



April 9, 2008

Mr. Brian A. Rakvica, P.E.
Nevada Division of Environmental Protection
Bureau of Corrective Actions
2030 E. Flamingo Road, Suite 230
Las Vegas, Nevada 89119-0818

Subject: Sewer Alignment Excavation Soil Sampling and Analysis Plan, BMI Common Areas (Eastside), Clark County, Nevada

Dear Brian:

Per previous discussions, this letter Sampling and Analysis Plan (SAP) presents the proposed scope of work for the collection of soil samples along the sewer alignment excavation through the Basic Management, Inc. (BMI) Common Areas (Eastside) in Clark County, Nevada. Figure 1 shows the location of the sewer alignment excavation subject to this SAP. The purpose of this project is to collect data to evaluate soil conditions that may have been impacted at the Site from former activities along the sewer alignment excavation. The scope of this investigation is limited to soil sampling in an effort to assess issues that might directly impact Site development potential consistent with the Closure Plan.

Background and Objectives

The BMI Common Areas and Complex are located in Clark County, Nevada, and are situated approximately two miles west of the River Mountains and one mile north of the McCullough Range. The local surface topography slopes in a westerly to northwesterly direction from the River Mountains and in a northerly to northeasterly direction from the McCullough Range. Near the BMI Common Areas and Complex, the surface topography slopes north toward the Las Vegas Wash. According to the Nevada Bureau of Mines and Geology (NBMG) *Las Vegas SE Folio Geologic Map (1977)* and the *Geologic Map of the Henderson Quadrangle, Nevada* (NBMG 1980), the River Mountains and McCullough Range consist of volcanic rocks: dacite in the River Mountains and andesite in the McCullough Range.

The sewer alignment passes through the Southern RIBs, First Eight Rows, Spray Wheel, and Upper Ponds sub-areas of the Eastside Area. As noted in the Closure Plan, all of the Eastside sub-areas are planned for redevelopment according to a mixed-use master plan, which will include above- and below-ground utilities (potable water, sewerage, power, gas), roadways, trails, parks, homes, schools, shops, and municipal buildings. The sewer alignment SAP includes the length of the excavation north of Parcel 4B until it meets up with the tie-in location at the Sunset North Commercial sub-area.

The objective of the field investigation is to identify and characterize the distribution of Site-related chemicals (SRC). Samples that will be collected are depth-discrete soil matrix samples. Specifically, the objective of the sampling is to obtain a No Further Action Determination (NFAD) for this corridor, via a human health risk assessment for the exposure scenario discussed below.

Conceptual Site Model

The conceptual site model (CSM) is used to describe relationships between chemicals and potentially exposed human receptor populations, thereby delineating the relationships between the suspected sources of chemicals identified at the property, the mechanisms by which the chemicals might be released and transported in the environment, and the means by which the receptors could come in contact with the chemicals. The CSM provides a basis for defining data quality objectives and developing exposure scenarios.

The CSM considers current and potential future land-use conditions. Currently, the property is undeveloped. Current receptors that may use the property include on-site trespassers. Therefore, current exposures to native soils at the property are likely to be minimal. USEPA (1989) guidance states that potential future land use should be considered in addition to current land use when evaluating the potential for human exposure at a site. Therefore, the CSM also considers other future land-uses. The excavated sewer alignment will be used for the placement of a below grade sewer line. The current excavation removed potentially impacted soil from the sewer alignment. Further excavation will be conducted for placement of the sewer line.

Therefore, given the planned use of the sewer alignment excavation, the primary potential human receptor is on-site construction workers. Because subsequent installation of the sewer line will eliminate further contact with native soil within and below the alignment, exposures to other potential human receptors, for example, outdoor maintenance workers, will be precluded. The potentially exposed populations and their potential routes of exposure are presented in Figure 2.

Scope of Work

The following is the proposed scope of work for this SAP. The scope of work has been divided into two main tasks: 1) Field Implementation; and 2) Reporting.

Task 1: Field Implementation

The requirements for sample collection and analysis are established in the BRC Quality Assurance Project Plan (QAPP; BRC, ERM and MWH 2008) and the Field Sampling and Standard Operating Procedures (FSSOP; BRC, ERM and MWH 2007), which are stand-alone NDEP-approved project documents.

Pre-Field Activities

The pre-field activities will be conducted in accordance with FSSOPs for the BMI Common Areas (BRC, ERM and MWH 2007). The Health and Safety Plan (HSP; BRC and MWH, 2005) and QAPP (BRC, ERM and MWH 2008) prepared for the BMI Common Areas will be used for this proposed scope of work. All work will be completed under the direction of a State of Nevada Certified Environmental Manager (CEM).

Sampling Locations and Depths

Soil sample locations are shown on Figure 3. Soil samples will be collected at 100 foot intervals where the sewer alignment passes through the first three pond rows, then at 200 foot intervals north of these ponds. These sample intervals are based on smaller sample spacing for areas with known contamination (*i.e.*, the ponds), and greater sample spacing for areas not expected to have high levels of contamination. Surface soil samples only (from 0-0.5 feet below ground surface [bgs]) will be collected in each location from the bottom of the current excavation. It is expected that additional soil may need to be excavated from the current bottom of the excavation depending on the final grades needed for the sewer placement. If so, additional surface (0-0.5 feet bgs) samples from the final exposed bottom of the alignment will be collected at that time. Based on this sampling approach, 38 samples will be collected for this initial analysis.

Analytical Program

The samples will be submitted for analysis to a Nevada-certified laboratory (TestAmerica - St. Louis, Missouri office). The proposed analyte list for soil samples is comprised of the BRC project SRC list, as presented in the Closure Plan and Table 1. Exceptions to this are the following:

- USEPA Method 551.1 for chlorinated compounds will not be conducted. In 150 soil samples collected from both the CAMU and Eastside areas, only seven detections (less than five percent) via this method have been recorded. USEPA Region 9 preliminary remediation goals (PRGs) have not been established for these compounds;
- USEPA Method 8141A for organophosphorous pesticides will not be conducted. There have been only 47 detections of these compounds in over 10,000 soil samples (<0.5 percent) from throughout the Eastside. The few detections are well below USEPA Region 9 residential PRGs levels;
- USEPA Method 8151A for chlorinated herbicides will not be conducted. There have been no detections of these compounds in over 1,400 soil samples from throughout the Eastside. Detection limits are below USEPA Region 9 residential PRGs levels;
- HPLC Method for organic acids will not be conducted. There have been only three detections of these compounds in 567 soil samples (<0.5 percent) from throughout the Eastside. USEPA Region 9 PRGs have not been established for these compounds;
- USEPA Method 8015B for nonhalogenated organics will not be conducted. There have been only five detections of these compounds in 420 soil samples (one percent) from throughout the Eastside. The few detections have been well below USEPA Region 9 residential PRGs levels;
- USEPA Method 8015 for total petroleum hydrocarbons (TPH) will not be conducted. There have been only three detections of these compounds in over 299 samples (one percent) from throughout the Eastside. The few detections have been below 100 mg/kg, which is the typical low-end aesthetic threshold used for these compounds. There are no indications of possible TPH source areas, for example, debris, abandoned vehicles, in the sewer alignment. While

TPH is not proposed for analysis, its components are via other methods. In addition, TPH cannot be included in a risk assessment while its components can; and

- Consistent with the current project analyte list, the following radionuclides will be analyzed for: radium-226, radium-228, thorium-228, thorium-230, thorium-232, uranium-233/234, uranium-235/236, and uranium-238.

The analyte list, as proposed, consists of over 300 of the 418 compounds (including water only parameters) on the project SRC list. In addition, BRC will implement field screening using photoionization detectors (PIDs) (using two lamps) in accordance with SOP-39. The individual analytes, analytical methods, and reporting limits are specified on Table 1. The analytical methods are consistent with the current BRC QAPP.

Task 2: Reporting

Measurement data will be consistently assessed and documented to determine whether objectives were met. The review will assess data quality and identify potential limitations on data use. The data quality review process provides information on overall method performance and data usability. The BRC QAPP defines the basis for assessing the elements of data quality. Laboratory data and data quality review reporting procedures and formats are also addressed in the BRC QAPP.

Once the data are collected, BRC will subject the data to validation per procedures agreed to previously with the NDEP and consistent with the BRC QAPP (BRC, ERM and MWH 2008) and SOP-40. Only those data determined by the QA/QC review to be suitable for use will be considered for the site dataset. A separate Data Validation Summary Report will be prepared and submitted to NDEP.

Following data validation the data will be discussed with the NDEP. This will include a comparison to the recently approved BRC-TIMET background data set (BRC/TIMET 2007). If required upon this evaluation, a risk assessment will be conducted to evaluate the potential risks to future on-site construction workers. The risk assessment will be conducted using standard USEPA guidance, input parameters, and methods, as well as consistent with the Closure Plan methodology. The risk assessment will include a summary of the results of the soil sampling and analysis.

Schedule

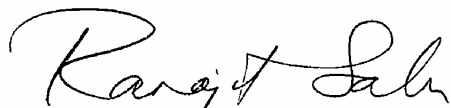
Once final approval of this SAP is received from NDEP, field implementation activities can commence within one to two weeks. BRC will provide NDEP with at least one week notice prior to the initiation of field activities at the Site. It is anticipated that this work can be completed within one week, depending on field conditions. The soil samples will be submitted to the laboratories and placed on a standard turn around time. Therefore, a report can be completed within one month after the final data is received from the laboratory and necessary validation is completed.

Closing Remarks

Please call me at 626-382-0001 if you have any questions or comments.

Sincerely,

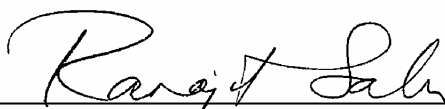
Basic Remediation Company



Ranajit Sahu, CEM
Project Manager

Attachments: Table 1 – Sewer Alignment Excavation Proposed Sample Analyses
Figure 1 – Sewer Alignment Location
Figure 2 – Conceptual Site Model Diagram for Potential Human Exposures
Figure 3 – Sewer Alignment Excavation Proposed Sample Locations

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and to the best of my knowledge comply with all applicable federal, state and local statutes, regulations and ordinances. I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein.



Dr. Ranajit Sahu, C.E.M. (No. EM-1699, Exp. 10/07/2009) Date
BRC Project Manager

April 9, 2008

REFERENCES

Basic Remediation Company (BRC) and MWH. 2005. BRC Health and Safety Plan, BMI Common Areas, Clark County, Nevada. October.

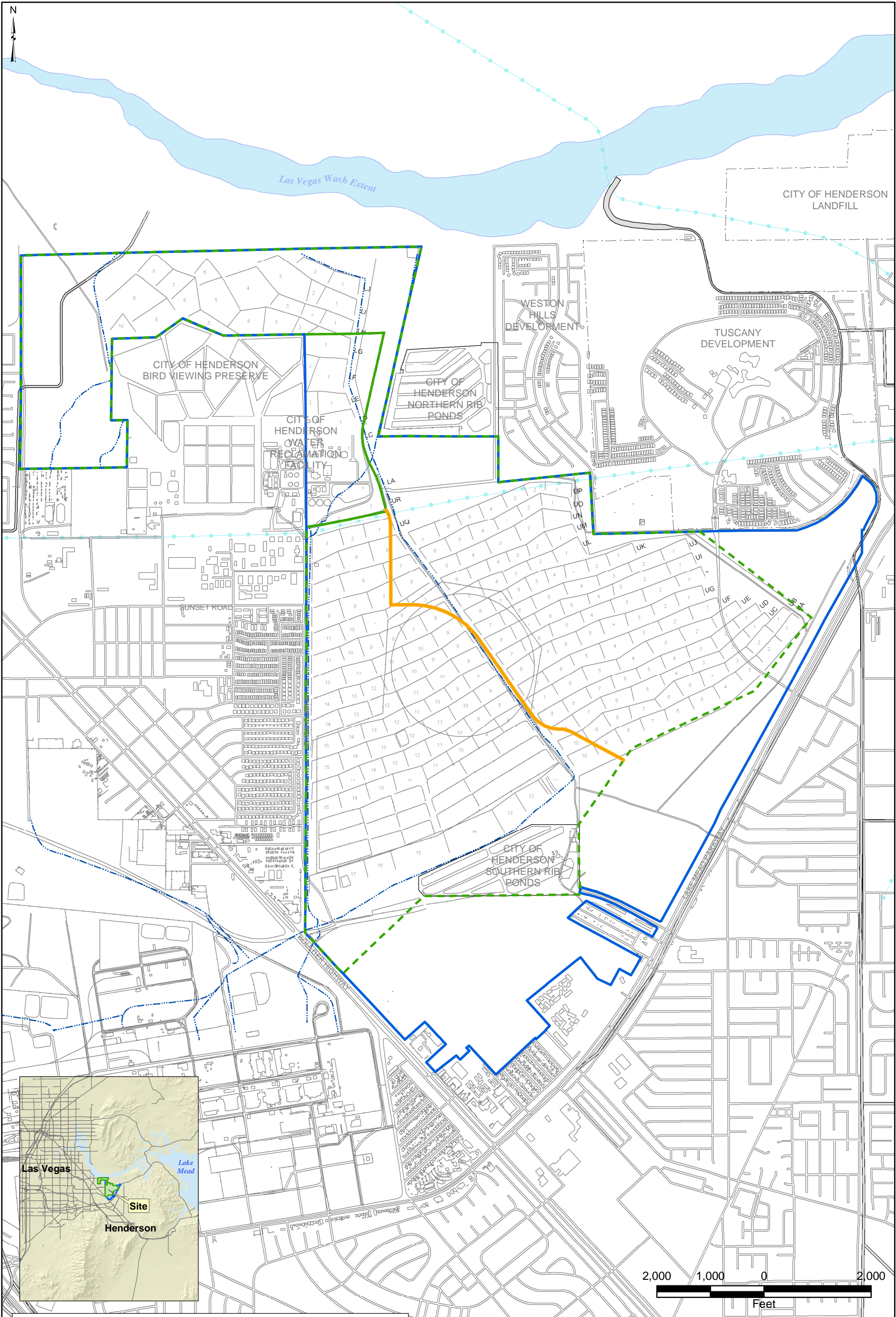
Basic Remediation Company (BRC), ERM, and MWH. 2007. BRC Field Sampling and Standard operating Procedures. BMI Common Areas, Clark County, Nevada. August.

Basic Remediation Company (BRC), ERM, and MWH. 2008. BRC Quality Assurance Project Plan. BMI Common Areas, Clark County, Nevada. August.

Basic Remediation Company (BRC) and Titanium Metals Corporation (TIMET). 2007. Background Shallow Soil Summary Report, BMI Complex and Common Areas Vicinity. March 16.

Nevada Bureau of Mines and Geology (NBMG). 1980. Las Vegas SE Folio Geologic Map (1977) and the Geologic Map of the Henderson Quadrangle, Nevada.

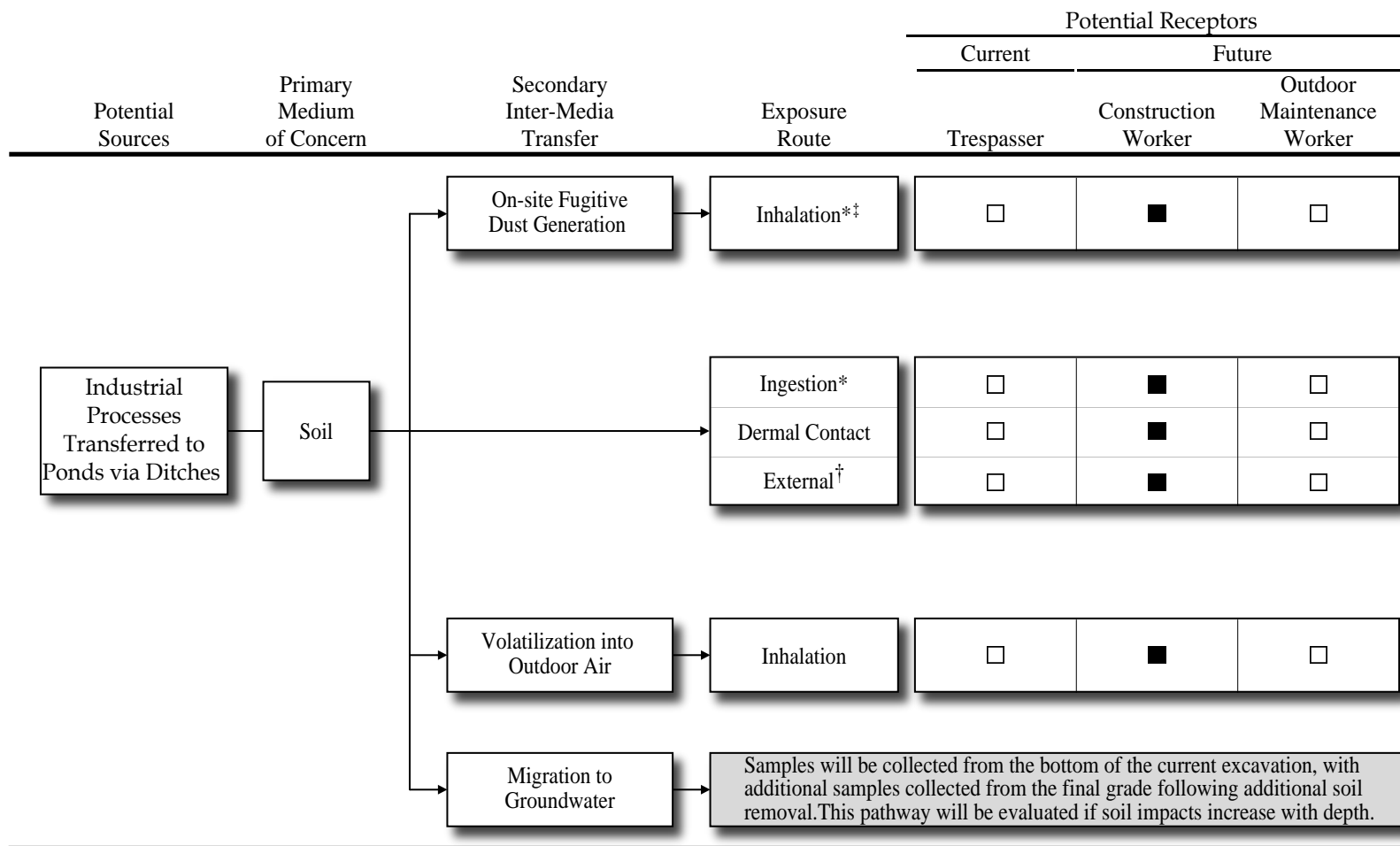
FIGURES



- | | |
|--------------------|---------------------------|
| Site Boundary | New Sewer Alignment |
| Site AOC3 Boundary | Ditches |
| | Flood Conveyance Channels |
| | Laterals |

BMI Common Areas (Eastside) Clark County, Nevada	
FIGURE 1	
SEWER ALIGNMENT LOCATION	
Prepared by: MKJ	Date 04/04/08
JOB No. 0064276 FILE: GIS/BRC/SEWERLINE_LOCATION.MXD	





☐ - Incomplete or insignificant exposure pathway.

☒ - Complete exposure pathway to sewer alignment soil.

*Includes radionuclide exposures.

[†]Only radionuclide exposures.

[‡]Includes asbestos exposures; evaluated separately.

BMI Common Areas (Eastside)
Clark County, Nevada

FIGURE 2

CONCEPTUAL SITE MODEL
DIAGRAM FOR POTENTIAL
HUMAN EXPOSURES







Prepared by:
MKJ

Date
04/09/08

JOB No. 0064276
FILE: GIS/BRC/SEWERLINE_CSM.AI



- | | | | |
|---|---------------------|---|--------------------------|
|  | New Sewer Alignment |  | Proposed Sample Location |
|  | Site Soil Boundary | | |
|  | Site AOC3 Boundary | | |

BMI Common Areas (Eastside)
Clark County, Nevada

FIGURE 3

**SEWER ALIGNMENT
EXCAVATION PROPOSED
SAMPLE LOCATIONS**



Prepared by:
MKJ

Date
04/04/08

JOB No. 0064276
FILE: GIS/BRO/SEWERLINE_SAMPLEPTS.MXD

TABLES

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 1 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Ions	EPA 300.0	Bromide	24959-67-9	X
		Bromine	7726-95-6	(a)
		Chlorate	14866-68-3	X
		Chloride	16887-00-6	X
		Chlorine (soluble)	7782-50-5	(a)
		Chlorite	14998-27-7	(a)
		Fluoride	16984-48-8	X
		Nitrate (as N)	14797-55-8	X
		Nitrite (as N)	14797-65-0	X
		Orthophosphate	14265-44-2	X
		Sulfate	14808-79-8	X
	EPA 377.1	Sulfite	14265-45-3	(a)
Dissolved Gases	RSK 175	Perchlorate	14797-73-0	X
		Ethane	74-84-0	(a)
		Ethylene	74-85-1	(a)
		Methane	74-82-8	(a)
Chlorinated Compounds	EPA 551.1	Chloral	75-87-6	(b)
		Dichloroacetaldehyde	79-02-7	(b)
Polychlorinated Dibenzodioxins/ Dibenzofurans	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001-02-0	X
		1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3268-87-9	X
		1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	X
		1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	X
		1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	X
		1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	X
		1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	X
		1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	X
		1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	X
		1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	X
		1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	X
		1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	X
		1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	X
		2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	X
		2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	X
		2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	X
		2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	X
Asbestos	Elutriator/TEM	Asbestos	1332-21-4	X

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 2 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
General Chemistry Parameters	EPA 350.2	Ammonia (as N)	7664-41-7	X
	EPA 9010/9014	Cyanide (Total)	57-12-5	X
	EPA 345.1	Iodine	7553-56-2	(a)
	EPA 9045C	pH in soil	pH	X
	EPA 9040B	pH in water	pH	(a)
	EPA 376.1/376.2	Sulfide	18496-25-8	X
	Mod. EPA 415.1	Total inorganic carbon	7440-44-0	X
	EPA 351.2	Total Kjeldahl nitrogen (TKN)	TKN	X
	EPA 415.1	Total organic carbon (TOC)	7440-44-0	X
Metals	EPA 6020/6010B	Aluminum	7429-90-5	X
		Antimony	7440-36-0	X
		Arsenic	7440-38-2	X
		Barium	7440-39-3	X
		Beryllium	7440-41-7	X
		Boron	7440-42-8	X
		Cadmium	7440-43-9	X
		Calcium	7440-70-2	X
		Chromium	7440-47-3	X
		Cobalt	7440-48-4	X
		Copper	7440-50-8	X
		Iron	7439-89-6	X
		Lead	7439-92-1	X
		Lithium	1313-13-9	X
		Magnesium	7439-95-4	X
		Manganese	7439-96-5	X
		Molybdenum	7439-98-7	X
		Nickel	7440-02-0	X
		Niobium	7440-03-1	X
		Palladium	7440-05-3	X
		Phosphorus	7723-14-0	X
		Platinum	7440-06-4	X
		Potassium	7440-09-7	X
		Selenium	7782-49-2	X
		Silicon	7440-21-3	X
		Silver	7440-22-4	X
		Sodium	7440-23-5	X
		Strontium	7440-24-6	X

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 3 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Metals (continued)	EPA 6020/6010B	Sulfur	7704-34-9	X
		Thallium	7440-28-0	X
		Tin	7440-31-5	X
		Titanium	7440-32-6	X
		Tungsten	7440-33-7	X
		Uranium	7440-61-1	X
		Vanadium	7440-62-2	X
		Zinc	7440-66-6	X
		Zirconium	7440-67-7	X
	EPA 7196A	Chromium (VI)	18540-29-9	X
	EPA 7470/7471A	Mercury	7439-97-6	X
Organophosphorous Pesticides	EPA 8141A	Azinphos-ethyl	264-27-19	(b)
		Azinphos-methyl	86-50-0	(b)
		Carbophenothion	786-19-6	(b)
		Chlorpyrifos	2921-88-2	(b)
		Coumaphos	56-72-4	(b)
		Demeton-O	298-03-3	(b)
		Demeton-S	126-75-0	(b)
		Diazinon	333-41-5	(b)
		Dichlorvos	62-73-7	(b)
		Dimethoate	60-51-5	(b)
		Disulfoton	298-04-4	(b)
		EPN	2104-64-5	(b)
		Ethoprop	13194-48-4	(b)
		Ethyl parathion	56-38-2	(b)
		Fampphur	52-85-7	(b)
		Fenthion	55-38-9	(b)
		Malathion	121-75-5	(b)
		Methyl carbophenothion	953-17-3	(b)
		Methyl parathion	298-00-0	(b)
		Mevinphos	7786-34-7	(b)
		Naled	300-76-5	(b)
		O,O,O-Triethyl phosphorothioate (TEPP)	297-97-2	(b)
		Phorate	298-02-2	(b)

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 4 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Organophosphorous Pesticides (continued)	EPA 8141A	Phosmet	732-11-6	(b)
		Ronnel	299-84-3	(b)
		Stirophos (Tetrachlorovinphos)	22248-79-9	(b)
		Sulfotep	3689-24-5	(b)
Chlorinated Herbicides	EPA 8151A	2,4,5-T	93-76-5	(b)
		2,4,5-TP (Silvex)	93-72-1	(b)
		2,4-D	94-75-7	(b)
		2,4-DB	94-82-6	(b)
		Dalapon	75-99-0	(b)
		Dicamba	1918-00-9	(b)
		Dichloroprop	120-36-5	(b)
		Dinoseb	88-85-7	(b)
		MCPA	94-74-6	(b)
		MCPP	93-65-2	(b)
Organic Acids	HPLC	4-Chlorobenzene sulfonic acid	98-66-8	(b)
		Benzenesulfonic acid	98-11-3	(b)
		O,O-Diethylphosphorodithioic acid	298-06-6	(b)
		O,O-Dimethylphosphorodithioic acid	756-80-9	(b)
Nonhalogenated Organics	EPA 8015B	Ethylene glycol	107-21-1	(b)
		Ethylene glycol monobutyl ether	111-76-2	(b)
		Methanol	67-56-1	(b)
		Propylene glycol	57-55-6	(b)
Organochlorine Pesticides	EPA 8081A	2,4-DDD	53-19-0	X
		2,4-DDE	3424-82-6	X
		4,4-DDD	72-54-8	X
		4,4-DDE	72-55-9	X
		4,4-DDT	50-29-3	X
		Aldrin	309-00-2	X
		alpha-BHC	319-84-6	X
		alpha-Chlordane	5103-71-9	X
		beta-BHC	319-85-7	X
		Chlordane	57-74-9	X
		delta-BHC	319-86-8	X
		Dieldrin	60-57-1	X
		Endosulfan I	959-98-8	X
		Endosulfan II	33213-65-9	X
		Endosulfan sulfate	1031-07-8	X

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 5 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Organochlorine Pesticides (continued)	EPA 8081A	Endrin	72-20-8	X
		Endrin aldehyde	7421-93-4	X
		Endrin ketone	53494-70-5	X
		gamma-BHC (Lindane)	58-89-9	X
		gamma-Chlordane	5103-74-2	X
		Heptachlor	76-44-8	X
		Heptachlor epoxide	1024-57-3	X
		Methoxychlor	72-43-5	X
		Toxaphene	8001-35-2	X
Polychlorinated Biphenyls	EPA 8082	Aroclor 1016	12674-11-2	X
		Aroclor 1221	11104-28-2	X
		Aroclor 1232	11141-16-5	X
		Aroclor 1242	53469-21-9	X
		Aroclor 1248	12672-29-6	X
		Aroclor 1254	11097-69-1	X
		Aroclor 1260	11096-82-5	X
		PCB-77	32598-13-3	X
		PCB-81	70362-50-4	X
		PCB-105	32598-14-4	X
		PCB-114	74472-37-0	X
		PCB-118	31508-00-6	X
		PCB-123	65510-44-3	X
		PCB-126	57465-28-8	X
		PCB-156	38380-08-4	X
		PCB-157	69782-90-7	X
		PCB-167	52663-72-6	X
		PCB-169	32774-16-6	X
		PCB-189	39635-31-9	X
Polynuclear Aromatic Hydrocarbons	EPA 8310 ¹	Acenaphthene	83-32-9	X
		Acenaphthylene	208-96-8	X
		Anthracene	120-12-7	X
		Benzo(a)anthracene	56-55-3	X
		Benzo(a)pyrene	50-32-8	X
		Benzo(b)fluoranthene	205-99-2	X
		Benzo(g,h,i)perylene	191-24-2	X
		Benzo(k)fluoranthene	207-08-9	X

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 6 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Polynuclear Aromatic Hydrocarbons (continued)	EPA 8310 ¹	Chrysene	218-01-9	X
		Dibenzo(a,h)anthracene	53-70-3	X
		Indeno(1,2,3-cd)pyrene	193-39-5	X
		Phenanthrene	85-01-8	X
		Pyrene	129-00-0	X
Radionuclides	EPA 900.0 or EPA 9310	Gross alpha	G_Alpha	(d)
		Gross beta	G_Beta	(d)
	EPA 901.1/ HASL GA-01-R	Actinium-228	14331-83-0	(d)
		Bismuth-212	14913-49-6	(d)
		Bismuth-214	14733-03-0	(d)
		Cobalt-57	13981-50-5	(d)
		Cobalt-60	10198-40-0	(d)
		Lead-210	14255-04-0	(d)
		Lead-211	015816-77-0	(d)
		Lead-212	15092-94-1	(d)
		Lead-214	15067-28-4	(d)
		Potassium-40	13966-00-2	(d)
		Thallium-208	14913-50-9	(d)
		Thorium-227	15623-47-9	(d)
		Thorium-234	15065-10-8	(d)
	HASL A-01-R	Thorium-232	7440-29-1	X
		Thorium-228	14274-82-9	X
		Thorium-230	14269-63-7	X
		Uranium-233/234	13966-29-5	X
		Uranium 235/236	15117-96-1	X
		Uranium-238	7440-61-1	X
	EPA 903.0 / 903.1	Radium-226	13982-63-3	X
	EPA 904.0	Radium-228	15262-20-1	X
	Quantitate from Parent or Daughter Radionuclide	Actinium-227 (from Th-227)	14952-40-0	(d)
		Bismuth-210 (from Pb-210)	14331-79-4	(d)
		Bismuth-211 (from Pb-211)	15229-37-5	(d)
		Polonium-210 (from Pb-210)	13981-52-7	(d)
		Polonium-212 (from Bi-212)	13981-52-7	(d)
		Polonium-214 (from Bi-214)	15735-67-8	(d)
		Polonium-216 (from Pb-212)	15756-58-8	(d)
		Polonium-218 (from Pb-214)	15422-74-9	(d)

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 7 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Radionuclides (continued)	Quantitate from Parent or Daughter Radionuclide	Protactinium-231 (from U-235)	14331-85-2	(d)
		Protactinium-234 (from Th-234)	15100-28-4	(d)
		Radium-223 (from Th-227)	15623-45-7	(d)
		Radium-224 (from Pb-212)	13233-32-4	(d)
		Thallium-207 (from Pb-211)	14133-67-6	(d)
		Thorium-231 (from U-235)	14932-40-2	(d)
Radon	FLUX	Radon-220	22481-48-7	(d)
		Radon-222	14859-67-7	(d)
Aldehydes	EPA 8315A	Acetaldehyde	75-07-0	X
		Chloroacetaldehyde	107-20-0	X
		Dichloroacetaldehyde	79-02-7	X
		Formaldehyde	50-00-0	X
		Trichloroacetaldehyde	75-87-6	X
Semivolatile Organic Compounds	EPA 8270C ²	1,2,4,5-Tetrachlorobenzene	95-94-3	X
		1,2-Diphenylhydrazine	122-66-7	X
		1,4-Dioxane	123-91-1	X
		2,2'/4,4'-Dichlorobenzil	3457-46-3	X
		2,4,5-Trichlorophenol	95-95-4	X
		2,4,6-Trichlorophenol	88-06-2	X
		2,4-Dichlorophenol	120-83-2	X
		2,4-Dimethylphenol	105-67-9	X
		2,4-Dinitrophenol	51-28-5	X
		2,4-Dinitrotoluene	121-14-2	X
		2,6-Dinitrotoluene	606-20-2	X
		2-Chloronaphthalene	91-58-7	X
		2-Chlorophenol	95-57-8	X
		2-Methylnaphthalene	91-57-6	X
		2-Nitroaniline	88-74-4	X
		2-Nitrophenol	88-75-5	X
		3,3-Dichlorobenzidine	91-94-1	X
		3-Nitroaniline	99-09-2	X
		4,4'-Dichlorobenzil	3457-46-3	X
		4-Bromophenyl phenyl ether	101-55-3	X
		4-Chloro-3-methylphenol	59-50-7	X
		4-Chlorophenyl phenyl ether	7005-72-3	X
		4-Chlorothioanisole	123-09-1	X

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 8 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Semivolatile Organic Compounds (continued)	EPA 8270C ²	4-Chlorothiophenol	106-54-7	X
		4-Nitroaniline	100-01-6	X
		4-Nitrophenol	100-02-7	X
		Acenaphthene	83-32-9	X
		Acenaphthylene	208-96-8	X
		Acetophenone	98-86-2	X
		Aniline	62-53-3	X
		Anthracene	120-12-7	X
		Azobenzene	103-33-3	X
		Benzo(a)anthracene	56-55-3	X
		Benzo(a)pyrene	50-32-8	X
		Benzo(b)fluoranthene	205-99-2	X
		Benzo(g,h,i)perylene	191-24-2	X
		Benzo(k)fluoranthene	207-08-9	X
		Benzoic acid	65-85-0	X
		Benzyl alcohol	100-51-6	X
		bis(2-Chloroethoxy)methane	111-91-1	X
		bis(2-Chloroethyl) ether	111-44-4	X
		bis(2-Chloroisopropyl) ether	108-60-1	X
		bis(2-Ethylhexyl) phthalate	117-81-7	X
		bis(Chloromethyl) ether	542-88-1	X
		bis(p-Chlorophenyl) sulfone	80-07-9	X
		bis(p-Chlorophenyl)disulfide	1142-19-4	X
		Butylbenzyl phthalate	85-68-7	X
		Carbazole	86-74-8	X
		Chrysene	218-01-9	X
		Dibenzo(a,h)anthracene	53-70-3	X
		Dibenzofuran	132-64-9	X
		Dichloromethyl ether	542-88-1	X
		Diethyl phthalate	84-66-2	X
		Dimethyl phthalate	131-11-3	X
		Di-n-butyl phthalate	84-74-2	X
		Di-n-octyl phthalate	117-84-0	X
		Diphenyl disulfide	882-33-7	X
		Diphenyl sulfide	139-66-2	X
		Diphenyl sulfone	127-63-9	X

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 9 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Semivolatile Organic Compounds (continued)	EPA 8270C²	Fluoranthene	206-44-0	X
		Fluorene	86-73-7	X
		Hexachlorobenzene	118-74-1	X
		Hexachlorobutadiene	87-68-3	X
		Hexachlorocyclopentadiene	77-47-4	X
		Hexachloroethane	67-72-1	X
		Hydroxymethyl phthalimide	118-29-6	X
		Indeno(1,2,3-cd)pyrene	193-39-5	X
		Isophorone	78-59-1	X
		m,p-Cresol	106-44-5	X
		Naphthalene	91-20-3	X
		Nitrobenzene	98-95-3	X
		N-nitrosodi-n-propylamine	621-64-7	X
		N-nitrosodiphenylamine	86-30-6	X
		o-Cresol	95-48-7	X
		Octachlorostyrene	29082-74-4	X
		p-Chloroaniline (4-Chloroaniline)	106-47-8	X
		p-Chlorobenzenethiol	106-54-7	X
		Pentachlorobenzene	608-93-5	X
		Pentachlorophenol	87-86-5	X
		Phenanthrene	85-01-8	X
		Phenol	108-95-2	X
		Phthalic acid	88-99-3	X
		Pyrene	129-00-0	X
		Pyridine	110-86-1	X
		Thiophenol	108-98-5	X
		Tentatively Identified Compounds (TICs)		X
Volatile Organic Compounds	EPA 8260B	1,1,1,2-Tetrachloroethane	630-20-6	X
		1,1,1-Trichloroethane	71-55-6	X
		1,1,2,2-Tetrachloroethane	79-34-5	X
		1,1,2-Trichloroethane	79-00-5	X
		1,1-Dichloroethane	75-34-3	X
		1,1-Dichloroethene	75-35-4	X
		1,1-Dichloropropene	563-58-6	X
		1,2,3-Trichlorobenzene	87-61-6	X
		1,2,3-Trichloropropane	96-18-4	X

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 10 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Volatile Organic Compounds (continued)	EPA 8260B	1,2,4-Trichlorobenzene	120-82-1	X
		1,2,4-Trimethylbenzene	95-63-6	X
		1,2-Dichlorobenzene	95-50-1	X
		1,2-Dichloroethane	107-06-2	X
		1,2-Dichloroethene	540-59-0	X
		1,2-Dichloropropane	78-87-5	X
		1,3,5-Trichlorobenzene	108-70-3	X
		1,3,5-Trimethylbenzene	108-67-8	X
		1,3-Dichlorobenzene	541-73-1	X
		1,3-Dichloropropene	542-75-6	X
		1,3-Dichloropropane	142-28-9	X
		1,4-Dichlorobenzene	106-46-7	X
		2,2-Dichloropropane	594-20-7	X
		2,2-Dimethylpentane	590-35-2	X
		2,2,3-Trimethylbutane	464-06-2	X
		2,3-Dimethylpentane	565-59-3	X
		2,4-Dimethylpentane	108-08-7	X
		2-Chlorotoluene	95-49-8	X
		2-Hexanone	591-78-6	X
		2-Methylhexane	591-76-4	X
		2-Nitropropane	79-46-9	X
		3,3-Dimethylpentane	562-49-2	X
		3-Ethylpentane	617-78-7	X
		3-Methylhexane	589-34-4	X
		4-Chlorobenzene	108-90-7	X
		4-Chlorotoluene	106-43-4	X
		4-Methyl-2-pentanone (MIBK)	108-10-1	X
		Acetone	67-64-1	X
		Acetonitrile	75-05-8	X
		Benzene	71-43-2	X
		Bromobenzene	108-86-1	X
		Bromodichloromethane	75-27-4	X
		Bromoform	75-25-2	X
		Bromomethane	74-83-9	X
		Carbon disulfide	75-15-0	X
		Carbon tetrachloride	56-23-5	X
		Chlorobenzene	108-90-7	X

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 11 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Volatile Organic Compounds (continued)	EPA 8260B	Chlorobromomethane	74-97-5	X
		Chlorodibromomethane	124-48-1	X
		Chloroethane	75-00-3	X
		Chloroform	67-66-3	X
		Chloromethane	74-87-3	X
		cis-1,2-Dichloroethene	156-59-2	X
		cis-1,3-Dichloropropene	10061-01-5	X
		Cymene (Isopropyltoluene)	99-87-6	X
		Dibromochloroethane	73506-94-2	X
		Dibromochloromethane	124-48-1	X
		Dibromochloropropane	96-12-8	X
		Dibromomethane	74-95-3	X
		Dichloromethane (Methylene chloride)	75-09-2	X
		Dimethyldisulfide	624-92-0	X
		Ethanol	64-17-5	X
		Ethylbenzene	100-41-4	X
		Freon-11 (Trichlorofluoromethane)	75-69-4	X
		Freon-113 (1,1,2-Trifluoro-1,2,2-trichloroethane)	76-13-1	X
		Freon-12 (Dichlorodifluoromethane)	75-71-8	X
		Heptane	142-82-5	X
		Isoheptane	31394-54-4	X
		Isopropylbenzene	98-82-8	X
		m,p-Xylene	mp-XYL	X
		Methyl ethyl ketone (2-Butanone)	78-93-3	X
		Methyl iodide	74-88-4	X
		MTBE (Methyl tert-butyl ether)	1634-04-4	X
		n-Butyl benzene	104-51-8	X
		n-Propylbenzene	103-65-1	X
		Nonanal	124-19-6	X
		o-Xylene	95-47-6	X
		sec-Butylbenzene	135-98-8	X
		Styrene	100-42-5	X
		tert-Butyl benzene	98-06-6	X
		Tetrachloroethene	127-18-4	X
		Toluene	108-88-3	X
		trans-1,2-Dichloroethene	156-60-5	X
		trans-1,3-Dichloropropene	10061-02-6	X

TABLE 1
SEWER ALIGNMENT EXCAVATION PROPOSED SAMPLE ANALYSES
(Page 12 of 12)

Parameter of Interest	Analytical Method	Compound List	CAS Number	Surface Soil Sample
Volatile Organic Compounds (continued)	EPA 8260B	Trichloroethene	79-01-6	X
		Vinyl acetate	108-05-4	X
		Vinyl chloride	75-01-4	X
		Xylenes (total)	1330-20-7	X
		Tentatively Identified Compounds (TICs)		X
Water Quality Parameters	EPA 120.1	Conductivity	COND	(a)
	EPA 130.2	Hardness, total	Hardness	(a)
	EPA 160.1	Total dissolved solids	TDS	(a)
	EPA 160.2	Total suspended solids	TSS	(a)
	EPA 310.1	Alkalinity, Total (as CaCO ₃)	ALK	(a)
		Bicarbonate alkalinity	71-52-3	(a)
		Carbonate alkalinity	3812-32-6	(a)
		Hydroxide alkalinity	OH-ALK	(a)
Flashpoint	EPA 1010	Flammables	NA	(b)
Total Petroleum Hydrocarbons	EPA 8015	Diesel	64742-46-7	(b)
		Gasoline	8006-61-9	(b)
		Grease	68153-81-1	(b)
		Mineral Spirits	NA	(b)
White Phosphorus	EPA 7580M	White phosphorus	12185-10-3	(b)
Methyl Mercury	EPA 1630	Methyl mercury	22967-92-6	(b)

Notes:

Laboratory limits are subject to matrix interferences and may not always be achieved in all samples.

The laboratory will be instructed to report the top 25 Tentatively Identified Compounds (TICs) under method 8260B and 8270C.

NA = Not applicable.

a - Groundwater only analyte.

b - Removed based on rationale provided in the text.

c - Asbestos and dioxins/furans will only be analyzed for in surface soil samples.

d - Removed consistent with approved list of radionuclides for project analysis.

¹For polynuclear aromatic hydrocarbons, Method 8310 is the primary analytical method.

²Method 3540 for extraction and Method 3640 for cleanup are to be used as appropriate.