



2100.26.065

ADEC File No.

VAPOR INTRUSION EVALUATION REPORT

**CHEVRON-BRANDED SERVICE STATION 9-1356
1465 WEST NORTHERN LIGHTS BOULEVARD
ANCHORAGE, ALASKA
FILE ID: 2100.26.065**

Prepared For:

Mr. Robert Weimer

Alaska Department of Environmental Conservation

RECEIVED

MAR 02 2010

**DEPT. OF ENVIRONMENTAL
CONSERVATION**

Susan Lear

Senior Staff Geologist

Brian Duggan, P.E.

Project Engineer

**FEBRUARY 26, 2010
REF. NO. 622232 (2)**

**Prepared by:
Conestoga-Rovers
& Associates**

2420 West 26th Ave, Suite 450-D
Denver, CO 80211

Office: 720-975-9120
Fax: 720-975-9150



**CONESTOGA-ROVERS
& ASSOCIATES**

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
2.0 SITE DESCRIPTION AND BACKGROUND	1
2.1 SITE DESCRIPTION.....	1
2.2 REGIONAL AND SITE GEOLOGY.....	1
2.3 HYDROGEOLOGY	2
2.4 CONCEPTUAL SITE MODEL SUMMARY.....	2
3.0 SITE CONDITIONS	2
3.1 SOIL QUALITY.....	3
3.2 GROUNDWATER QUALITY.....	3
3.3 EXTENT OF PETROLEUM HYDROCARBONS.....	3
4.0 VAPOR INTRUSION PATHWAY EVALUATION	4
4.1 INDOOR AIR INHALATION PATHWAY	4
4.2 VAPOR INTRUSION EVALUATION CRITERIA.....	4
4.3 SITE VAPOR INTRUSION RISK.....	4
5.0 CONCLUSIONS AND RECOMMENDATIONS.....	5
6.0 REFERENCES.....	6



**CONESTOGA-ROVERS
& ASSOCIATES**

LIST OF FIGURES
(Following Text)

FIGURE 1	VICINITY MAP
FIGURE 2	GROUNDWATER ELEVATION CONTOUR MAP

LIST OF TABLES
(Following Text)

TABLE 1	GROUNDWATER ANALYTICAL RESULTS
---------	--------------------------------

LIST OF APPENDICES

APPENDIX A	SITE PHOTOGRAPHS
APPENDIX B	ENVIRONMENTAL HISTORY



**CONESTOGA-ROVERS
& ASSOCIATES**

LIST OF ACRONYMS AND ABBREVIATIONS

ADEC	Alaska Department of Environmental Conservation
COCs	Chemicals of concern
CSM	Conceptual Site Model
CRA	Conestoga-Rovers & Associates
DRO	Diesel range organics
fbg	Feet below grade
GRO	Gasoline range organics
mg/l	Milligrams per liter
mg/kg	Milligrams per kilogram
P.E.	Professional Engineer
UST	Underground storage tank



1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) is submitting this *Vapor Intrusion Evaluation Report* to the Alaska Department of Environmental Conservation (ADEC) on behalf of Chevron Environmental Management Company (Chevron) for Chevron-branded Service Station 9-1356 in Anchorage, Alaska. CRA evaluated site conditions to determine if additional vapor intrusion pathway investigation was required based on the ADEC *Draft Vapor Intrusion Guidance for Contaminated Sites* (ADEC, 2009). The site background, site conditions, vapor intrusion pathway evaluation, conclusions and recommendations, and references are presented below.

2.0 SITE DESCRIPTION AND BACKGROUND

2.1 SITE DESCRIPTION

The site is an active Chevron-branded service station located at 1465 West Northern Lights Boulevard in Anchorage, Alaska (Figure 1). The property legal description is Chevron TR 1, and latitude and longitude is approximately 61.195146 north and 149.912277 west. The site is located in a mixed commercial and residential area of Anchorage. A Shell service station is located west across Minnesota Drive. Multi-business commercial complexes are located to the east behind the station building, north across West 27th Avenue and south across West Northern Lights Boulevard. Station facilities currently consist of three underground storage tanks (USTs), four fuel dispenser islands, associated piping, and a station building. Four site onsite and two offsite groundwater monitoring wells are currently sampled semiannually (Figure 2). Site photographs are presented in Appendix A. The site environmental history is included as Appendix B.

2.2 REGIONAL AND SITE GEOLOGY

Anchorage area bedrock consists of Mesozoic metamorphic and igneous rocks overlain by densely consolidated sediments of the Kenai group. A series of marine transgressive sequences combined with fluvial sediments, deposited in a lacustrine environment and created by ice fronts surrounding the Anchorage area, are overlain by the most recent glacial sediments. Holocene glacial till deposits from the Matanuska-Susitna Valley, typically used as backfill in the Anchorage area, underlay the upper portions of the subsurface. Lowland glacial sediments have been reported to reach thicknesses of up to 1,500 feet. The Anchorage area is a glacial lowland defined by the Chugach Mountains to the southeast. The Chugach Mountains are approximately five miles east of the site.



Subsurface sediments consist primarily of gravelly sand and sand to approximately 23 feet below grade (fbg) underlain by clay and clayey silt to the total explored depth of 30 fbg.

2.3 HYDROGEOLOGY

The site is located in south central Alaska between the northern Knik Arm and the southern Turnagain Arm of Cook Inlet. Cook Inlet is located approximately 5 miles downgradient from the site. Average annual precipitation rates in Anchorage are estimated at 15.9 inches per year, with September typically the wettest month. Groundwater depths in onsite wells have fluctuated between 11.35 and 16.40 fbg according to groundwater data from 1999 to present. Onsite historical groundwater flow direction is to the southwest. The August 2009 groundwater elevation contour map is presented as Figure 2. A summary of historical groundwater analytical results is presented in Table 1.

2.4 CONCEPTUAL SITE MODEL SUMMARY

A site-specific Conceptual Site Model (CSM) was submitted to the ADEC on September 19, 2007. Incidental soil ingestion, ingestion of groundwater, inhalation of outdoor air, and inhalation of indoor air were determined to be complete pathways. Dermal absorption is not a complete pathway because none of the skin permeating constituents listed on the scoping form are present in soil above cleanup levels. Potential human receptors include commercial or industrial workers, construction workers, and site visitors or trespassers.

3.0 SITE CONDITIONS

Petroleum hydrocarbons were discovered in 1998 during facility upgrades and are presumed to have originated from leaks in the USTs and dispenser islands. The site environmental history is included as Appendix B.

3.1. SOIL QUALITY

Maximum gasoline range organics (GRO) and benzene concentrations in soil were detected at 12,000 milligrams per kilogram (mg/kg) and 417 mg/kg, respectively, in dispenser sample D-2. Maximum diesel range organics (DRO) were detected at 18.0 mg/kg from used heating oil UST sample HOT-2 (SECOR, 1998).



3.2 GROUNDWATER QUALITY

No GRO or benzene was detected in groundwater samples collected during the August 2009 sampling event. Maximum GRO concentrations were detected at 21.8 milligrams per liter (mg/l) from MW-2 on October 1, 1999. Maximum benzene concentrations were detected at 0.382 mg/l from MW-4 on September 28, 2000. A summary of historical groundwater analytical results is presented in Table 1.

3.3 EXTENT OF PETROLEUM HYDROCARBONS

Concentrations of petroleum hydrocarbons have been defined under the former UST pit, dispensers, and product piping. Due to shallow groundwater at the site, hydrocarbon concentrations in soil have been vertically defined to the capillary fringe ranging between 15 and 17 fbg. Hydrocarbon concentrations are defined horizontally by soil samples taken during the installation of groundwater monitoring wells MW-1, MW-5, MW-6 and MW-7. Petroleum hydrocarbon concentrations in groundwater have been defined upgradient by groundwater monitoring well MW-1, and downgradient by groundwater monitoring wells MW-5, MW-6, and MW-7.



4.0 VAPOR INTRUSION PATHWAY EVALUATION

4.1 INDOOR AIR INHALATION PATHWAY

The ADEC defines vapor intrusion as the migration of volatile chemicals from a subsurface vapor source into overlying buildings (ADEC, 2009). Inhalation of indoor air is a complete pathway based on the presence of volatile compounds in soil and groundwater; and occupied buildings are present within 100 feet of the soil or groundwater plumes.

4.2 VAPOR INTRUSION EVALUATION CRITERIA

The ADEC requires additional vapor intrusion pathway investigation when one or more of the following conditions exist:

- Light non-aqueous phase liquid (LNAPL) is present in close proximity to structures (30 feet from a petroleum source, and 100 feet from a non-petroleum source);
- Volatile chemical concentrations in groundwater exceed the ADEC Groundwater Target Levels (ADEC, 2009, Appendix G) in close proximity to structures, and static groundwater depth is less than 20 fbg;
- Volatile chemical concentrations in soil gas exceed the ADEC Shallow and Deep Soil Gas Target Levels (ADEC, 2009, Appendix E & F).

4.3 SITE VAPOR INTRUSION RISK

No vapor intrusion risk was identified based on the ADEC *Draft Vapor Intrusion Guidance for Contaminated Sites* (ADEC, 2009). LNAPL has not been observed in site wells site. No volatile chemical concentrations in groundwater samples exceed the ADEC Groundwater Target Levels. Soil gas samples have not been collected at the site, and are not required based on volatile chemical concentrations in groundwater.



5.0 CONCLUSIONS AND RECOMMENDATIONS

CRA evaluated site conditions to determine if additional vapor intrusion pathway investigation was warranted based on the ADEC *Draft Vapor Intrusion Guidance for Contaminated Sites* (ADEC, 2009). No volatile chemical concentrations in groundwater exceed the Groundwater Target Levels, and no LNAPL is present in site groundwater. The vapor intrusion pathway is complete but does not warrant additional investigation based on the current soil and groundwater data.

CRA recommends no additional vapor intrusion pathway investigation based on available site data. The CSM and vapor intrusion evaluation will be revised as needed when new site data is acquired.



**CONESTOGA-ROVERS
& ASSOCIATES**

6.0 REFERENCES

Alaska Department of Environmental Conservation Division of Spill Prevention and Response, *Draft Vapor Intrusion Guidance for Contaminated Sites*, July, 2009.

Cambria Environmental Technology, Incorporated, *Subsurface Investigation Report*, February 9, 2007.

SECOR International, Incorporated, *Underground Storage Tank Removal and Site Assessment Report*, Chevron Service Station No. 9-1356, 1465 W. Northern Lights Boulevard, Anchorage, Alaska, August 6, 1998.

SECOR International, Incorporated, *Site Assessment Report*, Chevron Service Station 9-1356, 1465 Northern Lights Boulevard, Anchorage, Alaska, September 7, 1999.

SECOR International, Incorporated, *Installation of Groundwater Monitoring Wells*, Chevron Service Station 9-1356, 1465 Northern Lights Boulevard, Anchorage, Alaska, December 18, 2007.

FIGURES

FIGURE 1: VICINITY MAP

FIGURE 2: GROUNDWATER ELEVATION CONTOUR MAP

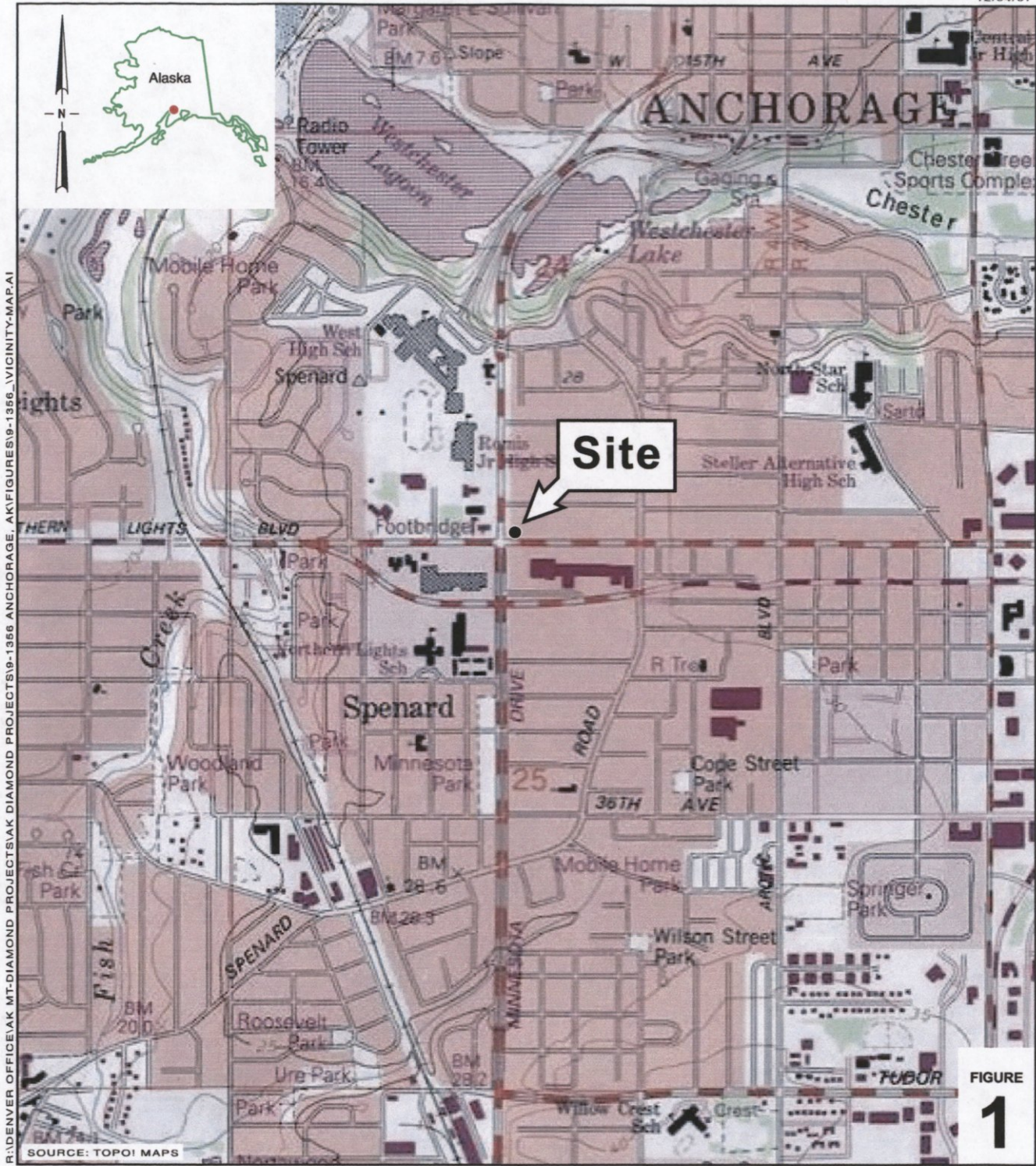


FIGURE 1

R:\DENVER OFFICE\IAK MT-DIAMOND PROJECTS\IAK DIAMOND PROJECTS\9-1356 ANCHORAGE, AK\FIGURES\9-1356_VICINITY-MAP.AI

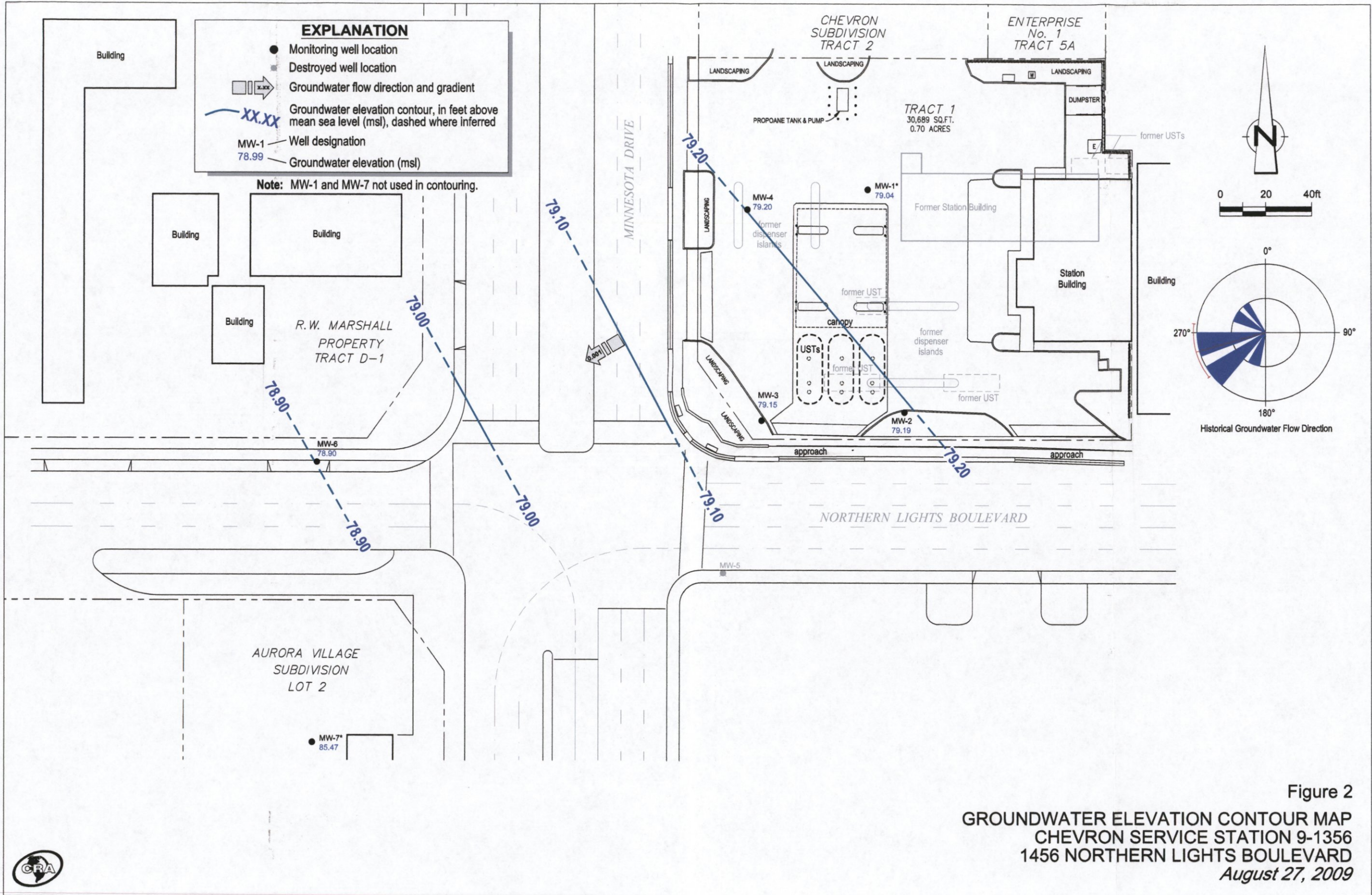
SOURCE: TOPOI MAPS

Chevron Service Station 9-1356
 1456 Northern Lights Boulevard
 Anchorage, Alaska



CONESTOGA-ROVERS & ASSOCIATES

Vicinity Map



TABLES

TABLE 1: GROUNDWATER ANALYTICAL RESULTS

Table 1
 Groundwater Analytical Results
 Chevron-branded Service Station 9-1356
 1465 Northern Lights Boulevard
 Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS			PRIMARY VOCs			
					DRO	GRO	Benzene	Toluene	Ethyl-benzene	Total xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels ^a					1.5	2.2	0.005	1.0	0.7	10	0.47
MW-1	07/03/1999	95.30	15.61	79.69	-	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-1	10/11/1999	95.30	14.84	80.46	-	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
MW-1	05/19/2000	95.30	13.64	81.66	-	<0.080	<0.0005	<0.0005	<0.0005	<0.0010	<0.002
MW-1	09/28/2000	95.30	12.80	82.50	-	<0.050	<0.0002	<0.0005	<0.0005	<0.0010	<0.001
MW-1	05/04/2001	95.30	14.34	80.96	-	<0.050	0.000274	<0.0005	<0.0005	<0.0010	<0.001
MW-1	10/04/2001	95.30	14.89	80.41	-	<0.050	<0.0002	<0.0005	<0.0005	<0.0010	<0.001
MW-1	05/04/2002	95.30	14.78	80.52	-	<0.050 / <0.050	0.000361 / <0.0002	0.00103 / <0.0005	<0.0005 / <0.0005	<0.0010 / <0.0010	<0.001 / <0.001
MW-1	09/22/2002	95.30	13.74	81.56	-	<0.050	<0.0002	<0.0005	<0.0005	<0.0010	<0.001
MW-1	05/30/2003	95.39	15.25	80.14	-	<0.010 / <0.010	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.002 / <0.002
MW-1	10/02/2003	95.39	15.50	79.89	-	-	-	-	-	-	-
MW-1	06/02/2004	95.39	15.23	80.16	-	-	-	-	-	-	-
MW-1	09/22/2004	95.39	15.06	80.33	-	-	-	-	-	-	-
MW-1	05/11/2005	95.39	15.02	80.37	-	-	-	-	-	-	-
MW-1	06/22/2005	95.39	14.26	81.13	-	-	-	-	-	-	-
MW-1	05/09/2006	95.39	16.24	79.15	-	-	-	-	-	-	-
MW-1	09/20/2006	95.39	15.69	79.70	-	-	-	-	-	-	-
MW-1	05/15/2007	95.39	16.23	79.16	-	-	-	-	-	-	-
MW-1	09/23/2007	95.39	16.04	79.35	-	-	-	-	-	-	-
MW-1	05/05/2008	95.39	16.22	79.17	-	-	-	-	-	-	-
MW-1	07/16/2008	95.39	16.17	79.22	-	-	-	-	-	-	-
MW-1	06/16/2009	95.39	16.40	78.99	-	-	-	-	-	-	-
MW-1	08/27/2009	95.39	16.35	79.04	-	-	-	-	-	-	-

Table 1
 Groundwater Analytical Results
 Chevron-branded Service Station 9-1356
 1465 Northern Lights Boulevard
 Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS			PRIMARY VOCs			
					DRO	GRO	Benzene	Toluene	Ethyl-benzene	Total xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels ^a					1.5	2.2	0.005	1.0	0.7	10	0.47
MW-2	07/03/1999	94.61	15.30	79.31	-	7.14	0.027	0.048	0.268	1.14	<0.100
MW-2	10/11/1999	94.61	14.27	80.34	-	20.4 / 21.8	<0.012 / <0.012	0.575 / 0.629	1.43 / 1.56	5.93 / 6.50	<0.125 / <0.125
MW-2	05/19/2000	94.61	12.92	81.69	-	8.84	0.0259	0.0124	<0.005	1.22	<0.020 / <0.002
MW-2	09/28/2000	94.61	11.97	82.64	-	4.52	<0.0055	0.0388	0.078	1.19	0.0303 / <0.020
MW-2	05/04/2001	94.61	13.75	80.86	-	7.02	0.012	0.0429	0.469	1.40	0.0452 / <0.005
MW-2	10/04/2001	94.61	14.35	80.26	-	14.2	0.0244	0.101	1.13	3.30	0.0884 / <0.005
MW-2	05/04/2002	94.61	14.23	80.38	-	19.2	<0.020	0.118	1.36	4.10	0.115 / <0.050
MW-2	09/22/2002	94.61	13.11	81.50	-	3.62	0.00262	0.0201	0.363	0.898	0.0184 / <0.050
MW-2	05/30/2003	94.61	14.54	80.07	-	13.0	0.0030	0.040	0.790	1.80	<0.002
MW-2	10/02/2003	94.61	14.81	79.80	-	4.60	0.0009	0.006	0.160	0.410	<0.002
MW-2	06/02/2004	94.61	14.49	80.12	-	14.0	0.0030	0.029	0.850	2.50	<0.002
MW-2	09/22/2004	94.61	14.48	80.13	-	10.0	<0.005	0.012	0.630	1.40	<0.005
MW-2	05/11/2005	94.61	14.23	80.38	-	7.00	0.0040	0.006	0.500	0.770	<0.002
MW-2	09/22/2005	94.61	14.09	80.52	-	4.70	0.0030	0.003	0.410	0.390	<0.002
MW-2	05/09/2006	94.61	15.43	79.18	-	0.094	<0.0005	<0.0005	0.008	0.0075	<0.0025
MW-2	09/20/2006	94.61	14.88	79.73	-	0.067	<0.0005	<0.0005	0.002	0.0035	<0.0025
MW-2	05/15/2007	94.59	15.32	79.27	-	0.100	<0.0010	<0.0010	0.005	0.004	<0.003
MW-2	09/23/2007	94.59	15.26	79.33	-	0.200 / 0.200	<0.0010 / <0.0010	<0.0010 / <0.0010	0.007 / 0.010	0.003 / 0.004	<0.003 / <0.003
MW-2	05/05/2008	94.59	15.30	79.29	-	<0.050	<0.0005	<0.0005	0.0009	<0.0015	<0.002
MW-2	07/16/2008	94.59	15.21	79.38	0.096	0.06	<0.001	<0.001	0.003	0.002	-
MW-2	06/16/2009	94.59	15.43	79.16	0.084 J	0.090 J	<0.0005	<0.0005	0.0031	0.0018 J	-
MW-2	08/27/2009	94.59	15.40	79.19	0.12 J	0.31	0.0011 J	<0.0005	0.0050	0.0063	-

Table 1
 Groundwater Analytical Results
 Chevron-branded Service Station 9-1356
 1465 Northern Lights Boulevard
 Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS			PRIMARY VOCS			
					DRO	GRO	Benzene	Toluene	Ethyl-benzene	Total xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels ^a					1.5	2.2	0.005	1.0	0.7	10	0.47
MW-3	07/03/1999	93.57	14.92	78.65	-	6.29	0.064	0.349	0.279	0.781	<0.020
MW-3	10/11/1999	93.57	13.33	80.24	-	6.08	0.194	0.341	0.406	1.15	<0.025
MW-3	05/19/2000	93.57	12.17	81.40	-	8.44 / 9.49	0.0586 / 0.0629	0.401 / 0.418	0.398 / 0.414	1.52 / 1.53	0.056 / 0.0651
MW-3	09/28/2000	93.57	11.35	82.22	-	5.36	0.0217	0.171	0.476	0.896	0.035/<0.020
MW-3	05/04/2001	93.57	12.84	80.73	-	5.58	0.0451	0.104	0.304	0.707	0.0703/<0.005
MW-3	10/04/2001	93.57	13.39	80.18	-	6.57	0.0531	0.108	0.441	1.24	0.0596/<0.050
MW-3	05/04/2002	93.57	13.32	80.25	-	4.27	0.0330	0.0626	0.337	0.641	0.0299/<0.050
MW-3	09/22/2002	93.57	12.41	81.16	-	2.23	0.0129	0.0193	0.216	0.295	0.0171/<0.025
MW-3	05/30/2003	93.58	13.61	79.97	-	1.80	0.009	0.002	0.140	0.160	<0.002
MW-3	10/02/2003	93.58	13.87	79.71	-	8.70 / 8.90	0.022 / 0.021	0.009 / 0.010	0.450 / 0.470	0.900 / 0.980	<0.002 / <0.002
MW-3	06/02/2004	93.58	13.37	80.21	-	2.80 / 2.70	0.018 / 0.015	<0.0005 / <0.0005	0.180 / 0.150	0.230 / 0.200	<0.002 / <0.002
MW-3	09/22/2004	93.58	13.79	79.79	-	4.70 / 4.00	0.073 / 0.065	0.008 / 0.007	0.270 / 0.230	0.380 / 0.310	<0.002 / <0.002
MW-3	05/11/2005	93.58	13.21	80.37	-	0.580 / 0.990	0.004 / 0.004	0.002 / 0.002	0.044 / 0.057	0.057 / 0.079	<0.002 / <0.002
MW-3	09/22/2005	93.58	13.05	80.53	-	6.00 / 5.60	0.030 / 0.029	0.110 / 0.110	0.310 / 0.300	0.660 / 0.630	<0.002 / <0.002
MW-3	05/09/2006	93.58	14.51	79.07	-	0.840	0.0047	0.0025	0.036	0.056	<0.020
MW-3	09/20/2006	93.58	13.93	79.65	-	1.30	0.013	0.0017	0.100	0.130	<0.020
MW-3	05/15/2007	93.58	14.23	79.35	-	0.20	0.002	<0.001	0.007	0.010	<0.003
MW-3	09/23/2007	93.58	14.32	79.26	-	0.20	0.003	<0.001	0.010	0.010	<0.003
MW-3	05/05/2008	93.58	14.28	79.30	-	0.444 / 1.510	0.00611 / 0.00884	0.00208 / 0.00384	0.0359 / 0.0786	0.0864 / 0.190	<0.002 / <0.002
MW-3	07/16/2008	93.58	14.27	79.31	0.095 / 0.20	0.9 / 0.8	0.006 / 0.006	<0.001 / <0.001	0.04 / 0.03	0.03 / 0.02	-
MW-3	06/16/2009	93.58	14.48	79.10	0.091 J / 0.072 J	0.250/0.250	0.0020 / 0.0020	<0.0005 / <0.0005	0.0077 / 0.0077	0.011 / 0.011	-
MW-3	08/27/2009	93.58	14.43	79.15	0.25 J / 0.12 J	0.32 / 0.43	0.0029 / 0.0034	<0.0005 / 0.0006 J	0.011 / 0.014	0.015 J / 0.021 J	-

Table 1
 Groundwater Analytical Results
 Chevron-branded Service Station 9-1356
 1465 Northern Lights Boulevard
 Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS			PRIMARY VOCs			
					DRO	GRO	Benzene	Toluene	Ethyl-benzene	Total xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels ^a					1.5	2.2	0.005	1.0	0.7	10	0.47
MW-4	07/09/1999	94.66	15.01	79.65	-	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-4	10/11/1999	94.66	14.31	80.35	-	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
MW-4	05/19/2000	94.66	13.22	81.44	-	0.867	0.0323	0.133	0.0162	0.110	<0.010
MW-4	09/28/2000	94.66	12.45	82.21	-	<2.50 / 5.65	0.366 / 0.382	0.338 / 1.65	0.0294 / 0.148	0.441 / 0.951	<0.050 / <0.100
MW-4	05/04/2001	94.66	13.78	80.88	-	0.190	0.00216	<0.0005	0.036	0.0256	<0.001
MW-4	10/04/2001	94.66	15.31	79.35	-	<0.050 / <0.050	0.000348 / 0.000359	<0.0005 / <0.0005	0.00491 / 0.00581	0.00275 / 0.00366	<0.001 / <0.001
MW-4	05/04/2002	94.66	14.20	80.46	-	<0.050	0.000209	0.000601	<0.0005	<0.0010	<0.001
MW-4	09/22/2002	94.66	13.19	81.47	-	<0.050 / <0.050	<0.0002 / <0.0002	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0010 / <0.0010	<0.001 / <0.001
MW-4	05/30/2003	94.68	14.59	80.09	-	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-4	10/02/2003	94.68	14.84	79.84	-	-	-	-	-	-	-
MW-4	06/02/2004	94.68	14.52	80.16	-	-	-	-	-	-	-
MW-4	09/22/2004	94.68	14.35	80.33	-	-	-	-	-	-	-
MW-4	05/11/2005	94.68	14.28	80.40	-	-	-	-	-	-	-
MW-4	09/22/2005	94.68	13.81	80.87	-	-	-	-	-	-	-
MW-4	05/09/2006	94.68	15.51	79.17	-	-	-	-	-	-	-
MW-4	09/20/2006	94.68	14.94	79.74	-	-	-	-	-	-	-
MW-4	05/15/2007	94.68	15.42	79.26	-	-	-	-	-	-	-
MW-4	09/23/2007	94.68	15.72	78.96	-	-	-	-	-	-	-
MW-4	05/05/2008	94.68	15.37	79.31	-	-	-	-	-	-	-
MW-4	07/16/2008	94.68	15.31	79.37	-	-	-	-	-	-	-
MW-4	06/16/2009	94.68	15.52	79.16	-	-	-	-	-	-	-
MW-4	08/27/2009	94.68	15.48	79.20	-	-	-	-	-	-	-

Table 1
 Groundwater Analytical Results
 Chevron-branded Service Station 9-1356
 1465 Northern Lights Boulevard
 Anchorage, Alaska

Location	Date	TOC	DTW	GWE	HYDROCARBONS		Benzene	Toluene	PRIMARY VOCS		
					DRO	GRO			Ethyl-benzene	Total xylenes	MTBE
	Units	ft msl	fbg	ft msl	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ADEC Groundwater Cleanup Levels ^a					1.5	2.2	0.005	1.0	0.7	10	0.47
MW-5	10/04/2001	-	13.36	-	-	0.0832	0.00391	<0.0005	<0.0005	<0.0010	0.00703/<0.005
MW-5	05/04/2002	-	13.30	-	-	0.403	0.00442	0.000837	0.00153	<0.0010	0.0115/<0.005
MW-5	09/22/2002	-	12.25	-	-	0.367	0.00446	0.000607	0.0026	0.00191	0.00913/<0.005
MW-5	05/30/2003	93.37	13.53	79.84	-	0.200	0.002	<0.0005	0.002	<0.0005	<0.002
MW-5	10/02/2003	93.37	13.79	79.58	-	0.300	0.003	<0.0005	0.005	<0.0005	<0.002
MW-5	06/02/2004	93.37	13.50	79.87	-	0.260	0.0006	<0.0005	<0.0005	<0.0005	<0.002
MW-5	09/22/2004	93.37	13.72	79.65	-	0.099	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-5	05/11/2005	93.37	13.24	80.13	-	0.048	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-5	09/22/2005	93.37	13.06	80.31	-	0.140	0.0006	<0.0005	<0.0005	<0.0005	<0.002
MW-5	05/09/2006	93.37	14.38	78.99	-	0.013 / <0.010	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0015 / <0.0015	<0.0025 / <0.0025
MW-5	09/20/2006	93.37	13.77	79.60	-	0.110	0.0023	<0.0005	0.0028	<0.0015	<0.0025
MW-5	05/15/2007	93.37	14.31	79.06	-	0.090	0.003	<0.0010	0.004	<0.0020	<0.010
MW-5	09/23/2007	93.37	14.17	79.20	-	0.020	<0.0010	<0.0010	0.001	<0.0020	<0.003
MW-5	05/05/2008	-	-	-	-	-	-	-	-	-	-
MW-6	10/04/2001	-	13.11	-	-	<0.050	0.000756	<0.0005	<0.0005	<0.001	<0.001
MW-6	05/04/2002	-	13.71	-	-	<0.050	0.000367	0.000545	<0.0005	<0.001	<0.001
MW-6	09/22/2002	-	12.22	-	-	<0.050	0.000271	<0.0005	<0.0005	<0.001	<0.001
MW-6	05/30/2003	92.89	13.29	79.60	-	0.014	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-6	10/02/2003	92.89	13.47	79.42	-	0.017	0.0009	<0.0005	<0.0005	<0.0005	<0.002
MW-6	06/02/2004	92.89	13.27	79.62	-	0.015	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-6	09/22/2004	92.89	13.36	79.53	-	0.010	0.0007	<0.0005	<0.0005	<0.0005	<0.002
MW-6	05/11/2005	92.89	12.98	79.91	-	0.013	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-6	09/22/2005	92.89	12.69	80.20	-	0.015	<0.0005	<0.0005	<0.0005	<0.0005	<0.002
MW-6	05/09/2006	92.89	14.14	78.75	-	<0.010	<0.0005	<0.0005	<0.0005	<0.0015	<0.002
MW-6	09/20/2006	92.89	13.45	79.44	-	<0.010	<0.0005	<0.0005	<0.0005	<0.0015	<0.0025
MW-6	05/15/2007	92.89	13.98	78.91	-	<0.010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0025
MW-6	09/23/2007	92.89	13.84	79.05	-	0.020	<0.0010	<0.0010	<0.0010	<0.0020	<0.003
MW-6	05/05/2008	92.89	13.89	79.00	-	<0.05	0.00063	<0.0005	<0.0005	<0.0015	<0.002
MW-6	07/16/2008	92.89	13.82	79.07	0.087	0.06	0.002	<0.001	<0.001	<0.002	-
MW-6	06/16/2009	92.89	14.02	78.87	<0.050	0.016 J	0.0016 J	<0.0005	<0.0005	<0.0015	-
MW-6	08/27/2009	92.89	13.99	78.90	<0.050	0.012 J	0.0007 J	<0.0005	<0.0005	<0.0015	-

Table 1
 Groundwater Analytical Results
 Chevron-branded Service Station 9-1356
 1465 Northern Lights Boulevard
 Anchorage, Alaska

Location	Date	TOC ft msl	DTW fbg	GWE ft msl	HYDROCARBONS		PRIMARY VOCs				
					DRO mg/L	GRO mg/L	Benzene mg/L	Toluene mg/L	Ethyl-benzene mg/L	Total xylenes mg/L	MTBE mg/L
ADEC Groundwater Cleanup Levels ^a					1.5	2.2	0.005	1.0	0.7	10	0.47
MW-7	09/20/2006	98.28	12.27	86.01	-	<0.010 / <0.010	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0005 / <0.0005	<0.0015 / <0.0015	<0.0025 / <0.0025
MW-7	05/15/2007	98.28	12.81	85.47	-	<0.010 / <0.010	<0.0005 / <0.0010	<0.0010 / <0.0010	<0.0010 / <0.0010	<0.0020 / <0.0020	<0.010 / <0.003
MW-7	09/23/2007	98.28	12.66	85.62	-	<0.010	<0.0010	<0.0010	<0.0010	<0.0020	<0.003
MW-7	05/05/2008	98.28	12.74	85.54	-	<0.050	<0.0005	<0.0005	<0.0005	<0.0015	<0.002
MW-7	07/16/2008	98.28	12.64	85.64	0.049	<0.01	<0.001	<0.001	<0.001	<0.002	-
MW-7	06/16/2009	98.28	12.85	85.43	0.069 J	0.046 J	0.0029	<0.0005	<0.0005	<0.0015	-
MW-7	08/27/2009	98.28	12.81	85.47	0.053 J	0.013 J	<0.0005	<0.0005	<0.0005	<0.0015	-
Trip Blank	10/11/1999	-	-	-	-	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
Trip Blank	05/19/2000	-	-	-	-	<0.080	<0.0005	<0.0005	<0.0005	<0.0010	<0.002
Trip Blank	09/28/2000	-	-	-	-	<0.050	<0.0002	0.000899	<0.0005	<0.0010	<0.001
Trip Blank	05/04/2001	-	-	-	-	<0.050	-	-	-	-	-
Trip Blank	10/04/2001	-	-	-	-	<0.050	<0.0002	<0.0005	<0.0005	<0.0010	<0.001
Trip Blank	05/04/2002	-	-	-	-	<0.050	0.000361	<0.0005	<0.0005	<0.0010	<0.001
Trip Blank	05/05/2008	-	-	-	-	<0.05	<0.0005	<0.0005	<0.0005	<0.0015	<0.002
Trip Blank	07/16/2008	-	-	-	-	<0.01	<0.001	<0.001	<0.001	<0.002	-
Trip Blank	06/10/2009	-	-	-	-	<0.010	<0.0005	<0.0005	<0.0005	<0.0015	-
Trip Blank	08/19/2009	-	-	-	-	<0.010	<0.0005	<0.0005	<0.0005	<0.0015	-

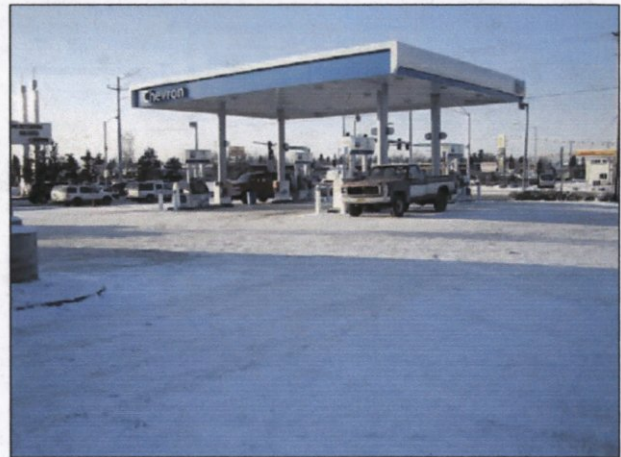
APPENDIX A
SITE PHOTOGRAPHS



1. Site layout looking NW



2. Site layout looking SE



3. Site layout looking SW

Appendix A

PHOTOS

CHEVRON SERVICE STATION 9-1356
1456 NORTHERN LIGHTS BOULEVARD
Anchorage, Alaska



APPENDIX B
ENVIRONMENTAL HISTORY

ENVIRONMENTAL HISTORY

1998 UST Removal: Pinnacle Construction, Inc. (Pinnacle) of Anchorage, Alaska performed facility upgrade activities at the site during May of 1998. One used-oil UST, one heating-oil UST, and three gasoline USTs and associated dispensers and product lines were removed from the site. Secor International, Inc. (Secor) of Sacramento, California conducted compliance soil sampling of the USTs, dispensers and associated piping. Soil samples T-5, T-6, D-2 and D-8 collected from beneath the USTs and dispenser islands contained gasoline range organics (GRO) concentrations above ADEC Method II Soil Cleanup Levels. Soil samples D-2 and PL-12 collected from beneath the dispenser and product line contained benzene concentrations of 417 milligrams per kilogram (mg/kg) and 4.69 mg/kg, respectively. No petroleum hydrocarbon concentrations above ADEC cleanup levels were reported in soil beneath the used oil or heating oil USTs. Approximately 1,500 tons of petroleum hydrocarbon impacted soil was excavated during the facility upgrade (SECOR, 1998).

1999 Site Assessment: Discovery Drilling, Inc. (Discovery) of Anchorage, Alaska installed four groundwater monitoring wells (MW-1 through MW-4) on July 1, 1999. Depth to groundwater ranged from 14.92 to 15.61 fbg during the 1999 site assessment. GRO, benzene, toluene, ethylbenzene, and total xylenes (BTEX) concentrations were detected in soil samples collected from wells MW-2 and MW-3 above ADEC Method II soil cleanup levels. Sample MW-2-17' contained the maximum GRO (929 mg/kg) and benzene (3 mg/kg) concentrations (SECOR, 1999).

2001 Site Assessment: Discovery installed two downgradient, offsite groundwater monitoring wells (MW-5 and MW-6) on September 5, 2001 to further delineate the lateral extent of dissolved phase hydrocarbons beneath the site. No petroleum hydrocarbons were detected in any analyzed soil sample. GRO and BTEX concentrations in grab groundwater samples were below the ADEC clean up levels (SECOR, 2001).

2006 Site Assessment: Discovery installed one crossgradient groundwater monitoring well (MW-7) on July 12, 2006 to assess if dissolved phase hydrocarbons were present in groundwater southwest of the site. Selected soil samples were analyzed for GRO and BTEX. No GRO or BTEX were detected above laboratory detection limits in any collected sample.