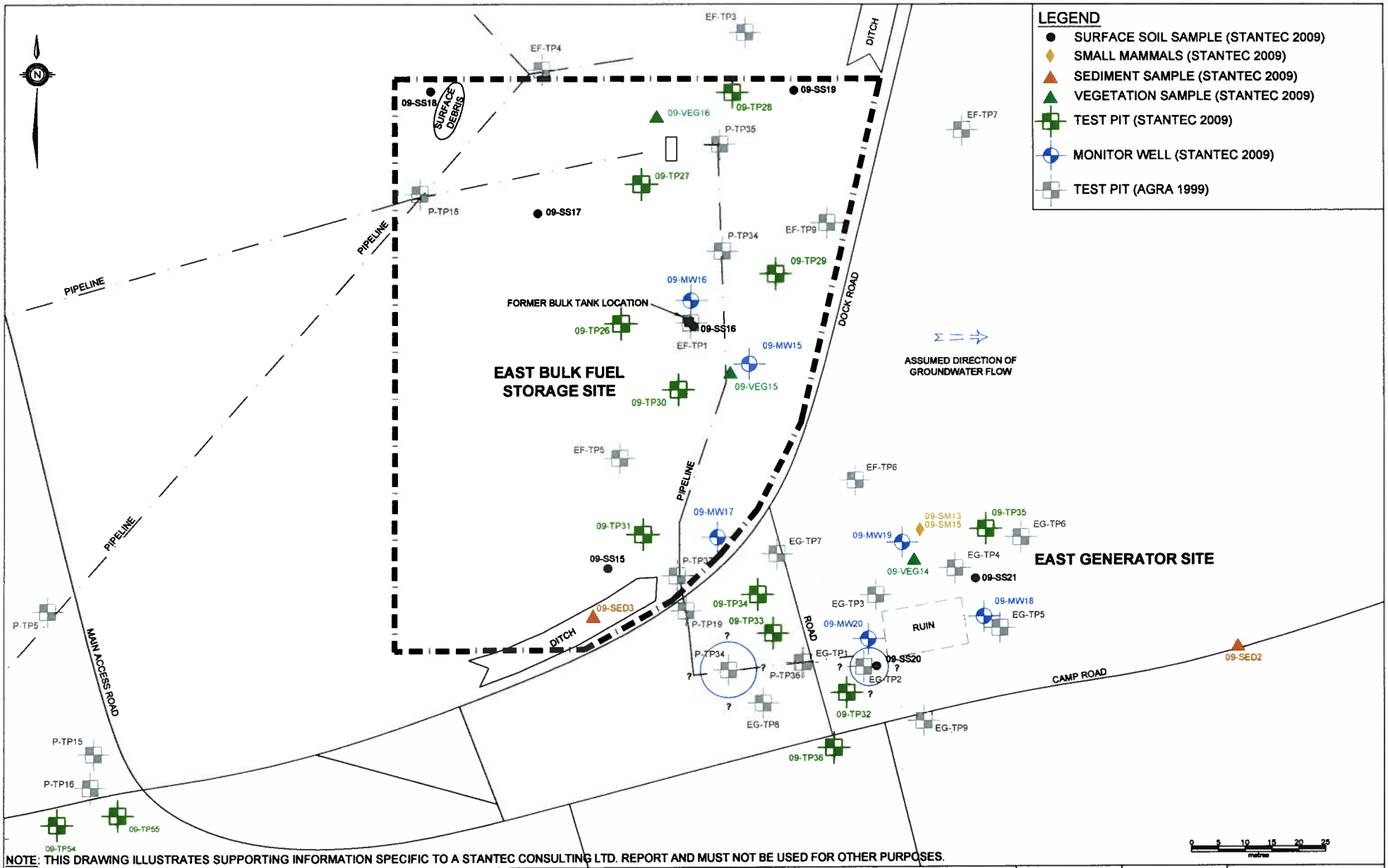
Appendix 4a

Site Drawings

– East Bulk Fuel Storage Site



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT: NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

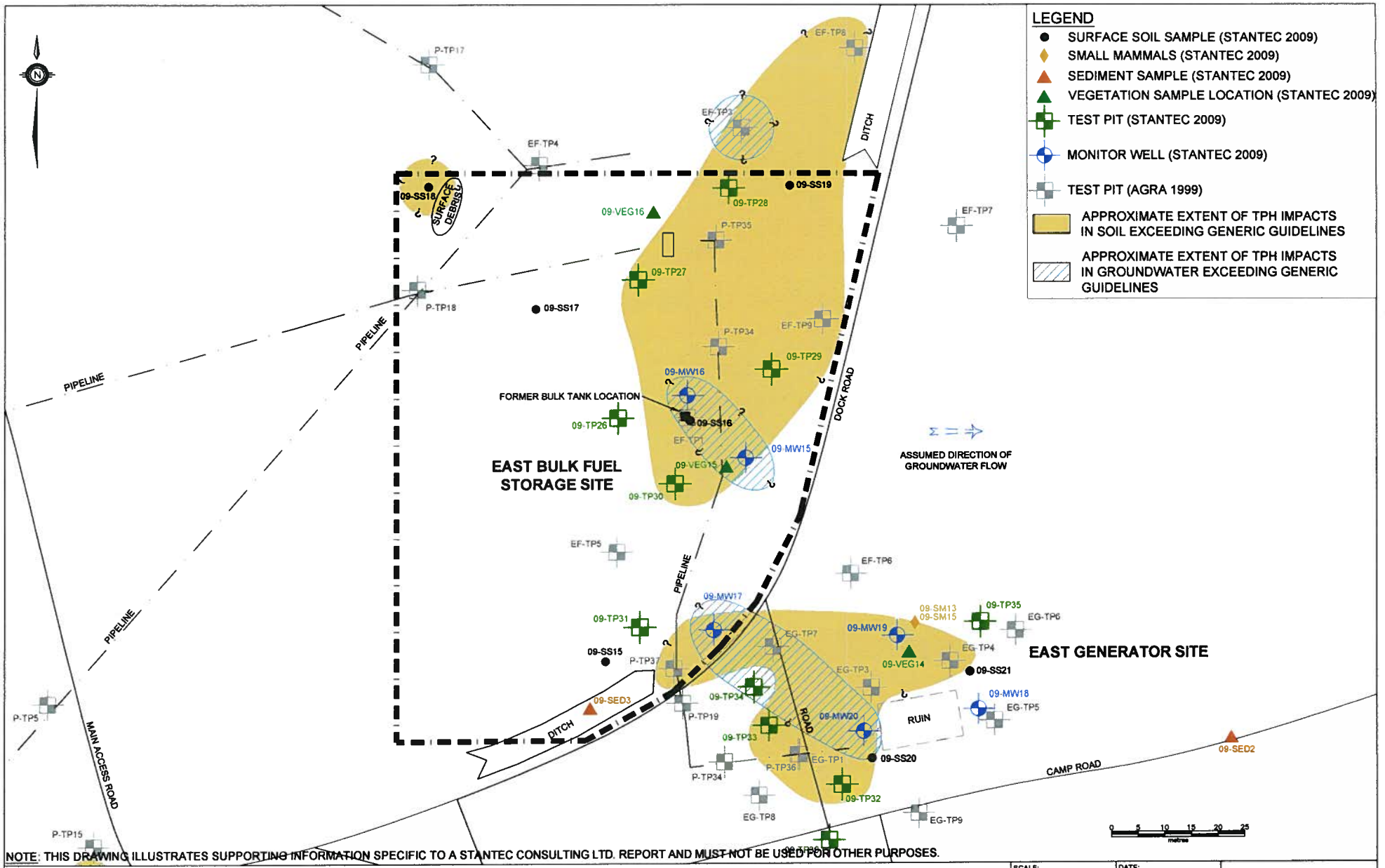
PROJECT TITLE: PHASE III ENVIRONMENTAL SITE ASSESSMENT, HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS, REMEDIAL ACTION PLAN FOR THE FORMER U.S. MILITARY FACILITY OF NORTHWEST POINT, NL

DRAWING TITLE: SITE PLAN - EAST BULK FUEL STORAGE SITE

SCALE: 1:800	DATE: JUNE 17, 2010
DRAWN BY: N.M.	CHECKED BY: A.R.
EDITED BY: -	REV. No. 0
DRAWING No: 121410105-EE-04A	
CAD FILE: 1044857-EE-07.DWG	

Stantec

17JUN10 1:00PM



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT: NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

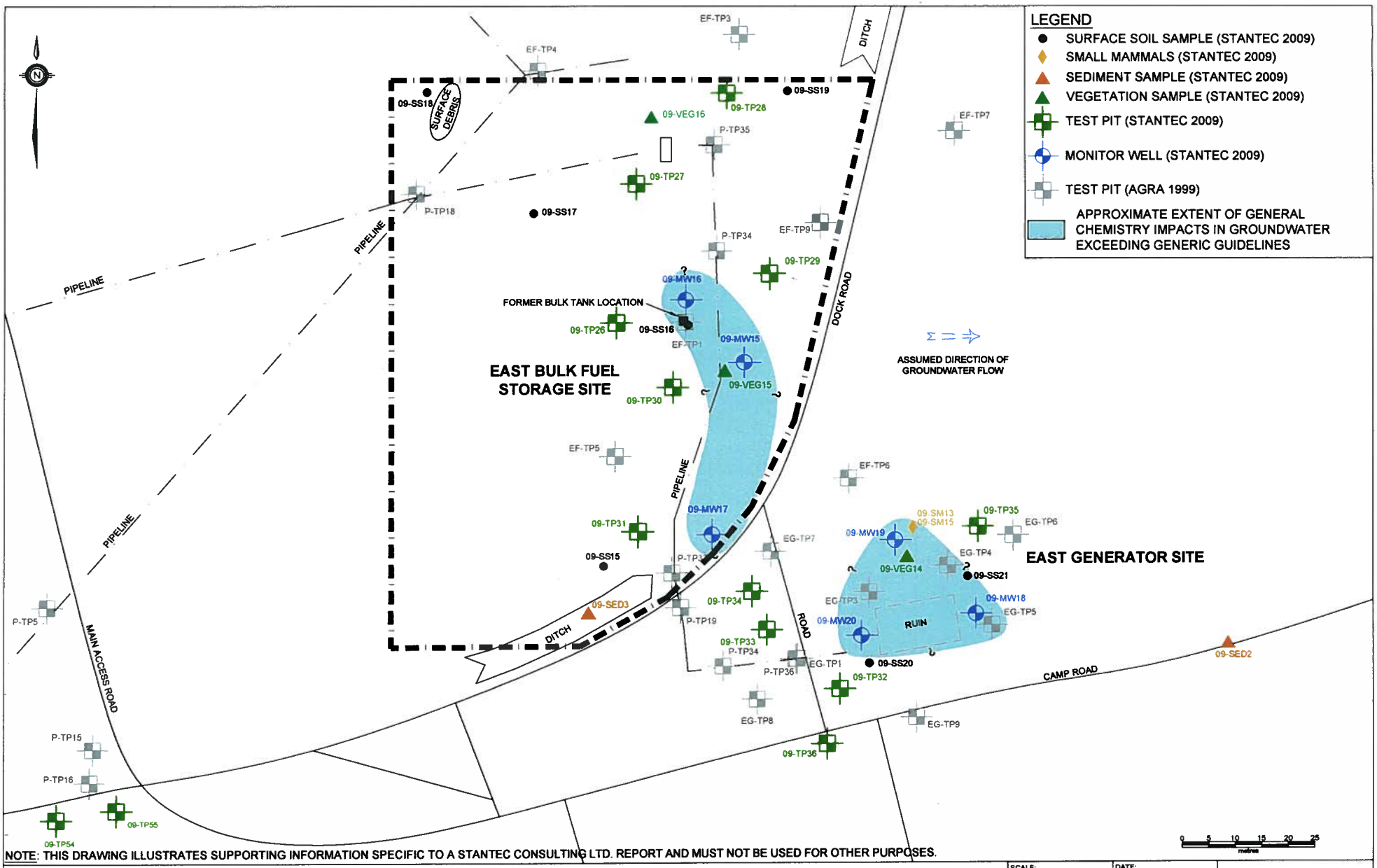
PROJECT TITLE: PHASE III ENVIRONMENTAL SITE ASSESSMENT, HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS, REMEDIAL ACTION PLAN FOR THE FORMER U.S. MILITARY FACILITY OF NORTHWEST POINT, NL

DRAWING TITLE: APPROXIMATE EXTENT OF TPH IMPACTS EXCEEDING GENERIC GUIDELINES - EAST BULK FUEL STORAGE SITE

SCALE: 1:800	DATE: JUNE 18, 2010
DRAWN BY: N.M.	CHECKED BY: A.R.
EDITED BY: -	REV. No. 0
DRAWING No: 121410105-EE-04B	
CAD FILE: 1044857-EE-10.DWG	

Stantec

18JUN10 1:00PM



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT: NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE: PHASE III ENVIRONMENTAL SITE ASSESSMENT, HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS, REMEDIAL ACTION PLAN FOR THE FORMER U.S. MILITARY FACILITY OF NORTHWEST POINT, NL

DRAWING TITLE: APPROXIMATE EXTENT OF GENERAL CHEMISTRY IMPACTS EXCEEDING GENERIC GUIDELINES - EAST BULK FUEL STORAGE SITE

SCALE: 1:800	DATE: JUNE 21, 2010
DRAWN BY: N.M.	CHECKED BY: A.R.
EDITED BY: -	REV. No. 0
DRAWING No: 121410105-EE-4C	
CAD FILE: 1044857-EE-13.DWG	

Stantec

21JUN10 12:00PM

Appendix 4b

Site Photos

– East Bulk Fuel Storage Site

Site Photographs – East Bulk Fuel Storage Site

Photo 1 View of 09-TP26 and 09-TP27

Photo 2 View of 09-MW16

Site Photographs – East Bulk Fuel Storage Site

Photo 3 View of 09-MW15

Photo 4 View of 09-TP28

Appendix 4c

Sample Coordinates – East Bulk Fuel Storage Site

Sample Coordinates - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Sample ID	Coordinates (NAD27)	
	Easting	Northing
TEST PITS		
09-TP26	694485	5931179
09-TP27	694481	5931194
09-TP28	694507	5931205
09-TP29	694507	5931192
09-TP30	694491	5931165
09-TP31	694483	5931143
MONITOR WELLS		
09-MW15	694503	5931175
09-MW16	694492	5931186
09-MW17	694497	5931153
SURFACE SOIL		
09-SS15	694494	5931150
09-SS16	694487	5931188
09-SS17	694481	5931205
09-SS18	694484	5931224
09-SS19	694507	5931211
SEDIMENT		
09-SED3	694489	5931140
VEGETATION		
09-VEG15	694499	5931173
09-VEG16	694484	5931220

Appendix 4d

Test Pit Records and Monitor Well Records

– East Bulk Fuel Storage Site

TEST PIT RECORD

CLIENT: NL Department of Environment and Conservation
PROJECT: Phase III ESA, HHRA & ERA, Former US Military Facility
LOCATION: Northwest Point, NL
DATES (mm-dd-yy): DUG 8-7-09 WATER LEVEL 0.9m 8-7-09

TEST PIT No. 09-TP26
PROJECT No. 121410105
DATUM

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0														
		Compact, brown, SAND (SP)			BS	1	1		2.0	-	-	-	-	-
1				▽	BS	2	0-1		7.5	62	nd	nd	nd	nd
		End of Test Pit Rapid groundwater seepage observed at 0.9 m depth; sheen on groundwater. Bedrock not encountered.												
2														
3														
4														
5														

Stantec

TEST PIT RECORD

CLIENT **NL Department of Environment and Conservation**
PROJECT **Phase III ESA, HHRA & ERA, Former US Military Facility**
LOCATION **Northwest Point, NL**
DATES (mm-dd-yy): DUG **8-7-09** WATER LEVEL **0.6m** **8-7-09**

TEST PIT No. **09-TP27**
PROJECT No. **121410105**
DATUM

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0														
		Compact, brown, SAND (SP)		▽	BS	1	1		55.3	-	-	-	-	-
					BS	2	1		379	9100	nd	nd	nd	nd
1														
		End of Test Pit Rapid groundwater seepage observed at 0.6 m depth; sheen on groundwater. Bedrock not encountered.												
2														
3														
4														
5														

TEST PIT RECORD

CLIENT: NL Department of Environment and Conservation
PROJECT: Phase III ESA, HHRA & ERA, Former US Military Facility
LOCATION: Northwest Point, NL
DATES (mm-dd-yy): DUG 8-7-09 WATER LEVEL 0.8m 8-7-09

TEST PIT No. 09-TP28
PROJECT No. 121410105
DATUM

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0														
		Compact, brown, SAND (SP)		▽	BS	1	1-2		131	-	-	-	-	-
1					BS	2	1-2		380	6500	nd	nd	nd	nd
		End of Test Pit Rapid groundwater seepage observed at 0.8 m depth; sheen on groundwater. Bedrock not encountered.												
2														
3														
4														
5														

Stantec

TEST PIT RECORD

CLIENT **NL Department of Environment and Conservation**
PROJECT **Phase III ESA, HHRA & ERA, Former US Military Facility**
LOCATION **Northwest Point, NL**
DATES (mm-dd-yy): DUG **8-7-09** WATER LEVEL **0.8m** **8-7-09**

TEST PIT No. **09-TP29**
PROJECT No. **121410105**
DATUM

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0														
		Compact, brown, SAND (SP)		▽	BS	1	1		138	-	-	-	-	-
1					BS	2	2		108	11000	nd	nd	nd	nd
		End of Test Pit Rapid groundwater seepage observed at 0.8 m depth. Bedrock not encountered.												
2														
3														
4														
5														

TEST PIT RECORD

CLIENT: NL Department of Environment and Conservation
PROJECT: Phase III ESA, HHRA & ERA, Former US Military Facility
LOCATION: Northwest Point, NL
DATES (mm-dd-yy): DUG 8-7-09 WATER LEVEL 1m 8-7-09

TEST PIT No. 09-TP30
PROJECT No. 121410105
DATUM

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0														
		Compact, brown, SAND (SP)			BS	1	1		167	-	-	-	-	-
1				▽	BS	2	1		261	11000	nd	nd	nd	nd
		End of Test Pit Rapid groundwater seepage observed at 1.0 m depth. Bedrock not encountered.												
2														
3														
4														
5														

TEST PIT RECORD

CLIENT: NL Department of Environment and Conservation
PROJECT: Phase III ESA, HHRA & ERA, Former US Military Facility
LOCATION: Northwest Point, NL
DATES (mm-dd-yy): DUG 8-6-09 WATER LEVEL 0.9m 8-6-09

TEST PIT No. 09-TP31
PROJECT No. 121410105
DATUM

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0														
		Loose to compact, brown, SAND (SP)			BS	1	0		46.7	-	-	-	-	-
1				▽	BS	2	0		34.1	-	-	-	-	-
		End of Test Pit Rapid groundwater seepage observed at 0.9 m depth. Bedrock not encountered.												
2														
3														
4														
5														

MONITOR WELL RECORD

BOREHOLE No. **09-MW15**
PAGE **1** of **1**
PROJECT No. **121410105**
DRILLING METHOD **Auger**
SIZE **100mm HS**
DATUM

CLIENT **NL Department of Enviroment and Conservation**
PROJECT **Phase III ESA, HHRA & ERA, Former US Military Facility**
LOCATION **Northwest Point, NL**
DATES (mm-dd-yy): BORING **8-8-09** WATER LEVEL **1.22m** **8-8-09**

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY mm	SAMPLES N-VALUE OR RQD %	HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS (0.61 m STICK UP)
0													CAST IRON WELL HEAD
0		Brown, SAND (SP)			SS	1	305	4	1		87.3	-	BENTONITE
1					SS	2	305	10	1	S	153	-	50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
		Grey, silty CLAY (CL-ML)		▼	SS	3	405	10	1	S	143	-	
		Brown, SAND (SP)											
2		Grey, silty CLAY (CL-ML)			SS	4	305	4	1	S	218	-	
		Brown, SAND (SP)											
		Grey, silty CLAY (CL-ML)			SS	5	405	5	1	S	210	-	
3		Brown, SAND (SP)											END CAP
		End of Borehole											
4													
5													
6													
7													
8													
9													
10													

Stantec

MONITOR WELL RECORD

BOREHOLE No. **09-MW16**
PAGE **1** of **1**
PROJECT No. **121410105**
DRILLING METHOD **Auger**
SIZE **100mm HS**
DATUM

CLIENT **NL Department of Enviroment and Conservation**
PROJECT **Phase III ESA, HHRA & ERA, Former US Military Facility**
LOCATION **Northwest Point, NL**
DATES (mm-dd-yy): BORING **8-8-09** WATER LEVEL **1.22m** **8-8-09**

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY mm	SAMPLES N-VALUE OR RQD %	HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS (0.61 m STICK UP)
0													CAST IRON WELL HEAD
0		Black, SAND (SP) layered with dark brown, SAND (SP)			SS	1	405	6	1-2		134	-	BENTONITE
1					SS	2	305	20	2		333	-	50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
		Brown, SAND (SP); some cobbles			SS	3	305	26	2	S	425	14000	
2		Black, SAND (SP) layered with dark brown, SAND (SP)			SS	4	510	15	1-2	S	517	-	
3													END CAP
		End of Borehole											
4													
5													
6													
7													
8													
9													
10													

MONITOR WELL RECORD

Stantec

BOREHOLE No. **09-MW17**
PAGE **1** of **1**
PROJECT No. **121410105**
DRILLING METHOD **Auger**
SIZE **100mm HS**
DATUM

CLIENT **NL Department of Enviroment and Conservation**
PROJECT **Phase III ESA, HHRA & ERA, Former US Military Facility**
LOCATION **Northwest Point, NL**
DATES (mm-dd-yy): BORING **8-8-09** WATER LEVEL **1.22m** **8-8-09**

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY mm	SAMPLES N-VALUE OR RQD %	HYDROCARBON ODOUR	APPARENT MOISTURE CONTENT	PID (ppm)	TPH (ppm)	WELL CONSTRUCTION DETAILS (0.91 m STICK UP)
0													CAST IRON WELL HEAD
0		Dark brown, SAND (SP)			SS	1	455	6	1-2		126	-	BENTONITE
1					SS	2	455	12	1-2		277	-	50 mm DIAMETER No. 10 SLOT PVC SCREEN IN No. 2 SILICA SAND PACK
		Grey, silty CLAY (CL-ML)											
		Grey, SILT (ML)			SS	3	455	6	2		408	16000	
2		Brown, SAND (SP); some cobbles			SS	4	255	9	1-2		88	-	
		Dark grey, SILT (ML)											
3													END CAP
		End of Borehole											
4													
5													
6													
7													
8													
9													
10													

Appendix 4e

Laboratory Analytical Results Summary Tables

– East Bulk Fuel Storage Site

Table 4.1 Results of Laboratory Analysis of TPH/BTEX in Soil - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Sample Location	Sample Depth (m)	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH Purgeable ($<C_{10}$)	TPH Extractable (C_{10}-C_{32})	C_6-C_{10} (Gas Range)	C_{10}-C_{21} (Fuel Range)	C_{21}-C_{32} (Lube Range)	Modified TPH - Tier I[2]	Resemblance
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
Tier I RBSLs[1]		0.16	14	58	17	-	-	-	-	-	140	-
1999 Sampling (AGRA)												
EF-TP1	0.5	<4.0	<4.0	<4.0	<8.0	86.7	23,300	-	-	-	23,387	D
EF-TP4	0.8	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.20	-
EF-TP5	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.20	-
EF-TP6	0.5	<0.002	<0.002	<0.002	<0.004	<0.02	<0.2	-	-	-	<0.20	-
EF-TP7	1.6	<0.002	<0.002	<0.002	<0.004	0.08	<0.2	-	-	-	0.28	NRD/G
EF-TP8	1.3	<0.002	<0.002	0.005	0.033	1.74	533	-	-	-	535	D
EF-TP9	0.7	0.005	0.32	0.026	0.142	4.21	356	-	-	-	360	D
P-TP19	1.5	<0.002	<0.002	<0.002	<0.004	<0.02	13	-	-	-	13	NRD/G
P-TP35	0.5	<0.400	<0.400	<0.400	1.26	62.9	22,200	-	-	-	22,263	D
P-TP37	0.5	<0.40	<0.40	<0.40	2.30	128	9,370	-	-	-	9,498	D
MDL	-	0.002	0.002	0.002	0.002	0.02	0.2	-	-	-	0.20	-
2009 Sampling (Stantec)												
09-TP26-BS2	0.7 - 1.2	<0.03	<0.03	<0.03	<0.05	-	-	<3	62	<15	62	WFO
09-TP27-BS2	0.4 - 0.9	<0.03	<0.03	<0.03	<0.05	-	-	340	8,700	70	9,100	FO
09-TP28-BS2	0.6 - 1.1	<0.03	<0.03	<0.03	<0.05	-	-	210	6,200	58	6,500	FO
09-TP29-BS2	0.6 - 1.0	<0.03	<0.03	<0.03	<0.05	-	-	72	11,000	160	11,000	FO
09-TP29-BS2 Lab-Dup	0.6 - 1.0	<0.03	<0.03	<0.03	<0.05	-	-	64	11,000	160	-	-
09-TP30-BS2	0.7 - 1.2	<0.03	<0.03	<0.03	<0.05	-	-	220	10,000	120	11,000	FO
09-SS18	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	-	-	<3	2,300	72	2,300	WFO
09-SS19	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	-	-	<3	18,000	160	19,000	FO
RDL	-	0.03	0.03	0.03	0.05	-	-	3	15	15	20	-
09-MW16-SS3	1.2 - 1.8	<0.03	<0.03	<0.03	<0.05	-	-	890	13,000	110	14,000	FO
RDL	-	0.03	0.03	0.03	0.05	-	-	30	75	15	80	-
09-MW17-SS3	1.2 - 1.8	<0.03	<0.03	0.46	1.1	-	-	520	15,000	190	16,000	FO
RDL	-	0.03	0.03	0.03	0.05	-	-	30	15	15	30	-

Notes:
1 = Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater and coarse grained soil, fuel oil impacts (September, 2003)
2 = Modified TPH - Tier I does not include BTEX
MDL = Method detection limit; RDL = Reportable Detection Limit for routine analysis
Lab-dup = Laboratory duplicate sample
< # = Not detected above MDL/RDL noted
"-" = Indicates value is not available or does not apply
D = Diesel; NRD/G = No resemblance to diesel or gasoline; FO = Fuel oil; WFO = Weathered fuel oil
Shaded = Value exceeds generic guideline for a residential site, non-potable groundwater, coarse grained soil and fuel oil impacts

Table 4.2 Results of Laboratory Analysis of Metals in Soil - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Parameters	RDL	Units	Criteria[1]	2009 Sampling (Stantec)				
				09-SS15	09-SS16	09-SS17	09-SS18	09-SS19
			Sample Depth (m)	0.0 - 0.15	0.0 - 0.15	0.0 - 0.15	0.0 - 0.15	0.0 - 0.15
Aluminum	10	mg/kg	-	2,100	2,000	2,600	1,800	2,100
Antimony	2	mg/kg	20	<2	<2	<2	<2	<2
Arsenic	2	mg/kg	12	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	15	15	17	8	15
Beryllium	2	mg/kg	4	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	<5	<5	<5	<5	<5
Cadmium	0.3	mg/kg	10	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	2	mg/kg	64	5	6	8	4	8
Cobalt	1	mg/kg	50	1	1	1	<1	<1
Copper	2	mg/kg	63	3	3	3	<2	2
Iron	50	mg/kg	-	3,300	3,000	5,200	2,000	3,800
Lead	0.5	mg/kg	140	15	2.3	16	1.3	10
Lithium	2	mg/kg	-	2	3	2	<2	2
Manganese	2	mg/kg	-	34	29	41	20	37
Mercury	0.1	mg/kg	6.6	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	2	mg/kg	10	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	2	2	3	<2	<2
Rubidium	2	mg/kg	-	3	2	3	<2	3
Selenium	1	mg/kg	1	<1	<1	<1	<1	<1
Silver	0.5	mg/kg	20	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	<5	<5	<5	<5	<5
Thallium	0.1	mg/kg	1	0.1	<0.1	<0.1	<0.1	<0.1
Tin	2	mg/kg	-	<2	<2	<2	<2	<2
Uranium	0.1	mg/kg	23	0.1	0.1	0.2	0.1	0.2
Vanadium	2	mg/kg	130	11	9	13	6	17
Zinc	5	mg/kg	200	9	7	8	6	8

Notes:
1 = CCME Canadian Soil Quality Guidelines for Protection of Environmental and Human Health at a Residential/Parkland site (2007)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = No applicable guideline

Table 4.3 Results of Laboratory Analysis of PAHs in Soil - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Parameters	RDL	Units	Criteria[1,3]	Criteria[2,3]	1999 Sampling (AGRA)		2009 Sampling (Stantec)					
					EF-TP9	MDL	09-SS16	RDL	09-SS17	RDL	09-SS18	RDL
Sample Depth (m)					0.7	-	0.0 - 0.15	-	0.0 - 0.15	-	0.0 - 0.15	-
Non-carcinogenic PAHs												
1-Methylnaphthalene	0.05	mg/kg	-	-	-	-	<0.005	0.005	<0.2(1)	0.2	<0.005	0.005
2-Methylnaphthalene	0.05	mg/kg	-	-	-	-	0.02(1)	0.02	<0.06(1)	0.06	<0.005	0.005
Acenaphthene	0.05	mg/kg	-	-	<0.002	0.002	0.1	0.005	<0.2(1)	0.2	<0.03(1)	0.03
Acenaphthylene	0.05	mg/kg	-	-	<0.001	0.001	0.18	0.005	0.070	0.005	0.046	0.005
Anthracene	0.05	mg/kg	2.5	-	<0.001	0.001	<0.03(1)	0.03	<0.07(1)	0.07	<0.005	0.005
Fluoranthene	0.05	mg/kg	50	-	<0.001	0.001	<0.005	0.005	0.019	0.005	<0.005	0.005
Fluorene	0.05	mg/kg	-	-	<0.001	0.001	<0.02(1)	0.02	<0.2(1)	0.2	<0.005	0.005
Naphthalene	0.05	mg/kg	-	-	<0.002	0.002	<0.005	0.005	0.021	0.005	<0.005	0.005
Perylene	0.05	mg/kg	-	-	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005
Phenanthrene	0.05	mg/kg	-	-	<0.001	0.001	0.007	0.005	0.11	0.005	<0.005	0.005
Pyrene	0.05	mg/kg	-	-	<0.003	0.003	0.026	0.005	0.074	0.005	0.013	0.005
Carcinogenic PAHs												
Benzo(a)anthracene	0.05	mg/kg	-	-	<0.001	0.001	<0.005	0.005	<0.005	0.005	<0.005	0.005
Benzo(a)pyrene	0.05	mg/kg	20	-	<0.003	0.003	<0.005	0.005	<0.005	0.005	<0.005	0.005
Benzo(b)fluoranthene	0.05	mg/kg	-	-	<0.004	0.004	<0.005	0.005	0.019	0.005	<0.005	0.005
Benzo(g,h,i)perylene	0.05	mg/kg	-	-	<0.002	0.002	<0.005	0.005	0.019	0.005	<0.005	0.005
Benzo(k)fluoranthene	0.05	mg/kg	-	-	<0.004	0.004	<0.005	0.005	0.019	0.005	<0.005	0.005
Chrysene	0.05	mg/kg	-	-	<0.001	0.001	<0.005	0.005	0.029	0.005	0.007	0.005
Indeno(1,2,3-c,d) pyrene	0.05	mg/kg	-	-	<0.003	0.003	<0.005	0.005	0.019	0.005	<0.005	0.005
Dibenz(a,h,)anthracene	0.05	mg/kg	-	-	<0.004	0.004	<0.005	0.005	<0.005	0.005	<0.005	0.005
Benzo(a)pyrene TPE[4]			-	5.3	0.004	-	0.006	-	0.011	-	0.006	-

Notes:

1 = CCME Canadian Soil Quality Guidelines for the Protection of Environmental Health at a Residential/Parkland Site (2008)

2 = CCME Canadian Soil Quality Guidelines for Protection of Human Health for a Residential Site (Direct Soil Contact) (2008)

3 = As per CCME recommendations, soil samples are compared against the SQG for the protection of human health and environmental health separately

4 = Carcinogenic PAHs Assessed as Benzo(a)pyrene Total Potency Equivalent (TPE)

MDL = Method Detection Limit; RDL = Reportable Detection Limit for routine analysis

< # = Not detected above MDL/RDL noted

"-" = No applicable guideline or does not apply

(1) = Elevated RDL due to sample dilution

Table 4.4 Results of Laboratory Analysis of TPH/BTEX in Groundwater - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Sample Location	Benzene	Toluene	Ethylbenzene	Xylenes	TPH Purgeable ($<C_{10}$)	TPH Extractable (C_{10}-C_{32})	C_6-C_{10} (Gas Range)	C_{10}-C_{21} (Fuel Range)	C_{21}-C_{32} (Lube Range)	Modified TPH - Tier I[2]	Resemblance
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	-
Tier I RBSLs[1]	1	20	20	20	-	-	-	-	-	12/20/20	-
1999 Sampling (AGRA)											
EF-TP3	<0.5	<0.5	<0.55	<1.125	150	12,230	-	-	-	12,380	D
MDL	0.0002	0.0002	0.00022	0.00023	0.005	0.05	-	-	-	0.05	-
2009 Sampling (Stantec)											
09-MW15	<0.001	<0.001	<0.001	<0.002	-	-	0.5	51	1.2	53	WFO
09-MW17	<0.001	<0.001	<0.001	<0.002	-	-	1.3	120	2.4	120	WFO
RDL	0.001	0.001	0.001	0.002	-	-	0.01	0.05	0.1	0.1	-

Notes:
1 = Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater and coarse grained soil, fuel oil impacts (September, 2003)
2 = Modified TPH - Tier I does not include BTEX
MDL = Method Detection Limit; RDL = Reportable Detection Limit for routine analysis
< # = Not detected above MDL/RDL noted
"-" = indicates value is not available or does not apply
D = Diesel; WFO= Weathered Fuel Oil
Shaded = Value exceeds applicable criteria

Table 4.5 Results of Laboratory Analysis of Petroleum Hydrocarbon Fractionation in Groundwater - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Parameter	RDL	Units	Criteria[1]	2009 Sampling (Stantec)
				09-MW16
Benzene	0.01	mg/L	1	<0.01
Toluene	0.01	mg/L	20	<0.01
Ethylbenzene	0.01	mg/L	20	<0.01
Xylene (Total)	0.01	mg/L	20	<0.01
Aliphatic >C6-C8	0.1	mg/L	-	0.1
Aliphatic >C8-C10	0.1	mg/L	-	<0.1
>C8-C10 Aromatics (-EX)	0.1	mg/L	-	0.2
Aliphatic >C10-C12	0.5	mg/L	-	37
Aliphatic >C12-C16	3	mg/L	-	100
Aliphatic >C16-C21	3	mg/L	-	30
Aliphatic >C21-C32	0.1	mg/L	-	1.4
Aromatic >C10-C12	0.01	mg/L	-	8.1
Aromatic >C12-C16	3	mg/L	-	38
Aromatic >C16-C21	3	mg/L	-	15
Aromatic >C21-C32	0.1	mg/L	-	1.2
Modified TPH (Tier 2)	3	mg/L	12/20/20	230
Resemblance	-	-	-	FO

Notes:
1 = Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater and coarse grained soil, gasoline/fuel oil/lube oil impacts (September, 2003)
RDL = Reportable Detection Limit
"-" = indicates value is not available or does not apply
< # = Not detected above RDL noted
Shaded = Value exceeds applicable criteria

Table 4.6 Results of Laboratory Analysis of Dissolved Metals in Groundwater - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Parameter	RDL	Units	Criteria[1]	2009 Sampling (Stantec)		
				09-MW15	09-MW16	09-MW17
Aluminum	5.0	ug/L	-	305	417	160
Antimony	2.0	ug/L	20,000	<2.0	<2.0	<2.0
Arsenic	2.0	ug/L	1,900	<2.0	<2.0	<2.0
Barium	5.0	ug/L	29,000	28.0	25.9	23.7
Beryllium	2.0	ug/L	67	<2.0	<2.0	<2.0
Bismuth	2.0	ug/L	-	<2.0	<2.0	<2.0
Boron	5.0	ug/L	45,000	<5.0	<5.0	<5.0
Cadmium	0.017	ug/L	2.7	0.037	<0.017	0.023
Chromium	1.0	ug/L	810	1.3	2.3	<1.0
Cobalt	0.40	ug/L	66	0.64	1.05	1.29
Copper	2.0	ug/L	87	3.2	<2.0	2.5
Iron	50	ug/L	-	634	4,520	4,280
Lead	0.50	ug/L	25	<0.50	<0.50	<0.50
Manganese	2.0	ug/L	-	57.3	69.8	68.7
Mercury	0.02	ug/L	0.29	<0.02	0.018	0.015
Molybdenum	2.0	ug/L	9,200	<2.0	<2.0	<2.0
Nickel	2.0	ug/L	490	<2.0	<2.0	3.6
Selenium	1.0	ug/L	63	<1.0	<1.0	<1.0
Silver	0.10	ug/L	1.5	<0.10	<0.10	<0.10
Strontium	5.0	ug/L	-	31.1	33.8	32.3
Thallium	0.10	ug/L	510	<0.10	<0.10	<0.10
Tin	2.0	ug/L	-	<2.0	<2.0	<2.0
Titanium	2.0	ug/L	-	2.3	6.1	<2.0
Uranium	0.10	ug/L	420	<0.10	<0.10	<0.10
Vanadium	2.0	ug/L	250	2.7	9.7	<2.0
Zinc	5.0	ug/L	1,100	13.8	7.7	26.2

Notes:

1 = Ontario Ministry of the Environment (MOE) Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. July 27, 2009. Table 3: full depth generic site condition standards in a non-potable groundwater condition, coarse-grained soil

< # = Not detected above RDL noted

"-" = No applicable guideline

Table 4.7 Results of Laboratory Analysis of General Chemistry in Groundwater - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Parameter	Units	Criteria[1]	2009 Sampling (Stantec)				
			09-MW15	09-MW16	RDL	09-MW17	RDL
Metals							
Dissolved Calcium	mg/L	-	2.4	3.0	0.1	3.3	0.1
Dissolved Magnesium	mg/L	-	0.5	0.7	0.1	0.6	0.1
Dissolved Phosphorus	mg/L	<0.004 to >0.1[3]	<0.1	<0.1	0.1	<0.1	0.1
Dissolved Potassium	mg/L	-	1.0	0.7	0.1	1.4	0.1
Dissolved Sodium	mg/L	-	2.0	2.3	0.1	2.1	0.1
Calculated Parameters							
Anion Sum	me/L	-	0.220	0.290	N/A	0.270	N/A
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	9	13	1	13	1
Calculated TDS	mg/L	-	23	31	1	31	1
Carb.Alkalinity (calc. as CaCO3)	mg/L	-	<1	<1	1	<1	1
Cation Sum	me/L	-	0.300	0.48	N/A	0.500	N/A
Hardness (CaCO3)	mg/L	-	8	10	1	11	1
Ion Balance (% Difference)	%	-	15.4	24.7	N/A	29.9	N/A
Langelier Index (@ 20C)	N/A	-	-4.00	-3.69	-	-3.54	-
Langelier Index (@ 4C)	N/A	-	-4.26	-3.94	-	-3.79	-
Nitrate (N)	mg/L	2.9	<0.05	<0.05	0.05	<0.05	0.05
Saturation pH (@20C)	N/A	-	9.95	9.72	-	9.64	-
Saturation pH (@4C)	N/A	-	10.2	9.97	-	9.89	-
Inorganics							
Total Alkalinity (Total as CaCO3)	mg/L	-	9	13	5	14	5
Dissolved Chloride (Cl)	mg/L	-	2	1	1	<1	1
Colour	TCU	-	25	16	5	8	5
Nitrate + Nitrite	mg/L	-	<0.05	<0.05	0.05	<0.05	0.05
Nitrite (N)	mg/L	0.06	<0.01	<0.01	0.01	<0.01	0.01
Nitrogen (Ammonia Nitrogen)	mg/L	-	0.07	<0.05	0.05	<0.05	0.05
Total Organic Compound	mg/L	-	16	<50(1)	50	<50(1)	50
Orthophosphate (P)	mg/L	-	<0.01	<0.01	0.01	<0.01	0.01
pH	pH	6.5 - 9	5.95	6.03	N/A	6.10	N/A
Reactive Silica (Si)2)	mg/L	-	9.7	11	0.5	11	0.5
Dissolved Sulphate (SO4)	mg/L	-	<2	<2	2	<2	2
Turbidity	NTU	Narritive[2]	91	360	1	410	10
Conductivity	uS/cm	-	26	32	1	31	1

Notes:
1 = CCME Water Quality Guidelines for the protection of freshwater aquatic life (2007)
2 = Maximum increase of 8 NTUs from background levels when background levels are between 8 and 80 NTUs
3 = Phosphorous guideline is dependant on trophic status of the freswater environment
RDL = Reportable Detection Limit
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
(1) Detection limit increased due to sample matrix
Shaded = Value exceeds applicable criteria

Table 4.8 Results of Laboratory Analysis of TPH/BTEX in Sediment - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Sample Location	Benzene	Toluene	Ethyl Benzene	Xylenes	C_6-C_{10} (Gas Range)	C_{10}-C_{21} (Fuel Range)	C_{21}-C_{32} (Lube Range)	Modified TPH[2]	Resemblance
RDL	0.03	0.03	0.03	0.05	3	15	15	20	-
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg	-
Criteria[1]	-	-	-	-	-	-	-	1,500	-
2009 Sampling (Stantec)									
09-SED3	<0.03	<0.03	<0.03	<0.05	<3	470	<15	470	WFO

Notes:
1 = Ontario Ministry of Environment Guideline for sediments to be used as lake fill material (1993). There are no federal or provincial guidelines for TPH or BTEX in freshwater sediment
2 = Modified TPH - Tier I does not include BTEX
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = Indicates value is not available or does not apply
WFO = Weathered fuel oil

Table 4.9 Results of Laboratory Analysis of Metals in Sediment - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Parameters	RDL	Units	Criteria[1]	Criteria[2]	2009 Sampling (Stantec)
					09-SED3
Aluminum	10	mg/kg	-	-	3,000
Antimony	2	mg/kg	-	-	<2
Arsenic	2	mg/kg	5.9	17	<2
Barium	5	mg/kg	-	-	28
Beryllium	2	mg/kg	-	-	<2
Bismuth	2	mg/kg	-	-	<2
Boron	5	mg/kg	-	-	<5
Cadmium	0.3	mg/kg	0.6	3.5	<0.3
Chromium	2	mg/kg	37.3	90	7
Cobalt	1	mg/kg	-	-	2
Copper	2	mg/kg	35.7	197	6
Iron	50	mg/kg	-	-	4,300
Lead	0.5	mg/kg	35	91.3	3.9
Lithium	2	mg/kg	-	-	2
Manganese	2	mg/kg	-	-	54
Mercury	0.1	mg/kg	-	-	<0.1
Molybdenum	2	mg/kg	-	-	<2
Nickel	2	mg/kg	-	-	3
Rubidium	2	mg/kg	-	-	5
Selenium	1	mg/kg	-	-	<1
Silver	0.5	mg/kg	-	-	<0.5
Strontium	5	mg/kg	-	-	10
Thallium	0.1	mg/kg	-	-	<0.1
Tin	2	mg/kg	-	-	<2
Uranium	0.1	mg/kg	-	-	0.2
Vanadium	2	mg/kg	-	-	11
Zinc	5	mg/kg	123	315	12

Notes:
1 = CCME Interim Sediment Quality Guidelines (ISQGs) for freshwater sediment (2002)
2 = CCME Probable Effects Levels (PELs) for freshwater sediment (2002)
RDL = Reportable Detection Limit
< = Not detected above RDL noted
"-" = indicates value is not available or does not apply

Table 4.10 Results of Laboratory Analysis of PCBs in Vegetation - East Bulk Fuel Storage Site
Phase III ESA, HHERA and RAP
Former U.S Military Facility, Northwest Point, NL
Stantec Consulting Ltd. Project No. 121410105

Sample Location	Polychlorinated Biphenyls (PCBs)
RDL	0.05
Units	ug/L
Criteria	na
2009 Sampling (Stantec)	
09-VEG-15	<0.3
09-VEG-16	<0.3

Notes:
RDL = Reportable Detection Limit
na = No applicable guideline
< # = Not detected above RDL noted

Appendix 4f

Results of Hydraulic Response (Bail-Down) Test

– East Bulk Fuel Storage Site

Stantec Consulting Ltd.
607 Torbay Road
St. John's, NL, A1A 4Y6
Tel: (709) 576-1458

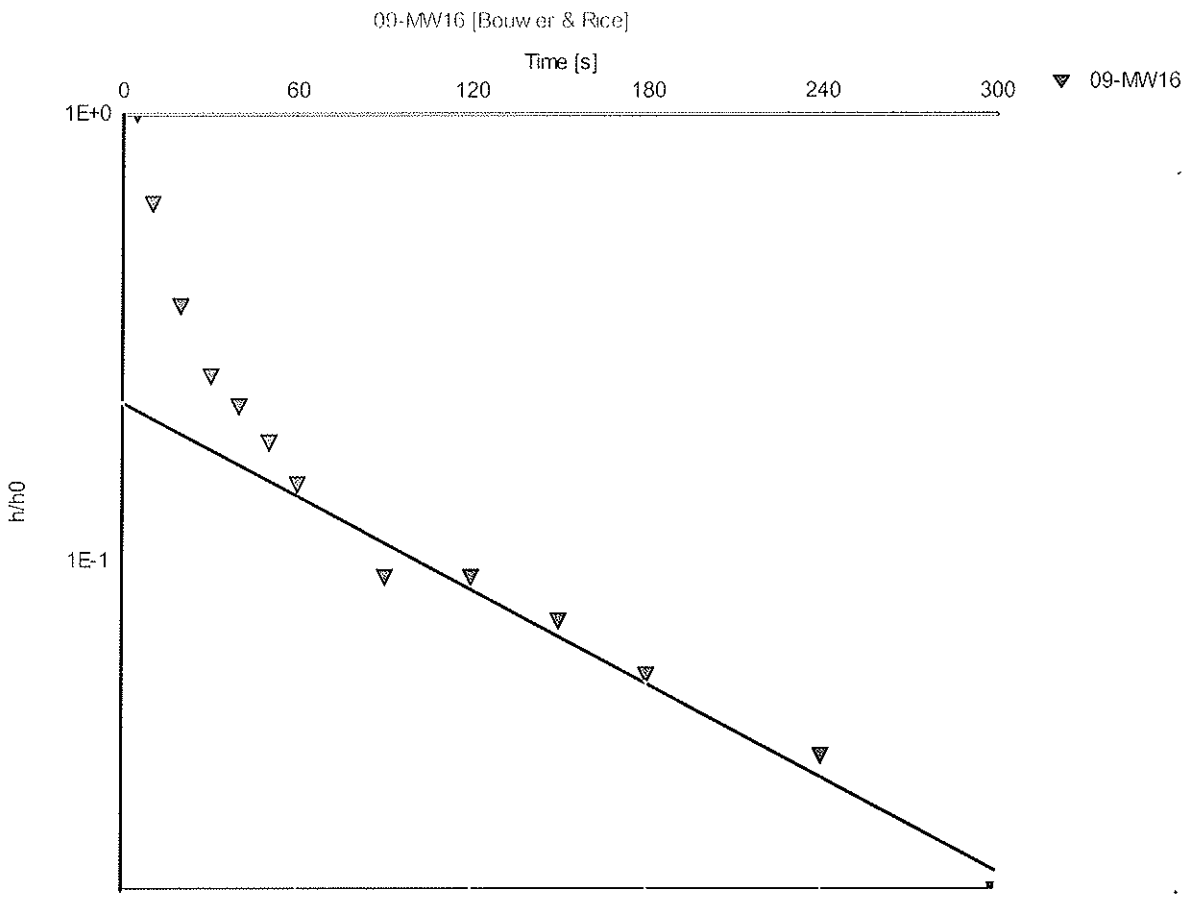
Slug Test Data Report
Project: Northwest Point
Number: 121410105
Client: NLDEC

Test Well:	**09-MW16**	**Slug Test:**	**09-MW16**
		Test Well:	09-MW16
Depth to Static WL:	1.05 [m]	Casing radius:	0.025 [m]
Location:		Boring radius:	0.05 [m]
Recorded by:	Stantec	Screen length:	2.44 [m]
Date:	8/27/2009	Aquifer Thickness:	2.68 [m]

	Time [s]	Depth to WL [m]	Drawdown [m]
1	5	1.32	0.27
2	10	1.22	0.17
3	20	1.15	0.10
4	30	1.12	0.07
5	40	1.11	0.06
6	50	1.10	0.05
7	60	1.09	0.04
8	90	1.08	0.02
9	120	1.08	0.02
10	150	1.07	0.02
11	180	1.07	0.01
12	240	1.06	0.01
13	300	1.06	0.00
14	360	1.05	0.00

Stantec Consulting Ltd.
607 Torbay Road
St. John's, NL, A1A 4Y6
Tel: (709) 576-1458

Slug Test Analysis Report
Project: Northwest Point
Number: 121410105
Client: NLDEC



Slug Test: **09-MW16**

Analysis Method: **Bouwer & Rice**

Analysis Results:

Conductivity: 3.13E-6 [m/s]

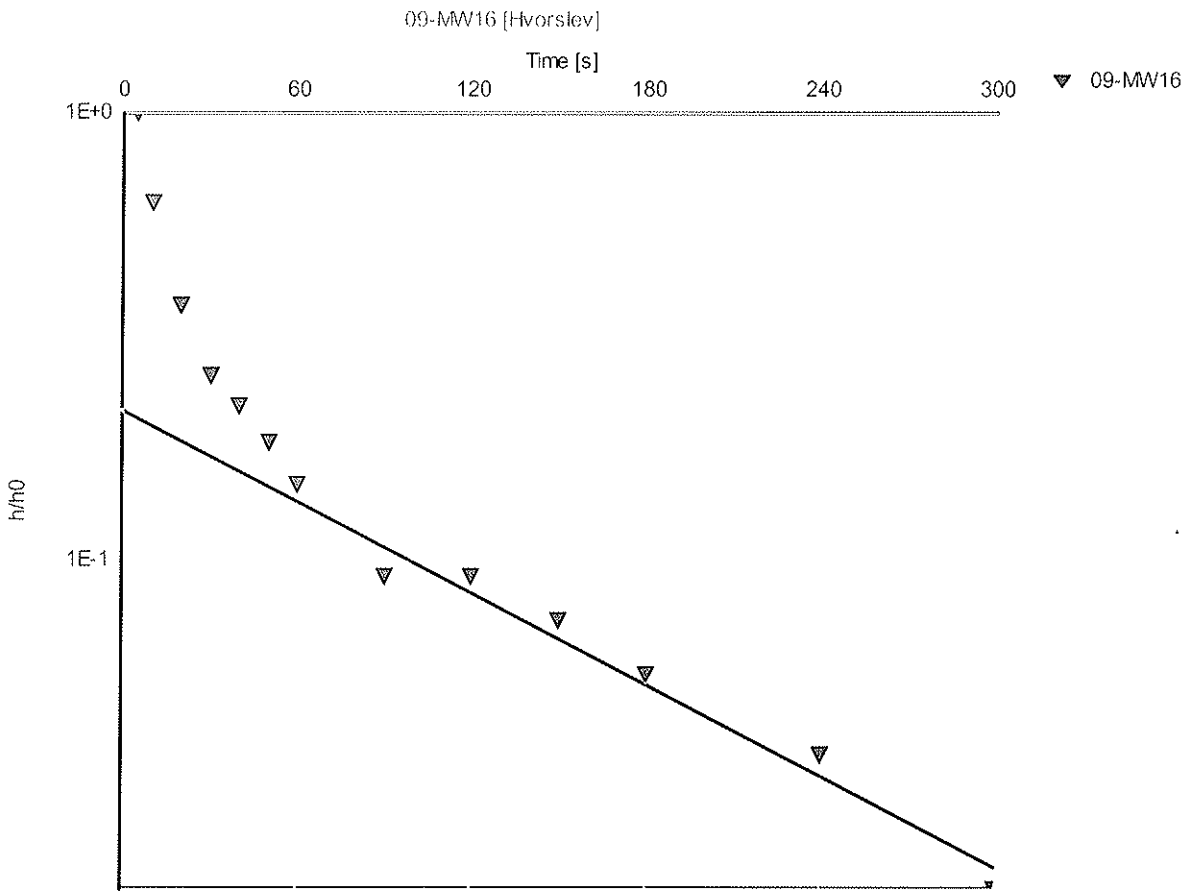
Test parameters:				
	Test Well:	09-MW16	Aquifer Thickness:	2.68 [m]
	Casing radius:	0.025 [m]	Gravel Pack Porosity (%)	25
	Screen length:	2.44 [m]		
	Boring radius:	0.05 [m]		
	r(eff):	0.033 [m]		

Comments:

Evaluated by: AR
Evaluation Date: 6/9/2010

Stantec Consulting Ltd.
607 Torbay Road
St. John's, NL, A1A 4Y6
Tel: (709) 576-1458

Slug Test Analysis Report
Project: Northwest Point
Number: 121410105
Client: NLDEC



Slug Test: **09-MW16**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 3.93E-6 [m/s]

Test parameters:

Test Well:	09-MW16	Aquifer Thickness:	2.68 [m]
Casing radius:	0.025 [m]		
Screen length:	2.44 [m]		
Boring radius:	0.05 [m]		

Comments:

Evaluated by: AR
Evaluation Date: 6/9/2010