	**10-4**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.65 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	(Good) w/lock + lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	**60.2**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**55.2 - 60.2**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**57.3**
Sampling Time:	1435	Depth to Groundwater (ft):	(Purge) 25.53 (Sample) 33.05
Total Discharge (gal):	25.260	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	Purge-27.15 (Sample) ~~24.25~~ 27.15
Weather:	Cloudy Lt Wind		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-4_ 060614	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 10-4_Date ie;mmddyy

1315 Time	~~1315~~ 1320	1323	1328				1429	1434
Parameter (every 5 min)	5 min	8 min	13 min	min	min	min	min	5 min
Flow Rate ~~(L/min)~~ gpm	~~0.3~~	~~0.3~~	~~0.3~~				L/min	0.2
Volume Purged ~~(Liters)~~ gal	~~1.5~~	~~3.0~~	~~4.5~~				Liters	1.0
Water Depth (ft)	~~24.60~~ 38.15	46.06	54.60					33.10
Temperature (Celsius)	12.21	12.37	12.55					12.69
pH *	8.44	8.34	8.34					8.21
Sp. Conductance (uS/cm)	688	682	685					716
DO (mg/L)	3.56	3.82	3.83					6.51
ORP (mV)	110.4	94.3	85.9					211.8
Turbidity (NTU)	2.02	1.53	2.42					7.01
Color	Clear →							Clear
Odor/Evidence of LNAPL	None →							None

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters * UNABLE TO SUSTAIN LOW/FLOW PURGE. SAMPLED 6/6/14 AFTER RECOVERY

12-8: 24.60 FT

Start: 150 gal Stop: 175 gal

→ 191.0 lbs

* pH probe replaced 6/6

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	(Purge) 6/5/14 (sample) 6/6/14	Well Number:	**10-5**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 0.93 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good w/ lock + lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	**64.9**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**59.9 - 64.9**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**62.9**
Sampling Time:	1415	Depth to Groundwater (ft):	(Purge) 22.23 (sample) 22.15
Total Discharge (gal):	50.26	Depth to LNAPL (ft):	
Water Disposal:	GWTP	Water Column (ft):	(Purge) ~~42.67~~ 42.75 (sample) ~~40.75~~ "
Weather:	Cloudy		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-5_060614	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 10-5_Date ie;mmddyy

1056 Time	1101	1106	1111	1116	1121		1405	1410
Parameter (every 5 min)	5 min	~~5~~ 10 min	15 min	20 min	25 min	min	min	5 min
Flow Rate (~~L/min~~) gpm	2	2	2	2	2		L/min	0.2
Volume Purged (~~Liters~~) gal	10	20	30	40	50		Liters	1.0
Water Depth (ft)	32.40	38.30	48.20	52.40	59.9			22.40
Temperature (Celsius)	12.27	12.27	12.28	12.35	12.36			12.32
pH *	8.00	8.16	8.38	8.48	8.45			8.81
Sp. Conductance (uS/cm)	567	558	561	557	564			573
DO (mg/L)	1.74	0.92	0.79	0.56	0.81			4.35
ORP (mV)	20.3	-48.4	-78.7	-96.7	-97.2			210.4
Turbidity (NTU)	25.26	10.62	9.76	8.13	6.26			5.39
Color	Clear →							Clear
Odor/Evidence of LNAPL	None →							None

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters * UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 6/6/14 AFTER RECOVERY

L-88-13: DTW = 23.72 * pH probe replaced 6/6

Purge Tank Start: 75 gal Stop: 125

→ @ 203.0 Hz (10) → 241.0 Hz (15) → 300.0 Hz (25)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**10-6**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.77 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**59.3**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**54.3 - 59.3**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**56.8**
Sampling Time:	1625	Depth to Groundwater (ft):	25.89
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	~~30.91~~ 33.41

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-6_060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 10-6_Date ie;mmddyy

1554 Time	1559	1604	1609	1614	1619	1624		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	25.97	25.97	25.97	25.97	25.97	25.97		
Temperature (Celsius)	12.15	11.83	11.67	11.63	11.60	11.58		
pH	7.43	7.30	7.26	7.18	7.18	7.17		
Sp. Conductance (uS/cm)	669	670	669	668	667	666		
DO (mg/L)	10.18	9.02	7.92	7.92	7.85	7.93		
ORP (mV)	164.6	168.0	170.3	174.7	175.9	177.5		
Turbidity (NTU)	0.33	0.59	0.00	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**10-7**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.23 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good w/ lid + lock
Water Level Meter:	Solinst	Total Casing Depth (ft):	**52.5**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**47.5 - 52.3**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**50.0**
Sampling Time:	1225	Depth to Groundwater (ft):	21.73
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	30.77

Reference: TOC

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14			
Turbidity:	Micro TPW	4/28/14	Trip Blank	TB2_060314	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-7_060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 10-7_Date ie;mmddyy

1150 Time	1155	1200	1205	1210	1215	1220		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	21.75	21.75	21.75	21.75	21.75	21.75		
Temperature (Celsius)	12.70	12.40	12.30	12.30	12.26	12.44		
pH	6.82	6.64	6.95	6.66	6.65	6.72		
Sp. Conductance (uS/cm)	877	878	879	880	877	875		
DO (mg/L)	3.62	3.02	2.86	2.77	2.66	2.65		
ORP (mV)	146.0	143.4	119.5	120.8	109.9	106.8		
Turbidity (NTU)	0.53	0.67	0.52	0.85	0.75	0.58		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

12-9: DTW = 21.57 -

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	(PURGE) 6/10/14 (SAMPLE) 6/11/14	Well Number:	**10-8**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.45 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL/BC	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**48.5**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**43.5 - 48.5**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**45.4**
Sampling Time:	0735	Depth to Groundwater (ft):	(PURGE) 4.18 (SAMPLE) 20.59
Total Discharge (gal):	22.76	Depth to LNAPL (ft):	—
Water Disposal:	~~GWTP~~	Water Column (ft):	(PURGE) ~~CL 41.22~~ 44.32 (SAMPLE) ~~CL 24.81~~ 27.91
Weather:			

Reference: TOC

Water Quality Meter(s)	Model	tion Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/10/14 0800			
Turbidity:	Micro TPW	4/28/14	TRIP BLANK	TBL-061114	0700
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
10-8_061114	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 10-8_Date ie;mmddyy

0947 Time	0950	0952	0954	0957			0729	0734
Parameter (every 5 min)	3 min	2 min	2 min	3 min	min	min	min	5 min
Flow Rate (~~L/min~~) gpm								.2 L/M
Volume Purged (~~Liters~~) gal	5	5	5	5				1
Water Depth (ft)	10.90	~~10.45~~ 19.45 BC	26.60	36.21			CL ~~20.~~	21.44
Temperature (Celsius)	9.63	~~9.32~~ 9.32 BC	9.06	9.76				9.64
pH	8.03	7.87	7.84	7.89				7.46
Sp. Conductance (uS/cm)	547	547	547	547				570
DO (mg/L)	11.85	10.31	9.89	9.53				8.62
ORP (mV)	71.8	68.7	70.3	66.3				174.5
Turbidity (NTU)	0.07	0.74	1.42	0.46				0.88
Color	Clear →							CLEAR
Odor/Evidence of LNAPL	None →							NONE NOTICED

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

92-2: DTW = 3.78

*purged = 20 + 2.5 = 22.5 gal total

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 6/11/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/2/14	Well Number:	**11-1**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.87 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good - l.d/lock
Water Level Meter:	Solinst	Total Casing Depth (ft):	**56.9**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**51.9 - 56.9**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**54.3**
Sampling Time:	1542	Depth to Groundwater (ft):	20.81
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	36.09

Reference: TOC

Weather: Cloudy / Lt Rain

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/2/14			
Turbidity:	Micro TPW	4/28/14	Trip Blank	TB2_060214	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
11-1_060214	3	VOA	HCL + Ascorbic	40ml	N	VOC 8260	

Note: Complete Sample ID 11-1_Date ie;mmddyy

1507 Time	1512	1517	1522	1527	1532	1537		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	20.83	20.83	20.83	20.83	20.83	20.83		
Temperature (Celsius)	11.22	11.03	11.01	10.95	11.23	10.98		
pH	7.63	7.05	7.02	7.00	7.31	7.23		
Sp. Conductance (uS/cm)	615	602	602	603	606	603		
DO (mg/L)	6.14	4.81	4.99	4.81	4.81	5.13		
ORP (mV)	168.2	168.8	149.8	141.6	133.2	135.1		
Turbidity (NTU)	2.69	1.88	2.87	4.30	9.03	11.46		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

07-1: DTW = 21.07

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**12-1 Port 1**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.0 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	FLUTe well completion with 5 sampling ports
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**51.0**
Purging Equipment:	FLUTe valve with	Screened Interval (ft):	**43.0 - 51.0**
Sampling Equipment:	compressed Nitrogen	Purge Depth (ft):	**50.5**
Sampling Time:	0855	Depth to Groundwater (ft):	22.09
Total Discharge (gal):	0.78	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	CL ~~28.41~~ 28.91

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0730			
Turbidity:	Micro TPW	4/28/14	Trip Blank	TBl_060714	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-1 Port 1_060714	3	VOA	HCL	40ml	N	VOC 8260	
Note: Complete Sample ID 12-1 Port 1_Date ie;mmddyy							

Time	0819	0836						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	—	—						
Volume Purged (Liters)	1.5	3						
Water Depth (ft)	22.09	22.12						
Temperature (Celsius)	11.58	11.58						
pH	6.88	6.80						
Sp. Conductance (uS/cm)	930	958						
DO (mg/L)	5.51	5.11						
ORP (mV)	124.2	45.0						
Turbidity (NTU)	1.64	0.59						
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

12-10: DTW = 23.84

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**12-1 Port 2**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.0 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	FLUTe well completion with 5 sampling ports
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**60.0**
Purging Equipment:	FLUTe valve with	Screened Interval (ft):	**55.0 - 60.0**
Sampling Equipment:	compressed Nitrogen	Purge Depth (ft):	**55.5**
Sampling Time:	0900	Depth to Groundwater (ft):	22.09
Total Discharge (gal):	0.78	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	CL 33.41 37.91

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
12-1 Port 2_060714	3	VOA	HCL	40ml	N	VOC 8260	
Note: Complete Sample ID 12-1 Port 2_Date ie;mmddyy							

Time	0822	0838						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	—	—						
Volume Purged (Liters)	1.5	3						
Water Depth (ft)	22.09	22.10						
Temperature (Celsius)	11.60	11.61						
pH	6.82	6.75						
Sp. Conductance (uS/cm)	906	919						
DO (mg/L)	5.59	5.23						
ORP (mV)	120.9	47.4						
Turbidity (NTU)	0.29	0.00						
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**12-1 Port 3**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.0 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	FLUTe well completion with 5 sampling ports
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**70.0**
Purging Equipment:	FLUTe valve with	Screened Interval (ft):	**65.0 - 70.0**
Sampling Equipment:	compressed Nitrogen	Purge Depth (ft):	**65.5**
Sampling Time:	0905	Depth to Groundwater (ft):	22.06
Total Discharge (gal):	0.78	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	~~CL 43.44~~ 47.94

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-1 Port 3_060714	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 12-1 Port 3_Date ie;mmddyy

Time	0826	0843						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	—	—						
Volume Purged (Liters)	1.5	3						
Water Depth (ft)	22.06	22.07						
Temperature (Celsius)	11.70	11.61						
pH	6.94	6.80						
Sp. Conductance (uS/cm)	863	905						
DO (mg/L)	4.83	4.36						
ORP (mV)	-3.1	32.2						
Turbidity (NTU)	0.42	2.61						
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**12-1 Port 4**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.0 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	FLUTe well completion with 5 sampling ports
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**78.0**
Purging Equipment:	FLUTe valve with	Screened Interval (ft):	**73.0 - 78.0**
Sampling Equipment:	compressed Nitrogen	Purge Depth (ft):	**73.5**
Sampling Time:	1400	Depth to Groundwater (ft):	22.03
Total Discharge (gal):	0.65	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	~~51.47~~ 55.97
Weather:			

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
12-1 Port 4_060714	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 12-1 Port 4_Date ie;mmddyy

Time	0829	1000						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	—	—						
Volume Purged (Liters)	1.5	2.5						
Water Depth (ft)	22.03	38.45						
Temperature (Celsius)	11.68	11.88						
pH	6.90	6.83						
Sp. Conductance (uS/cm)	885	896						
DO (mg/L)	5.12	3.90						
ORP (mV)	17.1	79.5						
Turbidity (NTU)	0.67	0.81						
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**12-1 Port 5**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.0 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	FLUTe well completion with 5 sampling ports
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**95.0**
Purging Equipment:	FLUTe valve with	Screened Interval (ft):	**90.0 - 95.0**
Sampling Equipment:	compressed Nitrogen	Purge Depth (ft):	**89.5**
Sampling Time:	0910	Depth to Groundwater (ft):	22.09
Total Discharge (gal):	0.78	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	CL ~~67.41~~ 72.91

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-1 Port 5_060714	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 12-1 Port 5_Date ie;mmddyy

Time	0832	0846						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	—	—						
Volume Purged (Liters)	1.5	3						
Water Depth (ft)	22.09	22.09						
Temperature (Celsius)	11.63	11.57						
pH	6.98	6.96						
Sp. Conductance (uS/cm)	880	884						
DO (mg/L)	5.10	5.13						
ORP (mV)	29.8	36.6						
Turbidity (NTU)	0.17	0.00						
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	(PURGE) 6/4/14 (SAMPLE) 6/5/14	Well Number:	**12-2**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	(PURGE) BENC (SAMPLE) BENC	Well Condition:	GOOD W/ LOCK + LID, H2O IN MONUMENT
Water Level Meter:	Solinst	Total Casing Depth (ft):	**85.0**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**75.0 - 85.0**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**80.0**
Sampling Time:	1655	Depth to Groundwater (ft):	(PURGE) 52.12 (SAMPLE) 51.83
Total Discharge (gal):	30.26	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	(PURGE) 32.88 (SAMPLE) 33.17

Reference: TOC

Weather: SUNNY

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/5/14	FIELD BLANK	LIV_060514	1640
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
~~12-2_Date ie;mmddyy~~ 12-2_060514	3	VOA	HCL	40ml	N	VOC 8260	

1503 Time	1508	1513	1518				1645	1650
Parameter (every 5 min)	5 min	10 min	15 min	min	min	min	min	5 min
Flow Rate ~~(L/min)~~ GPM	2	2	2				4/MIN	0.2
Volume Purged ~~(Liters)~~ GAL	10	20	30				LITERS	1.0
Water Depth (ft)	56.17	63.50	69.7					52.05
Temperature (Celsius)	14.23	13.69	13.70					14.97
pH	7.70	8.12	7.61					8.88
Sp. Conductance (uS/cm)	459	471	473					541
DO (mg/L)	1.11	0.36	0.74					6.60
ORP (mV)	-95.7	-105.5	-95.0					-95.3
Turbidity (NTU)	59.17	64.01	64.22					3.98
Color	VERY LIGHT GREY	→						
Odor/Evidence of LNAPL	NONE →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

PURGE TANK: START: 40 GAL STOP: 70 GAL

* UNABLE TO SUSTAIN LOW/FLOW PURGE. SAMPLED 6/5/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	(Purge) 6/4/14 (Sample) 6/5/14	Well Number:	**12-3**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	(Purge) Ben C (Sample) Ben C	Well Condition:	Good w/ lock + lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	**50.0**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**40.0 - 50.0**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**45.0**
Sampling Time:	1635	Depth to Groundwater (ft):	(purge)* 29.73 (sample) 29.33
Total Discharge (gal):	5.26	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	~~(purge)~~ 20.67 (sample)

Reference: TOC

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/5/14			
Turbidity:	Micro TPW	4/28/14	Trip Blank	TB2-060514	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-3_060514	3	VOA	HCL	40ml	N	VOC 8260	
Note: Complete Sample ID 12-3_Date ie;mmddyy							

1558 Time	~~1603~~ BC 1601	1604					1629	1634
Parameter (every 5 min)	~~3~~ min	~~3~~ BC 6 min	min	min	min	min	min	5 min
Flow Rate ~~(L/min)~~ gpm	0.83	0.83					(L/min)	0.2
Volume Purged ~~(Liters)~~ gal	2.5	~~3~~ BC 2.5					(liters)	1.0
Water Depth (ft)	37.0	40.0						29.68
Temperature (Celsius)	13.67	13.78						14.02
pH	7.81	7.67						8.58
Sp. Conductance (uS/cm)	565	549						566
DO (mg/L)	5.41	4.29						5.40
ORP (mV)	90.4	83.0						163.5
Turbidity (NTU)	4.51	1.48						1.71
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Purge Tank Start: 70 gal Stop: 75

* DTW measured after ded. pump removal

* UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 6/5/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/2/14	Well Number:	**12-4**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	WTR IN WELL BOX, GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**46.2**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**36.2 - 46.2**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**41.0**
Sampling Time:	1325	Depth to Groundwater (ft):	30.95
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	15.25

Reference: TOC

Weather: _____

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/2/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW	4/28/14			
Other:			Duplicate	DI_060214	0800

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-4_060214	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 12-4_Date ie;mmddyy

1300 Time	1305	1310	1315	1320	1325	1330		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	30.95	30.95	30.95	30.95	30.95	30.95		
Temperature (Celsius)	12.68	12.46	12.50	12.50	12.73	12.60		
pH	7.29	7.26	7.25	7.25	7.24	7.24		
Sp. Conductance (uS/cm)	689	694	695	695	695	696		
DO (mg/L)	10.11	9.24	8.45	8.795	7.94	8.08		
ORP (mV)	67.2	72.6	77.6	82.5	86.8	91.0		
Turbidity (NTU)	0.81	0.00	0.35	0.93	1.33	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	(Purge) 6/4/14 (SAMPLE) 6/4/14	Well Number:	**12-5**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: ~2 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**51.5**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**41.5 - 51.5**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**47.0**
Sampling Time:	1635	Depth to Groundwater (ft):	(Purge) 4.12 (SAMPLE) 3.85
Total Discharge (gal):	40.26	Depth to LNAPL (ft):	→
Water Disposal:	GWTP	Water Column (ft):	(PURGE) 47.38 (SAMPLE) 47.65

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/4/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-5_060414	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 12-5_Date ie;mmddyy

1305 Time	1310	1315	1320	1325			1626	1631
Parameter (every 5 min)	5 min	10 min	15 min	20 min	min	min	min	5 min
Flow Rate (~~L/min~~) gpm	2	2	2	2				.2
Volume Purged (~~Liters~~) gal	10	20	30	40				1
Water Depth (ft)	14.01	25.03	33.50	41.00				4.13
Temperature (Celsius)	8.16	8.23	8.69	8.96				9.92
pH	8.41	7.98	8.18	8.18				8.44
Sp. Conductance (uS/cm)	~~13~~357	356	355	355				~~7~~84
DO (mg/L)	4.85	1.43	0.20	0.36				9.84
ORP (mV)	121.0	154.7	129.0	95.9				209.6
Turbidity (NTU)	0.87	0.77	0.81	0.65				0.00
Color								CLEAR
Odor/Evidence of LNAPL								NONE NOTICED

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

07-11: DTW = 5.01

Purge tank: start: 0 gal Stop: 40 gal

* UNABLE TO SUSTAIN LOW|FLOW PURGE
SAMPLED 6/4/14 AFTER RECOVERY

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/6/14	Well Number:	**12-6**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	WTR IN WELL BOX, GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**62.7**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**52.7 - 62.7**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**58.0**
Sampling Time:	1740	Depth to Groundwater (ft):	17.69
Total Discharge (gal):	0.78	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	45.01

Reference: TOC

Weather: _____

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-6_060614	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 12-6_Date ie;mmddyy

1708 Time	1713	1718	1723	1728	1733	1738		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.1	.1	.1	.1	.1	.1		
Volume Purged (Liters)	.5	1	1.5	2	2.5	3		
Water Depth (ft)	17.71 (17.71)	17.72	17.72	17.72	17.73	17.73		
Temperature (Celsius)	15.39 (12.67)	12.36	12.19	12.16	12.11	12.00		
pH	7.49 (7.94)	7.67	7.54	7.49	7.47	7.45		
Sp. Conductance (uS/cm)	561	563	559	558	560	559		
DO (mg/L)	8.45	7.00	6.02	5.04	4.50	4.26		
ORP (mV)	46.5	51.4	57.5	64.6	68.8	73.2		
Turbidity (NTU)	2.68	1.52	0.87	0.52	0.68	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	**13-8**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: _____
Project Number:	**1496021*16**	Well Diameter (in):	
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**48.7**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**43.7 - 48.7**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**46.0**
Sampling Time:	1245	Depth to Groundwater (ft):	20.46
Total Discharge (gal):	1.97	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	28.24

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-8_060914	3	VOA	HCL	40ml	N	VOC 8260	
13-8_060914	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-8_060914	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-8_060914	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

Note: Complete Sample ID 13-8_Date ie;mmddyy

1212 Time	1217	1222	1227	1232	1237	1242		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.25	.25	.25	.25	.25	.25		
Volume Purged (Liters)	1.25	2.5	3.75	5	6.25	7.5		
Water Depth (ft)	20.48	20.48	20.48	20.48	20.48	20.48		
Temperature (Celsius)	13.36	13.67	13.47	13.93	14.17	13.97		
pH	7.43	7.39	7.39	7.38	7.39	7.38		
Sp. Conductance (uS/cm)	794	775	756	748	748	745		
DO (mg/L)	11.53	11.04	11.01	10.84	10.74	10.90		
ORP (mV)	199.0	200.5	202.1	203.2	203.9	205.3		
Turbidity (NTU)	0.74	0.42	0.93	0.35	0.73	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/10/14	Well Number:	**13-9**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: ____
Project Number:	**1496021*16**	Well Diameter (in):	
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**53.7**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**53.5 - 48.5**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**51.0**
Sampling Time:	1735	Depth to Groundwater (ft):	21.50
Total Discharge (gal):	1.18	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	32.20

Reference: TOC

Weather:

Water Quality Meter(s)	**Model**	**Calibration Date/Time**	**QA/QC Samples**		
Temp/pH/SC/ORP/DO:	YSI 556	CL 6/10/14 0730	**Type**	**Sample ID**	**Time**
Turbidity:	Micro TPW	4/28/14			
Other:			**Duplicate**	D4-061014	0800

Sample ID	**Sample Containers** No.	Type	Pres.	Vol.	**Field Filtered**	**Analysis Requested**	**MS/MSD & Comments**
13-9_	3	VOA	HCL	40ml	N	VOC 8260	
13-9_	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-9_	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-9_	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

Note: Complete Sample ID 13-9_Date ie;mmddyy

1703 Time	1708	1713	1718	1723	1728	1733		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min) CL	.2.5	.15	.15	.15	.15	.15		
Volume Purged (Liters)	.75	1.5	2.25	3	3.75	4.5		
Water Depth (ft)	21.51	21.51	21.51	21.51	21.52	21.52		
Temperature (Celsius)	14.29	14.14	14.38	13.86	13.67	13.76		
pH	7.65	7.50	7.47	7.45	7.44	7.44		
Sp. Conductance (uS/cm)	825	827	821	823	821	816		
DO (mg/L)	7.81	7.49	4.64	4.52	4.38	4.32		
ORP (mV)	65.7	69.4	70.5	71.3	71.6	71.8		
Turbidity (NTU)	4.18	5.56	5.36	4.99	6.14	5.08		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters **Note: DNAPL Test required.**

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	(Purge) 6/5/14 (sample) 6/6/14	Well Number:	**13-10**
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: ✓
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	BC	Well Condition:	Good w/ lock + l.d
Water Level Meter:	Solinst	Total Casing Depth (ft):	58.3
Purging Equipment:	Ded.cated	Screened Interval (ft):	53.0 - 58.0
Sampling Equipment:	Ded.cated	Purge Depth (ft):	55.0
Sampling Time:	1500	Depth to Groundwater (ft): BC	~~22.23~~ (Purge) 20.92 (sample) 20.90
Total Discharge (gal):	25.26	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	37.40
Weather:	Sunny		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-10_060614	3	VOA	HCL	40ml	N	VOC 8260	
13-10_060614	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-10_060614	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-10_060614	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

Note: Complete Sample ID 13-10_Date ie;mmddyy

1220 Time	1225	1230	1235				1454	1459
Parameter (every 5 min)	5 min	10 min	15 min	min	min	min	min	5 min
Flow Rate (~~L/min~~) gpm							L/min	0.2
Volume Purged (~~Liters~~) gal							Liters	1.0
Water Depth (ft)	34.36	44.70	52.00					21.26
Temperature (Celsius)	11.95	12.24	12.43					12.39
pH **	8.99	8.93	9.06					9.12
Sp. Conductance (uS/cm)	422	420	420					446
DO (mg/L)	0.18	0.13	0.10					4.00
ORP (mV)	10.7	-7.2	-22.0					173.2
Turbidity (NTU)	2.97	2.14	2.20					4.64
Color	Clear →							Clear
Odor/Evidence of LNAPL	None →							None

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters * UNABLE TO SUSTAIN LOW FLOW PURGE. SAMPLED 6/6/14 AFTER RECOVERY

13-5: 20.63 ft

Start: 125 gal stop: 150 gal

& 191.01 ft (5) - (15 min)

*Pulled transducer

** pH probe replaced 6/6

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/10/14	Well Number:	**ISCO-2**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.4
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**31.6**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**26.6-31.6**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**29.0**
Sampling Time:	1335	Depth to Groundwater (ft):	20.65
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.95

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/10/14 0730	FIELD BLANK	LIV_061014	1325
Turbidity:	Micro TPW	4/28/14	Duplicate	D2_061014	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
ISCO-2_061014	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID ISCO-2_Date ie;mmddyy

1301 Time	1306	1311	1316	1321	1326	1331		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	20.65	20.65	20.65	20.65	20.65	~~20~~ 20.65		
Temperature (Celsius)	11.81	11.63	11.93	12.14	12.02	12.10		
pH	7.56	7.41	7.35	7.33	7.31	7.30		
Sp. Conductance (uS/cm)	668	667	665	667	666	664		
DO (mg/L)	12.20	12.24	11.91	11.62	11.89	11.67		
ORP (mV)	18.4	18.3	26.3	33.7	39.1	43.4		
Turbidity (NTU)	1.14	0.10	0.84	0.31	0.44	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-2: DTW =

ISCO-1: DTW =

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	**ISCO-24R**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.3
Project Number:	**1496021*16**	Well Diameter (in):	6
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**33.7**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**28.7-33.7**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**31.0**
Sampling Time:	1000	Depth to Groundwater (ft):	18.50
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	15.20

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
ISCO-24R_060914	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID ISCO-24R_Date ie;mmddyy

0938 Time	~~1143~~ 0943 CL	~~0950~~ 0948 CL	0953	0958	1003	1008		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	.4	.4	.4	.4	.4		
Volume Purged (Liters)	2	4	6	8	10	12		
Water Depth (ft)	18.50	18.50	18.50	18.50	18.50	18.50		
Temperature (Celsius)	10.78	10.57	10.55	10.58	11.03	10.98		
pH	7.32	7.28	7.26	7.26	7.28	7.28		
Sp. Conductance (uS/cm)	616	617	618	617	618	618		
DO (mg/L)	14.24	13.00	12.82	12.58	12.36	12.37		
ORP (mV)	171.5	173.5	175.5	177.6	177.8	179.3		
Turbidity (NTU)	0.25	0.34	1.07	0.08	0.00	0.19		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-1: DTW = 18.65

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**89-8**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.5
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**25.6**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**15.5 - 25.5**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**23.0**
Sampling Time:	1125	Depth to Groundwater (ft):	18.95
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	6.65

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
89-8_060714	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 89-8_Date ie;mmddyy

1053 Time	1058	1103	1108	1113	1118	1123		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	18.95	18.95	18.95	18.95	18.95	18.95		
Temperature (Celsius)	11.33	11.02	10.96	10.95	10.90	10.94		
pH	7.62	7.39	7.32	7.30	7.29	7.29		
Sp. Conductance (uS/cm)	814	811	807	807	806	806		
DO (mg/L)	13.98	13.28	12.73	12.41	12.07	12.23		
ORP (mV)	86.8	89.3	92.1	94.4	96.4	97.9		
Turbidity (NTU)	1.46	0.22	0.14	0.04	0.05	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**L-88-13**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.1 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**42.6**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**32.6 - 42.6**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**34.7**
Sampling Time:	0930	Depth to Groundwater (ft):	23.72
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	18.88

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14 0730			
Turbidity:	Micro TPW	4/28/14	TRIP BLANK	TB1_060314	0800
Other:			FIELD BLANK	LIV_060314	0905

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
L-88-13_060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID L-88-13_Date ie;mmddyy

0857 Time	0902	0907	0912	0917	0922	0927		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	.4	.4	.4	.4	.4		
Volume Purged (Liters)	2	4	6	8	10	12		
Water Depth (ft)	23.72	23.72	23.72	23.72	23.72	23.72		
Temperature (Celsius)	11.76	11.65	11.68	11.75	11.41	11.47		
pH	7.17	7.13	7.13	7.12	7.09	7.09		
Sp. Conductance (uS/cm)	728	726	725	727	727	727		
DO (mg/L)	5.11	3.44	3.19	2.77	2.28	1.92		
ORP (mV)	130.1	132.0	132.8	134.5	136.5	137.7		
Turbidity (NTU)	0.23	0.19	0.45	0.02	0.61	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-5: DTW = 22.25

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/2/14	Well Number:	**EX-58**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	WTR IN WELL BOX, GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**40.5**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**15.5 - 40.5**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**31.0**
Sampling Time:	1430	Depth to Groundwater (ft):	19.34
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	21.16

Reference: TOC

Weather:

Water Quality Meter(s)	**Model**	**Calibration Date/Time**	**QA/QC Samples**		
Temp/pH/SC/ORP/DO:	YSI 556	6/2/14 0730	**Type**	**Sample ID**	**Time**
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	**Sample Containers** No.	Type	Pres.	Vol.	**Field Filtered**	**Analysis Requested**	**MS/MSD & Comments**
EX-58_060214	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID EX-58_Date ie;mmddyy

1358 Time	1403	1408	1413	1418	1423	1428		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	19.34	19.34	19.34	19.34	19.34	19.34		
Temperature (Celsius)	11.87	11.53	11.35	11.28	11.31	11.42		
pH	7.30	7.27	7.26	7.26	7.26	7.26		
Sp. Conductance (uS/cm)	600	606	610	610	611	612		
DO (mg/L)	9.68	6.99	6.55	6.46	6.59	6.25		
ORP (mV)	166.6	163.4	161.3	159.8	158.7	157.5		
Turbidity (NTU)	7.44	2.31	1.36	1.11	1.18	0.83		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/10/14	Well Number:	**92-2**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.3 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	BC/CL	Well Condition:	(Good) w/ lock/lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	**26.3**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**7.3 - 26.3**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**22.0**
Sampling Time:	1045	Depth to Groundwater (ft):	3.78
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	22.52

Reference: TOC

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/10/14 0800			
Turbidity:	Micro TPW	4/28/14	Trip Blank	TBl_061014	0800
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
92-2_061014	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 92-2_Date ie;mmddyy

1010 Time	1015	1020	1025	1030	1035	1040		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	3.75	3.75	3.75	3.75	3.75	3.75		
Temperature (Celsius)	9.67	9.53	9.58	9.47	9.54	9.54		
pH	7.47	7.35	7.22	7.15	7.13	7.10		
Sp. Conductance (uS/cm)	273	266	250	236	231	224		
DO (mg/L)	12.33	11.48	10.88	10.76	10.63	10.77		
ORP (mV)	69.5	70.9	73.6	76.0	77.1	78.9		
Turbidity (NTU)	2.94	2.10	1.06	1.30	0.81	0.96		
Color	Light brown / plant matter							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-8: DTW = 4.18

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/2/14	Well Number:	**07-1**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.1 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good L.d/lock
Water Level Meter:	Solinst	Total Casing Depth (ft):	33.1
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	23.1 - 33.1
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	30.0
Sampling Time:	1618	Depth to Groundwater (ft):	21.07
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	12.03

Reference: TOC

Weather: Rain - Pt Cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/2/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-1_ 060214	3	VOA	HCL	40ml	N	VOC 8260	
			~~Ascorbic~~				

Note: Complete Sample ID 07-1_Date ie;mmddyy

1543 Time	1548	1553	1558	1603	1608	1613		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.4	0.4	0.4	0.4	0.4	0.4		
Volume Purged (Liters)	2.0	4.0	6.0	8.0	10.0	12.0		
Water Depth (ft)	21.07	21.07	21.07	21.07	21.07	—		
Temperature (Celsius)	10.59	10.36	10.28	10.28	10.27	10.33		
pH	7.27	7.17	7.15	7.19	7.19	7.21		
Sp. Conductance (uS/cm)	589	590	591	591	590	590		
DO (mg/L)	6.67	6.36	6.33	6.31	6.26	6.21		
ORP (mV)	144.2	147.5	147.9	146.3	146.7	145.8		
Turbidity (NTU)	0.49	0.38	0.27	0.30	0.20	0.09		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

11-1: DTW = 20.81

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/4/14	Well Number:	**07-11**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 3.1 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**22.1**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**7.1 - 22.1**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**16.0**
Sampling Time:	1025	Depth to Groundwater (ft):	5.01
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	17.09

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/4/14 0700			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
07-11_060414	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 07-11_Date ie;mmddyy

0952 Time	0957	1002	1007	1012	1017	1022		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	5.01	5.01	5.01	5.01	5.01	5.01		
Temperature (Celsius)	7.21	6.93	6.92	6.82	6.67	6.80		
pH	7.88	7.73	7.56	7.50	7.43	7.43		
Sp. Conductance (uS/cm)	218	215	213	210	213	212		
DO (mg/L)	8.88	7.15	6.30	6.08	5.93	5.56		
ORP (mV)	99.5	107.1	117.4	121.9	128.7	132.0		
Turbidity (NTU)	1.57	0.69	1.02	0.10	0.26	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

12-5: DTW = 3.81

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**12-7**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.6 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good w/lock + l.d
Water Level Meter:	Solinst	Total Casing Depth (ft):	**35.1**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**15.1 - 35.1**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**30.0**
Sampling Time:	1457	Depth to Groundwater (ft):	23.73
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	11.37
Weather:	Slight Wind/Pt Cloudy		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-7_060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 12-7_Date ie;mmddyy

1422 Time	1427	1432	1437	1442	1447	1452		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.4	0.4	0.4	0.4	0.4	0.4		
Volume Purged (Liters)	2.0	4.0	6.0	8.0	10.0	12.0		
Water Depth (ft)	23.73	23.73	22.73	22.73	22.73	22.73		
Temperature (Celsius)	13.50	13.24	13.00	13.02	12.92	12.82		
pH	7.27	7.07	6.85	6.78	6.72	6.67		
Sp. Conductance (uS/cm)	864	869	871	870	870	868		
DO (mg/L)	4.68	1.36	1.49	1.52	1.57	1.55		
ORP (mV)	-44.8	-46.9	-47.0	-45.1	-46.5	-48.4		
Turbidity (NTU)	1.04	1.20	0.67	1.13	0.67	0.75		
Color	Clear / Very light yellow							
Odor/Evidence of LNAPL	Slight organic odor →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-3: DTW = 24.08

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/6/14	Well Number:	**12-8**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.4 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	~~17.9~~ 37.9
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	17.9 - 37.9
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	32.0
Sampling Time:	1605	Depth to Groundwater (ft):	24.56
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	13.34

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-8_060614	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 12-8_Date ie;mmddyy

1531 Time	1536	1541	1546	1551	1556	1601		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	.4	.4	.4	.4	.4		
Volume Purged (Liters)	2	4	6	8	10	12		
Water Depth (ft)	24.57	24.57	24.56	24.56	24.56	24.56		
Temperature (Celsius)	12.04	12.05	11.81	11.82	11.92	11.97		
pH	7.21	7.17	7.14	7.13	7.14	7.14		
Sp. Conductance (uS/cm)	757	757	757	756	756	756		
DO (mg/L)	12.60	11.54	11.19	10.73	10.43	9.98		
ORP (mV)	160.7	159.5	159.7	158.6	159.5	159.3		
Turbidity (NTU)	0.91	1.21	0.96	0.74	1.09	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-4: 25.53

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**12-9**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.1 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good w/ locket lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	**33.1**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**18.1 - 33.1**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**30.0**
Sampling Time:	1305	Depth to Groundwater (ft):	21.56
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	11.54
Weather:	Sunny		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3 ~~12~~ 14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-9_~~03~~ 060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 12-9_Date ie;mmddyy

1230 Time	1235	1240	1245	1250	1255	1300		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.4	0.4	0.4	0.4	0.4	0.4		
Volume Purged (Liters)	2.0	4.0	~~2.60~~ 6.0	8.0	10.0	12.0		
Water Depth (ft)	21.57	21.57	21.57	21.57	21.57	21.57		
Temperature (Celsius)	12.41	12.20	11.78	11.72	11.48	11.47		
pH	6.93	6.76	6.73	6.70	6.67	6.65		
Sp. Conductance (uS/cm)	908	912	913	911	911	909		
DO (mg/L)	4.97	4.76	4.69	4.71	4.74	4.81		
ORP (mV)	105.7	108.1	107.2	107.1	109.6	112.3		
Turbidity (NTU)	0.91	0.54	0.84	0.40	0.37	0.73		
Color	Clear	→						
Odor/Evidence of LNAPL	None	→						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

10-7: DTW = 21.73

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**12-10**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.6 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	CL ~~20.1~~ 30.1
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	20.1 - 30.1
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	30.0
Sampling Time:	0955	Depth to Groundwater (ft):	23.84
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	6.26

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
12-10_060714	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 12-10_Date ie;mmddyy

0922 Time	0927	0932	0937	0942	0947	0952		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	23.84	23.84	23.84	23.84	23.84	23.84		
Temperature (Celsius)	11.73	11.74	11.85	12.07	12.14	12.11		
pH	6.62	6.60	6.60	6.60	6.61	6.61		
Sp. Conductance (uS/cm)	1049	1050	1050	1051	1051	1051		
DO (mg/L)	5.80	4.26	4.23	4.13	4.25	4.42		
ORP (mV)	72.6	73.6	74.7	76.2	78.4	80.4		
Turbidity (NTU)	0.42	0.80	0.29	0.35	0.00	0.58		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	**13-1**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: _____
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**30.0**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**24.5 - 27.5**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**26.0**
Sampling Time:	1155	Depth to Groundwater (ft):	20.57
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.43

Reference: TOC

Weather: _____

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
Note: Complete Sample ID 13-1_Date ie;mmddyy							
13-1_060914	3	VOA	HCL	40ml	N	VOC 8260	
13-1_060914	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-1_060914	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-1_060914	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
Note: Complete Sample ID 13-1_Date ie;mmddyy							

1122 Time	1127	1132	1137	1142	1147	1152		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2 ~~.3~~	.2	.2	.2	.2	.2		
Volume Purged (Liters)	1	2	3	4	5	6		
Water Depth (ft)	20.65	20.65	20.65	20.64	20.64	20.64		
Temperature (Celsius) 14.10	~~21.51~~	13.90	13.92	14.12	13.97	14.11		
pH 8.19	~~7.64~~	7.57	7.46	7.41	7.40	7.38		
Sp. Conductance (uS/cm)	706	718	725	729	732	732		
DO (mg/L)	14.43	12.18	11.87	11.38	11.31	11.06		
ORP (mV)	172.3	182.0	183.2	186.3	188.9	191.0		
Turbidity (NTU)	7.71	3.40	2.34	1.86	2.64	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	**13-2**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: _____
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	29.2
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	26.2 - 29.2
Sampling Equipment:	DED BLADDER	Purge Depth (ft):	28.0
Sampling Time:	1340	Depth to Groundwater (ft):	19.99
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.21

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14 0730			
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-2_060914	3	VOA	HCL	40ml	N	VOC 8260	
13-2_060914	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-2_060914	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-2_060914	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

Note: Complete Sample ID 13-2_Date ie;mmddyy

1307 Time	1312	1317	1322	1327	1332	1337		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2	.2	.2	.2	.2	.2		
Volume Purged (Liters)	1	2	3	4	5	6		
Water Depth (ft)	20.02	20.02	20.02	20.02	20.01	20.01		
Temperature (Celsius)	13.25	13.22	13.62	13.42	13.36	13.55		
pH	7.46	7.40	7.39	7.38	7.38	7.36		
Sp. Conductance (uS/cm)	670	670	672	676	675	673		
DO (mg/L)	12.91	12.04	11.07	11.21	11.17	11.44		
ORP (mV)	228.3	227.9	227.0	228.2	229.0	230.1		
Turbidity (NTU)	1.43	0.41	1.06	0.46	0.38	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/10/14	Well Number:	**13-3**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: ____
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**31.5**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**28.5 - 31.5**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**30.0**
Sampling Time:	1615	Depth to Groundwater (ft):	21.55
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.55

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	CL 1677 6/10/14 0930	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:			**Duplicate**	D3_061014	0800

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-3_061014	3	VOA	HCL	40ml	N	VOC 8260	
13-3_061014	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-3_061014	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-3_061014	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

Note: Complete Sample ID 13-3_Date ie;mmddyy

1542 Time	1547	1552	1557	1602	1607	1612		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	21.57	21.57	21.57	21.57	21.57	21.57		
Temperature (Celsius)	12.64 ~~18.4~~	12.48	12.58	12.70	12.53	12.34		
pH	7.48	7.34	7.28	7.26	7.26	7.24		
Sp. Conductance (uS/cm)	744	735	734	727	728	726		
DO (mg/L)	13.27	12.85	11.50	11.32	11.34	11.25		
ORP (mV)	73.7	73.9	74.0	74.1	74.9	75.9		
Turbidity (NTU)	0.72	0.54	0.35	0.29	0.32	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	**13-4**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good/lock + lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	27.5
Purging Equipment:	Dedicated	Screened Interval (ft):	24.5 - 27.5
Sampling Equipment:	Dedicated	Purge Depth (ft):	26.0
Sampling Time:	1405	Depth to Groundwater (ft):	21.98
Total Discharge (gal):	2	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	5.52
Weather:	Sunny		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-4_ 060914	3	VOA	HCL	40ml	N	VOC 8260	
13-4_ 060914	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-4_ 060914	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-4_ 060914	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

Note: Complete Sample ID 13-4_Date ie;mmddyy

1530 Time	1535	1540	1545	1350	1355	1400		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0		
Water Depth (ft)	22.00	22.01	22.01	22.01	22.01	22.02		
Temperature (Celsius)	13.58	13.69	13.52	13.68	13.38	13.29		
pH	7.65	7.37	7.24	7.19	7.16	7.14		
Sp. Conductance (uS/cm)	709	706	704	703	703	700		
DO (mg/L)	7.37	6.25	5.87	5.70	5.61	5.62		
ORP (mV)	177.7	174.2	167.5	163.9	162.0	160.0		
Turbidity (NTU)	5.67	3.30	2.66	1.59	2.04	1.59		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	**13-5**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	BnC	Well Condition:	Good w/lock + lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	35.5
Purging Equipment:	Dedicated	Screened Interval (ft):	30.75 - 33.75
Sampling Equipment:	Dedicated	Purge Depth (ft):	32.0
Sampling Time:	~~1137~~ 1135	Depth to Groundwater (ft):	20.49
Total Discharge (gal):	2	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	15.01

Reference: TOC

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14			
Turbidity:	Micro TPW	4/28/14	TBZ. Trip Bl.	TBZ_060914	0800
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-5_ 060914	3	VOA	HCL	40ml	N	VOC 8260	
13-5_ 060914	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-5_ 060914	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-5_ 060914	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

Note: Complete Sample ID 13-5_Date ie;mmddyy

1102 Time	1107	1112	1117	1122	1127	1132		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0		
Water Depth (ft)	20.50	~~12.59~~ 20.51	20.51	20.51	20.51	20.51		
Temperature (Celsius)	12.70	12.59	12.44	12.24	12.43	12.28		
pH	7.12	7.09	7.05	7.05	7.06	7.10		
Sp. Conductance (uS/cm)	650	648	646	645	644	647		
DO (mg/L)	7.01	6.10	5.85	5.63	5.67	5.70		
ORP (mV)	161.2	154.3	152.8	142.8	143.3	138.8		
Turbidity (NTU)	1.38	2.13	2.16	2.39	1.74	1.47		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

13-10 DTW:

Transducer may have had slightly affected measurements

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	**13-6**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: ✓
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good w/lock + I.D
Water Level Meter:	Solinst	Total Casing Depth (ft):	33.0
Purging Equipment:	Dedicated	Screened Interval (ft):	30.0 - 33.0
Sampling Equipment:	Dedicated	Purge Depth (ft):	31.5
Sampling Time:	1225	Depth to Groundwater (ft):	20.27
Total Discharge (gal):	2	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	12.73

Reference: TOC

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-6_ 060914	3	VOA	HCL	40ml	N	VOC 8260	
13-6_ 060914	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-6_ 060914	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-6_ 060914	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

Note: Complete Sample ID 13-6_Date ie;mmddyy

1152 Time	1157	1202	1207	1212	1217	1222		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.5	2.5	3.5	4.5	5.5	6.5		
Water Depth (ft)	20.32	20.31	20.31	20.31	20.31	20.31		
Temperature (Celsius)	12.65	12.90	12.80	13.09	13.23	13.15		
pH	7.23	7.20	7.11	7.05	7.10	7.08		
Sp. Conductance (uS/cm)	615	619	618	619	619	620		
DO (mg/L)	5.49	5.27	5.00	5.25	5.24	5.14		
ORP (mV)	178.5	164.1	158.3	148.2	138.9	134.3		
Turbidity (NTU)	3.07	~~3.6~~ 2.60	1.66	1.44	1.23	0.94		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Well mislabeled 13-5.

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	13-7
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	BnC	Well Condition:	Good w/ lock & lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	32.0
Purging Equipment:	Ded. coated	Screened Interval (ft):	29.0 - 32.0
Sampling Equipment:	Ded. coated	Purge Depth (ft):	30.5
Sampling Time:	1315	Depth to Groundwater (ft):	20.39
Total Discharge (gal):	2	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	11.61
Weather:	Sunny		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-7_ 060914	3	VOA	HCL	40ml	N	VOC 8260	
13-7_ 060914	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-7_ 060914	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-7_ 060914	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	

Note: Complete Sample ID 13-7_Date ie;mmddyy

1240 Time	1245	1250	1255	1300	1305	1310		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0		
Water Depth (ft)	20.40	20.41	20.41	20.41	20.41	20.41		
Temperature (Celsius)	11.63	11.68	11.64	11.54	11.70	11.68		
pH	7.19	7.03	7.03	7.05	7.06	7.06		
Sp. Conductance (uS/cm)	375	538	555	569	578	582		
DO (mg/L)	5.28	5.70	5.58	5.50	5.46	5.39		
ORP (mV)	210.9	185.6	182.1	172.3	156.0	150.9		
Turbidity (NTU)	3.47	1.58	2.15	4.34	3.02	3.00		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/2/14	Well Number:	#3
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: ____ (ft PVC) Flush: -1.1
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	23.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	13.6 - 23.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	22.0
Sampling Time:	1140	Depth to Groundwater (ft):	18.10
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	5.50

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/2/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
3_060214	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 3_Date ie;mmddyy

1106 Time	1111	1116	1121	1126	1131	1136		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	18.10	18.10	18.11	18.11	18.11	18.11		
Temperature (Celsius)	11.37	11.19	11.33	10.93	10.88	10.83		
pH	7.54	7.51	7.52	7.49	7.49	7.48		
Sp. Conductance (uS/cm)	601	602	604	605	604	604		
DO (mg/L)	11.70	11.23	10.52	11.01	10.72	10.93		
ORP (mV)	95.1	97.9	98.8	101.4	102.4	104.2		
Turbidity (NTU)	8.28	5.30	3.53	2.83	2.18	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/2/14	Well Number:	#5
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.6
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	WTR IN WELL BOX / GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	12.7
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	2.7 - 12.7
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	11.0
Sampling Time:	1050	Depth to Groundwater (ft):	3.44
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.26

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/2/14 0930			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
5_060214	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 5_Date ie;mmddyy

1016 Time	1021	1026	1031	1036	1041	1046		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	.4	.4	.4	.4	.4		
Volume Purged (Liters)	2	4	6	8	10	12		
Water Depth (ft)	3.44	3.44	3.44	3.44	3.44	3.44		
Temperature (Celsius)	10.83 ~~12.62~~ CL	10.74	10.73	10.80	10.98	10.93		
pH	7.40 ~~7.78~~ CL	7.21	7.20	7.19	7.20	7.19		
Sp. Conductance (uS/cm)	553 ~~703~~ CL	550	550	550	549	550		
DO (mg/L)	7.45 ~~14.90~~ CL	4.51	4.07	3.76	3.49	3.32		
ORP (mV)	104.0	103.1	102.2	100.3	98.9	98.6		
Turbidity (NTU)	58.22	23.26	19.32	9.42	7.33	—		
Color	CL ~~CLEAR~~	TURBID BRN	→	CLEAR				
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/6/14	Well Number:	#6
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.9
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	WELL BOX BOLTS BROKEN, GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	12.4
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	2.4 - 12.4
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	10.0
Sampling Time:	1350	Depth to Groundwater (ft):	3.56
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	8.84

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14 0730	~~Trip Blank~~ TB		
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
6_060614	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 6_Date ie;mmddyy

1318 Time	1323	1328	1333	1338	1343	1348		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	3.56	3.56	3.56	3.56	3.56	3.56		
Temperature (Celsius)	11.56	11.58	11.57	11.51	11.54	11.58		
pH	7.31	7.21	7.21	7.19	7.19	7.20		
Sp. Conductance (uS/cm)	622	621	621	621	622	623		
DO (mg/L)	10.35	8.98	8.43	7.83	7.42	7.26		
ORP (mV)	107.6	108.2	107.8	107.9	107.5	107.0		
Turbidity (NTU)	1.95	0.12	0.55	0.45	0.00	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	#11
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.4
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	28.0
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	18.0 - 28.0
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	27.0
Sampling Time:	1320	Depth to Groundwater (ft):	24.51
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	3.49

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
11_060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 11_Date ie;mmddyy

1249 Time	1254	1259	1304	1309	1314	1319		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2	.2	.2	.2	.2	.2		
Volume Purged (Liters)	1	2	3	4	5	6		
Water Depth (ft)	24.52	24.52	24.52	24.52	24.52	24.52		
Temperature (Celsius)	12.21	11.90	11.73	11.76	11.72	11.74		
pH	7.29	7.27	7.26	7.26	7.26	7.25		
Sp. Conductance (uS/cm)	782	747	729	723	717	714		
DO (mg/L)	7.72	7.65	7.51	7.52	7.66	7.62		
ORP (mV)	83.1	73.4	61.1	54.4	44.5	38.9		
Turbidity (NTU)	1.04	0.62	0.88	0.70	0.48	0.25		
Color	CLEAR W/ MINOR PLANT MATTER							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/6/14	Well Number:	**89-1**
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: 2.2 (ft PVC) Flush:
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	Ben C	Well Condition:	Good - w/ l.d + lock
Water Level Meter:	Solinst	Total Casing Depth (ft):	32.2
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	22.2 - 32.2
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	27.0
Sampling Time:	1350	Depth to Groundwater (ft):	3.31
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	28.89
Weather:	Cloudy		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
89-1_060614	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 89-1_Date ie;mmddyy

1315 Time	1320	1325	1330	1335	1340	1345		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0		
Water Depth (ft)	3.31	3.31	3.31	3.31	3.31	3.31		
Temperature (Celsius)	10.19	10.06	10.03	10.10	9.94	10.08		
pH	7.40	7.36	7.26	7.31	7.30	7.27		
Sp. Conductance (uS/cm)	683	703	714	716	716	711		
DO (mg/L)	4.63	3.88	3.76	3.60	3.67	3.72		
ORP (mV)	230.4	230.7	227.1	221.0	219.1	216.0		
Turbidity (NTU)	6.23	2.27	4.28	2.44	1.24	1.30		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**89-2**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 0.8 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**39.8**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**19.8 - 39.8**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**36.0**
Sampling Time:	1410	Depth to Groundwater (ft):	23.88
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	15.92

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
89-2_060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 89-2_Date ie;mmddyy

1338 Time	1343	1348	1353	1358	1403	1408		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	23.88	23.88	23.88	23.88	23.88	23.88		
Temperature (Celsius)	12.65	12.58	12.69	12.73	12.74	12.71		
pH	7.60	7.45	7.43	7.42	7.41	7.40		
Sp. Conductance (uS/cm)	596	596	596	597	596	595		
DO (mg/L)	9.40	8.24	8.04	8.10	8.31	8.00		
ORP (mV)	61.8	67.3	71.7	75.5	79.4	82.9		
Turbidity (NTU)	0.18	0.22	0.00	0.01	0.00	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) — Kennedy/Jenks Consultants

Date:	6/16/14	Well Number:	89-3
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: ____ (ft PVC) Flush: -0.7
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	BC	Well Condition:	Good w/ locking lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	33.3
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	13.3 - 33.3
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	31.0
Sampling Time:	1203 ~~1203~~ ~~1205~~ BC	Depth to Groundwater (ft):	17.69
Total Discharge (gal):		Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	BC ~~15.64~~ 15.61

Reference: TOC

Weather: Sunny

Field Blank (89-3-PDB-BLANK_ 061614) 1030

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	6/16/14
Turbidity:	Micro TPW	4/28/14
Other:		

QA/QC Samples		
Type	Sample ID	Time
BC ~~FBZ~~ Trip Blank	TBZ_061614	0800
Duplicate	D1_061614	0800

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
89-3_061614	3	VOA	HCL	40ml	N	VOC 8260	
89-3-PDB-BC ~~21~~ 19_ 061614		VOA	HCL	40ml	N	VOC 8260	Sample Time: 1040
89-3-PDB-BC ~~26~~ ~~24~~ 25_ 061614		VOA	HCL	40ml	N	VOC 8260	BC: 1050 1045
89-3-PDB-BC ~~30~~ 31_ 061614		VOA	HCL	40ml	N	VOC 8260	BC: 1100 1050

Note: Complete Low/Flow Sample ID 89-3_Date ie;mmddyy, PDB Sample ID 89-3-PDB-Depth_Date ie;mmddyy

1128 Time	1133	1138	1143	1148	1153	1158		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0		
Water Depth (ft)	17.70	17.70	17.70	17.70	17.70	17.70		
Temperature (Celsius)	10.97	10.45	10.14	10.13	10.08	10.06		
pH	7.49	7.36	7.27	7.17	7.16	7.17		
Sp. Conductance (uS/cm)	608	604	603	603	603	603		
DO (mg/L)	14.03	11.82	10.98	10.55	10.50	10.36		
ORP (mV)	171.2	175.1	184.3	191.7	193.1	194.1		
Turbidity (NTU)	177.1	80.50	35.66	24.35	19.14	10.94		
Color	Light Brown →			Light Grey				
Odor/Evidence of LNAPL	None	→						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**89-6**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.6 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	Ben C	Well Condition:	Good w/ lid + lock
Water Level Meter:	Solinst	Total Casing Depth (ft):	**39.6**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**29.6 - 39.6**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**35.0**
Sampling Time:	1355	Depth to Groundwater (ft):	23.05
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	16.55

Reference: TOC

Weather: Cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
89-6_ 060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 89-6_Date ie;mmddyy

1320 Time	1325	1330	1335	1340	1345	1350		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0		
Water Depth (ft)	~~23.00~~ 23.05	23.05	23.05	23.06	23.06	23.06		
Temperature (Celsius)	13.00	12.11	11.95	12.01	12.03	12.19		
pH	7.29	7.19	7.10	7.18	7.20	7.21		
Sp. Conductance (uS/cm)	602	604	605	606	606	606		
DO (mg/L)	6.78	6.71	6.52	6.39	6.32	6.34		
ORP (mV)	159.6	156.8	154.3	147.0	142.6	139.7		
Turbidity (NTU)	0.48	0.38	0.45	0.31	0.36	0.33		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**89-9**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.5
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**33.5**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**13.5 - 33.5**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**29.0**
Sampling Time:	1215	Depth to Groundwater (ft):	26.36
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	7.14

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
89-9_060714	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 89-9_Date ie;mmddyy

1140 Time	1145	1150	1155	1200	1205	1210		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	26.36	26.36	26.36	26.36	26.36	26.36		
Temperature (Celsius)	11.26	10.67	10.56	10.54	10.53	10.53		
pH	7.21	7.21	7.21	7.20	7.19	7.19		
Sp. Conductance (uS/cm)	611	600	599	599	599	599		
DO (mg/L)	11.78	11.12	10.89	10.79	10.69	10.61		
ORP (mV)	93.9	96.9	99.1	100.8	102.6	103.9		
Turbidity (NTU)	0.23	0.07	0.01	0.01	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/4/14	Well Number:	**90-2B**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.7 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**24.7**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**14.7 - 24.7**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**24.0**
Sampling Time:	0835	Depth to Groundwater (ft):	17.71
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	6.99

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/4/14 0700	Trip Blank	TBI_060414	0700
Turbidity:	Micro TPW	4/28/14	~~Field Blank~~	~~LIV_060414~~	~~0815~~
Other:		CL			

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
90-2B_ 060414	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 90-2B_Date ie;mmddyy

0800 Time	0805	0810	0815	0820	0825	0830		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	17.71	17.71	17.71	17.71	17.71	17.71		
Temperature (Celsius)	10.47	10.40	10.39	10.48	10.57	10.44		
pH	7.10	6.99	6.98	6.98	7.00	6.99		
Sp. Conductance (uS/cm)	908	910	910	909	909	908		
DO (mg/L)	10.60	9.44	9.02	8.67	8.47	8.28		
ORP (mV)	161.2	166.3	168.3	171.4	173.4	175.6		
Turbidity (NTU)	0.00	0.26	0.04	0.00	0.00	0.01		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/4/14	Well Number:	**90-3**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.1 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**18.1**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**8.1 - 18.1**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**16.0**
Sampling Time:	1435	Depth to Groundwater (ft):	4.75
Total Discharge (gal):	3.15	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	13.35

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/4/14 0700			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
90-3_060414	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 90-3_Date ie;mmddyy

1403 Time	1408	1413	1418	1423	1428	1433		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	.4	.4	.4	.4	.4		
Volume Purged (Liters)	2	4	6	8	10	12		
Water Depth (ft)	4.75	4.75	4.75	4.75	4.75	4.75		
Temperature (Celsius)	10.82 ~~18.82~~	10.51	10.40	10.43	10.44	10.39		
pH	7.19	7.13	7.10	7.09	7.09	7.10		
Sp. Conductance (uS/cm)	640	635	634	634	633	635		
DO (mg/L)	5.90	4.14	3.08	2.55	2.35	2.19		
ORP (mV)	223.4	224.0	225.0	225.6	226.1	226.2		
Turbidity (NTU)	0.21	0.06	0.00	0.00	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NONE						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**92-1**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.4 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	
Water Level Meter:	Solinst	Total Casing Depth (ft):	**35.2**
Purging Equipment:	QED	Screened Interval (ft):	**25.2 - 35.2**
Sampling Equipment:	QED	Purge Depth (ft):	31.0
Sampling Time:	1625	Depth to Groundwater (ft):	23.07
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	12.13

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0930			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
92-1_060714	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 92-1_Date ie;mmddyy

1553 Time	1558	1603	1608	1613	1618	1623		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	23.07	23.07	23.07	23.07	23.07	23.07		
Temperature (Celsius)	13.62	13.39	13.01	12.50	12.39	11.88		
pH	7.44	7.37	7.36	7.36	7.37	7.34		
Sp. Conductance (uS/cm)	747	743	739	734	729	724		
DO (mg/L)	14.51	13.61	13.56	13.44	13.25	13.65		
ORP (mV)	104.7	107.6	109.3	110.5	112.7	115.1		
Turbidity (NTU)	1100	1100	701.9	337.9	188.0	98.75		
Color	BRN							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/6/14	Well Number:	**92-4**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.2
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	Ben C	Well Condition:	Good w/lock + l.d
Water Level Meter:	Solinst	Total Casing Depth (ft):	34.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	24.6 - 34.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	31.0
Sampling Time:	0925	Depth to Groundwater (ft):	21.20
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	13.40

Reference: TOC

Weather: Cloudy / Windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14	Trip Blank	TB2_060614	0800
Turbidity:	Micro TPW	4/28/14	Field Blank	LIV-060614	0905
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
92-4_060614	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 92-4_Date ie;mmddyy

0854 Time	0859	0904	0909	0914	0919	0924		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0		
Water Depth (ft)	21.20	21.20	21.20	21.20	21.20	21.20		
Temperature (Celsius)	11.11	11.04	11.03	11.01	11.01	10.99		
pH	*5.78	7.4	~~6.~~ BC 7.4	7.3	7.3	7.3		
Sp. Conductance (uS/cm)	780	778	777	775	774	773		
DO (mg/L)	5.28	5.27	5.12	5.39	5.40	5.37		
ORP (mV)	240.4	233.3	226.1	222.7	218.3	213.4		
Turbidity (NTU)	1.58	0.82	0.29	0.41	0.35	0.73		
Color	Clear →							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

*- pH probe - will replace after sample - used eco test pH2 for remainder
→ pH meter had not been recently cal. (eco)

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/4/14	Well Number:	**94-1**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.8 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**37.8**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**27.8 - 37.8**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**33.0**
Sampling Time:	CL 1145 1205	Depth to Groundwater (ft):	7.54
Total Discharge (gal):		Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	30.26

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/4/14 0700	Type	Sample ID	Time
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
94-1_060414	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 94-1_Date ie;mmddyy

CL 1114 1134 Time	~~1139~~ 1119 CL	~~1144~~ 1124 CL	~~1149~~ 1129 CL	~~1154~~ 1134 CL	~~1159~~ 1139 CL	~~1204~~ 1144 CL		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.4	.4	.4	.4	.4	.4		
Volume Purged (Liters)	2	4	6	8	10	12		
Water Depth (ft)	7.54	7.54	7.54	7.54	7.54	7.54		
Temperature (Celsius)	8.87	8.43	8.29	8.28	8.21	8.24		
pH	7.44	7.37	7.35	7.33	7.33	7.30		
Sp. Conductance (uS/cm)	403	409	410	410	410	410		
DO (mg/L)	9.46	6.17	5.16	5.03	4.90	4.74		
ORP (mV)	92.2	101.0	107.8	112.2	116.3	119.1		
Turbidity (NTU)	0.21	0.37	0.00	0.00	0.00	0.01		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**94-2**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.7 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**39.2**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**29.2 - 39.2**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**34.0**
Sampling Time:	1220	Depth to Groundwater (ft):	3.71
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	35.49

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
94-2_060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 94-2_Date ie;mmddyy

1145 Time	1150	1155	1200	1205	1210	1215		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	3.71	3.71	3.71	3.71	3.71	3.71		
Temperature (Celsius)	11.20	10.83	10.77	10.79	10.87	10.95		
pH	7.75	7.43	7.39	7.35	7.34	7.33		
Sp. Conductance (uS/cm)	392	377	374	372	373	373		
DO (mg/L)	6.71	5.24	4.72	4.51	4.48	4.36		
ORP (mV)	177.5	184.7	188.2	191.4	193.9	196.8		
Turbidity (NTU)	0.00	0.00	0.00	0.01	0.00	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**E-7**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	6
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	31.40
Purging Equipment:	QED	Screened Interval (ft):	
Sampling Equipment:	QED	Purge Depth (ft):	27.0
Sampling Time:	1320	Depth to Groundwater (ft):	21.32
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.08

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0730	CL		
Turbidity:	Micro TPW	4/28/14	~~DX~~		
Other:			Rinse Blank	DX_060714	1235

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
E-7_060714	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID E-7_Date ie;mmddyy

1246 Time	1251	1256	1301	1306	1311	1316		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	21.32	21.32	21.32	21.32	21.32	21.32		
Temperature (Celsius)	12.49	12.16	12.09	12.11	12.20	12.23		
pH	7.37	7.30	7.28	7.28	7.28	7.27		
Sp. Conductance (uS/cm)	715	707	699	696	693	693		
DO (mg/L)	13.03	11.87	11.53	11.64	11.51	11.55		
ORP (mV)	116.0	117.7	118.8	119.6	120.8	122.5		
Turbidity (NTU)	12.39	9.65	7.44	7.70	5.84	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/10/14	Well Number:	**L-87-2**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.5 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**32.5**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**22.5 - 32.5**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**31.0**
Sampling Time:	1155	Depth to Groundwater (ft):	24.75
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	7.75

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/10/14 0730			
Turbidity:	Micro TPW	4/28/14	DUPLICATE	D1-061014	0800
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
L-87-2_061014	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID L-87-2_Date ie;mmddyy

1124 Time	1129	1134	1139	1144	1149	1154		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	24.75	24.75	24.75	24.75	24.75	24.75		
Temperature (Celsius)	14.97	14.68	14.81	14.78	14.84	14.83		
pH	6.49	6.57	6.62	6.62	6.65	6.66		
Sp. Conductance (uS/cm)	1207	1195	1188	1190	1191	1189		
DO (mg/L)	7.18	4.86	4.09	3.92	3.85	3.76		
ORP (mV)	74.1	5.3	-34.0	-45.6	-52.9	-59.3		
Turbidity (NTU)	7.66	1.98	1.20	1.88	2.05	1.42		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED	DURING	PURGE,	DTW	METER	SET,	ODOR

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/6/14	Well Number:	**L-87-5**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 1.2 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**28.2**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**18.2 - 28.2**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**27.0**
Sampling Time:	1450	Depth to Groundwater (ft):	24.08
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	4.12

Reference: TOC

Weather:

Water Quality Meter(s)	**Model**	**Calibration Date/Time**	**QA/QC Samples**		
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14 0730	**Type**	**Sample ID**	**Time**
Turbidity:	Micro TPW	4/28/14			
Other:			**Duplicate**	D2_060614	0800

Sample ID	**Sample Containers** No.	Type	Pres.	Vol.	**Field Filtered**	**Analysis Requested**	**MS/MSD & Comments**
L-87-5_060614	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID L-87-5_Date ie;mmddyy

1416 Time	1421	1426	~~1432~~ 1431	1436	1441	1446		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	24.08	24.08	24.08	24.08	24.08	24.08		
Temperature (Celsius)	10.81	10.98	10.73	10.62	10.61	10.65		
pH	7.33	7.21	7.21	7.18	7.18	7.16		
Sp. Conductance (uS/cm)	616	614	616	613	613	613		
DO (mg/L)	12.40	11.41	10.70	10.81	10.77	10.53		
ORP (mV)	99.8	103.2	104.3	107.0	108.7	110.8		
Turbidity (NTU)	0.26	0.17	0.45	0.32	0.00	0.14		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/4/14	Well Number:	**LS-11**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	2
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**16.0**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**5.8 - 15.8**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**14.0**
Sampling Time:	1525	Depth to Groundwater (ft):	3.98
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	12.02

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/4/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
LS-11_060414	3	VOA	HCL	40ml	N	VOC 8260	
Note: Complete Sample ID LS-11_Date ie;mmddyy							

1451 Time	1456	1501	1506	1511	1516	1521		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	4.00	4.00	4.00	4.00	4.00	4.00		
Temperature (Celsius)	11.85	11.71	11.53	11.57	11.68	11.98		
pH	7.05	7.04	7.03	7.02	7.03	7.03		
Sp. Conductance (uS/cm)	1024	1047	1053	1054	1054	1053		
DO (mg/L)	4.40	2.08	1.63	1.41	1.40	1.37		
ORP (mV)	246.7	246.8	247.1	247.6	248.0	249.1		
Turbidity (NTU)	2.66	0.10	1.02	0.01	0.00	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/7/14	Well Number:	**MW-5RR**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.3
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**14.03**
Purging Equipment:	QED	Screened Interval (ft):	**4.03 - 14.03**
Sampling Equipment:	QED	Purge Depth (ft):	**9.0**
Sampling Time:	1535	Depth to Groundwater (ft):	2.81
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	11.22

Reference: TOC

Weather:

Water Quality Meter(s)	**Model**	**Calibration Date/Time**	**QA/QC Samples**		
			Type	**Sample ID**	**Time**
Temp/pH/SC/ORP/DO:	YSI 556	6/7/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	**Sample Containers**				**Field Filtered**	**Analysis Requested**	**MS/MSD & Comments**
	No.	**Type**	**Pres.**	**Vol.**			
MW-5RR_060714	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID MW-5RR_Date ie;mmddyy

1501 Time	1506	1511	1516	1521	1526	1531		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	2.82	2.81	2.81	2.81	2.81	2.81		
Temperature (Celsius)	12.73	12.48	12.46	12.59	12.10	12.05		
pH	7.26	7.16	7.12	7.11	7.09	7.10		
Sp. Conductance (uS/cm)	1003	972	956	947	941	940		
DO (mg/L)	10.57	8.96	8.23	7.70	7.65	7.59		
ORP (mV)	47.7	57.1	61.9	66.4	70.2	71.5		
Turbidity (NTU)	1.79	0.63	0.57	0.43	0.40	0.27		
Color	Clear							
Odor/Evidence of LNAPL	None	Noticed						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	**MW-10**
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.5
Project Number:	1496021*16	Well Diameter (in):	2
Sampling Personnel:	Ben C	Well Condition:	Good w/lock + lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	14.5
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	4.5 - 14.5
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	14.0
Sampling Time:	1545	Depth to Groundwater (ft):	3.86
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.64
Weather:	Sunny		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
MW-10_060914	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID MW-10_Date ie;mmddyy

1511 Time	1516	1521	1526	1531	1536	1541		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	3.87	3.87	3.88	3.88	3.88	3.88		
Temperature (Celsius)	11.61	10.43	10.36	10.18	10.05	10.15		
pH	7.68	7.21	7.08	6.94	6.93	6.98		
Sp. Conductance (uS/cm)	728	727	728	726	724	724		
DO (mg/L)	7.70	5.24	4.94	4.97	4.76	4.59		
ORP (mV)	44.1	35.0	35.0	30.0	10.6	13.9		
Turbidity (NTU)	22.93	5.55	3.90	2.36	1.64	2.01		
Color	Brown/Lt Brown ~ plant matter							
Odor/Evidence of LNAPL	None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

EX-22

Date:	6/2/14	Well Number:	EX-22
Project Name:	BN Livingston Shop Complex	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.2
Project Number:	1496021*16	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	(good)/lock + lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	34.8
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	19.8 - 34.8
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	29.0
Sampling Time:	1710	Depth to Groundwater (ft):	22.40
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	12.40
Weather:	Rain Pt Cloudy		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/2/14			
Turbidity:	Micro TPW	4/28/14			
Other:			Duplicate	D2_060214	0800

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
EX-22_060214	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID EX-22_Date ie;mmddyy

1635 Time	1640	1645	1650	1655	1700	1705		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	22.41	22.42	22.43	22.43	22.43	22.43		
Temperature (Celsius)	12.38	11.98	11.93	12.16	12.26	12.22		
pH	7.38	7.06	7.10	7.07	7.11	6.95		
Sp. Conductance (uS/cm)	834	832	832	832	834	834		
DO (mg/L)	1.92	0.82	0.85	0.97	1.24	1.39		
ORP (mV)	147.2	151.8	147.0	145.0	140.7	140.8		
Turbidity (NTU)	5.78	3.92	1.31	1.25	0.89	1.13		
Color	Clear	→						
Odor/Evidence of LNAPL	None	→						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/2/14	Well Number:	**EX-24**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.6
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**24.4**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**9.4 - 24.4**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**22.0**
Sampling Time:	0955	Depth to Groundwater (ft):	14.77
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.63

Reference: TOC

Weather:

Water Quality Meter(s)	**Model**	**Calibration Date/Time**	**QA/QC Samples**		
			Type	**Sample ID**	**Time**
Temp/pH/SC/ORP/DO:	YSI 556	6/2/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	**Sample Containers**				**Field Filtered**	**Analysis Requested**	**MS/MSD & Comments**
	No.	**Type**	**Pres.**	**Vol.**			
EX-24_060214	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID EX-24_Date ie;mmddyy

0922 Time	0927	0932	0937	0942	0947	0952		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	14.78	14.77	14.77	14.77	14.77	14.77		
Temperature (Celsius)	11.76	11.62	11.60	11.57	11.58	11.73		
pH	7.07	7.00	6.99	6.98	6.98	7.01		
Sp. Conductance (uS/cm)	699	714	722	727	726	726		
DO (mg/L)	2.62	2.57	2.15	1.89	1.67	1.60		
ORP (mV)	90.4	88.3	86.4	84.9	83.7	83.3		
Turbidity (NTU)	0.29	0.48	0.00	0.14	0.01	0.01		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	**EX-28**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.2 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	BnC	Well Condition:	Good w/ locks + lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	**20.6**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**5.6 - 20.6**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**14.0**
Sampling Time:	1630	Depth to Groundwater (ft):	5.27
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	15.37
Weather:	Sunny		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
EX-28_060914	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID EX-28_Date ie;mmddyy

1557 Time	1602	1607	1612	1617	1622	1627		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)	1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)	5.27	5.27	5.27	5.27	5.28	5.28		
Temperature (Celsius)	11.78	11.33	11.49	11.47	11.31	11.21		
pH	7.38	7.15	7.06	7.03	6.93	6.99		
Sp. Conductance (uS/cm)	653	648	645	646	645	645		
DO (mg/L)	3.81	2.31	2.06	2.00	1.95	1.90		
ORP (mV)	153.8	146.5	136.5	131.8	125.8	122.2		
Turbidity (NTU)	2.58	1.37	1.81	1.66	1.74	1.56		
Color	Clear							
Odor/Evidence of LNAPL	None							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/9/14	Well Number:	**07-2A**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.6
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**24.4**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**14.4 - 24.4**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**24.0**
Sampling Time:	0920	Depth to Groundwater (ft):	17.58
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	6.82

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/9/14 0730	Trip Blank	TB1_060914	0800
Turbidity:	Micro TPW	4/28/14	Field Blank	LIV_060914	0910
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-2A_060914	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 07-2A_Date ie;mmddyy

0847 Time	0852	0857	0902	0907	0912	0917		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2	.2	.2	.2	.2	.2		
Volume Purged (Liters)	CL ~~17.59~~ 1	2	3	4	5	6		
Water Depth (ft)	17.59	17.59	17.58	17.58	17.58	17.58		
Temperature (Celsius)	10.82 ~~15.54~~	10.11	10.13	10.03	10.00	9.95		
pH	7.77	7.49	7.43	7.35	7.32	7.31		
Sp. Conductance (uS/cm)	610	612	609	608	609	608		
DO (mg/L)	14.54	13.59	13.04	12.80	12.52	12.42		
ORP (mV)	127.1	136.8	141.6	150.3	153.9	156.4		
Turbidity (NTU)	4.28	3.73	2.23	1.04	1.44	1.08		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/2/14	Well Number:	**07-5A**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.3
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**14.7**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**4.7 - 14.7**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**13.0**
Sampling Time:	0905	Depth to Groundwater (ft):	2.88
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	11.82

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/2/14 0730	TRIP BLANK	TBL_060214	0800
Turbidity:	Micro TPW	4/28/14	FIELD BLANK	LIV-060214	0845
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-5A_060214	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 07-5A_Date ie;mmddyy

0833 Time	0838	0843	0848	0853	0858	0903		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	2.88	2.88	2.88	2.88	2.88	2.88		
Temperature (Celsius)	10.74	10.69	10.76	10.87	10.89	10.97		
pH	7.14	7.10	7.14	7.15	7.14	7.14		
Sp. Conductance (uS/cm)	570	569	569	570	569	569		
DO (mg/L)	9.26	8.49	8.14	7.75	7.74	7.58		
ORP (mV)	85.6	81.6	78.7	78.3	78.9	79.4		
Turbidity (NTU)	0.71	0.94	1.71	0.00	0.09	0.00		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**07-6**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.9 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**21.9**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**6.9 - 21.9**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**16.0**
Sampling Time:	1130	Depth to Groundwater (ft):	5.86
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	16.04

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14 0730			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-6_060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 07-6_Date ie;mmddyy

1059 Time	1104	1109	1114	1119	1124	1129		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	5.86	5.86	5.86	5.86	5.86	5.86		
Temperature (Celsius)	10.62	10.26	10.08	10.09	10.19	10.14		
pH	7.58	7.43	7.41	7.41	7.39	7.34		
Sp. Conductance (uS/cm)	384	374	374	373	373	373		
DO (mg/L)	7.71	6.11	5.62	5.41	5.32	5.42		
ORP (mV)	191.8	198.4	201.3	204.2	207.4	213.0		
Turbidity (NTU)	0.30	0.15	0.00	0.22	0.00	—		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/4/14	Well Number:	**07-7**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.4 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	22.4
Purging Equipment:	QED ~~Ded. Bladder~~ CL	Screened Interval (ft):	7.4 - 22.4
Sampling Equipment:	QED ~~Ded. Bladder~~ CL	Purge Depth (ft):	15.0
Sampling Time:	1310	Depth to Groundwater (ft):	8.75
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	13.65

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/4/14 CL			
Turbidity:	Micro TPW	4/28/14	~~DX~~		
Other:			RINSE BLANK	RX_060414	1220

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-7_060414	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 07-7_Date ie;mmddyy

1238 Time	1243	1248	1253	1258	1303	1308		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	8.75	8.75	8.75	8.75	8.75	8.75		
Temperature (Celsius)	10.36	10.26	10.12	10.24	10.28	10.42		
pH	7.29	7.18	7.15	7.14	7.14	7.17		
Sp. Conductance (uS/cm)	421	421	422	421	421	420		
DO (mg/L)	7.88	7.51	7.37	7.15	7.16	7.13		
ORP (mV)	129.8	133.0	134.8	136.2	137.3	137.3		
Turbidity (NTU)	8.44	4.41	3.20	2.53	1.16	0.53		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/6/14	Well Number:	**07-8**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.4
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	BenC	Well Condition:	Good w/lock + lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	37.6
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	22.6 - 37.6
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	31.0
Sampling Time:	1100	Depth to Groundwater (ft):	22.40
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	15.20

Reference: TOC

Weather: Cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	6/6/14 1015			
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-8_ 060614	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 07-8_Date ie;mmddyy

Time	1025	1030	1035	1040	1045	1050	1055		
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)		0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)		1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)		22.40	22.40	22.40	22.40	22.40	22.40		
Temperature (Celsius)		11.16	11.19	11.23	11.24	11.25	11.24		
pH		6.92	6.98	7.06	7.15	7.20	7.21		
Sp. Conductance (uS/cm)		575	571	568	586	565	564		
DO (mg/L)		5.87	5.86	5.96	5.80	6.03	6.01		
ORP (mV)		217.9	211.7	204.3	198.3	194.6	193.9		
Turbidity (NTU)		0.97	0.75	0.51	1.07	0.56	0.25		
Color		Clear →							
Odor/Evidence of LNAPL		None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/3/14	Well Number:	**07-9**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: -0.7
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	Ben C	Well Condition:	Good - lock + lid
Water Level Meter:	Solinst	Total Casing Depth (ft):	**34.3**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**19.3 - 34.3**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**32.0**
Sampling Time:	1635	Depth to Groundwater (ft):	23.72
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	–
Water Disposal:	GWTP	Water Column (ft):	~~10.58~~ ~~10.48~~ 10.58

Reference: TOC

Weather: Wind / Cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/3/14	Type	Sample ID	Time
Turbidity:	Micro TPW	4/28/14			
Other:			Duplicate	D1_060314	0800

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-9_060314	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 07-9_Date ie;mmddyy

Time	1600	1605	1610	1615	1620	1625	1630		
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)		0.3	0.3	0.3	0.3	0.3	0.3		
Volume Purged (Liters)		1.5	3.0	4.5	6.0	7.5	9.0		
Water Depth (ft)		23.72	23.72	23.72	23.72	23.72	23.72		
Temperature (Celsius)		11.42	11.35	11.30	11.28	11.30	11.22		
pH		7.25	7.09	7.11	7.28	7.10	6.93		
Sp. Conductance (uS/cm)		755	758	758	758	759	759		
DO (mg/L)		7.77	7.84	7.81	7.84	8.43	8.30		
ORP (mV)		147.3	136.5	131.2	123.0	141.6	138.4		
Turbidity (NTU)		0.26	0.55	0.27	0.55	0.58	0.29		
Color		Clear →							
Odor/Evidence of LNAPL		None →							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	6/4/14	Well Number:	**07-12**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: 2.4 (ft PVC) Flush:
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**21.9**
Purging Equipment:	Ded. Bladder	Screened Interval (ft):	**6.4 - 21.9**
Sampling Equipment:	Ded. Bladder	Purge Depth (ft):	**15.0**
Sampling Time:	1110	Depth to Groundwater (ft):	4.41
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	17.49

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	6/4/14 0700	Type	Sample ID	Time
Turbidity:	Micro TPW	4/28/14			
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
07-12_060414	3	VOA	HCL	40ml	N	VOC 8260	

Note: Complete Sample ID 07-12_Date ie;mmddyy

1039 Time	1044	1049	1054	1059	1104	1109		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	4.41	4.41	4.41	4.41	4.41	4.41		
Temperature (Celsius)	7.95	8.07	7.93	8.03	8.07	8.02		
pH	7.24	7.17	7.16	7.16	7.14	7.13		
Sp. Conductance (uS/cm)	301	299	299	297	296	296		
DO (mg/L)	4.22	3.61	3.54	3.42	3.23	3.24		
ORP (mV)	125.8	128.7	129.7	131.3	132.2	133.2		
Turbidity (NTU)	0.19	0.49	0.30	0.01	0.00	0.10		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

DEQ's Groundwater Monitoring Program
Directive No. 2 - September 2014
Groundwater Purge and Sample Forms

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	9/17/14	Well Number:	**13-1**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**30.0**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**24.5 - 27.5**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**26.0**
Sampling Time:	1045	Depth to Groundwater (ft):	20.48
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.52

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	9/17/14 0730			
Turbidity:	Micro TPW		TRIP BLANK	TB_091714	0800
Other:			FIELD BLANK	LIV_091714	1025

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-1_091714	3	VOA	HCL	40ml	N	VOC 8260	
13-1_091714	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-1_091714	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-1_091714	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
COMPLETE SAMPLE ID: 13-1_Date ie; mmddyy							

1012 Time	1017	1022	1027	1032	1037	1042		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2	.2	.2	.2	.2	.2		
Volume Purged (Liters)	1	2	3	4	5	6		
Water Depth (ft)	20.61	20.61	20.61	20.61	20.61	20.60		
Temperature (Celsius)	12.90	12.71	12.79	12.89	13.02	13.26		
pH	7.43	7.16	7.07	7.06	7.06	7.07		
Sp. Conductance (uS/cm)	730	735	738	739	739	739		
DO (mg/L)	21.12	7.33	6.81	6.82	6.50	6.28		
ORP (mV)	119.6	104.0	94.6	85.1	75.2	66.7		
Turbidity (NTU)	4.37	0.72	0.77	0.98	0.73	0.39		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	9/15/14	Well Number:	**13-2**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**29.2**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**26.2 - 29.2**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**28.0**
Sampling Time:	1620	Depth to Groundwater (ft):	19.86
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	9.34

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	9/15/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-2_091514	3	VOA	HCL	40ml	N	VOC 8260	
13-2_091514	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-2_091514	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-2_09154	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
COMPLETE SAMPLE ID: 13-2_Date ie; mmddyy							

1548 Time	1553	1558	1603	1608	1613	1618		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2	.2	.2	.2	.2	.2		
Volume Purged (Liters)	1	2	3	4	5	6		
Water Depth (ft)	19.88	19.88	19.88	19.88	19.88	19.88		
Temperature (Celsius)	12.74	12.40	12.52	12.33	12.26	12.25		
pH	7.39	7.13	7.09	7.08	7.08	7.08		
Sp. Conductance (uS/cm)	668	670	669	669	669	668		
DO (mg/L)	7.53	7.15	6.64	6.35	6.18	6.01		
ORP (mV)	84.0	86.4	84.8	81.9	80.6	79.3		
Turbidity (NTU)	0.20	0.09	0.25	0.91	0.28	0.82		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	9/15/14	Well Number:	**13-3**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**31.5**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**28.5 - 31.5**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**30.0**
Sampling Time:	1525	Depth to Groundwater (ft):	21.36
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.14

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	9/15/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:			~~Duplicate~~ CL		

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-3_091514	3	VOA	HCL	40ml	N	VOC 8260	
13-3_091514	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-3_091514	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-3_091514	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
COMPLETE SAMPLE ID: 13-3_Date ie; mmddyy							

1449 Time	1454	1459	1504	1509	1514	1519		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	21.77	21.38	21.38	21.38	21.38	21.38		
Temperature (Celsius)	13.08	12.50	12.33	12.47	12.47	12.49		
pH	7.58	7.23	7.07	7.04	7.05	7.05		
Sp. Conductance (uS/cm)	723	726	712	710	708	708		
DO (mg/L)	8.23	6.94	6.48	6.33	6.22	6.03		
ORP (mV)	57.7	43.4	42.7	44.1	47.1	48.4		
Turbidity (NTU)	0.77	3.93	2.59	1.38	0.90	0.89		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	9/15/14	Well Number:	**13-4**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**27.5**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**24.5 - 27.5**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**26.0**
Sampling Time:	1425	Depth to Groundwater (ft):	21.74
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	5.76

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	9/15/14 0730			
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
13-4_091514	3	VOA	HCL	40ml	N	VOC 8260	
13-4_09154	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-4_091514	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-4_09154	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
COMPLETE SAMPLE ID: 13-4_Date ie; mmddyy							

1351 Time	1356	1401	1406	1411	1416	1421		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	21.79	21.79	21.79	21.79	21.79	21.79		
Temperature (Celsius)	12.40	12.21	12.27	12.15	12.31	12.32		
pH	7.38	7.15	7.14	7.13	7.12	7.10		
Sp. Conductance (uS/cm)	712	711	710	710	708	708		
DO (mg/L)	7.37	6.57	6.39	6.20	6.19	6.18		
ORP (mV)	71.8	44.8	32.8	23.7	19.6	21.0		
Turbidity (NTU)	3.85	2.23	1.95	1.42	0.95	0.74		
Color	Clear							
Odor/Evidence of LNAPL	None	Noticed						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	9/15/14	Well Number:	**13-5**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**35.5**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**30.75 - 33.75**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**32.0**
Sampling Time:	1325	Depth to Groundwater (ft):	20.33
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	15.17

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	9/15/14 0930			
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-5_091514	3	VOA	HCL	40ml	N	VOC 8260	
13-5_091514	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-5_091514	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-5_091514	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
COMPLETE SAMPLE ID: 13-5_Date ie; mmddyy							

1253 Time	1258	1303	1308	1313	1318	1323		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	20.34	20.34	20.34	20.34	20.34	20.34		
Temperature (Celsius)	12.36	12.32	12.23	12.24	12.26	12.24		
pH	7.43	7.20	7.09	7.07	7.09	7.10		
Sp. Conductance (uS/cm)	664	666	668	669	669	668		
DO (mg/L)	8.76	7.68	6.99	6.64	6.35	6.11		
ORP (mV)	52.0	49.6	48.0	45.3	42.5	40.2		
Turbidity (NTU)	1.92	2.39	1.56	1.12	0.81	1.15		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	9/15/14	Well Number:	**13-6**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD - WTR IN WELL BOX
Water Level Meter:	Solinst	Total Casing Depth (ft):	**33.0**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**30.0 - 33.0**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**31.5**
Sampling Time:	1220	Depth to Groundwater (ft):	20.15
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	12.85

Reference: TOC

Weather: _____

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	9/15/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-6_091514	3	VOA	HCL	40ml	N	VOC 8260	
13-6_09154	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-6_091514	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-6_09154	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
COMPLETE SAMPLE ID: 13-6_Date ie; mmddyy							

1147 Time	1152	1157	1202	1207	1212	1217		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	20.18	20.18	20.18	20.18	20.18	20.18		
Temperature (Celsius)	12.84	12.84	12.73	12.92	12.97	13.20		
pH	7.43	7.27	7.20	7.15	7.15	7.17		
Sp. Conductance (uS/cm)	608	612	611	609	612	611		
DO (mg/L)	16.20	7.34	6.66	6.25	5.92	5.69		
ORP (mV)	42.0	39.2	40.1	40.1	38.2	35.8		
Turbidity (NTU)	0.69	0.73	0.71	0.61	0.71	0.50		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

*WELL BOX BOLTS DO NOT FULLY SEAT

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	9/15/14	Well Number:	**13-7**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	4
Sampling Personnel:	CL	Well Condition:	GOOD
Water Level Meter:	Solinst	Total Casing Depth (ft):	**32.0**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**29.0 - 32.0**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**30.5**
Sampling Time:	1055	Depth to Groundwater (ft):	21.26
Total Discharge (gal):	2.36	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	10.74

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	9/15/14 0730	TRIP BLANK	TB_091514	0800
Turbidity:	Micro TPW		FIELD BLANK	LIV_091514	0945
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-7_091514	3	VOA	HCL	40ml	N	VOC 8260	
13-7_091514	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-7_091514	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-7_091514	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
COMPLETE SAMPLE ID: 13-7_Date ie; mmddyy							

1020 Time	1025	1030	1035	1040	1045	1050		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.3	.3	.3	.3	.3	.3		
Volume Purged (Liters)	1.5	3	4.5	6	7.5	9		
Water Depth (ft)	21.26	21.26	21.26	21.26	21.26	21.26		
Temperature (Celsius)	11.38	11.23	11.46	11.09	11.16	11.25		
pH	7.25	6.87	6.76	6.77	6.80	6.84		
Sp. Conductance (uS/cm)	592	593	592	595	594	595		
DO (mg/L)	7.47	6.75	6.35	6.28	6.10	6.10		
ORP (mV)	90.3	98.2	97.4	88.0	79.5	71.5		
Turbidity (NTU)	0.41	1.03	0.42	0.45	0.60	0.62		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE NOTICED							

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	9/17/14	Well Number:	**13-8**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	
Sampling Personnel:	CL	Well Condition:	Good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**48.7**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**43.7 - 48.7**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**46.0**
Sampling Time:	1130	Depth to Groundwater (ft):	20.33
Total Discharge (gal):	1.57	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	28.37

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	9/17/14 0730	Type	Sample ID	Time
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
13-8_091714	3	VOA	HCL	40ml	N	VOC 8260	
13-8_091714	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-8_091714	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-8_091714	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
COMPLETE SAMPLE ID: 13-8_Date ie; mmddyy							

1058 Time	1103	1108	1113	1118	1123	1128		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.2	.2	.2	.2	.2	.2		
Volume Purged (Liters)	1	2	3	4	5	6		
Water Depth (ft)	20.37	20.37	20.37	20.37	20.37	20.37		
Temperature (Celsius)	13.11	12.80	12.67	12.61	12.57	12.51		
pH	7.26	7.15	7.10	7.08	7.08	7.07		
Sp. Conductance (uS/cm)	735	746	750	751	751	751		
DO (mg/L)	6.03	5.95	5.93	6.48	5.94	5.85		
ORP (mV)	44.2	44.7	42.2	40.7	35.4	36.1		
Turbidity (NTU)	0.46	0.40	0.29	0.39	0.18	0.38		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	9/17/14	Well Number:	**13-9**
Project Name:	**BN Livingston Shop Complex**	Monument Type:	Stickup: _____ (ft PVC) Flush: X
Project Number:	**1496021*16**	Well Diameter (in):	
Sampling Personnel:	CL	Well Condition:	good
Water Level Meter:	Solinst	Total Casing Depth (ft):	**53.7**
Purging Equipment:	DED. BLADDER	Screened Interval (ft):	**53.5 - 48.5**
Sampling Equipment:	DED. BLADDER	Purge Depth (ft):	**51.0**
Sampling Time:	1250	Depth to Groundwater (ft):	21.41
Total Discharge (gal):	1.18	Depth to LNAPL (ft):	—
Water Disposal:	GWTP	Water Column (ft):	32.29

Reference: TOC

Weather:

Water Quality Meter(s)	**Model**	**Calibration Date/Time**	**QA/QC Samples**		
Temp/pH/SC/ORP/DO:	YSI 556	9/17/14 0730	**Type**	**Sample ID**	**Time**
Turbidity:	Micro TPW				
Other:			**Duplicate**	DI_091714	0800

Sample ID	**Sample Containers** No.	Type	Pres.	Vol.	**Field Filtered**	**Analysis Requested**	**MS/MSD & Comments**
13-9_091714	3	VOA	HCL	40ml	N	VOC 8260	
13-9_091714	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-9_091714	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-9_091714	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
COMPLETE SAMPLE ID: 13-9_Date ie; mmddyy							

1217 Time	1222	1227	1232	1237	1242	1247		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	.15	.15	.15	.15	.15	.15		
Volume Purged (Liters)	.75	1.5	2.25	3	3.75	4.5		
Water Depth (ft)	21.41	21.41	21.41	21.41	21.41	21.41		
Temperature (Celsius)	14.34	13.70	13.68	13.68	13.75	13.72		
pH	7.59	7.36	7.31	7.30	7.28	7.27		
Sp. Conductance (uS/cm)	756	754	752	752	753	752		
DO (mg/L)	6.72	4.93	4.33	3.78	3.50	3.38		
ORP (mV)	102.1	75.7	61.9	50.2	43.2	40.5		
Turbidity (NTU)	3.11	3.94	4.19	3.71	3.63	3.41		
Color	CLEAR							
Odor/Evidence of LNAPL	NONE	NOTICED						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

NOTE: DNAPL TEST → NEG.

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date: Purged - 9/17/14 Sampled - 9/18/14

Well Number: **13-10**

Project Name: **BN Livingston Shop Complex**

Project Number: **1496021*16**

Monument Type: Stickup: _____ (ft PVC) Flush: X

Well Diameter (in):

Sampling Personnel: CL

Well Condition: Good - Concrete Mon. Needs Replace

Water Level Meter: Solinst

Purging Equipment: Sub Pump

Sampling Equipment: Ded. Bladder

Sampling Time: 0800

Total Discharge (gal): 25

Water Disposal: GWTP

Total Casing Depth (ft): 58.3

Screened Interval (ft): 53.0 - 58.0

Purge Depth (ft): 55.0

Depth to Groundwater (ft): Purge - 20.64 Sample - 20.73

Depth to LNAPL (ft): —

Water Column (ft): Purge - 37.66 Sample - 37.57

Reference: TOC

Weather:

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556	9/18/14 0730			
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
13-10_ 091814	3	VOA	HCL	40ml	N	VOC 8260	
13-10_ 091814	1	PL	HNO3	250ml	Y	Diss. Fe, K, Na, Ca, Mg, & Total Hardness	Field Filtered
13-10_ 091814	1	PL	H2SO4	250ml	N	Nitrate+Nitrite	
13-10_ 091814	1	PL	None	1Liter	N	TDS, Alkalinity, Sulfate, & Chloride	
COMPLETE SAMPLE ID: 13-10_Date ie; mmddyy							

0930 Time	0932	0935	0938				0950	0955
Parameter (every 5 min)	2 min	5 min	8 min	min	min	min	min	5 min
Flow Rate (L/min)								.2
Volume Purged ~~(Liters)~~ CL	5	15	25					1l
Water Depth (ft)	30.13	46.83	52.00					21.11
Temperature (Celsius)	11.18	11.29	11.39					12.44
pH	8.47	7.85	7.80					8.48
Sp. Conductance (uS/cm)	403	402	402					430
DO (mg/L)	18.90	5.84	5.07					6.80
ORP (mV)	119.9	137.4	134.3					103.7
Turbidity (NTU)	0.52	0.58	0.58					0.42
Color	Clear						Clear	
Odor/Evidence of LNAPL	None Noticed						None Noticed	

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters **Unable to sustain Low/Flow purge. Sampled 9 / 18 / 14 after recovery.**

~~13-5: DTW =~~ CL