APPENDIX C:
LABORATORY TEST RESULTS

Laboratory Analysis Summary Sheet

Project Info: *BNG23*

Client: *Watt Consulting*

** Note: Soil classification is for the whole sample. Soil classification uses the Atterberg Limits results and the percent fines, percent sand and percent gravel as described in ASTM D2487.

Borehole ID	Sample ID	Depth(m)	MC as Received (%)	Particle Size Analysis				
				Cobble Size (%) (75-300mm)	Gravel Size (%) (4.75-75mm)	Sand Size (%) (0.075-4.5mm)	Silt Size (%) (0.002-0.075 mm)	Clay Size (%) (<0.002mm)
BNG23-1088	BH23-16	1.0 m	7.1	0.0	2.4	35.9	40.8	20.9
BNG23-1085	BH23-18	2.0 m	13.5	0.0	0.0	31.9	41.5	26.6
BNG23-1085	BH23-24	3.0 m	11.5	0.0	0.5	33.9	41.8	23.8

Particle Size Analysis
(ASTM D6913 & D7928)

Project Info: *BNG23*

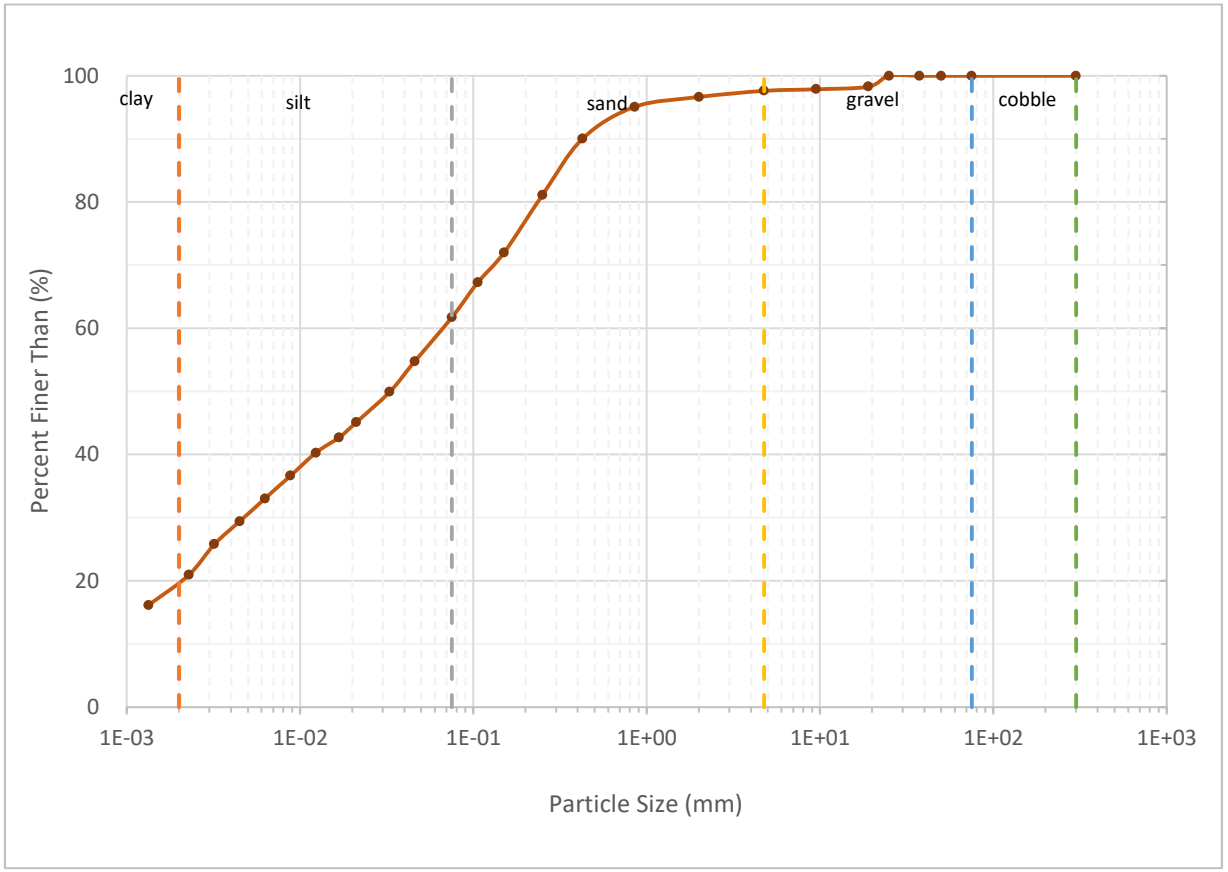
Client: *Watt Consulting*

Sample Info: ***BNG23-1085*** ***BH23-16*** ***1.0 m***

	PARTICLE-SIZE (mm)	PERCENT FINER (%)
GRAVEL	300.000	100.00
	75.000	100.00
	50.000	100.00
	37.500	100.00
	25.000	100.00
	19.000	98.30
	9.500	97.88
	4.750	97.63
SAND	2.000	96.65
	0.850	95.08
	0.425	90.03
	0.250	81.10
	0.150	71.97
	0.106	67.27
	0.075	61.74
HYDROMETER	0.0458	54.76
	0.0329	49.93
	0.0211	45.10
	0.0168	42.69
	0.0123	40.27
	0.0088	36.65
	0.0063	33.03
	0.0045	29.41
	0.0032	25.79
	0.0023	20.96
	0.0013	16.13

Test Results

Cobbles (%) *(75-300mm)*	Gravel (%) *(4.75-75mm)*	Sand (%) *(0.075-4.75mm)*	Silt (%) *0.002-0.075mm*	Clay (%) *<0.002mm*
0.0	**2.4**	**35.9**	**40.8**	**20.9**



Particle Size Analysis
(ASTM D6913 & D7928)

Project Info: *BNG23*

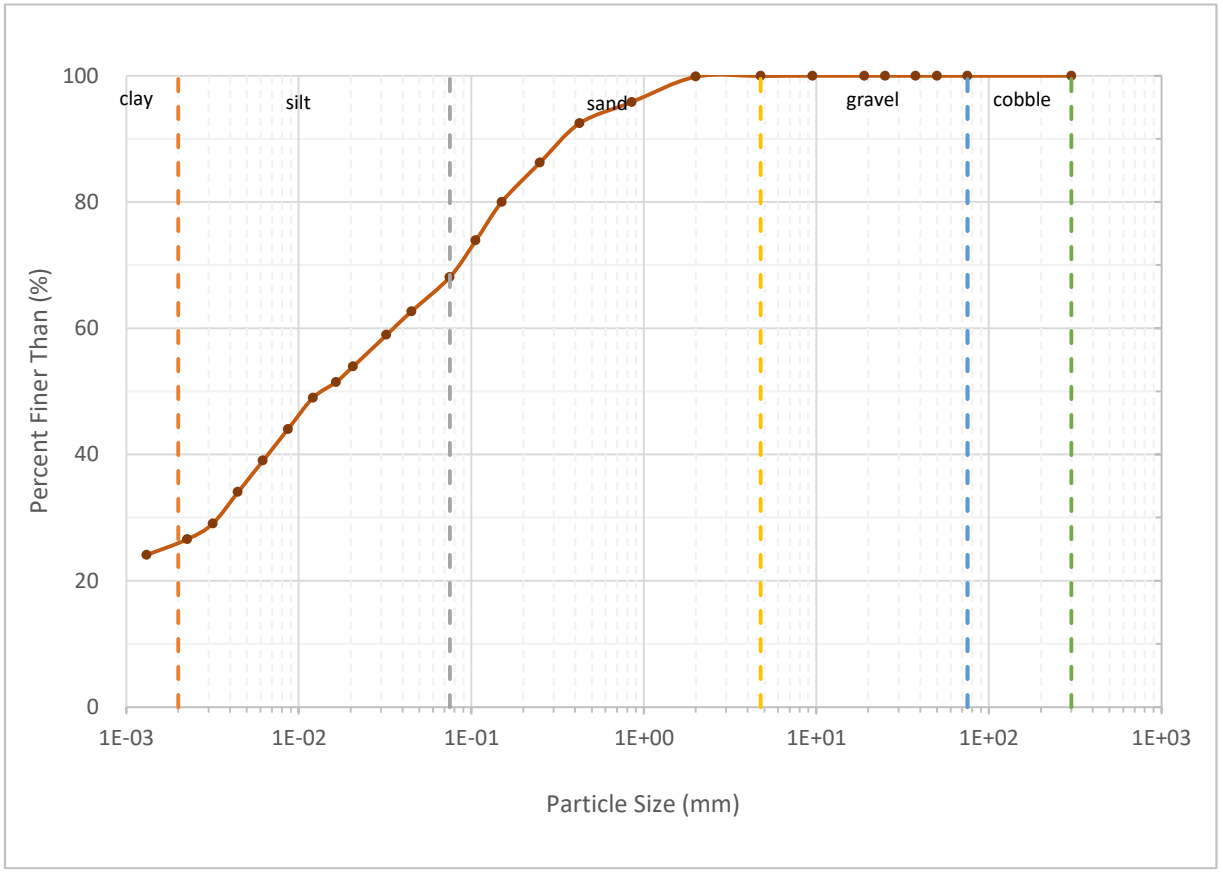
Client: *Watt Consulting*

Sample Info: ***BNG23-1085*** ***BH23-18*** ***2.0 m***

	PARTICLE-SIZE (mm)	PERCENT FINER (%)
GRAVEL	300.000	100.00
	75.000	100.00
	50.000	100.00
	37.500	100.00
	25.000	100.00
	19.000	100.00
	9.500	100.00
	4.750	99.97
SAND	2.000	99.87
	0.850	95.83
	0.425	92.47
	0.250	86.25
	0.150	80.00
	0.106	73.90
	0.075	68.10
HYDROMETER	0.0450	62.68
	0.0322	58.94
	0.0206	53.97
	0.0164	51.48
	0.0121	48.99
	0.0087	44.01
	0.0062	39.03
	0.0044	34.05
	0.0032	29.07
	0.0023	26.58
	0.0013	24.10

Test Results

Cobbles (%) *(75-300mm)*	Gravel (%) *(4.75-75mm)*	Sand (%) *(0.075-4.75mm)*	Silt (%) *0.002-0.075mm*	Clay (%) *<0.002mm*
0.0	**0.0**	**31.9**	**41.5**	**26.6**



Particle Size Analysis
(ASTM D6913 & D7928)

Project Info: *BNG23*

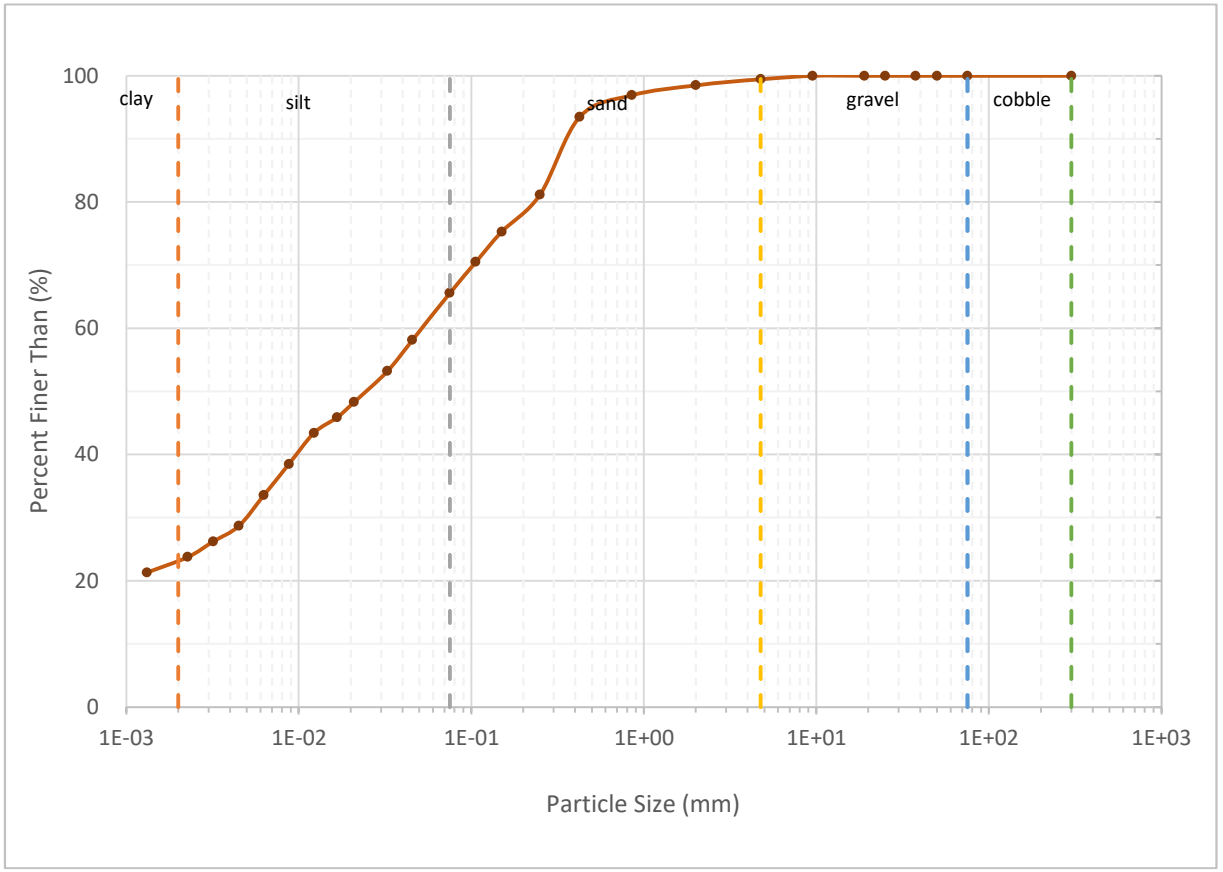
Client: *Watt Consulting*

Sample Info: ***BNG23-1085*** ***BH23-24*** ***3.0 m***

	PARTICLE-SIZE (mm)	PERCENT FINER (%)
GRAVEL	300.000	100.00
	75.000	100.00
	50.000	100.00
	37.500	100.00
	25.000	100.00
	19.000	100.00
	9.500	100.00
	4.750	99.47
SAND	2.000	98.49
	0.850	96.92
	0.425	93.51
	0.250	81.19
	0.150	75.29
	0.106	70.51
	0.075	65.60
HYDROMETER	0.0455	58.13
	0.0326	53.22
	0.0209	48.31
	0.0166	45.86
	0.0122	43.40
	0.0088	38.49
	0.0063	33.58
	0.0045	28.67
	0.0032	26.22
	0.0023	23.76
	0.0013	21.31

Test Results

Cobbles (%) *(75-300mm)*	Gravel (%) *(4.75-75mm)*	Sand (%) *(0.075-4.75mm)*	Silt (%) *0.002-0.075mm*	Clay (%) *<0.002mm*
0.0	**0.5**	**33.9**	**41.8**	**23.8**



HYDROMETER ANALYSIS

AR Geotechnical Engineering Ltd

Lab Technician:	Jemal	**Date:**	Jan 18/2024	
Air Dry weight of Spec. (g):	105	Corrected Sample Wt.		99.8
Specific Gravity(Gs):	2.7	Gs correction factor:		0.99
Composite Correction:	5			
k-factor	0.01312	**CLIENT:**	WATT Consultant	
Hydrometer type:	152 - H	**Sample**	2023-08 @10'	

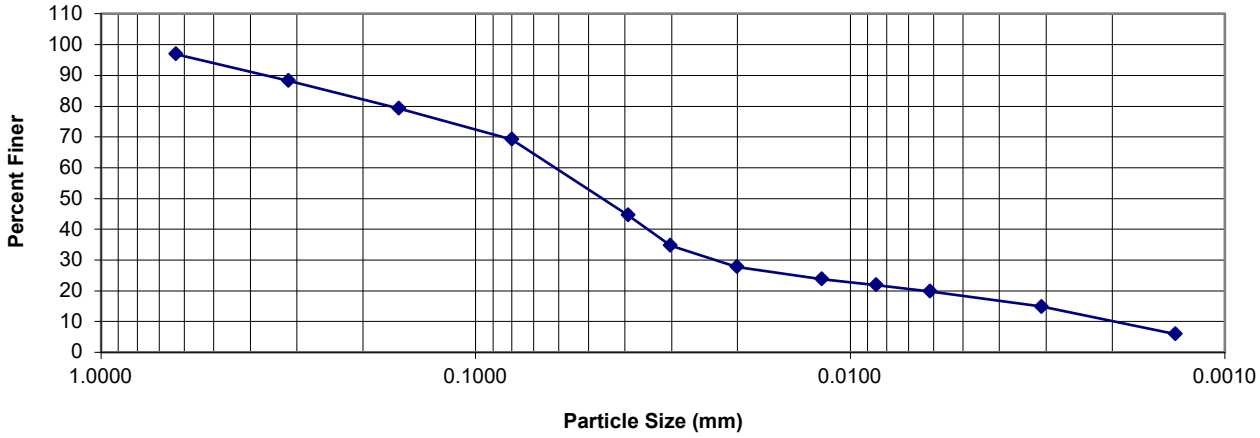
Pan No.:	E
Wt. of Pan + Air Dried (g):	105.3
Wt. of Pan + Oven Dried (g):	100.1
Wt. of Water (g):	5.2
Wt. of Pan (g):	8.2
Wt. of Oven Dried (g):	91.9
Hygroscopic Moisture (%):	5.66

ASTM D422

LIQUID LIMIT	
PLASTIC INDEX	
GRAVEL	0.45
SAND (0.074mm-4.75mm)	34
SILT (0.074mm-0.005mm)	48
CLAY(<0.005mm)	18

Test Data:

Time (1st Four are Sieves) (min)	Hydrometer Reading	Adj. Hydrometer Reading	Effective Depth, L (cm)	Percent Finer	D (mm)
630µm				96.89	0.6300
315µm				88.28	0.3150
160µm				79.26	0.1600
80µm				69.24	0.0800
1	50	45	8.9	44.63	0.0392
2	40	35	10.6	34.71	0.0301
5	33	28	11.7	27.77	0.0201
15	29	24	12.4	23.80	0.0119
30	27	22	12.7	21.82	0.0085
60	25	20	13.0	19.84	0.0061
250	20	15	13.8	14.88	0.0031
1440	11	6	15.3	5.95	0.0014



HYDROMETER ANALYSIS

AR Geotechnical Engineering Ltd

Lab Technician:	Jemal	**Date:**	Jan 18/2024	
Air Dry weight of Spec. (g):	110	Corrected Sample Wt.		104.6
Specific Gravity(Gs):	2.7	Gs correction factor:		0.99
Composite Correction:	5			
k-factor	0.01312	**CLIENT:**	WATT Consultant	
Hydrometer type:	152 - H	**Sample**	2023-11 @10'	

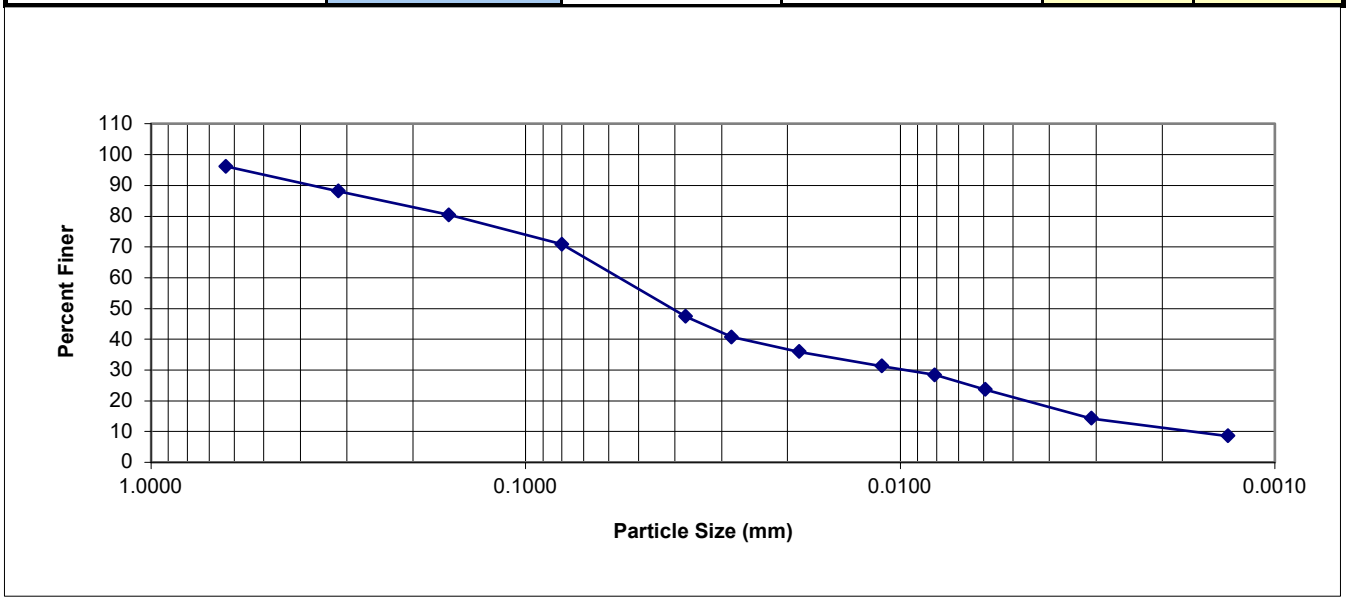
Pan No.:	E
Wt. of Pan + Air Dried (g):	110.3
Wt. of Pan + Oven Dried (g):	104.9
Wt. of Water (g):	5.4
Wt. of Pan (g):	8.2
Wt. of Oven Dried (g):	96.7
Hygroscopic Moisture (%):	5.58

ASTM D422

LIQUID LIMIT	
PLASTIC INDEX	
GRAVEL	1.5
SAND (0.074mm-4.75mm)	31
SILT (0.074mm-0.005mm)	47
CLAY(<0.005mm)	21

Test Data:

Time (1st Four are Sieves) (min)	Hydrometer Reading	Adj. Hydrometer Reading	Effective Depth, L (cm)	Percent Finer	D (mm)
630µm				96.18	0.6300
315µm				88.05	0.3150
160µm				80.40	0.1600
80µm				70.85	0.0800
1	55	50	8.1	47.32	0.0373
2	48	43	9.2	40.69	0.0282
5	43	38	10.1	35.96	0.0186
15	38	33	10.9	31.23	0.0112
30	35	30	11.4	28.39	0.0081
60	30	25	12.2	23.66	0.0059
250	20	15	13.8	14.19	0.0031
1440	14	9	14.8	8.52	0.0013



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 3	**DATE:**	06-Jan-24
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	16	A	J		
NUMBER OF BLOWS (LIQUID LIMIT)	32	27	28		
WET WEIGHT	39.2	31.7	31.6		
DRY WEIGHT	34.3	28.2	28		
MOISTURE	4.9	3.5	3.6		
TIN WEIGHT	14.2	14.2	14.3		
SOIL WEIGHT	20.1	14	13.7		
WATER CONTENT	24.4%	25.0%	26.3%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	N	L			
WET WEIGHT	24.5	27.1			
DRY WEIGHT	23	25.2			
MOISTURE	1.5	1.9			
TIN WEIGHT	14.2	14.1			
SOIL WEIGHT	8.8	11.1			
WATER CONTENT	17.0%	17.1%			

NATURAL WATER CONTENT ASTM D 4959

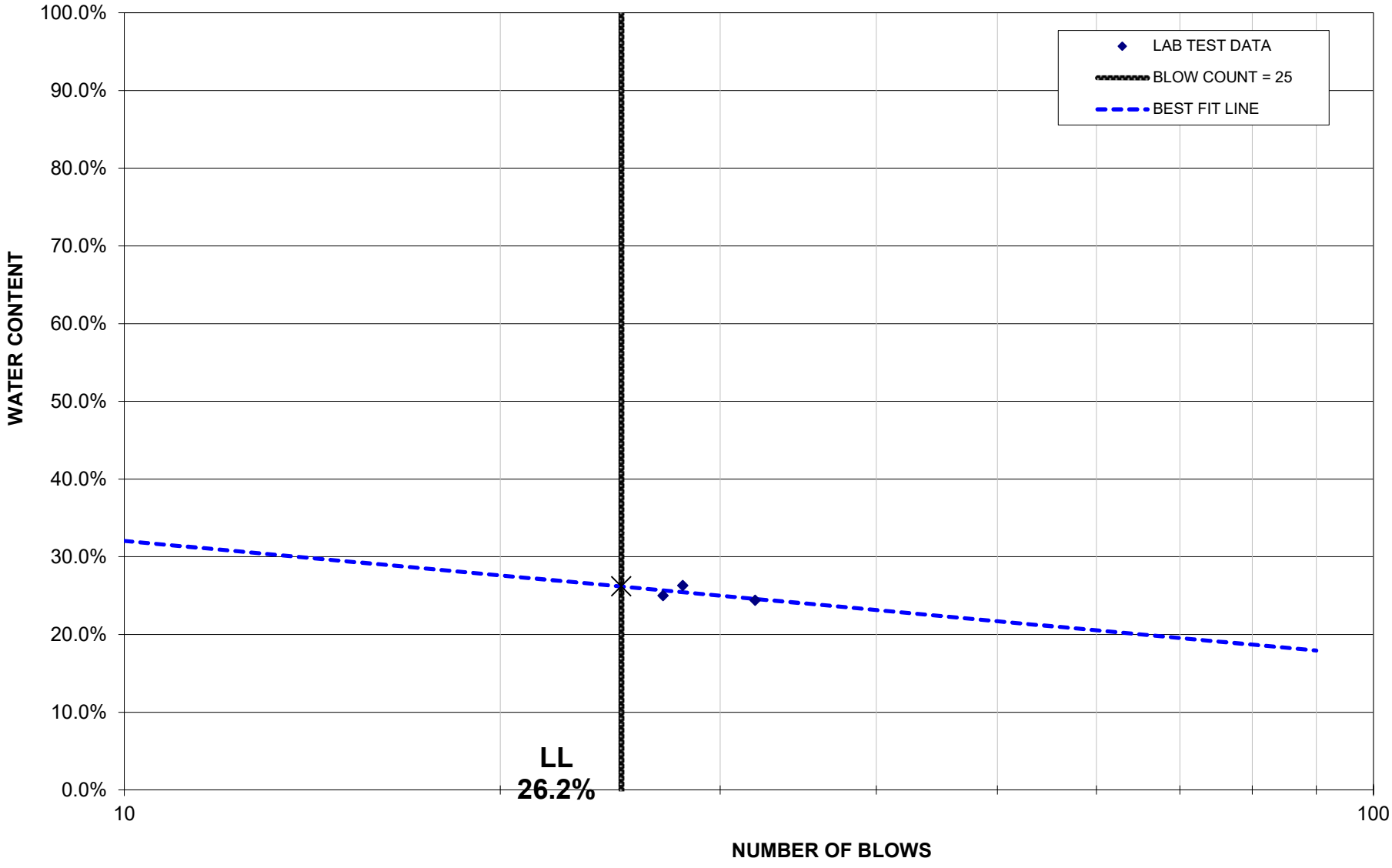
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	26.2%	PLASTIC LIMIT	17.1%
PLASTICITY INDEX	9.1%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	6-Jan-24
Hole Number	BH # 3
Depth:	6 ft
Technician:	Jemal

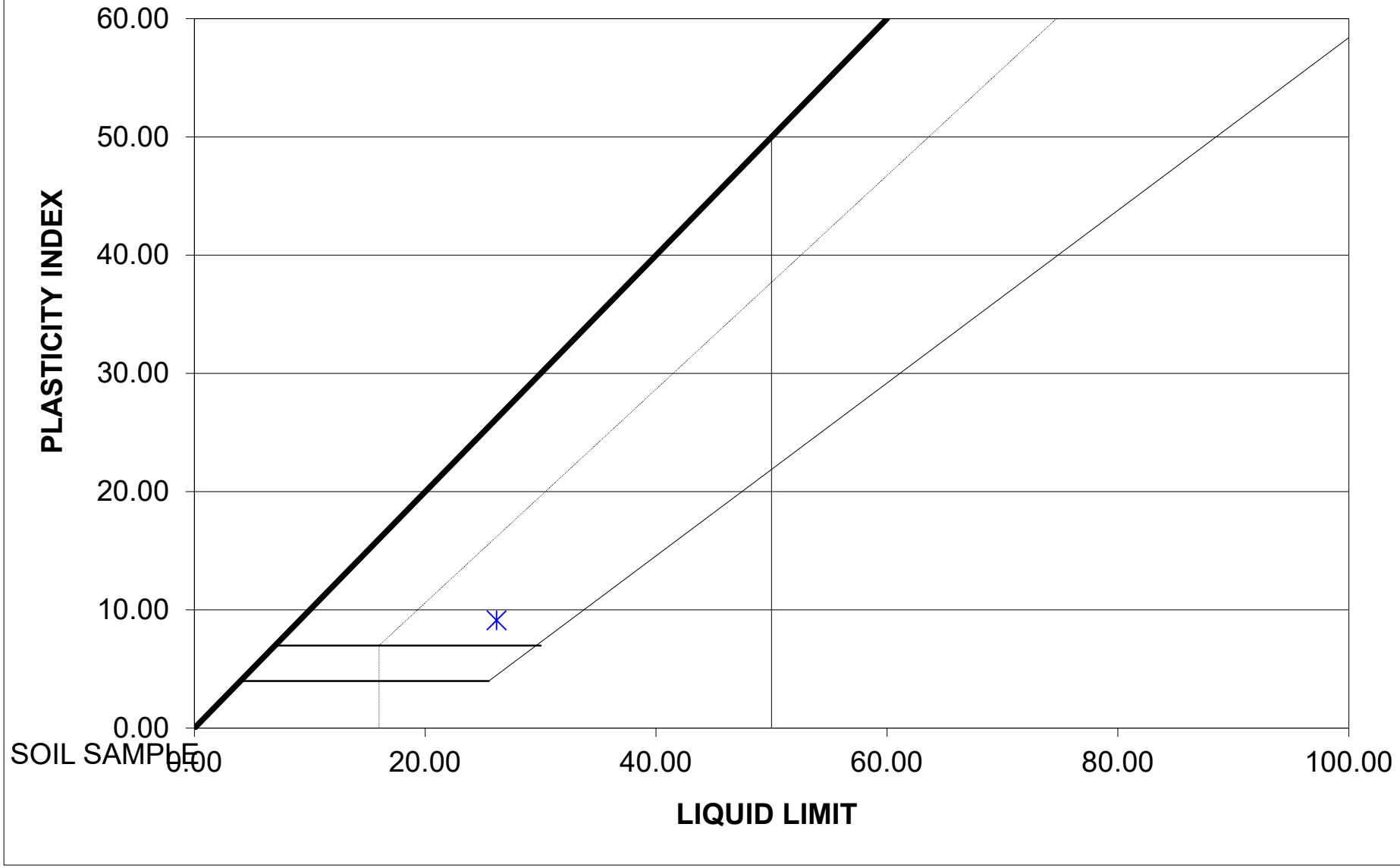
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	6-Jan-24
Hole Number	BH # 3
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 4	**DATE:**	06-Jan-24
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	2	E	C		
NUMBER OF BLOWS (LIQUID LIMIT)	34	29	24		
WET WEIGHT	33.7	31.7	31.5		
DRY WEIGHT	29.1	27.6	27.2		
MOISTURE	4.6	4.1	4.3		
TIN WEIGHT	14.2	14.2	14		
SOIL WEIGHT	14.9	13.4	13.2		
WATER CONTENT	30.9%	30.6%	32.6%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	17	A2			
WET WEIGHT	24.8	26.2			
DRY WEIGHT	23.3	24.4			
MOISTURE	1.5	1.8			
TIN WEIGHT	14.2	14.2			
SOIL WEIGHT	9.1	10.2			
WATER CONTENT	16.5%	17.6%			

NATURAL WATER CONTENT ASTM D 4959

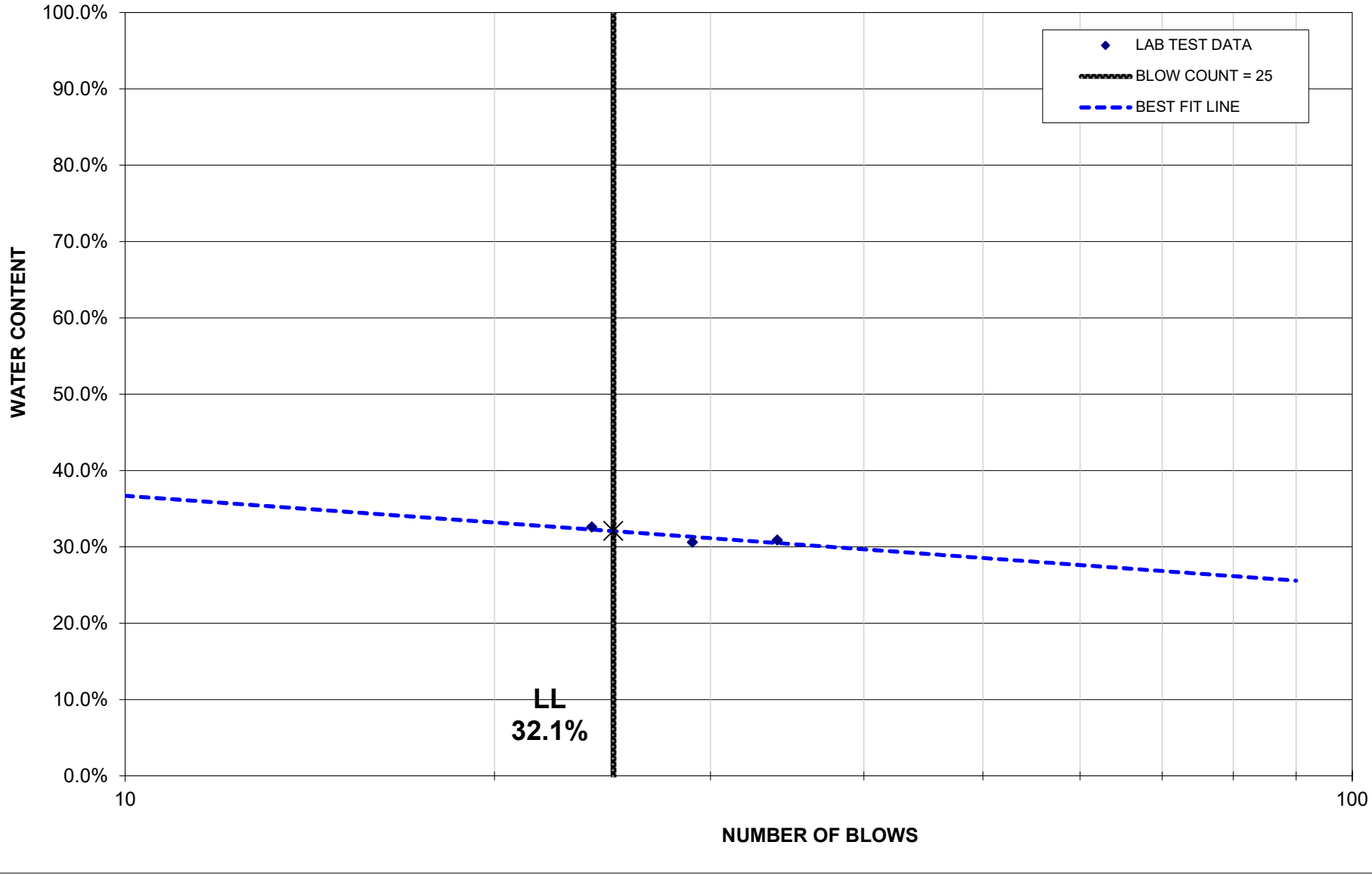
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	32.1%	PLASTIC LIMIT	17.1%
PLASTICITY INDEX	15.0%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	6-Jan-24
Hole Number	BH # 4
Depth:	6 ft
Technician:	Jemal

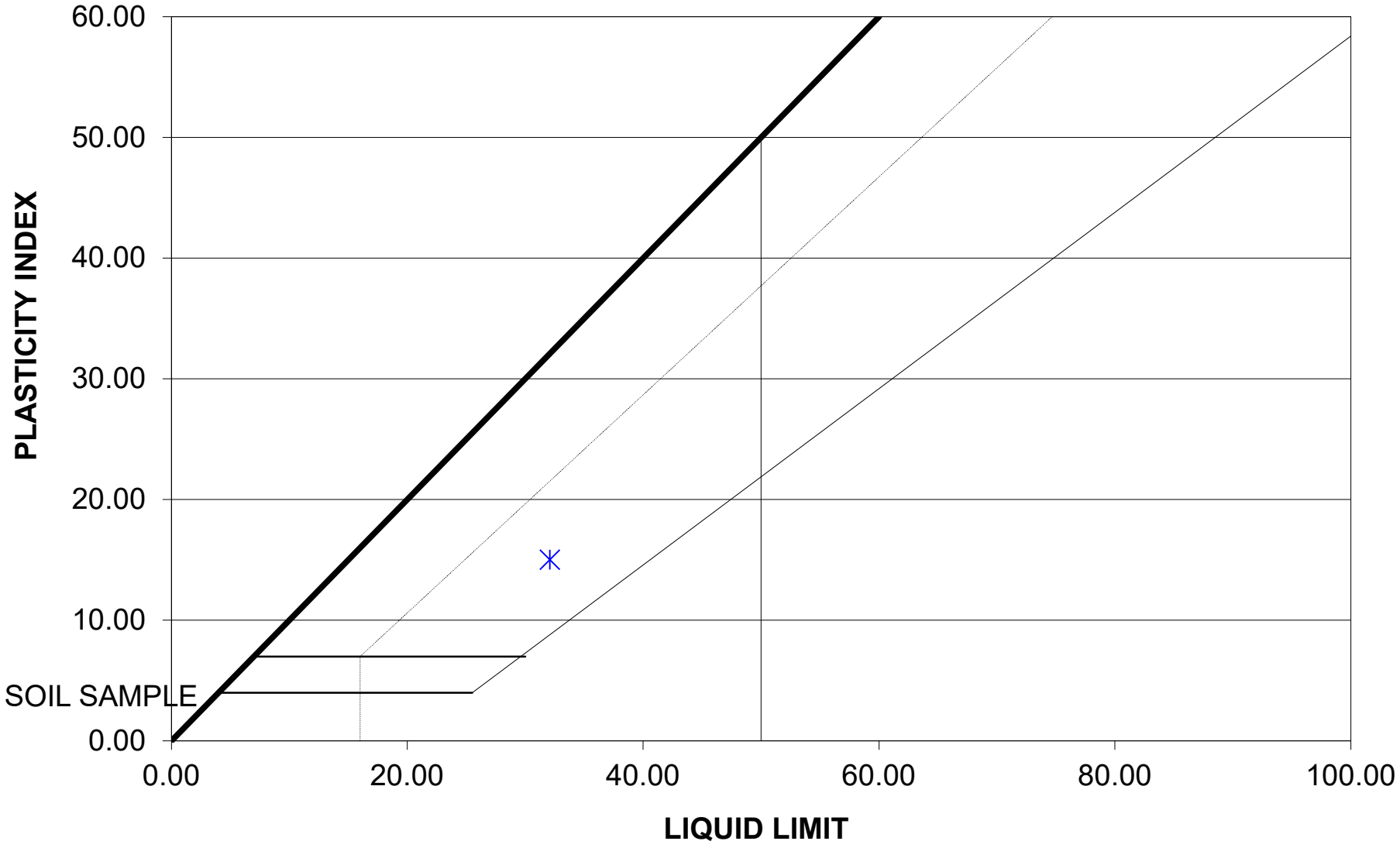
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	6-Jan-24
Hole Number	BH # 4
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 6	**DATE:**	18-Dec-23
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	T	15	A6		
NUMBER OF BLOWS (LIQUID LIMIT)	39	30	23		
WET WEIGHT	35.4	35.1	32.3		
DRY WEIGHT	29.9	29.5	27.3		
MOISTURE	5.5	5.6	5		
TIN WEIGHT	14.2	14.1	14.2		
SOIL WEIGHT	15.7	15.4	13.1		
WATER CONTENT	35.0%	36.4%	38.2%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	F	S			
WET WEIGHT	24.3	24.2			
DRY WEIGHT	23	22.9			
MOISTURE	1.3	1.3			
TIN WEIGHT	13.9	14.2			
SOIL WEIGHT	9.1	8.7			
WATER CONTENT	14.3%	14.9%			

NATURAL WATER CONTENT ASTM D 4959

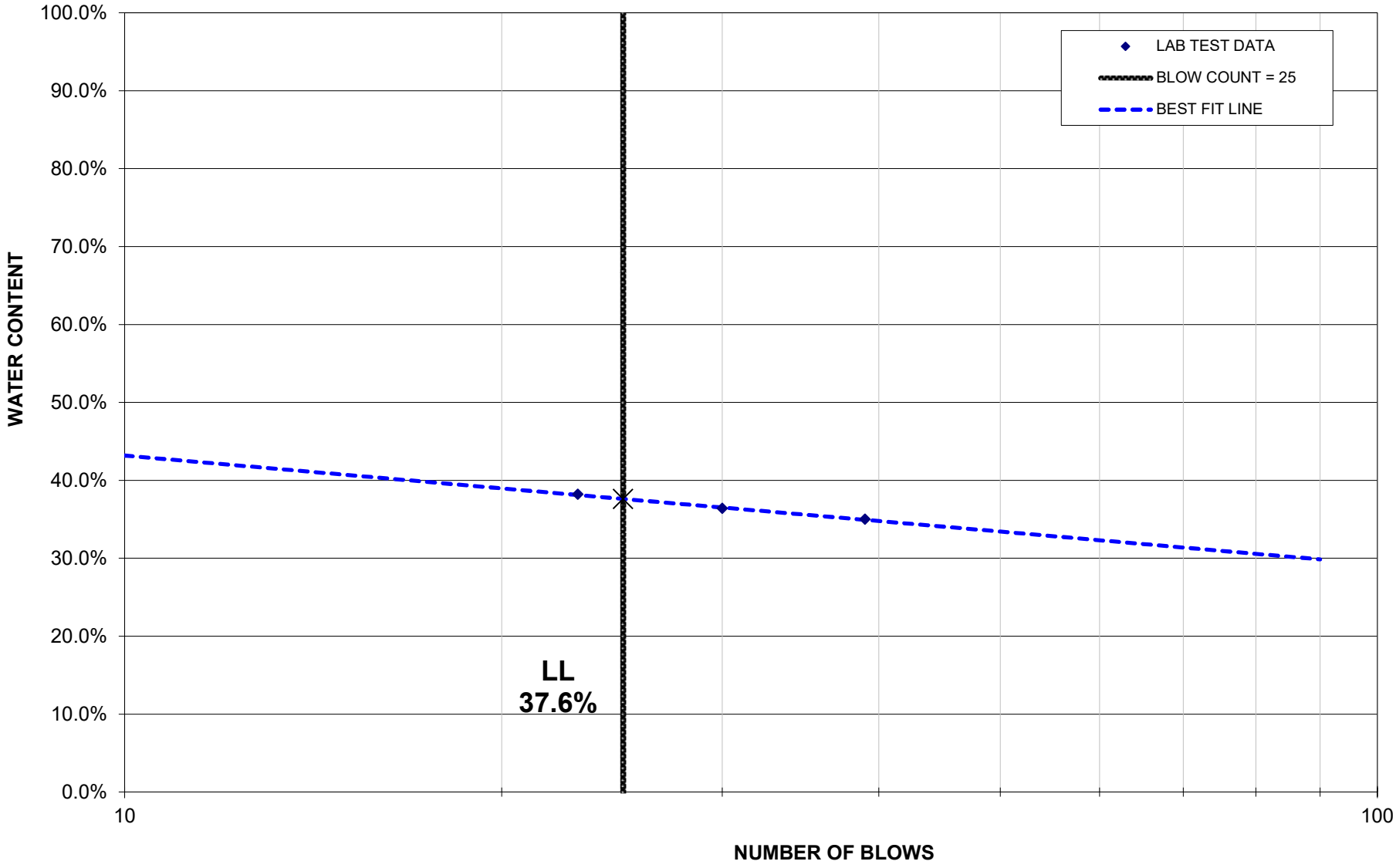
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	37.6%	PLASTIC LIMIT	14.6%
PLASTICITY INDEX	23.0%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 6
Depth:	6 ft
Technician:	Jemal

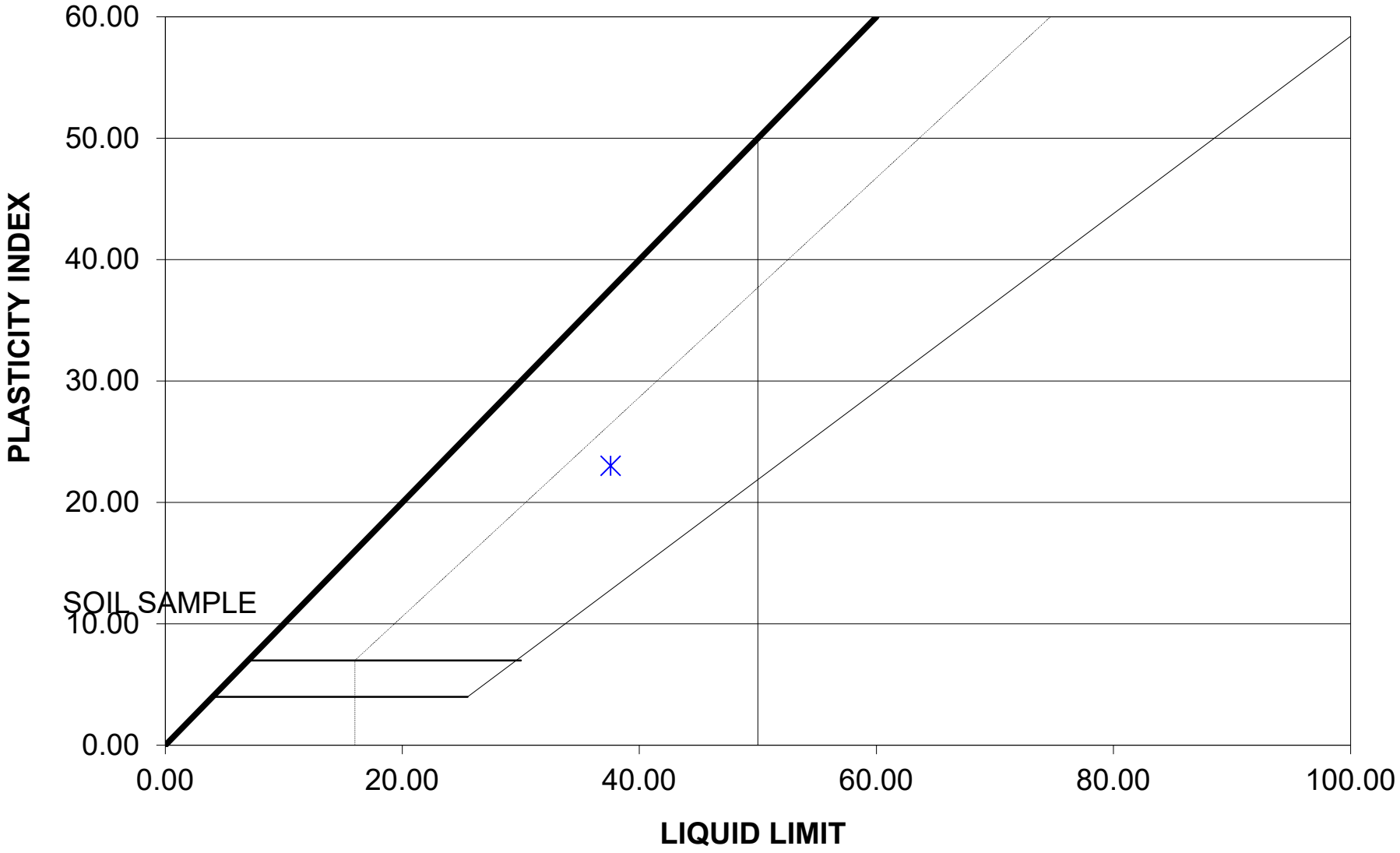
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 6
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 11	**DATE:**	18-Dec-23
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	A8	6	A7		
NUMBER OF BLOWS (LIQUID LIMIT)	42	30	26		
WET WEIGHT	33.8	33.3	33.6		
DRY WEIGHT	28.7	28.2	28.4		
MOISTURE	5.1	5.1	5.2		
TIN WEIGHT	14	14.1	14.3		
SOIL WEIGHT	14.7	14.1	14.1		
WATER CONTENT	34.7%	36.2%	36.9%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	16	11			
WET WEIGHT	24.9	25			
DRY WEIGHT	23.5	23.6			
MOISTURE	1.4	1.4			
TIN WEIGHT	14.2	14.1			
SOIL WEIGHT	9.3	9.5			
WATER CONTENT	15.1%	14.7%			

NATURAL WATER CONTENT ASTM D 4959

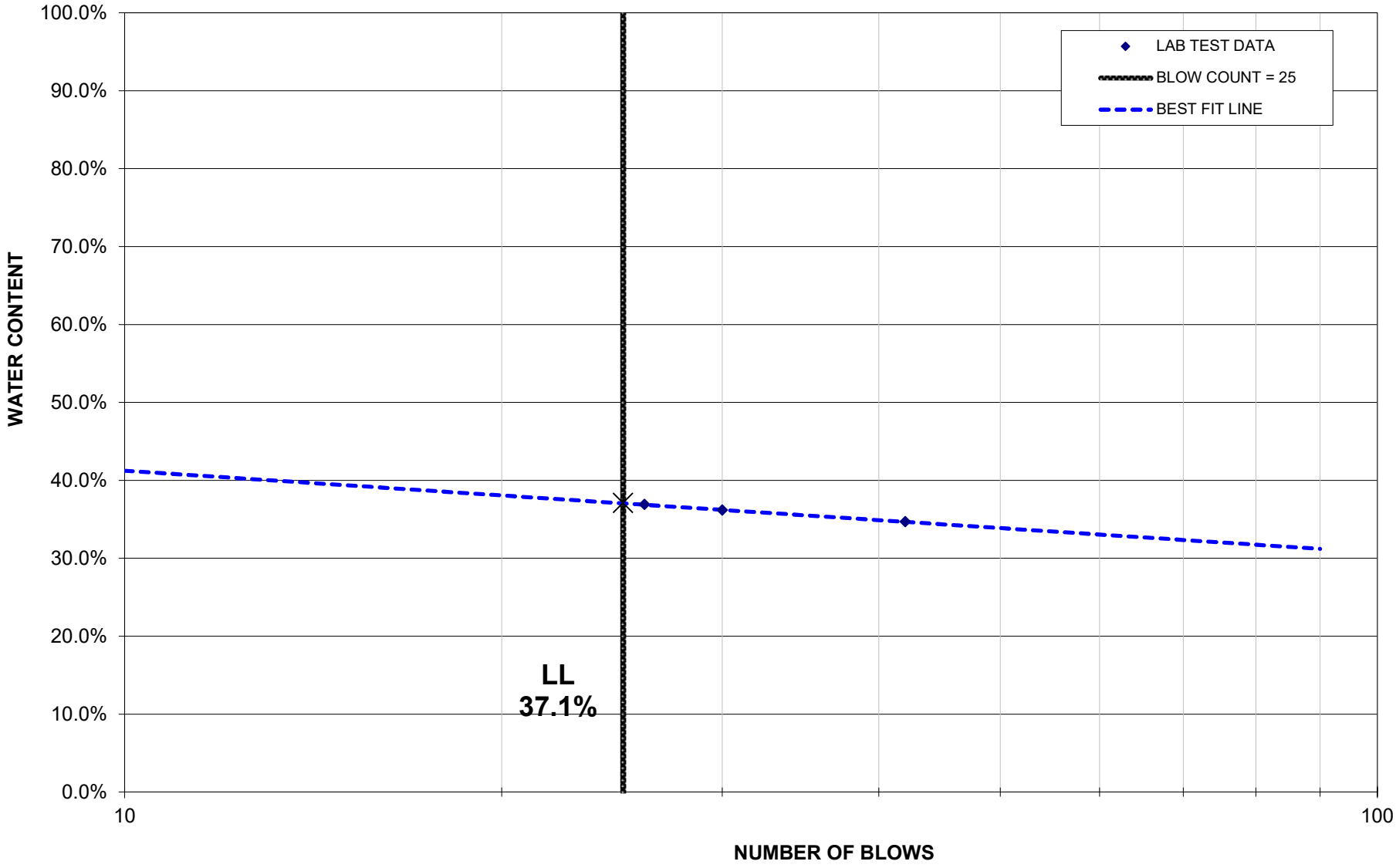
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	37.1%	PLASTIC LIMIT	14.9%
PLASTICITY INDEX	22.2%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 11
Depth:	6 ft
Technician:	Jemal

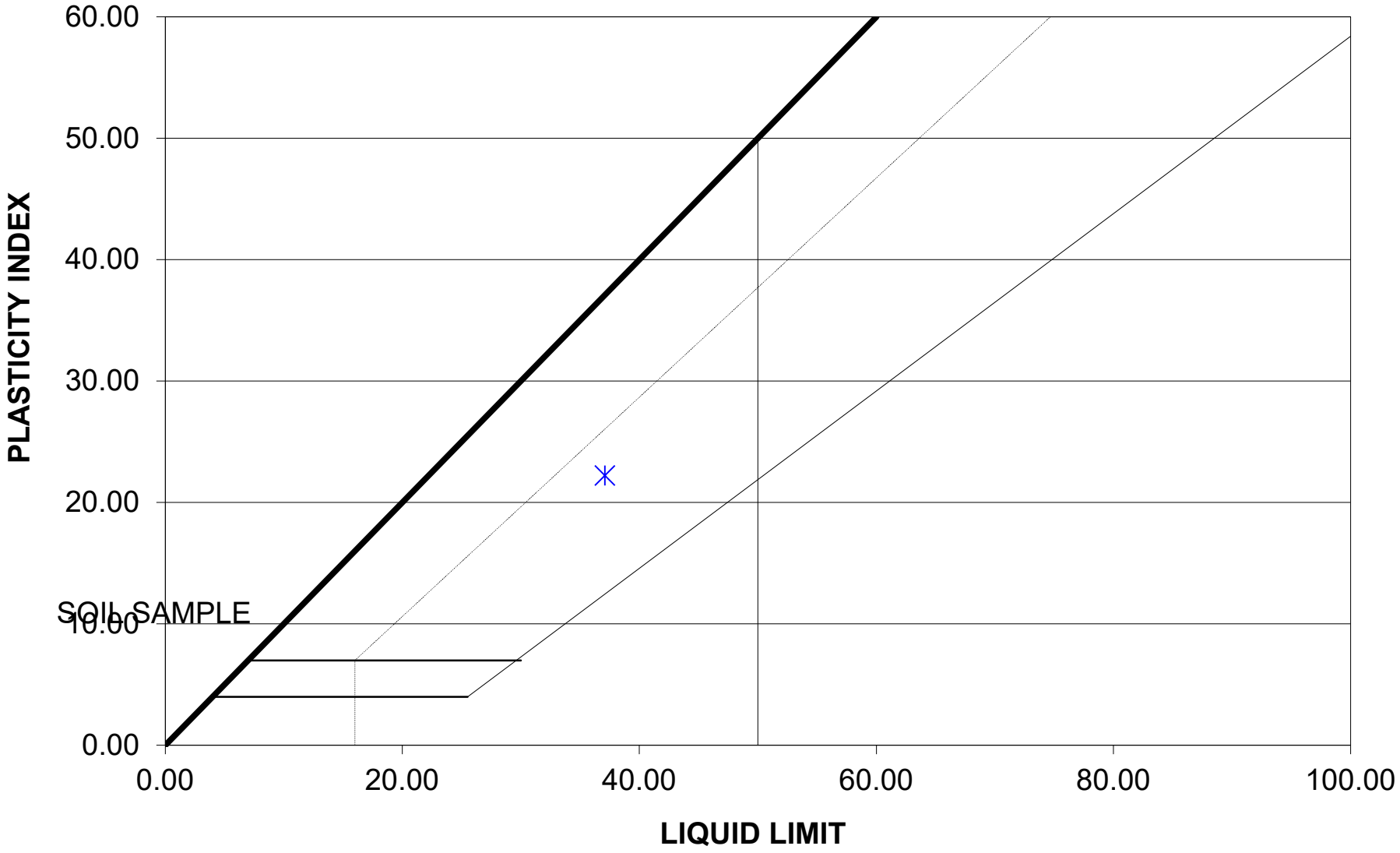
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 11
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 15	**DATE:**	18-Dec-23
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	D	B	C		
NUMBER OF BLOWS (LIQUID LIMIT)	41	30	24		
WET WEIGHT	34.1	36.2	35.4		
DRY WEIGHT	29.3	30.8	30		
MOISTURE	4.8	5.4	5.4		
TIN WEIGHT	14.2	14.3	14.3		
SOIL WEIGHT	15.1	16.5	15.7		
WATER CONTENT	31.8%	32.7%	34.4%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	A2	D2			
WET WEIGHT	23.4	24.2			
DRY WEIGHT	22.2	23			
MOISTURE	1.2	1.2			
TIN WEIGHT	14.1	14.2			
SOIL WEIGHT	8.1	8.8			
WATER CONTENT	14.8%	13.6%			

NATURAL WATER CONTENT ASTM D 4959

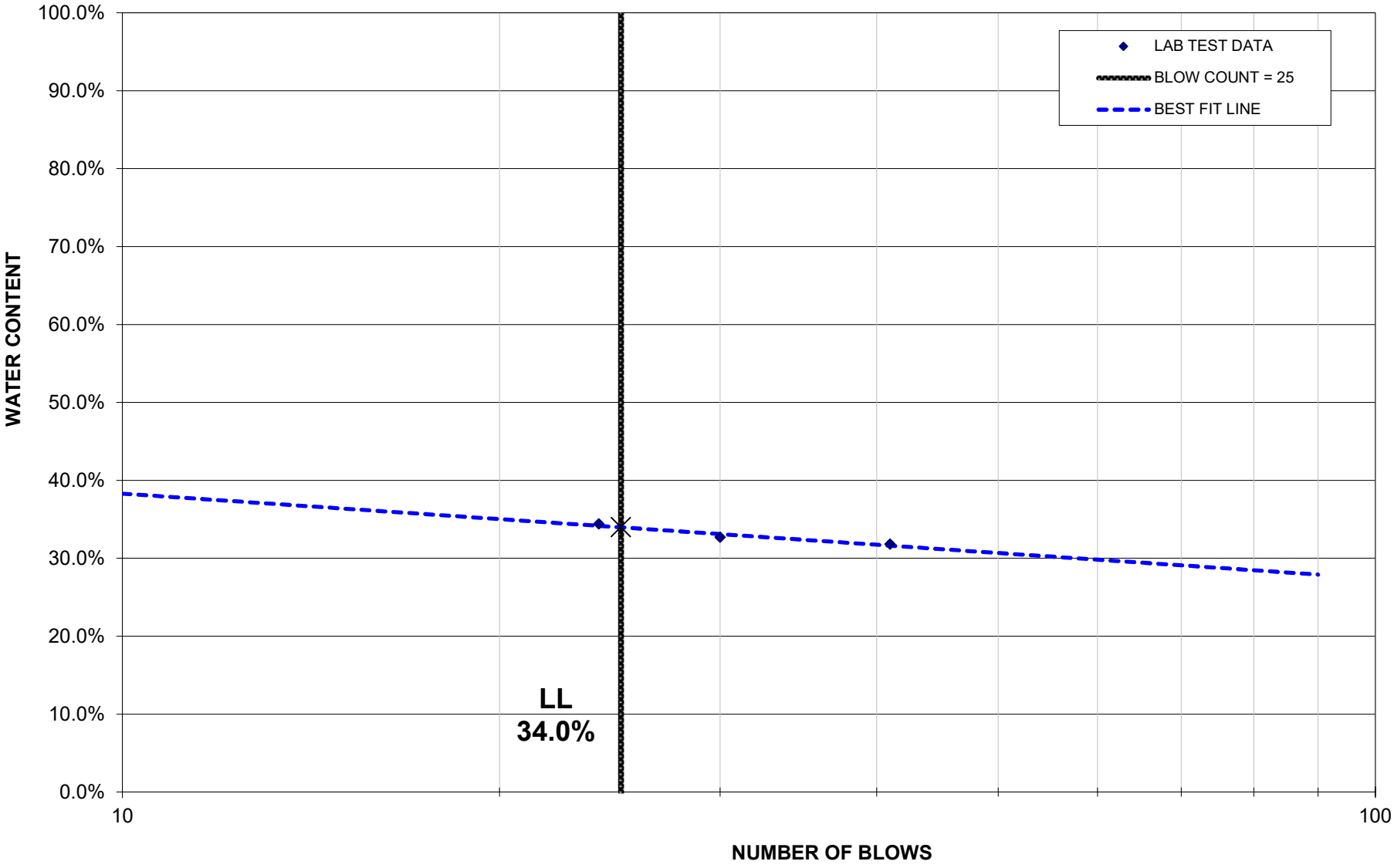
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	34.0%	PLASTIC LIMIT	14.2%
PLASTICITY INDEX	19.8%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 15
Depth:	6 ft
Technician:	Jemal

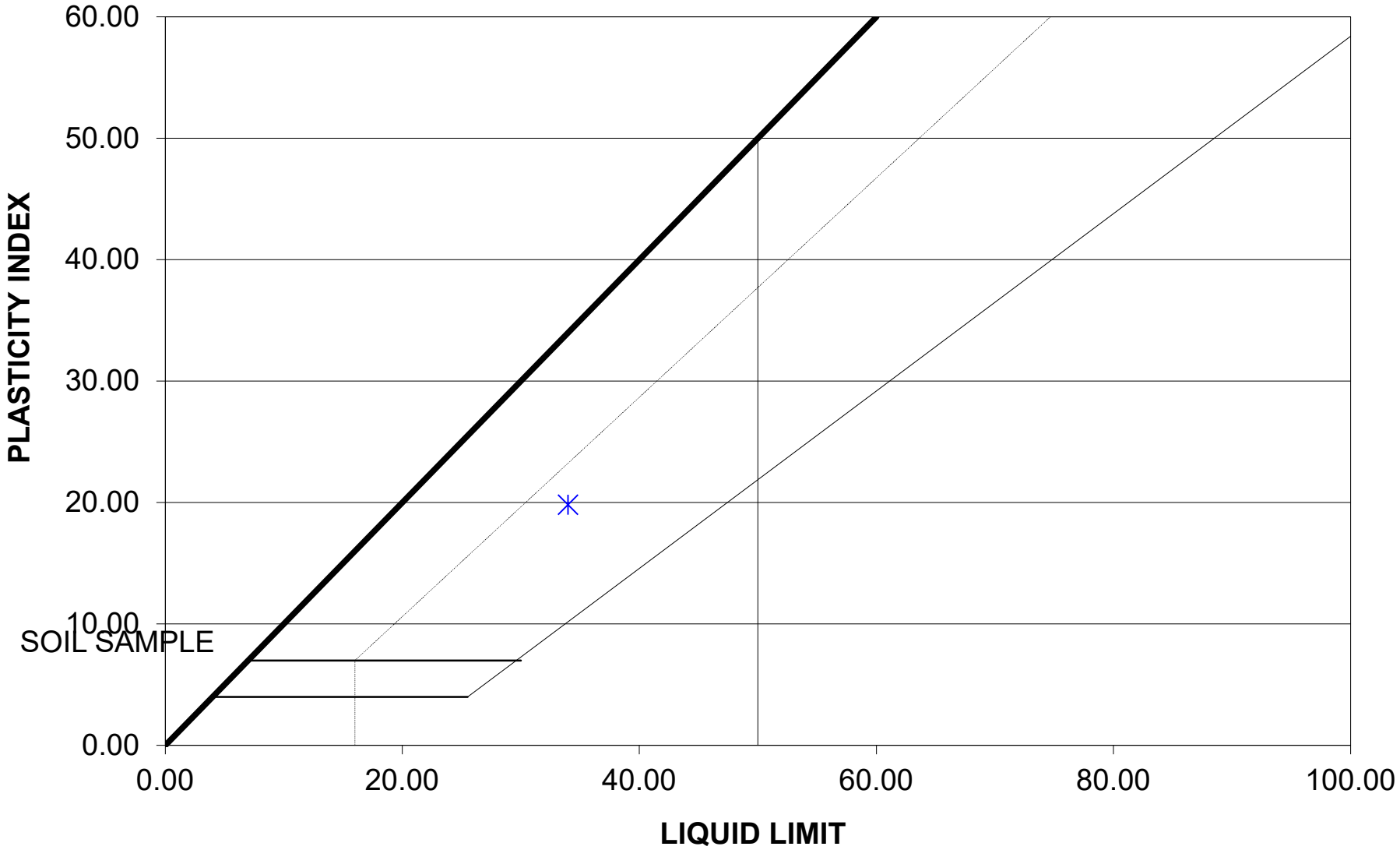
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 15
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



ATTERBERG LIMITS

PROJECT NUMBER:	WATT Subdivision		
HOLE NUMBER:	BH # 19	**DATE:**	18-Dec-23
DEPTH:	6 ft	**TECHNICIAN:**	Jemal
SAMPLE DESCRIPTION:	Clay and silt		

LIQUID LIMIT (2 TESTS MINIMUM) ASTM D 4318

TEST NUMBER	1	2	3		
TIN NUMBER	C	A9	A4		
NUMBER OF BLOWS (LIQUID LIMIT)	32	22	17		
WET WEIGHT	35.1	34.1	33.4		
DRY WEIGHT	29.9	29	28.3		
MOISTURE	5.2	5.1	5.1		
TIN WEIGHT	14.2	14	14		
SOIL WEIGHT	15.7	15	14.3		
WATER CONTENT	33.1%	34.0%	35.7%		

PLASTIC LIMIT ASTM D 4318

TEST NUMBER	1	2			
TIN NUMBER	16	11			
WET WEIGHT	24.9	25.4			
DRY WEIGHT	23.6	24			
MOISTURE	1.3	1.4			
TIN WEIGHT	14.1	14.5			
SOIL WEIGHT	9.5	9.5			
WATER CONTENT	13.7%	14.7%			

NATURAL WATER CONTENT ASTM D 4959

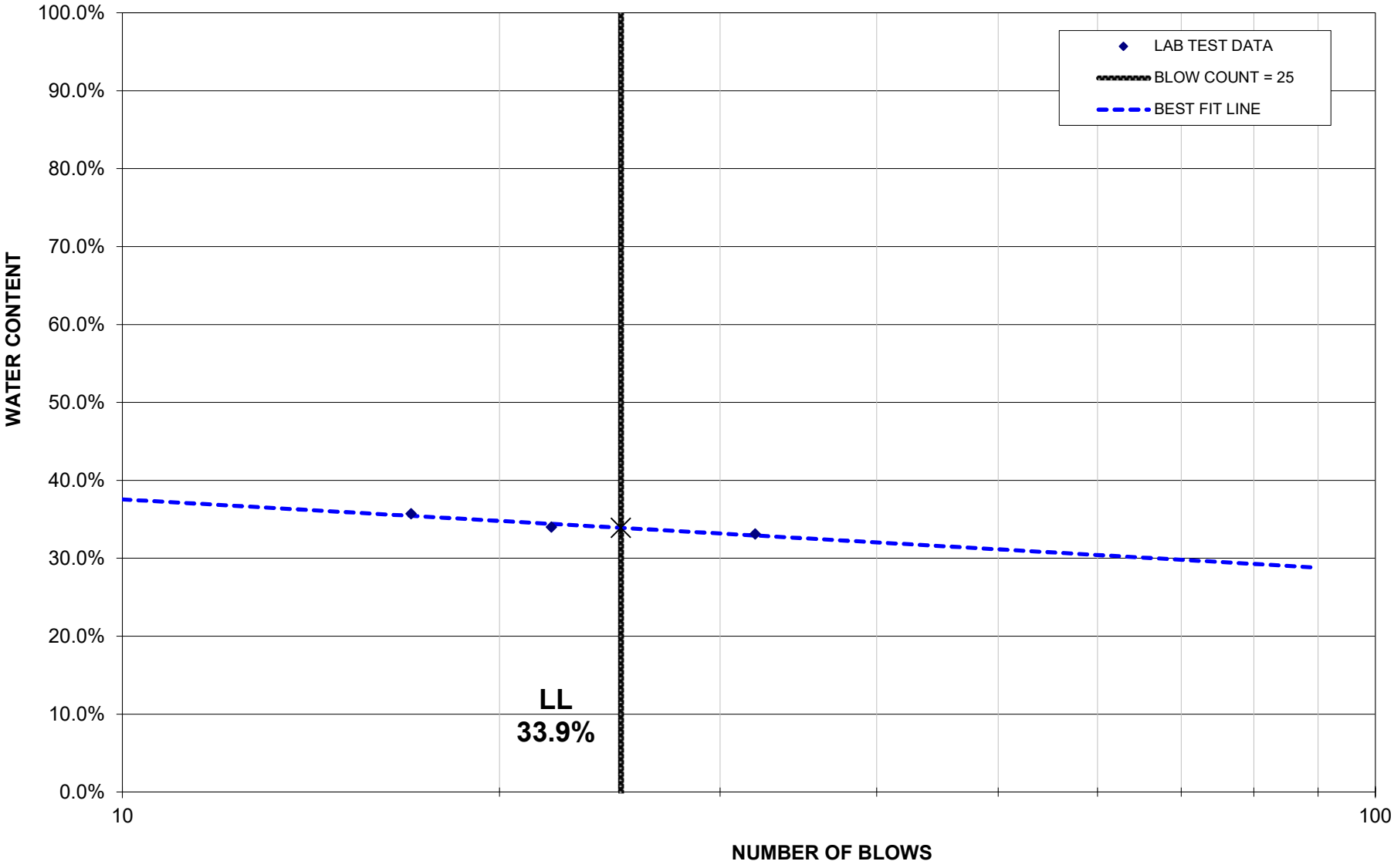
TEST NUMBER					
TIN NUMBER					
WET WEIGHT					
DRY WEIGHT					
MOISTURE					
TIN WEIGHT					
SOIL WEIGHT					
NATURAL WATER CONTENT					

LIQUID LIMIT	33.9%	PLASTIC LIMIT	14.2%
PLASTICITY INDEX	19.7%	NATURAL WATER CONTENT	

Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 19
Depth:	6 ft
Technician:	Jemal

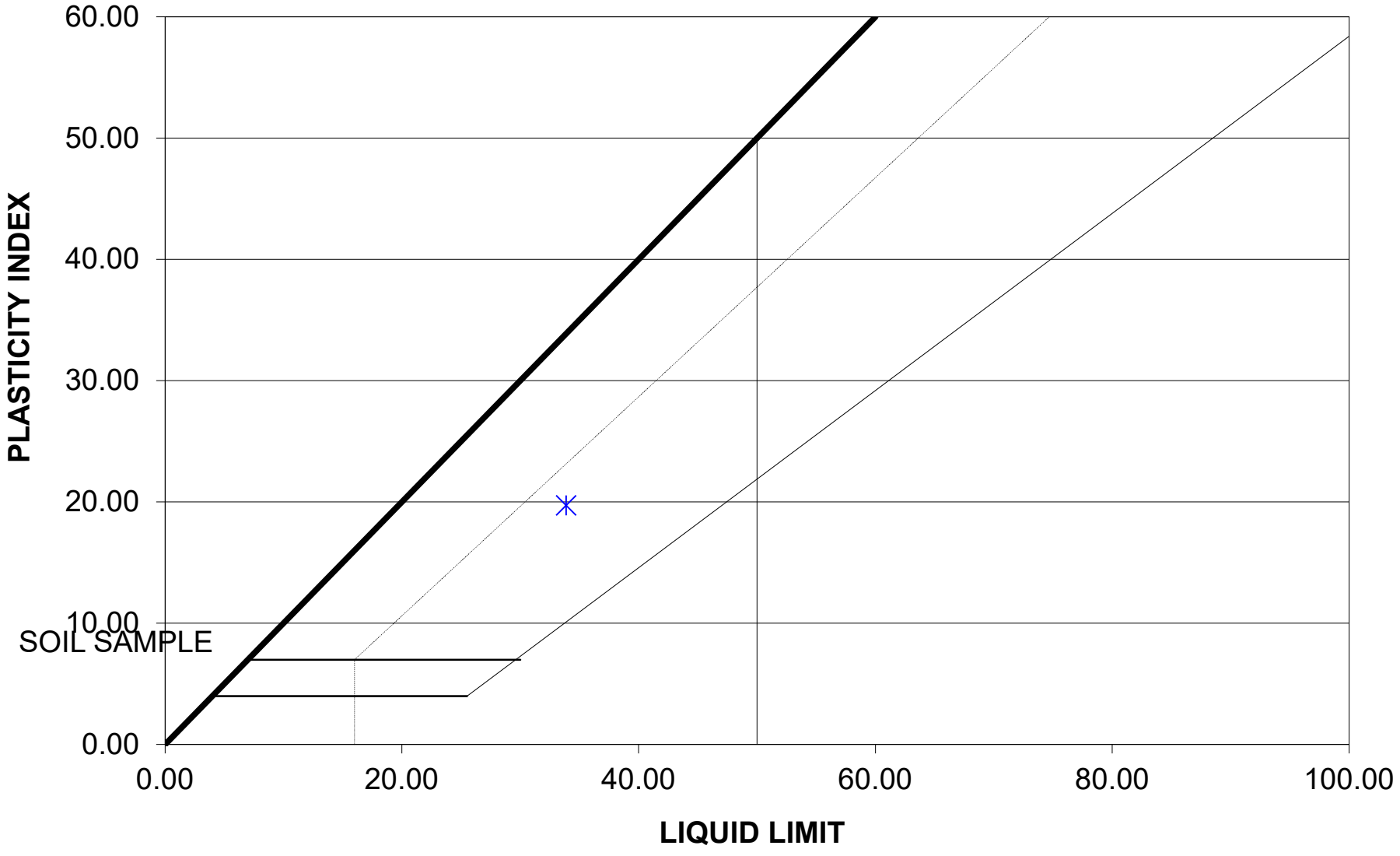
LIQUID LIMIT DETERMINATION

Semi-Log Plot



Project Number:	WATT Subdivision
Date:	18-Dec-23
Hole Number	BH # 19
Depth:	6 ft
Technician:	Jemal

PLASTICITY CHART



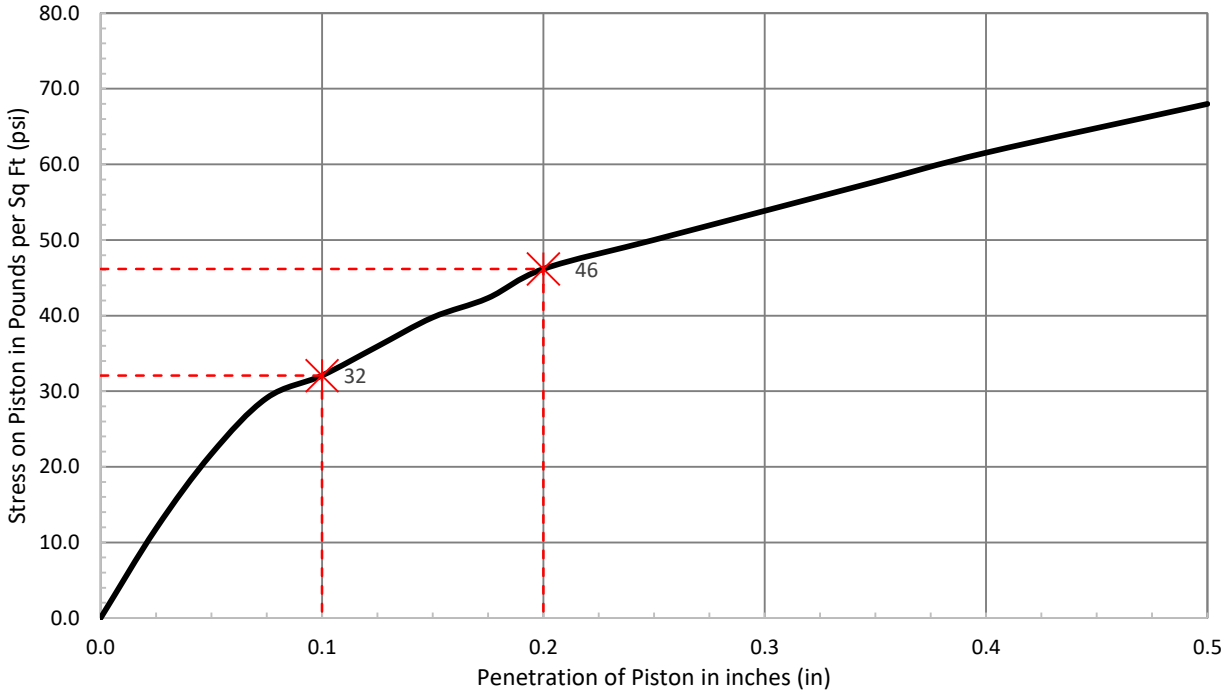
California Bearing Ratio

ASTM D1883-16, Soaking Method

WSP Canada Inc.
1003 53rd Ave NE
Calgary AB T2E 6X9

Type of Preparation	Standard ASTM D698	Sample Preparation	Soaked
Maximum Dry Density	1892 kg/m^3	Soaking time	96 hrs
Optimum Moisture Content	13.3 %	Top 1 Inch Soaked Moisture	17.3 %
Compacted Dry Density	1880 kg/m^3	Bottom 1 Inch Soaked Moisture	16.6 %
Compacted Moisture Content	15.5 %	Average Soaked Moisture	16.5 %
Percent Compaction	99.4 %	Mass of Surcharge	13.6 kg

Corrected Penetration (in.)	Standard Load of Crushed Stone (psi)	Corrected Load (psi)	CBR (%)
0.100	1000	32	**3.2**
0.200	1500	46	**3.1**



Client: Watt

Project: Netook Crossing

Site composite sample at 1.0 to 1.5 m depth

Project No: CA18784.8400_3903.T01

Site Location:

Date: February 26, 2024

Request No: -

Technologist: JCS

Reviewed By: HM

Soil Description: Silty Clay trace Organic

Liquid Limit -

Plastic Limit -

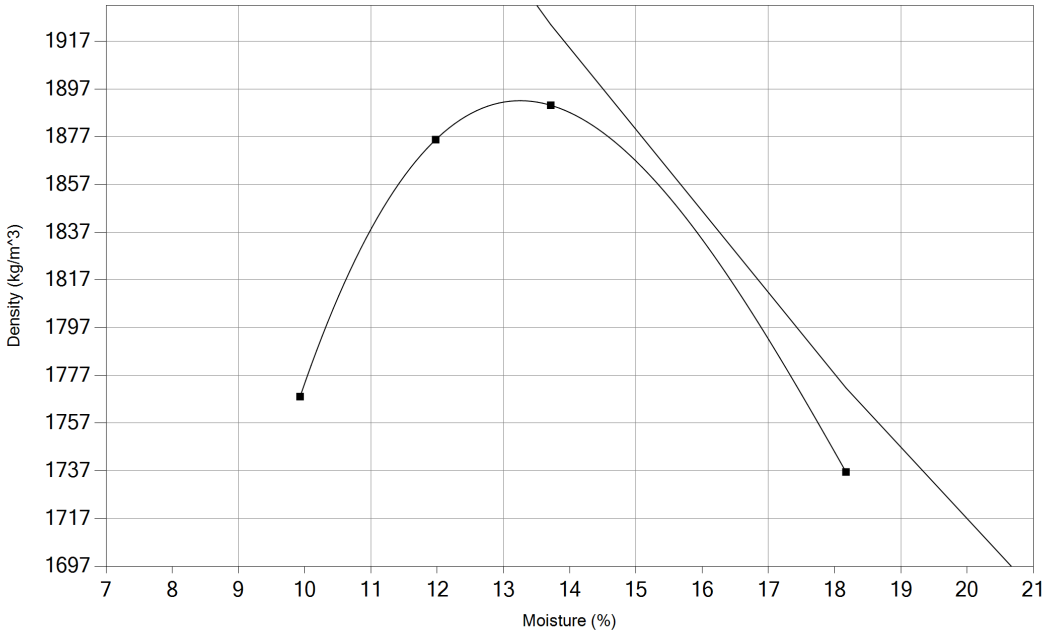
Plasticity Index -

Swell 0.04%

Moisture / Density Relationship

Report Date: March 06, 2024 **Amend Date:** March 06, 2024

Client		Project	
Name:	Watt Consulting Group	**Name:**	(CA18784.8400) Netook Crossing (3903.T01)
Address:	3016 5 Ave NE Calgary, AB T2A 6K4	**Address:**	Calgary, AB
Attention:	Joel Rombough	**Phase:**	**Task:**
PO Number:		**Manager:**	Hamdan Marwasi
Sample Date:	2/22/2024 by Renato Lumawig	**Lab/Ref. #:**	NS666808
Source:	Composite Sample @ 1.0 to 1.5 m depth	**Description:**	Silty Clay trace organic



Moisture Density Relationship: (ASTM D698-12) Method: B

Preparation Method: Dry **Rammer Type:**Mechanical

Maximum Density (kg/m^3): 1892

Optimum Moisture (%): 13.3

Remarks:

Distribution:

Reviewed By: Hamdan Marwasi

Reporting of these test results constitutes a testing service only.

WSP E&I Canada Ltd. - 1003 53rd Avenue NE - Calgary, AB - T2E 6X9

AR Geotechnical Engineering

Sulphate Test

http://www.argeoeng.com

CLIENT NAME: Watt Consulting **ATTENTION TO: Ayoub Ramadan**

SAMPLING SITE: Olds Subdivision **SAMPLED BY: Getu**

Soil Analysis - Sulfate

DATE RECEIVED: 2024-01-21 **DATE REPORTED: 2024-01-29**

Parameter	Unit	SAMPLE DESCRIPTION:	BH23-25 (GB-1m)	BH23-16 (GB-2m)	BH23-08 (GB-2m)	BH23-08 (GB-2m)
		SAMPLE TYPE:	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2024-01-21	2024-01-21	2024-01-21	2024-01-21
			5608878	5608880	5608882	5608884
Saturation Percentage	%		32	38	36	33
Sulfate (SO4-S), Soluble	mg/L		918	521	625	890
Sulfur (as Sulfate), Soluble (meq/L)	meq/L		19.1	10.8	14.5	18.8

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 1						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	A7	A8	A9	B1	B2	B3
Wt. Sample Wet + Tare (g)	259.9	287.1	285.3	262.9	286.3	268.8
Wt. Sample Dry + Tare (g)	224.1	247.9	247.2	228.1	248.0	231.9
Wt. Water (g)	35.8	39.2	38.1	34.8	38.3	36.9
Tare Container (g)	4.1	4.1	4.2	4.4	4.3	4.3
Wt. Dry Sample (g)	220.0	243.8	243.0	223.7	243.7	227.6
Moist Content	16.3%	16.1%	15.7%	15.6%	15.7%	16.2%

BH # 2						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	36.0	29.0	103.0	12.0	19.0	37.0
Wt. Sample Wet + Tare (g)	250.6	297.8	240.8	249.2	222.8	242.6
Wt. Sample Dry + Tare (g)	218.7	258.3	208.9	218.8	197.3	210.7
Wt. Water (g)	31.9	39.5	31.9	30.4	25.5	31.9
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	214.3	253.9	204.5	214.4	192.9	206.3
Moist Content	14.9%	15.6%	15.6%	14.2%	13.2%	15%

BH # 3						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	33.0	41.0	13.0	44.0	20.0	22.0
Wt. Sample Wet + Tare (g)	298.2	286.8	261.5	283.3	271.0	276.9
Wt. Sample Dry + Tare (g)	259.7	251.6	227.5	243.6	233.8	238.9
Wt. Water (g)	38.5	35.2	34.0	39.7	37.2	38.0
Tare Container (g)	4.0	4.0	4.3	4.5	4.4	4.3
Wt. Dry Sample (g)	255.7	247.6	223.2	239.1	229.4	234.6
Moist Content	15.1%	14.2%	15.2%	16.6%	16.2%	16.2%

BH # 4						
Depth	1	2				
Tare No.	23.0	38.0				
Wt. Sample Wet + Tare (g)	241.7	230.3				
Wt. Sample Dry + Tare (g)	209.0	198.0				
Wt. Water (g)	32.7	32.3				
Tare Container (g)	4.3	4.3				
Wt. Dry Sample (g)	204.7	193.7				
Moist Content	16.0%	16.7%				

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 5						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	28A	4A	55.0	9.0	19A	2A
Wt. Sample Wet + Tare (g)	259.8	282.4	247.0	257.4	242.5	275.0
Wt. Sample Dry + Tare (g)	227.7	245.6	215.1	223.9	210.6	239.8
Wt. Water (g)	32.1	36.8	31.9	33.5	31.9	35.2
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	223.3	241.2	210.7	219.5	206.2	235.4
Moist Content	14.4%	15.3%	15.1%	15.3%	15.5%	15%

BH # 6						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	61.0	40.0	45.0	15.0	11.0	27.0
Wt. Sample Wet + Tare (g)	252.7	237.2	252.4	221.4	246.1	258.5
Wt. Sample Dry + Tare (g)	222.5	204.9	218.6	193.3	212.2	223.9
Wt. Water (g)	30.2	32.3	33.8	28.1	33.9	34.6
Tare Container (g)	4.3	4.4	4.3	4.5	4.4	4.3
Wt. Dry Sample (g)	218.2	200.5	214.3	188.8	207.8	219.6
Moist Content	13.8%	16.1%	15.8%	14.9%	16.3%	15.8%

BH # 7						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	35.0	16.0	18.0	14.0	46.0	30.0
Wt. Sample Wet + Tare (g)	225.9	237.5	282.2	266.3	273.9	276.4
Wt. Sample Dry + Tare (g)	195.0	205.5	243.6	230.3	236.6	239.2
Wt. Water (g)	30.9	32.0	38.6	36.0	37.3	37.2
Tare Container (g)	4.3	4.4	4.3	4.3	4.3	4.3
Wt. Dry Sample (g)	190.7	201.1	239.3	226.0	232.3	234.9
Moist Content	16.2%	15.9%	16.1%	15.9%	16.1%	15.8%

BH # 8						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	11.0	27.0	61.0	40.0	15.0	45.0
Wt. Sample Wet + Tare (g)	245.9	275.0	288.8	251.3	268.5	272.0
Wt. Sample Dry + Tare (g)	212.5	234.5	248.5	216.6	232.4	236.0
Wt. Water (g)	33.4	40.5	40.3	34.7	36.1	36.0
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	208.1	230.1	244.1	212.2	228.0	231.6
Moist Content	16.0%	17.6%	16.5%	16.4%	15.8%	16%

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 9						
Depth	1	4	5	6 SPT		
Tare No.	60.0	32.0	28.0	34.0		
Wt. Sample Wet + Tare (g)	246.9	266.7	264.6	257.5		
Wt. Sample Dry + Tare (g)	222.8	232.6	230.4	223.5		
Wt. Water (g)	24.1	34.1	34.2	34.0		
Tare Container (g)	4.5	4.5	4.3	4.3		
Wt. Dry Sample (g)	218.3	228.1	226.1	219.2		
Moist Content	11.0%	14.9%	15.1%	15.5%		

BH # 10						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	A6	A4	A1	A3	A2	A5
Wt. Sample Wet + Tare (g)	257.9	300.2	269.4	274.5	289.7	284.8
Wt. Sample Dry + Tare (g)	234.2	263.4	240.3	241.8	256.9	250.5
Wt. Water (g)	23.7	36.8	29.1	32.7	32.8	34.3
Tare Container (g)	4.4	4.3	4.2	4.4	4.3	4.3
Wt. Dry Sample (g)	229.8	259.1	236.1	237.4	252.6	246.2
Moist Content	10.3%	14.2%	12.3%	13.8%	13.0%	13.9%

BH # 11						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	104.0	2.0	17.0	64.0	3.0	29A
Wt. Sample Wet + Tare (g)	219.4	233.1	225.7	236.8	227.0	220.8
Wt. Sample Dry + Tare (g)	190.3	202.6	195.2	205.3	196.8	190.7
Wt. Water (g)	29.1	30.5	30.5	31.5	30.2	30.1
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	185.9	198.2	190.8	200.9	192.4	186.3
Moist Content	15.7%	15.4%	16.0%	15.7%	15.7%	16%

BH # 12						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	B4	B5	B6	B7	B8	B9
Wt. Sample Wet + Tare (g)	269.5	282.0	271.6	290.7	276.5	284.8
Wt. Sample Dry + Tare (g)	237.2	248.3	236.1	252.4	242.9	251.0
Wt. Water (g)	32.3	33.7	35.5	38.3	33.6	33.8
Tare Container (g)	4.1	4.0	4.1	4.1	4.1	4.1
Wt. Dry Sample (g)	233.1	244.3	232.0	248.3	238.8	246.9
Moist Content	13.9%	13.8%	15.3%	15.4%	14.1%	13.7%

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 13						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	28.0	23.0	32.0	38.0	60.0	34.0
Wt. Sample Wet + Tare (g)	281.6	276.2	263.9	269.4	271.2	267.4
Wt. Sample Dry + Tare (g)	244.9	238.2	228.9	234.9	238.1	230.7
Wt. Water (g)	36.7	38.0	35.0	34.5	33.1	36.7
Tare Container (g)	4.4	4.3	4.3	4.3	4.3	4.3
Wt. Dry Sample (g)	240.5	233.9	224.6	230.6	233.8	226.4
Moist Content	15.3%	16.2%	15.6%	15.0%	14.2%	16.2%

BH # 14						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	36.0	103.0	37.0	19.0	12.0	29.0
Wt. Sample Wet + Tare (g)	289.8	264.9	248.0	287.9	286.4	276.6
Wt. Sample Dry + Tare (g)	258.1	236.1	223.1	257.8	256.7	243.5
Wt. Water (g)	31.7	28.8	24.9	30.1	29.7	33.1
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	253.7	231.7	218.7	253.4	252.3	239.1
Moist Content	12.5%	12.4%	11.4%	11.9%	11.8%	14%

BH # 15						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	44.0	13.0	33.0	22.0	20.0	41.0
Wt. Sample Wet + Tare (g)	237.9	242.7	249.1	232.1	231.1	239.0
Wt. Sample Dry + Tare (g)	209.2	215.0	218.2	204.6	200.9	208.6
Wt. Water (g)	28.7	27.7	30.9	27.5	30.2	30.4
Tare Container (g)	4.3	4.4	4.6	4.3	4.3	4.3
Wt. Dry Sample (g)	204.9	210.6	213.6	200.3	196.6	204.3
Moist Content	14.0%	13.2%	14.5%	13.7%	15.4%	14.9%

BH # 16						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	A7	A8	A9	B1	B2	B3
Wt. Sample Wet + Tare (g)	255.0	284.1	274.1	285.2	276.0	277.9
Wt. Sample Dry + Tare (g)	232.5	252.6	241.0	251.6	243.4	245.3
Wt. Water (g)	22.5	31.5	33.1	33.6	32.6	32.6
Tare Container (g)	4.4	4.3	4.3	4.3	4.3	4.3
Wt. Dry Sample (g)	228.1	248.3	236.7	247.3	239.1	241.0
Moist Content	9.9%	12.7%	14.0%	13.6%	13.6%	13.5%

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 17						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	46.0	30.0	18.0	35.0	16.0	14.0
Wt. Sample Wet + Tare (g)	277.5	293.8	275.0	275.2	281.2	282.9
Wt. Sample Dry + Tare (g)	245.5	254.9	239.0	239.9	246.5	245.5
Wt. Water (g)	32.0	38.9	36.0	35.3	34.7	37.4
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	241.1	250.5	234.6	235.5	242.1	241.1
Moist Content	13.3%	15.5%	15.3%	15.0%	14.3%	16%

BH # 18						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	25.0	39.0	42.0	47.0	31.0	55.0
Wt. Sample Wet + Tare (g)	221.4	235.0	236.3	211.6	241.9	234.7
Wt. Sample Dry + Tare (g)	198.0	207.2	206.3	185.8	211.5	206.5
Wt. Water (g)	23.4	27.8	30.0	25.8	30.4	28.2
Tare Container (g)	4.4	4.4	4.3	4.3	4.3	4.6
Wt. Dry Sample (g)	193.6	202.8	202.0	181.5	207.2	201.9
Moist Content	12.1%	13.7%	14.9%	14.2%	14.7%	14.0%

BH # 19						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	A1	A2	A3	A4	A5	A6
Wt. Sample Wet + Tare (g)	252.3	253.1	279.7	276.7	280.7	277.9
Wt. Sample Dry + Tare (g)	219.4	230.3	252.4	249.9	252.9	244.7
Wt. Water (g)	32.9	22.8	27.3	26.8	27.8	33.2
Tare Container (g)	4.4	4.3	4.3	4.3	4.3	4.3
Wt. Dry Sample (g)	215.0	226.0	248.1	245.6	248.6	240.4
Moist Content	15.3%	10.1%	11.0%	10.9%	11.2%	13.8%

BH # 20						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	2A	28A	19A	4A	55.0	9.0
Wt. Sample Wet + Tare (g)	201.0	262.0	253.9	241.1	274.2	259.8
Wt. Sample Dry + Tare (g)	185.1	233.0	226.6	220.9	251.5	244.5
Wt. Water (g)	15.9	29.0	27.3	20.2	22.7	15.3
Tare Container (g)	4.4	4.4	4.4	4.4	4.4	4.4
Wt. Dry Sample (g)	180.7	228.6	222.2	216.5	247.1	240.1
Moist Content	8.8%	12.7%	12.3%	9.3%	9.2%	6%

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

BH # 21						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	37.0	7.0	5.0	21.0	111.0	1.0
Wt. Sample Wet + Tare (g)	279.4	265.2	264.4	291.3	271.0	275.9
Wt. Sample Dry + Tare (g)	251.5	239.0	225.9	259.7	240.9	233.3
Wt. Water (g)	27.9	26.2	38.5	31.6	30.1	42.6
Tare Container (g)	4.4	4.4	4.3	4.3	4.3	4.6
Wt. Dry Sample (g)	247.1	234.6	221.6	255.4	236.6	228.7
Moist Content	11.3%	11.2%	17.4%	12.4%	12.7%	18.6%

BH # 22						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	C1	C2	C3	C4	C5	C6
Wt. Sample Wet + Tare (g)	268.8	285.2	286.7	272.2	279.0	268.4
Wt. Sample Dry + Tare (g)	234.7	246.7	246.2	236.3	244.3	231.9
Wt. Water (g)	34.1	38.5	40.5	35.9	34.7	36.5
Tare Container (g)	4.1	4.0	4.1	4.1	4.1	4.1
Wt. Dry Sample (g)	230.6	242.7	242.1	232.2	240.2	227.8
Moist Content	14.8%	15.9%	16.7%	15.5%	14.4%	16.0%

BH # 23						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	47.0	55.0	25.0	31.0	39.0	42.0
Wt. Sample Wet + Tare (g)	219.4	227.3	276.4	250.5	243.1	273.2
Wt. Sample Dry + Tare (g)	196.4	197.4	239.8	217.1	210.3	234.3
Wt. Water (g)	23.0	29.9	36.6	33.4	32.8	38.9
Tare Container (g)	4.4	4.5	4.4	4.3	4.4	4.4
Wt. Dry Sample (g)	192.0	192.9	235.4	212.8	205.9	229.9
Moist Content	12.0%	15.5%	15.5%	15.7%	15.9%	17%

BH # 24						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	37.0	21.0	111.0	7.0	5.0	1.0
Wt. Sample Wet + Tare (g)	241.9	205.5	243.7	232.0	234.5	233.8
Wt. Sample Dry + Tare (g)	212.6	180.4	212.0	202.8	205.1	203.2
Wt. Water (g)	29.3	25.1	31.7	29.2	29.4	30.6
Tare Container (g)	4.4	4.4	4.3	4.3	4.3	4.6
Wt. Dry Sample (g)	208.2	176.0	207.7	198.5	200.8	198.6
Moist Content	14.1%	14.3%	15.3%	14.7%	14.6%	15.4%

Moisture Content Worksheet

AR Geotechnical Engineering

Project: Netook Crossing

Technician: Jemal/Haile

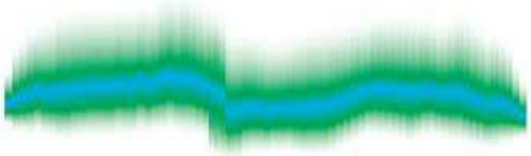
BH # 25						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	43.0	52.0	24.0	100.0	8.0	47A
Wt. Sample Wet + Tare (g)	243.0	275.1	281.5	258.0	238.2	296.8
Wt. Sample Dry + Tare (g)	215.6	246.5	245.3	225.8	208.0	259.4
Wt. Water (g)	27.4	28.6	36.2	32.2	30.2	37.4
Tare Container (g)	4.3	4.5	4.3	4.1	4.3	4.4
Wt. Dry Sample (g)	211.3	242.0	241.0	221.7	203.7	255.0
Moist Content	13.0%	11.8%	15.0%	14.5%	14.8%	14.7%

BH # 26						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	8.0	24.0	43.0	52.0	48.0	47A
Wt. Sample Wet + Tare (g)	281.5	288.8	264.3	280.3	256.6	263.8
Wt. Sample Dry + Tare (g)	244.8	249.4	227.7	241.4	221.0	227.7
Wt. Water (g)	36.7	39.4	36.6	38.9	35.6	36.1
Tare Container (g)	4.3	4.3	4.3	4.5	4.5	4.4
Wt. Dry Sample (g)	240.5	245.1	223.4	236.9	216.5	223.3
Moist Content	15.3%	16.1%	16.4%	16.4%	16.4%	16%

BH # 27						
Depth	1	2	3 SPT	4	5	6 SPT
Tare No.	3.0	64.0	2.0	104.0	29A	17.0
Wt. Sample Wet + Tare (g)	269.7	282.6	264.4	275.8	288.8	266.6
Wt. Sample Dry + Tare (g)	238.5	249.4	228.2	238.7	249.8	231.5
Wt. Water (g)	31.2	33.2	36.2	37.1	39.0	35.1
Tare Container (g)	4.4	4.5	4.3	4.4	4.3	4.3
Wt. Dry Sample (g)	234.1	244.9	223.9	234.3	245.5	227.2
Moist Content	13.3%	13.6%	16.2%	15.8%	15.9%	15.4%

APPENDIX F3

Base Property Consultants – Phase 1 ESA



Bifröst

Environmental and Remediation Services Inc.

Phase One

Environmental Site Assessment

Of

W ½ Sec 2, SE Sec 2 , SE Sec 3 Twp 33 Rge 1 W5M

Olds, Alberta

Prepared For : **Brown & Associates Planning Group**
Prepared By : Base Property Consultants Ltd.
Date: April 30, 2008

Executive Summary

A Phase One Environmental Site Assessment was completed for an agricultural acreage property located east of Olds, Alberta in Mountain View County. Past and present uses of the property have been agricultural and country residential.

Because the farmstead buildings on the SW2 were built after 1995 they are not likely to contain any regulated substances such as lead-based paints, asbestos containing construction materials and fluorescent light fixtures with PCB's in their ballast. An AST was observed on the SW2 farmstead but no above ground fuel storage tanks (ASTs) were observed on the SE2, they may have been on that property in the past. When the AST on the SW2 is no longer required and when the SE2 is redeveloped, should any stained or noxious soil be encountered during site development then Base Property Consultants Ltd. should be contacted to determine the appropriate use of this material. No obvious signs of uncontrolled dumping were observed during the site reconnaissance. Historical air photos show a surface disturbance at the northwest corner of the SW 2 in 1988 and 1990. No obvious sign of this disturbance was noted during the site reconnaissance. Should any buried foreign materials, buried organic soil, stained or noxious smelling soil be encountered during site development then Base Property Consultants Ltd. should be contacted to conduct further investigation.

No obvious sign of the former farmstead buildings on the SE2 was observed during the site reconnaissance. Heating fuel oil facilities, demolition refuse, burn or garbage pits are typical features of country residences. No obvious sign of such facilities were observed during the site reconnaissance. Should any buried foreign materials, buried organic soil, stained or noxious smelling soil be encountered during site development then Base Property Consultants Ltd. should be contacted to conduct further investigation.

Alberta Environment's Groundwater Information Website indicates 26 water wells on the ¼ sections of land which include the subject site. Only two water wells were observed during the site reconnaissance of the subject site plus three septic sewer systems. Other water wells may be present. When these services are no longer required they must be reclaimed in an appropriate manner. A review of the documents presently available from Municipal and Provincial agencies contacted show no records of impairment or

environmental violations pertaining to the subject site. An oil and gas database for this part of Alberta shows an oil and gas well and pipeline on the NW2 and a well to the south of the SE3. An oil and gas battery is to the east of the NW2. Development seatbacks may apply to these facilities. An abandoned oil and gas well is on the SE3. Sumps or pits associated with this well may be present and could impact soil and groundwater conditions on the subject site. A service station has operated adjacent to the southeast property line of the SE2 since at least 1966. Over that period of time leaks or spills of fuel may have occurred which could impact the soil and/or shallow groundwater on the SE2. Other adjacent properties appear to be maintained in a reasonable manner and do not pose obvious environmental concerns at this time.

Therefore, based upon the results of the historical records review, site reconnaissance and information available to the author at the time of preparing this report, it is our opinion that the potential for environmental impairment exists on the subject site. The sources of the potential impacts are the abandoned oil and gas well lease on the SE3 and the service station adjacent to the SE2. Further environmental investigation is recommended.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 General

Base Property Consultants Ltd. conducted a Phase One Environmental Site Assessment (ESA) for an acreage property located east of Olds, Alberta in Mountain View County. The objective of this investigation is to identify and evaluate potential environmental liabilities associated with past and current activities on the site. It is understood that this ESA report may form part of a proposed land use application.

1.2 Authorization

Mr. Greg Brown of Brown & Associates Planning Group provided written authorization to proceed with the Assessment on January 29, 2008.

1.3 Scope of Work

This investigation follows protocols as outlined by CSA Z768-01. The scope of this Phase One ESA includes the following:

- undertake a historical review of the subject and adjacent properties using such documents as Land Titles for previous ownership, air photos, records kept by Municipal and Provincial Governments pertaining to land use and environmental compliance.
- undertake a site reconnaissance noting any potential building hazardous materials (using no destructive sampling methods), present physical features, site surface drainage, location and identification of any obvious surface dump material and any obvious drainage sumps or standing water existing on site. This investigation does not address mould issues on the premises.
- note obvious past and present adjacent land uses that may be an environmental concern to the subject site.
- evaluate data collected for potential on-site environmental liability and prepare a final document expressing comments and opinions based on this investigation.

2.0 Site Attributes

2.1 Location and Legal Description

The legal description for the property includes portions of the Northwest and Southeast ¼'s of Section 2, the Southeast ¼ of Section 3 all in Township 33 Range 1 West of the Fifth Meridian, Lot 1 Block 2 Plan 0611022 and Lot 2 Block 2 Plan 0611833. For the purposes of this investigation specific reference to a quarter section on the subject site will be made using SE2 to refer to the SE ¼ of 2-33-1-5. Lot 1 and Lot 2 will be referred to by the ¼ section they are both located in, SW2. The ¼ sections are contiguous and are approximately 228.4 ha in area. Figure One shows the location of the property relative to Olds and Figure Two shows a site plan. All figures are presented in Appendix A.

2.2 Site Geography and Land Use

The subject agricultural acreage property is located 2.4 km east of Olds, Alberta. Site buildings include a house, quonset/green house and two animal shelters on the SW2, a detached double garage, mobile home and an animal shelter on the SE3. The remainder of the property is agricultural land. Topographical relief across the site is approximately 8 meters dropping down to the southeast. Site vegetation is stubble from last season's grain crop, a wood lot (aspen and willows) is on the southeast corner of the NW2 and planted trees, shrubs and grass are around the farmsteads in the SW2 and SE2. Alberta Environment's Groundwater Information Website has record of 11 water wells drilled in the NW2, 3 water wells in the SW2, 10 water wells in the SE2 and 2 water wells in the SE3. Macintosh Lalani Engineering Ltd. (MLEL) completed a geotechnical for the subject site in February 2008. Natural soil observed in the investigation was silty clay till and some sand with sandstone bedrock at approximately 6.7 m below the ground surface. Road access to the property is from the south property line at the Hwy 27 service road for the SE2, Range Rd 1.2 at the west property line of the SW2 and NW2 and the east property line of the SE3. Adjacent land uses are agricultural to the north, east and south of Section 2, west of SE3 and north of SE2; a golf course north of SE3, a service station to the southeast of the SE2, a country residential subdivision west of NW2 with country residences south of SE3 and SW2 and north of SE2.

3.0 Site History

3.1 Historical Land Title Search

A land title search was conducted by the Alberta Attorney General Land Title Office to determine historical property ownership. Copies of title resulting from this search are on file with Base Property Consultants Ltd. and can be reviewed upon request. Since 1945 numerous individuals and limited companies have been listed as owners of the property. Caveats by an oil and gas company were registered on title for the SE3 indicating the potential presence of pipelines or oil and gas wells. Facilities such as pipelines, oil and gas wells represent potential sources of environmental concern to the subject site.

3.2 Aerial Photography

Air photos from 1950 to 2006 were obtained from Alberta Sustainable Resource Development and the Maps and Air Photo Department of the MacKimmie Library, University of Calgary and reviewed to determine previous activities on the site and adjacent land uses. A detailed description of the air photo analysis is presented in Table One, Appendix B. In summary, the subject sites were agricultural (crop and pasture) until between 1998 and 2006 when a portion of the NW2 outside the study area was subdivided into residential acreages. A service station has been adjacent to the southeast corner of the SE2 since at least 1966.

3.3 Municipal Directories and Archives

A search of the Alberta Energy & Utility Board oil and gas well database for this portion of Alberta indicates that an oil gas well was directionally drilled off-site from the NE2 to the NW2 in 2004 but is not in production. A natural gas pipeline crosses the northeast corner of the NW2. This pipeline is not rated to carry any hydrogen sulfide. These facilities are operated by Verro Energy Inc. A well was drilled and abandoned in 1978 on the SE3. No production was associated with this well. An active oil and gas well is approximately 600m to the south of the SE3 and an oil and gas battery is adjacent to the east-central portion of the NW2. Development setbacks may apply to these on-site and off-site facilities. Alberta Environment's Groundwater Information Website indicates 11

water wells drilled in the NW2, 3 water wells in the SW2, 10 water wells in the SE2 and 2 water wells in the SE3. Their exact locations are not given.

3.4 Historical Synopsis

Based upon the compilation of information from land titles and air photos, the historical land uses for the subject site and adjacent properties have been agricultural and country residential. An oil and gas well was drilled and abandoned on the SE3 in 1978.

3.5 Government Documents

Correspondence with and document reviews of various provincial and municipal departments has yielded the following information for the site. Copies of the correspondence received can be found in Appendix C.

- Alberta Environment, Freedom of Information and Protection of Privacy Division – have not identified any records for the subject site.
- Alberta Environment, Authorizations & Approvals – no records for the NW2 and SE2. A Water Act registration by a previous farm owner does exist for the SW2 and an approval to construct a pipeline is registered on the SE3.
- Mountain View County – have no environmental records pertaining to the subject site but do note the presence of a service station on the southeast corner of the SE2.

4.0 Site Reconnaissance and Interviews

The author conducted a site reconnaissance on March 31, 2008. The subject agricultural acreage property is located 2.4 km east of Olds, Alberta (Photos One to Four). All photographs are presented in Appendix C. Site buildings include a house, quonset/green house and two animal shelters in the SW2, a detached double garage, mobile home and an animal shelter in the SE3. The remainder of the property is agricultural land. Topographical relief across the site is approximately 8 meters dropping down to the southeast. Site vegetation is stubble from last season's grain crop, a wood lot (aspen and

willows) in the southeast corner of the NW2 and planted trees, shrubs and grass around the farmsteads in the SW2 and SE2. The wood lot has a dugout at its southeast corner. There were no obvious signs of uncontrolled dumping observed on the property.

An oil and gas battery is adjacent to the east-central property line of the NW2. No obvious sign of water wells were noted on either the NW2 or SE3. The water wells registered with Alberta Environment for the NW2 may be associated with the country residences on the NW2 that are excluded from the study area. No obvious sign of the abandoned oil and gas well was noted on the SE3.

The farmstead on the SW2 is serviced by a water well and two septic sewer systems. The house has an attached double garage. Windows in the house are construction date stamped 1996. The quonset/greenhouse includes a mezzanine residence. The quonset has a gravel floor with no floor pits or drains. The greenhouse has floor drains connected to an external dry well to the south. A steel dumpster is located between the house and quonset and is used for solid waste disposal. Two dugouts are located north and south of the house. These dugouts collect surface drainage water and water from pipes draining a slough area to the north. A steel above ground fuel storage tank (AST – approximately 454 l) is located northwest of the quonset. No obvious spills or leaks were noted beneath this tank.

The farmstead on the SE2 is serviced by a septic system and water well. No obvious signs of refuse or burn pits was observed. The detached garage was not available for viewing. No obvious signs of the former farmstead buildings was observed. The service station to the southeast of the SE2 has underground storage tanks (UST's).

Mr. Lee Martin P. Eng. of Macintosh Lalani Engineering Ltd. (MLEL) was interviewed on March 31, 2008. MLEL completed a geotechnical investigation for the subject site in February 2008. Mr. Martin indicated that borehole observations recorded site natural soil to be silty clay till and some sand with sandstone bedrock at approximately 6.7 m below the ground surface at some locations.

Road access to the property is from the south property line at the Hwy 27 service road for the SE2, Range Rd 1.2 at the west property line of the SW2 and NW2 and the east property line of the SE3. Adjacent land uses are agricultural to the north, east and south of Section 2, west of SE3 and north of SE2; a golf course north of SE3, a country residential subdivision west of NW2, a service station to the southeast of the SE2 with country

residences south of SE3 and SW2 and north of SE2. Adjacent properties exhibit reasonable levels of maintenance.

5.0 Environmental Site Assessment

Because the farmstead buildings on the SW2 were built after 1995 they are not likely to contain any regulated substances such as lead-based paints, asbestos containing construction materials and fluorescent light fixtures with PCB's in their ballast. An AST was observed on the SW2 farmstead but no above ground fuel storage tanks (ASTs) were observed on the SE2, they may have been on that property in the past. When the AST on the SW2 is no longer required and when the SE2 is redeveloped, should any stained or noxious soil be encountered during site development then Base Property Consultants Ltd. should be contacted to determine the appropriate use of this material. No obvious signs of uncontrolled dumping were observed during the site reconnaissance. Historical air photos show a surface disturbance at the northwest corner of the SW 2 in 1988 and 1990. No obvious sign of this disturbance was noted during the site reconnaissance. Should any buried foreign materials, buried organic soil, stained or noxious smelling soil be encountered during site development then Base Property Consultants Ltd. should be contacted to conduct further investigation.

No obvious sign of the former farmstead buildings on the SE2 was observed during the site reconnaissance. Heating fuel oil facilities, demolition refuse, burn or garbage pits are typical features of country residences. No obvious sign of such facilities were observed during the site reconnaissance. Should any buried foreign materials, buried organic soil, stained or noxious smelling soil be encountered during site development then Base Property Consultants Ltd. should be contacted to conduct further investigation.

Alberta Environment's Groundwater Information Website indicates 26 water wells on the ¼ sections of land which include the subject site. Only two water wells were observed during the site reconnaissance of the subject site plus three septic sewer systems. Other water wells may be present. When these services are no longer required they must be reclaimed in an appropriate manner. Water wells to be abandoned will need to be reclaimed as per Alberta Environmental Protection and Enhancement Act Water Well Regulation (Twelve3/93). This would include but not be limited to the removal of the casings, grouting or sealing the producing zone and backfilling with clean material. Septic

system reclamation would include; septic tank contents being taken to a landfill site for disposal, the tank and associated piping disposed of properly and the soil in the septic field sampled and analyzed for metals and organic solvents to ensure that any such contaminants that may be present are dealt with appropriately. It is suggested that the soil in the septic fields be allowed to remediate itself prior to mixing with other loam. The removal of the septic field laterals require some excavation which will start the remediation process by aerating the fields.

A review of the documents presently available from Municipal and Provincial agencies contacted show no records of impairment or environmental violations pertaining to the subject site. An oil and gas database for this part of Alberta shows an oil and gas well and pipeline on the NW2 and a well to the south of the SE3. An oil and gas battery is to the east of the NW2. Development seatbacks may apply to these facilities. An abandoned oil and gas well is on the SE3. Sumps or pits associated with this well may be present and could impact soil and groundwater conditions on the subject site. A service station has operated adjacent to the southeast property line of the SE2 since at least 1966. Over that period of time leaks or spills of fuel may have occurred which could impact the soil and/or shallow groundwater on the SE2. Other adjacent properties appear to be maintained in a reasonable manner and do not pose obvious environmental concerns at this time.

Therefore, based upon the results of the historical records review, site reconnaissance and information available to the author at the time of preparing this report, it is our opinion that the potential for environmental impairment exists on the subject site. The sources of the potential impacts are the abandoned oil and gas well lease on the SE3 and the service station adjacent to the SE2. Further environmental investigation is recommended.

6.0 Environmental Site Assessment Liability Limitations

Since the assessment was conducted on the dates presented within this report the conditions prevalent and noted at this time must be recognized as having a limited life. Should activities be introduced or practices change, either of which may not be deemed to comply with generally accepted environmental practices, the site conditions would be altered sufficiently for this report to be invalid.

Recommendations, comments and opinions presented herein are based on a Phase One Environmental Site Assessment as described in the Scope of Work included in Section

One of this report. The report has been prepared in accordance with generally accepted environmental practice and no other warranty is made, either express or implied. Distribution of this report beyond the client is only at the mutual agreement of both the client and the author and is not assignable.

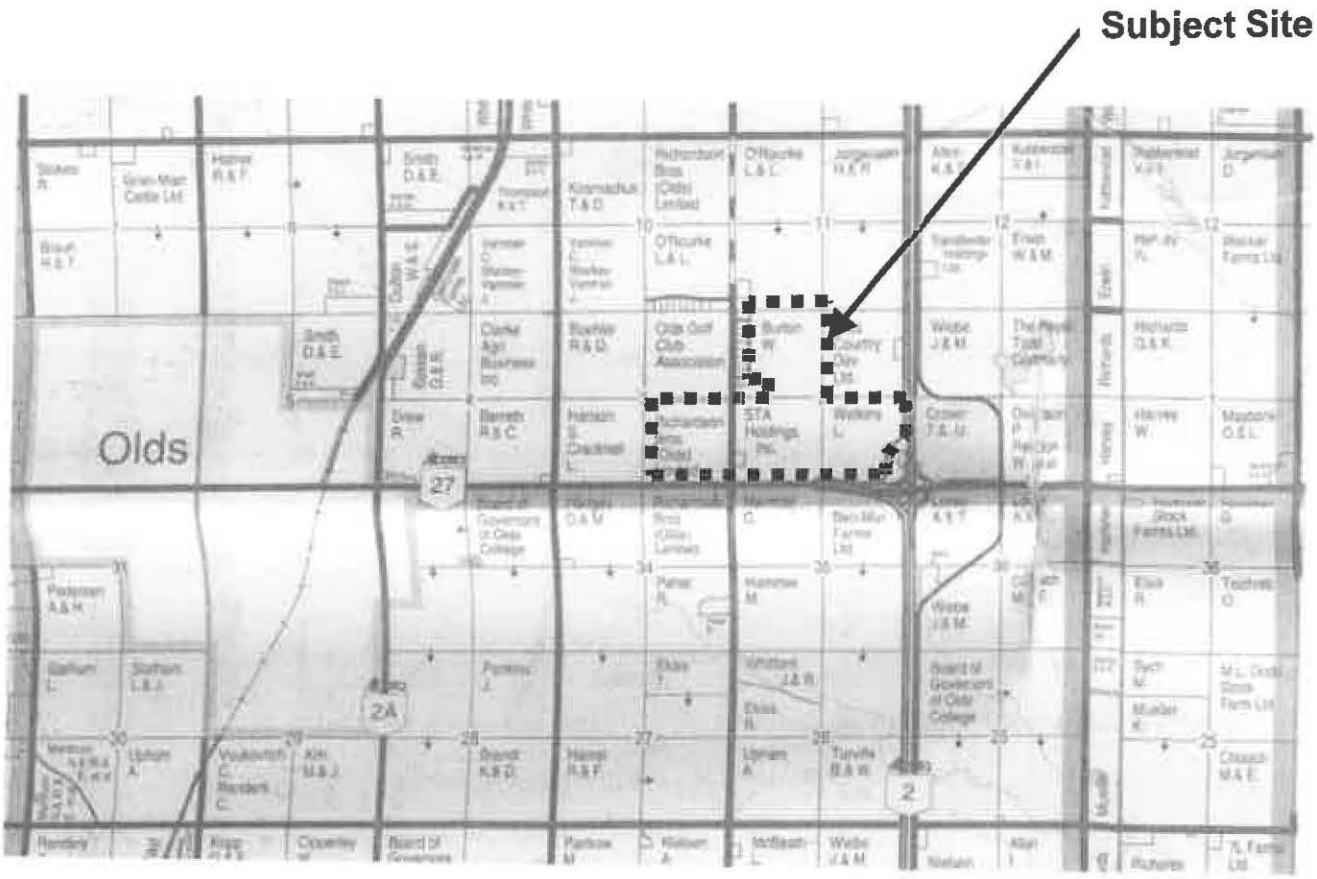
7.0 Closure

This report is respectfully submitted to Mr. Greg Brown of Brown & Associates Planning Group for your review. We trust that it meets your present needs. Should you have any questions please do not hesitate in contacting us.

Respectfully submitted,

Brian Chikmoroff P. Eng.
Environmental Consultant

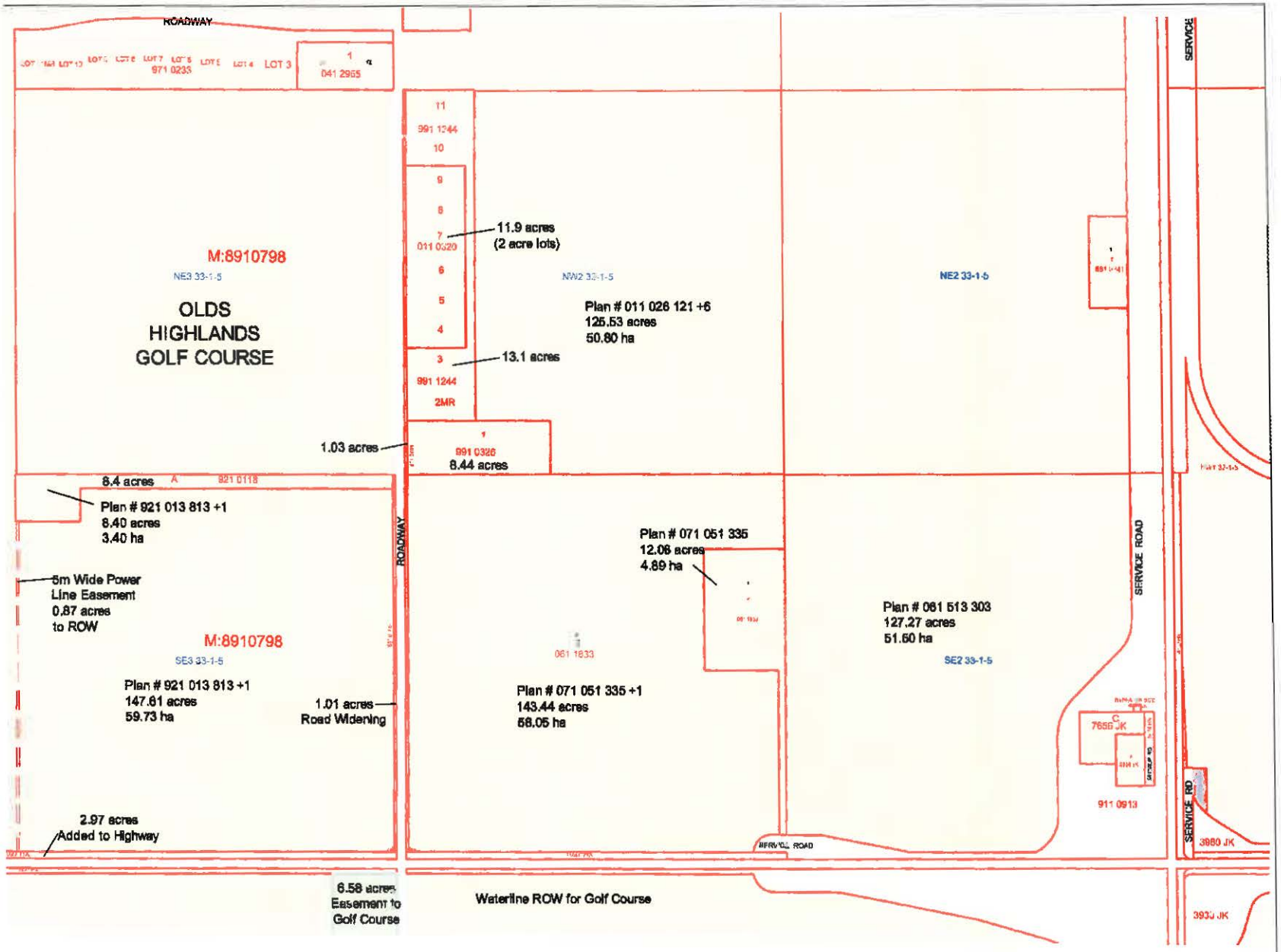
Appendix A: Figures



N

Figure One

MOUNTAINVIEW MEADOWS BUSINESS PARK & RESIDENTIAL COMMUNITY



Legal Descriptions

brown & associates

January 2008

Appendix B: Air Photo Analysis

Table One: Air Photo Analysis

Year	Scale	Location	Land Use-Subject	Land Use – Adjacent
1950	1:40,000	All	Agricultural, country residences on the southwest of SE2 and the southwest of the NW2 but outside the study area	NSEW is agricultural, Hwy 27 at south property line of S ½ 2 and SE3, Rge Rd 1.2 at the east property line of the SE3 and west property line of the W ½ 2, country residences are to the south of the SE3 and SW2 and east of the NW2
1966	1:31,680	SE2	Hwy 2 is to the east of the SE2	A service station is adjacent to the southeast corner
1970	1:80,000	All	No change	No change
1975	1:24,000	SE2	No change	A dugout is between the SE2 and the service station
1977	1:71,000	NW2	A dugout is at the southeast corner,	A golf course is to the west (north of SE3)
1982	1:60,000	All	No change	No change
1988	1:30,000	SW2	A country residence site is being prepared on the southeast portion a surface disturbance is visible at the northwest corner	No change
1990	1:20,000	SW2	A house is on the southeast corner	No change
1998	1:30,000	SW2 and NW2	A quonset is east of the house on SW2 and a road has been built at the west edge of NW2 outside the study area	No surface disturbance is visible on the northwest corner of the SW2
2006	1:20,000	NW2	No change	A country residential subdivision is adjacent to the west property line of the NW2 and an oil and gas facility is to the east

Appendix C: Correspondence

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Alberta
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FOIP, Records and
Corporate Support Branch

6th Floor, Petroleum Plaza South
9915 – 108 Street
Edmonton, AB T5K 2G6

Telephone: (780) 427-4429
Fax: (780) 427-9838

Mr. Brian Chikmoroff
Base Property Consultants Ltd.
45 Deer River Green SE
Calgary, AB T2J 7A2
403

[Fax:] (403) 278-9738

February 07, 2008

Dear Mr. Chikmoroff:

Re: Routine Disclosure Request 0269-RD-08 for information routinely available under the Environmental Protection and Enhancement (EPEA) Legislation.

Our office received your request dated February 05, 2008 for the following subject records.

Location : **NW & S ½ Sec 2-Twp 33-Rge 01 W5M, Olds, AB**
SE Sec 3-Twp 33-Rge 1 W5M
Plan 061 1833 Block 2 Lot 2

Name(s): **None Provided**

Time Frame: **Historical Search**

Records: **Scientific/technical information which may include reports documenting the nature and extent of soil, ground and surface water contamination; remedial measures taken to clean-up the site or status of the site; and external correspondence between the submitter and the Department of Environment pertaining to the reports.**

Alberta Environment has conducted a search of department records; based on the search parameters you provided to this office and has not identified any routinely available records relating to the subject of your request. As a result of our findings, your Routine Disclosure request has been closed.

Enclosed is a receipt for the initial fee in the amount of $25.00, submitted to Alberta Environment to undertake your request for a search for these records.

If you have any further questions or concerns, please write or call me at (780) 427-0271.

Yours truly,

(Mrs) Culyer

Emily Culyer,
Administrative Assistant

Enclosure (Receipt Visa 5 468)

FAXED FEB 07 2008

protection & enforcement

Alberta ENVIRONMENT

Last Update/Review: **April 1, 2000**

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The search used the following values:

Legal Land Location: M: 5 Rge: 1 Twp: 33 Sec: 2 QS: NW

Show Inactive Authorizations / Approvals: No

The resulting Authorizations / Approvals based on the search criteria will be displayed below. A 🗎 will appear next to the Authorization / Approval when documentation is available for viewing or downloading. **Please click** Authorization / Approval Viewer Help **if you encounter problems viewing the approval document.**

The documents referenced from this page are in Adobe Acrobat Writer (.pdf) format.
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No records match the search criteria.

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Last Update/Review: **April 1, 2000**

Authorization /Approval Viewer

For advanced search help see:
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The search used the following values:

Legal Land Location: M: 5 Rge: 1 Twp: 33 Sec: 2 QS: SE

Show Inactive Authorizations / Approvals: No

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Alberta Connects

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Last Update/Review: **April 1, 2000**

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The search used the following values:

Legal Land Location: M: 5 Rge: 1 Twp: 33 Sec: 2 QS: SW

Show Inactive Authorizations / Approvals: No

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Document 00174199-00-00 OLDS/REGISTRATION/BURTON BLAIR - F00174199 is held by Blair Burton, under the provisions of the *Water Act*. This registration is currently issued as of Mar. 25, 2002 and does not expire.

Record 1

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Alberta ENVIRONMENT

Last Update/Review: **April 1, 2000**

Authorization /Approval Viewer

For advanced search help see:
Authorization / Approval Viewer Help

The search used the following values:

Legal Land Location: M: 5 Rge: 1 Twp: 33 Sec: 3 QS: SE

Show Inactive Authorizations / Approvals: No

The resulting Authorizations / Approvals based on the search criteria will be displayed below. A will appear next to the Authorization / Approval when documentation is available for viewing or downloading. **Please click** Authorization / Approval Viewer Help **if you encounter problems viewing the approval document.**

The documents referenced from this page are in Adobe Acrobat Writer (.pdf) format.

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Document 00223038-00-00 LONEPINE WEST TORRINGTON GATHERING SYSTEM PIPELINE PROJECT is held by Apache Canada Ltd., under the provisions of the *Environmental Protection & Enhancement Act.* This approval is currently issued as of Jan. 17, 2006 and expires on Jan. 16, 2011.

Record 1

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Alberta
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APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended

APPLICATION NO. 001-223038

APPROVAL NO. 223038-00-00

EFFECTIVE DATE. January 17, 2006

EXPIRY DATE. January 16, 2011

APPROVAL HOLDER. Apache Canada Ltd.

Pursuant to Division 2, Part 2, of the Environmental Protection and Enhancement Act, R.S.A. 2000, c.E-12, as amended, approval is granted subject to the attached terms and conditions for the following activity:

the construction and reclamation of a pipeline being the Lonepine / Torrington Gas Gathering System Pipeline Project.

Designated Director under the Act _____
David L. Ardell, P. Eng.

Date signed January 17, 2006

Mountain View
COUNTY

April 24, 2008

Attention: Brian M. Chikmoroff P. Eng.
Base Property Consultants Ltd.
45 Deer River Green S.E
Calgary, Alberta, T2J 7A2

Dear Mr. Chikmoroff:

Re: NW 2, S ½ 2 and SE 3-33-1 W5M

Please be advised that after review of the above property we can confirm that there is no record of any fuel storage tanks, clean-up orders, hazardous materials and/ or spills.

We can verify that there is an active gas station on SE 2-33-1 W5M; however we are unaware of the location of the fuel holding tanks.

Enclosed is the relevant charge for our time researching this information.

Sincerely,

Diana L. Hawryluk, BA, PPS, ACP, MCIP
Director of Planning and Development Services
Mountain View County
Postal Bag 100
Didsbury, AB T0M 0W0
Ph: 335 - 3311

Appendix D: Photographs

Photo One – View of SW2 Farmstead Looking Northwest

Photo Two – View of SE2 Farmstead Looking Southeast

Photo Three – View of SE3 Looking Northwest

Photo Four – View of Dugout in NW2 Wood Lot Looking East

Appendix E: Curriculum Vitae

Brian M. Chikmoroff, P. Eng.

Education

B. Sc. (Civil Engineering) 1985, University of Calgary
B. Sc. (Environmental Biology) 1979, University of Calgary

Expertise

Mr. Chikmoroff has over twenty years expertise in the planning, design, construction and marketing of land for development, management of a land bank in excess of 4000 acres plus hands-on field experience in the environmental areas of water quality sampling, soils sampling and the freeze/thaw modeling of soils.

Mr. Chikmoroff is experienced in environmental site assessments of commercial sites, raw land and residential property, conducting over 700 hundred Phase One, Two and Three Assessments on lands that had undergone varied uses since the late 1800's. He has directed soil investigations for purposes ranging from the search for environmental contaminants through to structural investigations and has participated in water sampling programs searching for and measuring contaminants. On the research side, he has studied the use of biological monitors as a means to track the presence of pollutants in aquatic environments.

Land development experience included the management of over 4000 acres of raw land in the Calgary region. Mr. Chikmoroff has been responsible for the costing, construction, pricing and marketing of residential properties ranging from entry level through to estate properties at a volume of between two to three hundred lots per year. As a part of this development process he has coordinated planning and engineering consultants to obtain provincial and municipal approvals ranging from area structure, outline and tentative plans through to subdivision and permission to construct.

In technical expertise, Mr. Chikmoroff has designed single and multi family subdivisions as well as site services for commercial developments. He has coordinated all aspects of municipal construction projects from site grading through to paving and landscaping. Mr. Chikmoroff has been responsible for materials testing on municipal construction projects.

Experience

1994 to Present	**Base Property Consultants Ltd.**
	President and Senior Environmental Consultant Responsible for Phase One, Two and Three environmental site assessments (ESA's) and environmental property audits (EPA's).
1987 - 1994	**Genstar Development Co.**
	Development Manager/Project Manager Responsible for the management of land bank, development, construction and marketing of residential properties.
1986 to 1987	**Kellam Berg Engineering and Surveys**
	Municipal Design Engineer Responsible for the deep service, roadway and sidewalk design of residential and commercial developments.
1984 to 1985	**Markborough Properties Inc.**
	Field Coordinator Responsible for the management of new and maintenance construction of residential subdivisions.
1979 to 1981	**EBA Engineering Consultants Ltd.**
	Materials Technician/ Engineering Assistant Responsible for geotechnical investigations, materials testing and analytical analysis of data from a geothermal computer model.

Professional Affiliations

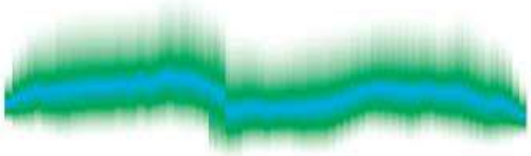
Member, Alberta Professional Engineers, Geologists and Geophysicists Association
Past Member, City of Calgary Environmental Advisory Committee
Past Chairman, Environmental Committee, Urban Development Institute, Calgary Chapter

Presentations

"Residential Land Development and Calgary's New Environmental Policy" (1993)
Conference on Sustainable Development - Faculty of Environmental Design

APPENDIX F4

Base Property Consultants – Phase 2 ESA



Bifröst

Environmental and Remediation Services Inc.

Phase Two

Environmental Site Assessment

Of

SE Sec 2 and SE Sec 3 Twp 33 Rge 1 W5M

Olds, Alberta

Prepared For : **Brown & Associates Planning Group**
Prepared By : Base Property Consultants Ltd.
Date: October 24, 2008

Executive Summary

A Phase Two Environmental Site Assessment (ESA) was completed for an agricultural acreage property located east of Olds, Alberta in the Municipal District of Mountain View. An abandoned oil and gas well lease is on the SE 3-33-1-5 and a service station is to the east of the SE 2-33-1-5. Drilling activities at the well lease typically include a drilling mud sump and a flare pit which may be potential on-site sources of subsurface contamination. Underground storage tanks (USTs) of fuel at the service station represent possible off-site sources of underground contamination to the subject site. The purpose of this investigation was to determine whether or not hydrocarbons (benzene, toluene, ethylbenzene, xylene and F1 to F4 hydrocarbon components), volatile organic compounds (VOCs) or metal contaminants are present in the soil or shallow groundwater at select points on the subject property.

Thirty-seven boreholes were advanced for subsurface investigation of existing soil and groundwater conditions. Thirty-three of these boreholes were shallow (2m in depth) and the remainder were between 7 and 10 m deep. Shallow boreholes in a 15 m grid pattern near the abandoned well head location were used to search for the sump, flare pit and well head. Natural soil in the area was observed on-site to be silt and clay till with traces of sand. An underlying layer of sandstone and siltstone bedrock was observed between 6 and 9 m below the surface. The approximate position for the wellhead was drilled (E3) but no evidence of a steel standpipe or concrete was encountered in that area. For future development of the property, the well head will have to be located for setback purposes. This would be most efficiently done at the surface grading stage of construction. No foreign material, visible staining or olfactory evidence of hydrocarbons were noted in any of the boreholes. Fill soil consisting of sand, silt and clay observed north of the approximate wellhead location (E9) could be the drilling sump. Monitoring wells were installed at E1, E3 and E9 to allow for shallow groundwater sampling. Borehole E3 produced sufficient groundwater for sampling. No evidence of a flare pit was encountered at any of the boreholes on the well lease.

Soil samples were collected from E1, E2, E3 and E9 and qualitatively sampled for hydrocarbon vapors. Recorded levels of hydrocarbons ranged from 10 to 520 PPM. The 520 PPM readings at E1 could possibly be indicative of hydrocarbon contamination. Three disturbed soil and one shallow groundwater sample were collected and sent to the laboratory for chemical analysis. No hydrocarbon or VOCs measured exceeded the

Alberta Environment criteria for residential land use. Elevated manganese in the groundwater sample is not deemed significant in the context of this investigation because its guideline is primarily an aesthetic one for drinking water.

Therefore, based upon the results of the site drilling investigation, soil and groundwater sampling program it is our opinion that no significant hydrocarbon, VOC or metals impairment exists at the selected sample points on the subject site. Further environmental investigation is not required at this time.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Background

A Phase Two Environmental Site Assessment (ESA) was completed for an agricultural acreage property located east of Olds, Alberta in the Municipal District of Mountain View. A previous Phase One ESA by Base Property Consultants Ltd. in April 2008 noted an abandoned oil and gas well lease on the SE 3-33-1-5 and a service station adjacent to he SE 2-33-1-5. Drilling activities at the well lease could include a drilling mud sump and a flare pit which may be potential on-site sources of subsurface contamination. Underground storage tanks (USTs) of fuel at the service station represent possible off-site sources of underground contamination to the subject site. The purpose of this investigation was to determine whether or not hydrocarbons (benzene, toluene, ethylbenzene, xylene and F1 to F4 hydrocarbon components), volatile organic compounds (VOCs) or metal contaminants are present in the soil or shallow groundwater at select points on the subject property.

1.2 Authorization

Mr. Greg Brown of Brown & Associates Planning Group provided written authorization to proceed with this Assessment on June 16, 2008.

1.3 Scope of Work

The scope of this Phase Two ESA was to identify the abandoned oil and gas well location and to note whether any subsurface metals, VOCs or hydrocarbon contamination is present in soil or groundwater at select locations on the well lease and adjacent to the service station site. The well head location would be approximated in the field using information from an Alberta Energy and Utility Board database. Drilling at the well head itself and in a 15 m grid pattern around the well head would be undertaken to confirm the location of the well head and to possibly locate any drilling mud sump or flare pit. Select disturbed soil samples would be qualitatively analyzed in the field for hydrocarbon vapors using an RKI Eagle Combustible Vapor Monitor with methane response off. Selection of sampling points was based upon proximity to the recorded location of the abandoned oil and gas

well lease and adjacent to the off-site service station location. Assessment criteria to which analytical results are compared are Alberta Tier 1 Soil and Groundwater Remediation Guidelines, 2008 Alberta Environment.

2.0 Soils and Groundwater Investigation

2.1 Site Description

The legal description for the property includes portions of the Southeast ¼'s of Section 2 and the Southeast ¼ of Section 3 all in Township 33 Range 1 West of the Fifth Meridian. For the purposes of this investigation specific reference to a quarter section on the subject site will be made using SE2 to refer to the SE ¼ of 2-33-1-5. Approximate area of the two ¼'s is 111.73 ha. Figure One shows the location of the site relative to Olds while Figure Two shows the site plan. All figures are presented in Appendix A.

The subject agricultural acreage property with no buildings is located 2.4 km east of Olds, Alberta. Topographical relief across the site is approximately 8 meters dropping down to the southeast. Site vegetation is planted canola on the SE2 and hay on the SE3. Alberta Environment's Groundwater Information Website has record of 10 water wells in the SE2 and 2 water wells in the SE3. Macintosh Lalani Engineering Ltd. (MLEL) completed a geotechnical for the subject site in February 2008. Natural soil observed in their investigation was silty clay till and some sand with sandstone bedrock at approximately 6.7 m below the ground surface. Road access to the property is from the south property line at the Hwy 27 service road for the SE2, Range Rd 1.2 at the east property line of the SE3. Adjacent land uses are agricultural to the north and west of SE2; west, south and east of SE3; a golf course north of SE3, a service station to the east of the SE2, new construction south of SE2 with country residences south of SE3 and north of SE2.

2.2 Sampling Method

This Phase Two ESA investigation included thirty-seven boreholes (E1 to E37), the locations of which are shown in Figures Two and Three. Albert One Call provided buried utility locations prior to commencing drilling.

Boreholes were made using a mobile solid stem auger drill rig with a 100-mm diameter auger. Disturbed soils samples were logged at approximately 1.0-meter intervals and select samples placed in plastic bags for headspace hydrocarbon vapor field monitoring. Three soil samples were collected, placed in 250-ml glass jars, stored in a cooler and transported to the lab for analysis. The Chain of Custody documentation can be found in Appendix C. The samples were selected based upon field vapor readings. A summary table of the borehole logs is presented in Appendix B.

Three, 50-mm diameter threaded PVC pipe groundwater monitoring wells were installed at borehole E1, E3 and E9 the location of which is shown in Figure Two. Horizontally machine slotted screen portions of standpipe were installed at the bottom of the wells with the remainder of the standpipe solid, each well fitted with solid end caps. The wells were backfilled with sil-9 sand to approximately 0.5 meters below the surface and then capped with 0.5m of bentonite. A steel casing with locking cap was placed over the monitoring wells for security.

An unfiltered groundwater sample would be collected from the monitoring wells producing water after bailing three times the volume of water that had collected in the well. The groundwater samples would then be placed in appropriate containers and transported to the laboratory in a cooler for laboratory analysis. The lab would receive the samples within one hour of sampling. Chain of Custody documentation can be found in Appendix C.

2.3 Drilling Results

The drilling and soil sampling program was undertaken at the site on August 25, 2008. The abandoned oil and gas lease was approximated in the field using Alberta Energy and Utility Board site drawings and marked prior to drilling. The first borehole on the SE3 lease – E3, was advanced at the approximated well head location with the next 34 boreholes radiating outwards in a 15 m grid. Boreholes E1 and E2 were drilled on the SE2 at two locations immediately west of the off-site service station property.

Thirty-seven environmental investigative boreholes were advanced up to a maximum depth of 10 meters. Natural soil observed on the site was loam overlying silt and clay till with traces of sand and gravel. An underlying layer of sandstone and siltstone bedrock was encountered between 6 and 9 m below the ground surface (bgs). No foreign material, visible staining or olfactory evidence of hydrocarbons was noted in any of the boreholes. Fill soil consisting of silt, sand and clay was encountered in the upper 4 m of boreholes E8, E9 and E11 indicating the potential location of the drilling mud sump. Monitoring wells were installed at E1, E3 and E9, nearest the service station (E1), near the well head location (E3) and in the fill area (E9). Groundwater was initially measured at 4.0 meters below the ground surface (bgs) at E3. No obvious evidence of a flare pit or well head was encountered at the well lease.

Qualitative readings of hydrocarbons from disturbed soil samples are recorded on the borehole logs. The levels recorded ranged between 10 PPM and 520 PPM. The 520 PPM reading is potentially indicative of hydrocarbon contamination.

2.4 Laboratory Results

Native soil observed in the boreholes was clay till therefore a fine-grained particle size for the conservative residential land use was used with the Alberta Tier One Guidelines. Hydrocarbon laboratory analysis results are presented in Appendix C and summarized in Table One with the guidelines. No hydrocarbons or VOC's exceeded the selected criteria. Metals laboratory analysis results are presented in Appendix C and summarized in Table Two with the guidelines. No metals in soil exceeded the selected criteria. Elevated manganese in the groundwater sample is not deemed significant in the context of this investigation because its guideline is primarily an aesthetic one for drinking water.

Table One Hydrocarbon Measurements (all values in PPM)

	Benzene	Toluene	Ethylbenzene	Xylene	F1	F2	F3	F4
AE Soil Residential	0.046	0.52	0.11	15	210	150	1300	5600
E1 8m bgs soil	<0.02	<0.02	<0.02	<0.02	<0.1	<10	316	222

Table Two Metals Measurements (all Values in PPM)

	E3 8m bgs soil	E9 5m bgs soil	E3 Water	AE Soil Residential	AE GW Residential
Arsenic	5.1	5.6	<0.01	17	0.005
Barium	220	199	0.056	500	1
Beryllium	<0.6	<0.6	<0.002	5	NG
Boron	NA	NA	0.278	2	5
Cadmium	0.2	0.2	<0.004	10	0.005
Chromium	19.3	19.3	<0.002	64	0.05
Cobalt	7.3	7.2	<0.004	20	NG
Copper	21.9	20.2	<0.004	63	1
Lead	12.6	12.0	<0.005	140	0.01
Manganese	NA	NA	**0.802**	NG	.05
Mercury	<0.5	<0.5	NA	6.6	.001
Molybdenum	0.4	<0.2	0.009	4	NG
Nickel	21.4	20.3	<0.007	50	NG
Selenium	<0.5	<0.5	<0.007	1	0.001
Silver	<0.5	<0.5	0.005	20	.1
Thallium	<0.5	<0.5	<0.03	1	NG
Uranium	NA	NA	<0.025	23	0.02
Vanadium	18.8	19.5	<0.006	130	NG
Zinc	66.4	60.9	0.008	200	0.03

NA = Not Analyzed

NG = No Guideline

3.0 Environmental Site Assessment

The approximated location for the wellhead was drilled but no evidence of a steel standpipe, concrete or fill soil was encountered in that area. For future development the well head will have to be located for setback purposes. This would be most efficiently done at the surface grading stage of construction. Therefore, based upon the results of the site drilling investigation, soil and groundwater sampling program it is our opinion that no

significant hydrocarbon, VOCs or metals impairment from on-site or off-site sources exists at the selected sample points on the subject site. Further environmental investigation is not required at this time.

4.0 Environmental Site Assessment Liability Limitations

Since the assessment was conducted on the dates presented within this report the conditions prevalent and noted at this time must be recognized as having a limited life. Should activities be introduced or practices change, either of which may not be deemed to comply with generally accepted environmental practices, the site conditions would be altered sufficiently for this report to be invalid.

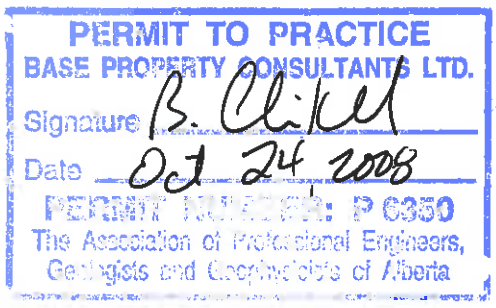
Recommendations, comments and opinions presented herein are based on a Phase Two Environmental Site Assessment as described in Section 1.3 - the Scope of Work. Sample points were selected based on proximity to known sources of potential contaminants. The report has been prepared in accordance with generally accepted environmental practice and no other warranty is made, either express or implied. Distribution of this report beyond the client is only at the mutual agreement of both the client and the author and is not assignable.

5.0 Closure

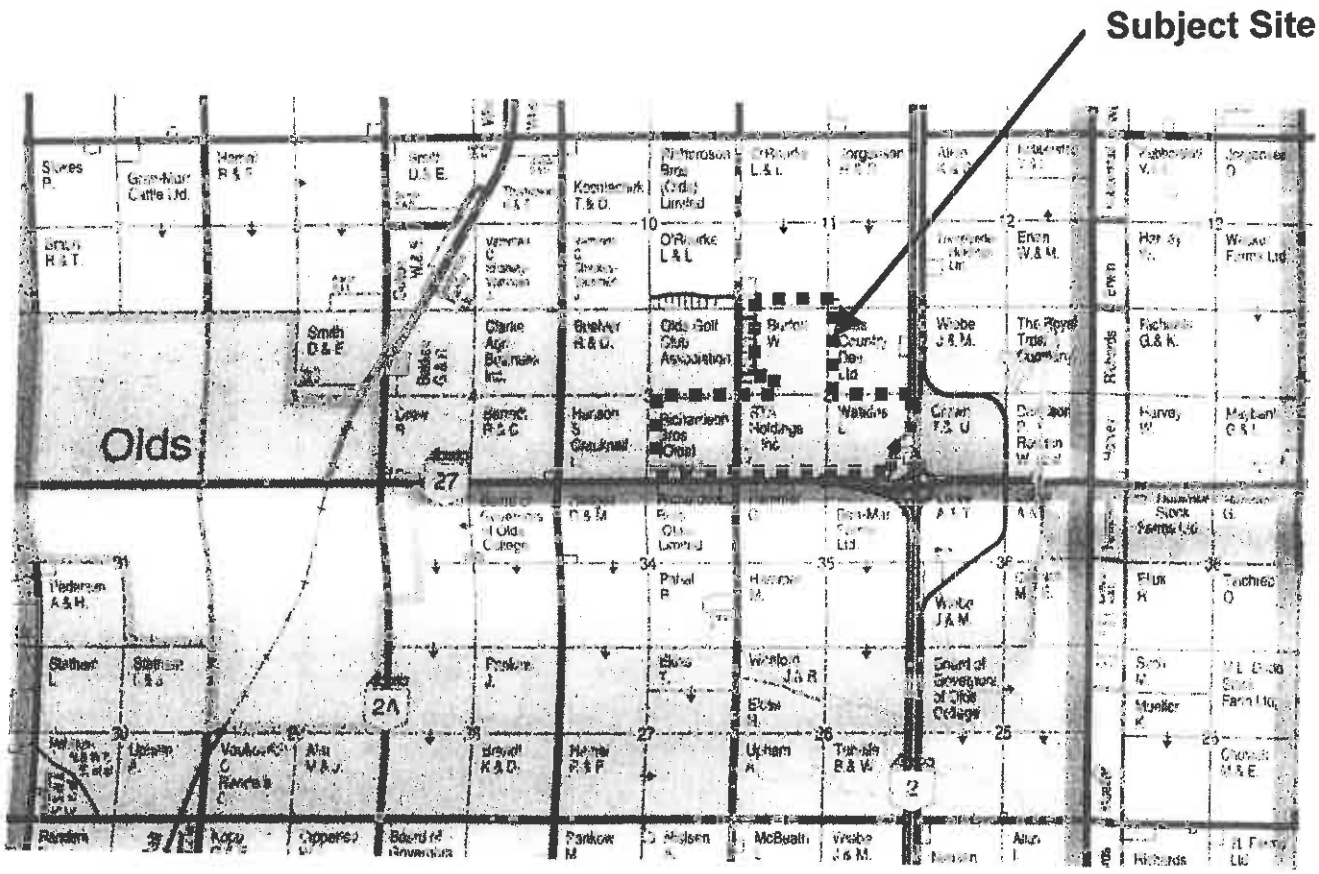
This report is respectfully submitted to Mr. Greg Brown of Brown & Associates Planning Group for review and we trust that it meets your present needs. Should you have any questions please do not hesitate in contacting us.

Respectfully submitted,

Brian M. Chikmoroff, P. Eng.
Environmental Consultant

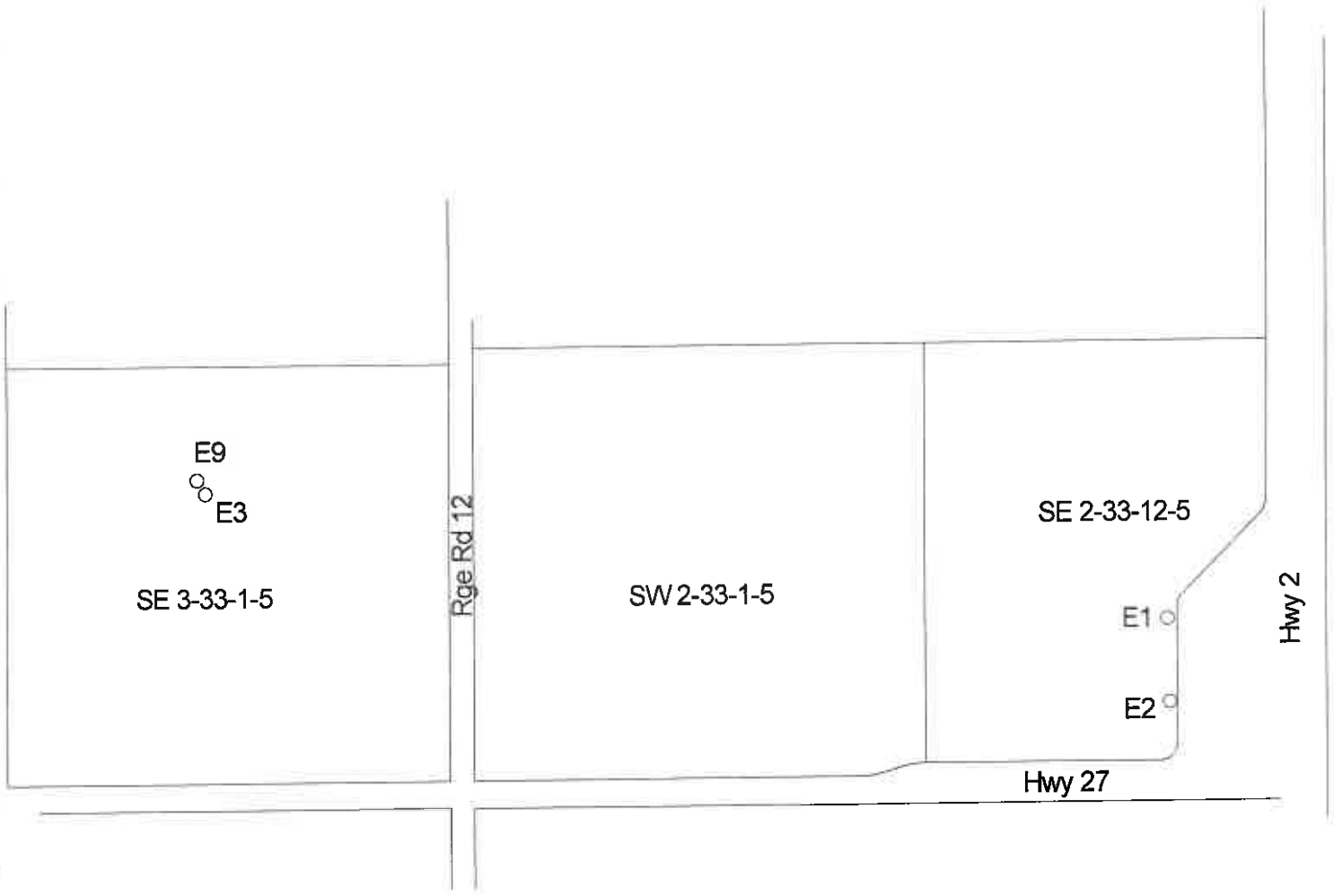


Appendix A: Figures



N

Figure One

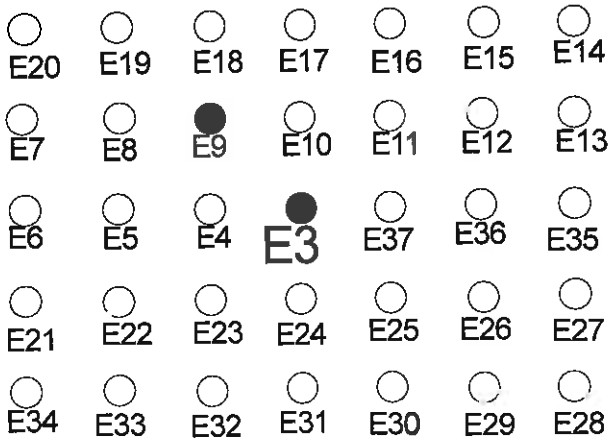


Legend

○ Borehole

N

Client: Brown & Associates Planning Group	Base Property Consultants Ltd.		
Project: Mountian View Meadows, Olds, AB	Date: Oct 24 08	Drawn By: bc	Checked By: BC
Title: SITE PLAN	Scale: nts	Project No.: ESA 872-2	Figure 2



Legend

E12 Borehole

E3 Monitoring Well

Client:	Brown & Associates Planning Group	Base Property Consultants Ltd.		
Project:	Mountain View Meadows Olds, AB	Date: Oct 24/08	Drawn By: bc	Checked By: BC
Title:	Drilling Detail SE 3-33-1-5	Scale: nts	Project No.: ESA 872-2	Figure 3

Appendix B: Bore hole Logs

Soil Borehole Log Summary

Borehole	Description
E4 to E7	Loam 0.1 to 0.2 m over Silt & Sand then Clay Till, olive, moist, hard. Drilled to a depth of 2 m.
E8	Loam 0.1m , Clay and Silt Fill, trace sand to 4.2 m over Clay Till, olive. Drilled to a depth of 4.5 m.
E9 & E10	Loam 0.1 m over Silt & Sand then Clay Till, olive, moist, hard. Drilled to a depth of 2 m.
E11	Loam 0.1m , Silt, Sand & Clay Fill, tr wood chips and rootlets to 4 m over Clay Till. Drilled to a depth of 4.5 m.
E12 to E37	Loam 0.1 to 0.2 m over Silt & Sand then Clay Till, olive, moist, hard. Drilled to a depth of 2 m.

PROJECT: Mountain View Meadows	**BOREHOLE NO. E1**
PROJECT NO.: ESA 872-2	**DRILL TYPE:** Auger
LOCATION: Olds, AB	**ELEVATION:** na
CLIENT: Brown & Associates	

SAMPLE TYPE: ■ SHELBY TUBE ▨ SPLIT SPOON ▩ DISTURBED

DEPTH (m)		SAMPLE TYPE	SAMPLE NO.	Lab Sample	VOC (PPM)	Well Profile
0.0	Grass					
1.0	Sand & Clay Till, lt olive, moist, compact				10	Bentonite
2.0	Clay Till, olive, moist, hard				25	
3.0	Clay Till, olive, moist, hard				70	
4.0	Clay Till, tr sand, olive, moist, hard				100	Sand
5.0	Clay Till, tr gravel, olive, moist, hard				60	Dry
6.0	Clay Till, dk olive, moist, hard				60	
7.0	Clay Till, dk olive, moist, hard				190	
8.0	Clay Till, tr gravel, dk olive, moist, hard		E1-8	X	520	
9.0	Sandstone Bedrock, gray, dry, hard				15	
10.0						
11.0						
12.0						

BASE PROPERTY CONSULTANTS LTD.

GROUNDWATER LEVEL: dry — DATE: Aug 25, 2008

DATE DRILLED: Aug 25, 2008 — LOGGED BY: bc

PAGE 1 of 4

PROJECT: Mountain View Meadows	**BOREHOLE NO. E2**
PROJECT NO.: ESA 872-2	**DRILL TYPE:** Auger
LOCATION: Olds, AB	**ELEVATION:** na
CLIENT: Brown & Associates	

SAMPLE TYPE: ■ SHELBY TUBE ▨ SPLIT SPOON ▩ DISTURBED

DEPTH (m)		SAMPLE TYPE	SAMPLE NO.	Lab Sample	VOC (PPM)	Well Profile
0.0	Grass					
1.0	Silt, olive, moist, firm				10	
2.0	Clay Till, olive, moist, hard				15	
3.0	Clay Till, tr gravel, olive, moist, hard				25	
4.0	Clay Till, tr gravel, olive, moist, hard				20	
5.0	Clay Till, tr gravel, olive, moist, hard				10	
6.0	Siltstone Bedrock, gray, dry, hard				10	
7.0	Siltstone Bedrock, gray, dry, hard				20	
8.0						
9.0						
10.0						
11.0						
12.0						

BASE PROPERTY CONSULTANTS LTD.

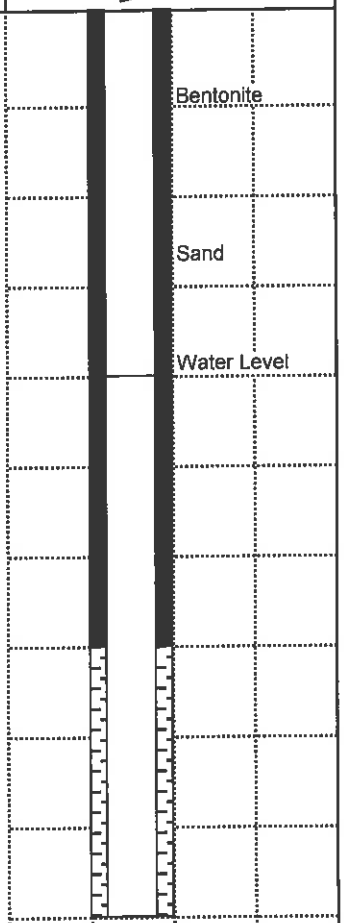
GROUNDWATER LEVEL: na | DATE: Aug 25, 2008

DATE DRILLED: Aug 25, 2008 | LOGGED BY: bc

PROJECT: Mountain View Meadows	**BOREHOLE NO. E3**
PROJECT NO.: ESA 872-2	**DRILL TYPE:** Auger
LOCATION: Olds, AB	**ELEVATION:** na
CLIENT: Brown & Associates	

SAMPLE TYPE: ■ SHELBY TUBE ▨ SPLIT SPOON ▩ DISTURBED

DEPTH (m)		SAMPLE TYPE	SAMPLE NO.	Lab Sample	VOC (PPM)
0.0	Grass				
1.0	Sand, tr gravel, lt olive, dry, compact				15
2.0	Sand, tr gravel, lt olive, dry, compact				30
3.0	Silt & Clay Till, tr gravel, med olive, moist, stiff				20
4.0	Silt & Clay Till, tr gravel, med olive, moist, stiff				25
5.0	Silt & Clay Till, tr gravel, dk olive-gray, moist, hard				35
6.0	Silt & Clay Till, tr gravel, dk olive-gray, moist, hard				10
7.0	Silt & Clay Till, tr sand, gray, moist, hard				45
8.0	Silt & Clay Till, tr sand, gray, moist, hard		E3-8	X	50
9.0	Silt & Clay Till, tr sand, gray, moist, hard				25
10.0	Silt & Clay Till, tr sand, gray, moist, hard				10
11.0					
12.0					



BASE PROPERTY CONSULTANTS LTD.

GROUNDWATER LEVEL: 4 m bgs | DATE: Aug 25, 2008

DATE DRILLED: Aug 25, 2008 | LOGGED BY: bc

PROJECT: Mountain View Meadows	**BOREHOLE NO. E9**
PROJECT NO.: ESA 872-2	**DRILL TYPE:** Auger
LOCATION: Olds, AB	**ELEVATION:** na
CLIENT: Brown & Associates	

SAMPLE TYPE: SHELBY TUBE | SPLIT SPOON | DISTURBED

DEPTH (m)		SAMPLE TYPE	SAMPLE NO.	Lab Sample	VOC (PPM)
0.0	Grass				
1.0	Silt, Clay & Sand Fill, olive, moist, firm				20
2.0	Silt, Clay & Sand Fill, olive, moist, firm				20
3.0	Silt, Clay & Sand Fill, olive, moist, firm				25
4.0	Silt, Clay & Sand Fill, olive, moist, firm				50
5.0	Clay Till, dk olive, moist, hard		E9-5	X	75
6.0	Clay Till, dk olive, moist, hard				15
7.0	Clay Till, dk olive, moist, hard				15
8.0					
9.0					
10.0					
11.0					
12.0					

Well Profile: Bentonite; Sand; Water Level

BASE PROPERTY CONSULTANTS LTD.

GROUNDWATER LEVEL: 4.2 m b | DATE: Aug 25, 2008

DATE DRILLED: Aug 25, 2008 | LOGGED BY: bc

Appendix C: Laboratory Results

ANALYTICAL REQUEST FORM

COC# 37601

Access Analytical Laboratories Inc.
#3, 2215 - 27 Avenue, N.E., Calgary, AB T2E 7M4
Phone (403) 291-4682 Fax (403) 291-4688
www.accesslabs.ca

Turnaround

Normal ☒ (5 Days)
Rush ☐ ☐ ☐ ☐
Days 1 2 3 4

Access W/O#
Project ESA 872-2
Legal

REPORTING INFORMATION

Consultant Base Property Consultants Ltd.
Contact Brian Chikmoroff
Address 45 Deer River Green SE
Calgary, AB. T2J 7A2
Phone (403) 680-6284 Cell
Fax (403) 278-9738
e-mail

Reporting Method
Mail X ☐
Fax X ☐
Email:
PDF ☐
Excel ☐
Flat ☐

INVOICING INFORMATION

Client Base Property Consultants Ltd.
Contact Brian Chikmoroff
Address 45 Deer River Green SE
Calgary, AB. T2J 7A2
Phone (403) 680-6284
Fax (403) 278-9738
e-mail

To Consultant
Report ☐
Report + Invoice X ☐
To Client
Report ☐
Report + Invoice ☐
Invoice Only ☐

Relinquished By Aug 25/08 B Chikmoroff
Date
Received By
Date

Relinquished By
Date
Received By
Date

Analysis Request

Access Lab #	Client Sample Description	Date / Time	Containers Jar	Bag	CCME PCS	VOC 624	TERM	Hol
1	E1 - 3		✓		✓			
2	E3 - 8		✓			✓	✓	
3	E9 - 5a		✓			✓	✓	
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Special Instructions

Access Analytical Laboratories Inc.
#3, 2215 - 27 Avenue, N.E., Calgary, AB T2E 7M4
Phone (403) 291-4682 Fax (403) 291-4688
www.accesslabs.ca

ANALYTICAL REQUEST FORM

COC# 3755

Turnaround
Normal [X] (5 Days)
Rush [ ] [ ] [ ] [ ]
Days 1 2 3 4

Access W/O#
Project ESA 8712-2
Legal

REPORTING INFORMATION

Consultant Base Property Consultants Ltd.
Contact Brian Chikmoroff
Address 45 Deer River Green SE
Calgary, AB. T2J 7A2
Phone (403) 660-6284 **Cell**
Fax (403) 278-9738
e-mail

Reporting Method
Mail X [ ]
Fax X [ ]
Email:
PDF [ ]
Excel [ ]
Flat [ ]

Relinquished By [signature]
Date Oct 10/08
Received By
Date

Relinquished By
Date 10Oct/08
Received By [signature]
Date

INVOICING INFORMATION

Client Base Property Consultants Ltd.
Contact Brian Chikmoroff
Address 45 Deer River Green SE
Calgary, AB. T2J 7A2
Phone (403) 660-6284
Fax (403) 278-9738
e-mail

To Consultant
Report [ ]
Report + Invoice X [ ]
To Client
Report [ ]
Report + Invoice [ ]
Invoice Only [ ]

Analysis Request

Access Lab #	Client Sample Description	Date Time	Containers Jar	Containers Bag	VOC624	MWQ	Hold
1	E3		✓		✓	✓	
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Special Instructions

Access Analytical Laboratories Inc.

#3, 2215 - 27 Avenue N.E., Calgary, AB T2E 7M4
Tel: (403) 291-4682 • Fax: (403) 291-4688
www.accesslabs.ca

Name: Base Property Consultants Ltd.	**Workorder:** 23630
Address: 45 Deer River Green S.E	**COC:** 37600
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Aug 26, 2008
Phone: (403) 660-6284	**Date Reported:** Sep 3, 2008
Fax: (403) 278-9738	**Samples:** 3 Soil

CCME Petroleum Hydrocarbons - Soil

Lab #:			**23630-01**
Date Sampled:			**26-Aug-08**
	Detection Limit	**Units**	**E1-8**
BTEX			
Extraction Date			26-Aug-08
Benzene	0.02	mg/kg dry wt.	< 0.02
Toluene	0.02	mg/kg dry wt.	< 0.02
Ethyl Benzene	0.02	mg/kg dry wt.	< 0.02
m,p-Xylene	0.02	mg/kg dry wt.	< 0.02
o-Xylene	0.02	mg/kg dry wt.	< 0.02
Total Xylenes (o,m, & p)	0.02	mg/kg dry wt.	< 0.02
CCME Petroleum Hydrocarbons			
Extraction Date			26-Aug-08
F1-BTX	0.1	mg/kg dry wt.	< 0.1
F2 (C10 - C16)	10	mg/kg dry wt.	< 10
F3 (C16 - C34)	10	mg/kg dry wt.	316
F4 (C34 - C50)	10	mg/kg dry wt.	164
F4-HTG (C34+)***	10	mg/kg dry wt.	222**
% Moisture	0.1	%	12.5

*Chromatogram did go to baseline (as per CCME guidelines) therefore report only the F4 (C34-C50) value.

**Chromatogram did not go to baseline

*** The F4 fraction to be reported can be either F4 (C34 - C50) or F4 $_{HTG}$ (C34+). Fraction F4$_{HTG}$ is a result derived from the use of high temperature gas chromatography as noted in the CCME Canada-Wide PHC Method and should be utilized if it is noted that the chromatogram **does not** go to baseline.

BTEX results, and PAHs (if requested), have been subtracted from the appropriate fractions.

Access Analytical Laboratories Inc.

Name:	Base Property Consultants Ltd.	**Workorder:**	**23630**
Address:	45 Deer River Green S.E	**COC:**	37600
		Project:	ESA 872-2
	Calgary	**Legal Desc:**	
	AB T2J 7A2		
Contact:	Brian Chikmoroff	**Date Received:**	Aug 26, 2008
Phone:	(403) 660-6284	**Date Reported:**	Sep 3, 2008
Fax:	(403) 278-9738	**Samples:**	3 Soil

EPA 624 Volatiles Screen - Soil

Lab #:			**23630-02**	**23630-03**
Date Sampled:			**26-Aug-08**	**26-Aug-08**
	Detection Limit	**Units**	**E3-8**	**E9-5a**
EPA 624				
Benzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
Bromodichloromethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Bromoform	0.02	mg/kg dry wt.	< 0.02	< 0.02
Bromomethane	0.1	mg/kg dry wt.	< 0.1	< 0.1
Carbon Tetrachloride	0.01	mg/kg dry wt.	< 0.01	< 0.01
Chlorobenzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
Chloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Chloroform	0.01	mg/kg dry wt.	< 0.01	< 0.01
Chloromethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Dibromochloromethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,2-Dichlorobenzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,3-Dichlorobenzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,4-Dichlorobenzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,1-Dichloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,2-Dichloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,1-Dichloroethene	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,2-Dichloroethene (cis)	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,2-Dichloroethene (trans)	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,2-Dichloropropane	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,3-Dichloropropene (cis)	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,3-Dichloropropene (trans)	0.02	mg/kg dry wt.	< 0.02	< 0.02
Ethyl Benzene	0.02	mg/kg dry wt.	< 0.02	< 0.02
Methylene Chloride	0.1	mg/kg dry wt.	< 0.1	< 0.1
1,1,2,2-Tetrachloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Tetrachloroethene	0.02	mg/kg dry wt.	< 0.02	< 0.02
Toluene	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,1,1-Trichloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
1,1,2-Trichloroethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Trichloroethene	0.02	mg/kg dry wt.	< 0.02	< 0.02
Trichlorofluoromethane	0.02	mg/kg dry wt.	< 0.02	< 0.02
Vinyl Chloride	0.01	mg/kg dry wt.	< 0.01	< 0.01
Total Xylenes (o,m, & p)	0.02	mg/kg dry wt.	< 0.02	< 0.02
Surrogates				
1,2-Dichloroethane-d4		%	89	87
Toluene-d8		%	100	100
Bromofluorobenzene		%	103	105

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd.	**Workorder:** 23630
Address: 45 Deer River Green S.E	**COC:** 37600
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Aug 26, 2008
Phone: (403) 660-6284	**Date Reported:** Sep 3, 2008
Fax: (403) 278-9738	**Samples:** 3 Soil

Metals - Alberta Tier I - Soil

Lab #:			**23630-02**	**23630-03**
Date Sampled:			**26-Aug-08**	**26-Aug-08**
	Detection Limit	**Units**	**E3-8**	**E9-5a**
Metals Tier 1				
Antimony	0.4	mg/kg dry wt.	<0.4	<0.4
Arsenic	0.6	mg/kg dry wt.	5.1	5.6
Barium	0.5	mg/kg dry wt.	220	199
Beryllium	0.6	mg/kg dry wt.	<0.6	<0.6
Cadmium	0.1	mg/kg dry wt.	0.2	0.2
Chromium	0.4	mg/kg dry wt.	19.3	19.3
Cobalt	0.5	mg/kg dry wt.	7.3	7.2
Copper	0.2	mg/kg dry wt.	21.9	20.2
Lead	0.3	mg/kg dry wt.	12.6	12.0
Molybdenum	0.2	mg/kg dry wt.	0.4	<0.2
Nickel	0.6	mg/kg dry wt.	21.4	20.3
Selenium	0.5	mg/kg dry wt.	<0.5	<0.5
Silver	0.5	mg/kg dry wt.	<0.5	<0.5
Thallium	0.5	mg/kg dry wt.	<0.5	<0.5
Tin	0.6	mg/kg dry wt.	<0.6	<0.6
Vanadium	0.3	mg/kg dry wt.	18.8	19.5
Zinc	0.5	mg/kg dry wt.	66.4	60.9
Mercury				
Mercury	0.5	mg/kg dry wt.	< 0.5	< 0.5

Access Analytical Laboratories Inc.

Per: _____

Bob Corbet, M.Sc., P.Chem.
Manager, Technical Services

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd.	**Workorder:** 23630
Address: 45 Deer River Green S.E	**COC:** 37600
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Aug 26, 2008
Phone: (403) 660-6284	**Date Reported:** Sep 3, 2008
Fax: (403) 278-9738	**Samples:** 3 Soil

Soil and Water Quality Guidelines for Hydrocarbons at Upstream Oil and Gas Facilities (July, 2007)

Alberta Tier 1 Hydrocarbon Remediation Guidelines for Surface Soils

Land Use	Soil Type	Benzene	Toluene	Ethylbenzene	Xylenes	mg/kg F1	F2	F3	F4
Natural	Fine	0.046	0.52	0.11	15	210	150	1300	5600
	Coarse	0.078	0.49	0.21	28	210	150	300	2800
Agricultural	Fine	0.046	0.52	0.11	15	210	150	1300	5600
	Coarse	0.073	0.49	0.21	12	24	130	300	2800
Residential	Fine	0.046	0.52	0.11	15	210	150	1300	5600
	Coarse	0.073	0.49	0.21	12	24	130	300	2800
Commercial	Fine	0.046	0.52	0.11	15	320	260	2500	6600
	Coarse	0.078	0.49	0.21	28	270	260	1700	3300
Industrial	Fine	0.046	0.52	0.11	15	320	260	2500	6600
	Coarse	0.078	0.49	0.21	28	270	260	1700	3300

Alberta Tier 1 Hydrocarbon Remediation Guidelines for Sub-Soils(2007)*

Applicable below 1.5m depth within a 5 metre radius of wellhead (3 metres depth everywhere else)

Land Use	Soil Type	Benzene	Toluene	Ethylbenzene	Xylenes	mg/kg F1	F2	F3	F4
Natural	Fine	0.046	0.52	0.11	15	420	300	2600	10000
	Coarse	0.078	0.49	0.21	28	420	300	600	5600
Agricultural	Fine	0.046	0.52	0.11	15	420	300	2600	10000
	Coarse	0.078	0.49	0.21	16	30	160	600	5600
Residential	Fine	0.046	0.52	0.11	15	420	300	2600	10000
	Coarse	0.078	0.49	0.21	16	30	160	600	5600
Commercial	Fine	0.046	0.52	0.11	15	640	520	3500	10000
	Coarse	0.078	0.49	0.21	28	440	520	2500	6600
Industrial	Fine	0.046	0.52	0.11	15	640	520	3500	6600
	Coarse	0.078	0.49	0.21	28	440	520	2500	6600

*F1 to F4 = Petroleum Hydrocarbon Fractions as defined by CCME (2001)

***The Guidelines noted above are as per the July, 2007 revision and represent the most stringent criteria in each category (pathway). To see the entire Guide, please refer to Tier 1 Guidelines Alta. Environment (July, 2007)**

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd.	**Workorder:** 23630
Address: 45 Deer River Green S.E	**COC:** 37600
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Aug 26, 2008
Phone: (403) 660-6284	**Date Reported:** Sep 3, 2008
Fax: (403) 278-9738	**Samples:** 3 Soil

Quality Assurance Report

Method: CCME Response Factors
Date: 29-Aug-08
Analyst: Gavin January

Carbon Range	Amount Ng's	Area	RF	RT	% of Tol.
C6	100	30759	0.003251	3.83	104+/- 30%
C10	100	30689	0.003258	13.02	104+/- 30%
Toluene	100	31857	0.003139	7.49	100

Carbon Range	Response	
C10/C12	0.0716	
C16	0.0705	
C34	0.0712	
C50	0.0711	
Average RF C10, 16, 34	0.0711	
		Range %
Average RF C10, 26, 34 / RF C50	108.4%	70-110

Calibration Check Low Point	Actual Amt (ng)	Recovered Amt (ng)	% Recovery
Benzene	10.0	10.7	107%
Toluene	10.0	9.9	99%
Ethyl Benzene	10.0	9.4	94%
M+P Xylenes	10.0	9.5	95%
O-Xylene	10.0	9.5	95%

Calibration Check Mid Point	Actual Amt (ng)	Recovered Amt (ng)	% Recovery
Benzene	100	90	90%
Toluene	100	97	97%
Ethyl Benzene	100	89	89%
M+P Xylenes	100	88	88%
O-Xylene	100	93	93%

Estimates of uncertainty can be provided upon request.
Data for quality control samples is available on request.

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd.	**Workorder:** 23630
Address: 45 Deer River Green S.E	**COC:** 37600
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Aug 26, 2008
Phone: (403) 660-6284	**Date Reported:** Sep 3, 2008
Fax: (403) 278-9738	**Samples:** 3 Soil

Quality Assurance Report

Method: Metals in Soil
Date: 02-Sep-08
Analyst: Sandra Hirsche

Analyte	EnviroMat 1	EnviroMat 2	Advisory Range	Units
Antimony	0.24	0.22	0.18-0.28	ppm
Arsenic	0.33	0.32	0.28-0.37	ppm
Barium	0.50	0.50	0.38-0.59	ppm
Beryllium	0.21	0.21	0.16-0.25	ppm
Cadmium	0.12	0.12	0.09-0.15	ppm
Chromium	0.18	0.18	0.15-0.21	ppm
Cobalt	0.27	0.28	0.23-0.33	ppm
Copper	0.34	0.33	0.26-0.42	ppm
Lead	0.28	0.28	0.22-0.34	ppm
Molybdenum	0.32	0.31	0.24-0.40	ppm
Nickel	0.33	0.33	0.28-0.40	ppm
Selenium	0.08	0.06	0.046-0.072	ppm
Thallium	0.20	0.18	0.14-0.21	ppm
Vanadium	0.37	0.36	0.30-0.43	ppm
Zinc	0.41	0.42	0.30-0.51	ppm

Method: Hg in Soil
Date: 02-Sep-08
Analyst: Rahul Surywanshi

Analyte	CRM020 1	CRM020 2	Advisory Range	Units
Mercury	0.77	0.81	0.59-0.85	ppm

Estimates of uncertainty can be provided upon request

Access Analytical Laboratories Inc.

Name:	Base Property Consultants Ltd.	**Workorder:**	**23630**
Address:	45 Deer River Green S.E	**COC:**	37600
		Project:	ESA 872-2
	Calgary	**Legal Desc:**	
	AB T2J 7A2		
Contact:	Brian Chikmoroff	**Date Received:**	Aug 26, 2008
Phone:	(403) 660-6284	**Date Reported:**	Sep 3, 2008
Fax:	(403) 278-9738	**Samples:**	3 Soil

Method References

BTEX

Preparation based on EPA 5035; Analysis based on "Volatile Organic Contaminants by GC/MS", EPA 8240/8260.

Mercury (Cold Vapour)

Based on U.S. EPA Method 7473 by Thermal Decompostition followed by Atomic Absorption Spectrophotometry.

Metals Prep in Soil / Solid

Based on EPA Method 3050B. Acid Digestion of Sediments, Sludges and Soils.

Metals Tier 1: EPA 3050 Digest

Based on U.S. EPA Method 3050 digestion with analysis by ICP-AES (EPA Method 6010B).

*Results relate only to the items tested.
*Parameters reported in italics designates non-accreditation.

Access Analytical Laboratories Inc.

#3, 2215 - 27 Avenue N.E., Calgary, AB T2E 7M4
Tel: (403) 291-4682 - Fax: (403) 291-4688
www.accesslabs.ca

Name: Base Property Consultants Ltd.	**Workorder:** 24270
Address: 45 Deer River Green S.E	**COC:** 37555
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Oct 10, 2008
Phone: (403) 660-6284	**Date Reported:** Oct 20, 2008
Fax: (403) 278-9738	**Samples:** 1 Water

EPA 624 Volatile Screen - Water

Lab #:			24270-01
Date Sampled:			10-Oct-08
	Detection Limit	**Units**	**E3**
EPA 624			
Benzene	0.001	mg/L	< 0.001
Bromodichloromethane	0.001	mg/L	< 0.001
Bromoform	0.001	mg/L	< 0.001
Bromomethane	0.005	mg/L	< 0.005
Carbon Tetrachloride	0.0005	mg/L	< 0.0005
Chlorobenzene	0.001	mg/L	< 0.001
Chloroethane	0.001	mg/L	< 0.001
Chloroform	0.0005	mg/L	< 0.0005
Chloromethane	0.001	mg/L	< 0.001
Dibromochloromethane	0.001	mg/L	< 0.001
1,2-Dichlorobenzene	0.001	mg/L	< 0.001
1,3-Dichlorobenzene	0.001	mg/L	< 0.001
1,4-Dichlorobenzene	0.001	mg/L	< 0.001
1,1-Dichloroethane	0.001	mg/L	< 0.001
1,2-Dichloroethane	0.001	mg/L	< 0.001
1,1-Dichloroethene	0.001	mg/L	< 0.001
1,2-Dichloroethene (cis)	0.001	mg/L	< 0.001
1,2-Dichloroethene (trans)	0.001	mg/L	< 0.001
1,2-Dichloropropane	0.001	mg/L	< 0.001
1,3-Dichloropropene (cis)	0.001	mg/L	< 0.001
1,3-Dichloropropene (trans)	0.001	mg/L	< 0.001
Ethyl Benzene	0.001	mg/L	< 0.001
Methylene Chloride	0.005	mg/L	< 0.005
1,1,2,2-Tetrachloroethane	0.001	mg/L	< 0.001
Tetrachloroethene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
1,1,1-Trichloroethane	0.001	mg/L	< 0.001
1,1,2-Trichloroethane	0.001	mg/L	< 0.001
Trichloroethene	0.001	mg/L	< 0.001
Trichlorofluoromethane	0.001	mg/L	< 0.001
Vinyl Chloride	0.0005	mg/L	< 0.0005
Total Xylenes (o,m, & p)	0.001	mg/L	< 0.001

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd.	**Workorder:** 24270
Address: 45 Deer River Green S.E	**COC:** 37555
	Project: ESA 872-2
Calgary	**Legal Desc:**
AB T2J 7A2	
Contact: Brian Chikmoroff	**Date Received:** Oct 10, 2008
Phone: (403) 660-6284	**Date Reported:** Oct 20, 2008
Fax: (403) 278-9738	**Samples:** 1 Water

Quality Assurance Report

Method: BTEX
Date: 17-Oct-08
Analyst: Ron Towler

Calibration Check

Analyte	Amount Expected	Amount Found	Recovery	Units
Benzene	200	181	91%	ng
Toluene	200	188	94%	ng
Ethyl Benzene	200	204	102%	ng
M+P Xylenes	400	413	103%	ng
O-Xylene	200	209	105%	ng
Trichloroethene	200	184	92%	ng
Tetrachloroethene	200	190	95%	ng
Naphthalene	200	225	113%	ng

	Matrix Spike - Sample #1			Matrix Spike - Sample #2		
Analyte	Amount Expected	Amount Found	Recovery	Amount Expected	Amount Found	Recovery
Benzene	39.9	41.4	103.8%	39.9	40.2	100.8%
Toluene	18.0	20.2	112.2%	18.0	20.7	114.9%
Ethyl-Benzene	197.3	203.1	102.9%	197.3	195.2	98.9%
M+P Xylenes	176.6	196.9	111.5%	176.6	182.4	103.3%
O-Xylene	13.8	13.6	98.3%	13.8	15.1	109.1%
			105.7%			105.4%
			% Accuracy	105.6		
			%RSD	0.305		

Duplicates	Sample #1 09-Oct-08	Sample #2 09-Oct-08	% Difference
Benzene	0.000	0.000	0.00
Toluene	0.000	0.000	0.00
Ethyl-Benzene	0.000	0.000	0.00
M+P Xylenes	0.000	0.000	0.00
O-Xylene	0.000	0.000	0.00

Estimates of uncertainty can be provided upon request

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd. **Address:** 45 Deer River Green S.E Calgary AB T2J 7A2 **Contact:** Brian Chikmoroff **Phone:** (403) 660-6284 **Fax:** (403) 278-9738	**Workorder:** 24270 **COC:** 37555 **Project:** ESA B72-2 **Legal Desc:** **Date Received:** Oct 10, 2008 **Date Reported:** Oct 20, 2008 **Samples:** 1 Water

Quality Assurance Report

Method: Metals in Water
Date: 16-Oct-08
Analyst: Sandra Hirsche

Analyte	EnviroMat 1	EnviroMat 2	Advisory Range	Units
Aluminum	0.86	0.83	0.717-0.989	ppm
Antimony	0.24	0.24	0.162-0.277	ppm
Arsenic	0.18	0.18	0.146-0.214	ppm
Barium	0.52	0.52	0.470-0.569	ppm
Beryllium	0.09	0.09	0.077-0.103	ppm
Boron	0.60	0.61	0.494-0.766	ppm
Cadmium	0.11	0.11	0.093-0.127	ppm
Cobalt	0.34	0.34	0.288-0.373	ppm
Chromium	0.90	0.91	0.726-1.03	ppm
Copper	0.59	0.61	0.552-0.650	ppm
Iron	0.74	0.70	0.624-0.813	ppm
Lead	0.82	0.84	0.888-0.926	ppm
Molybdenum	0.58	0.59	0.473-0.666	ppm
Nickel	0.90	0.91	0.788-0.968	ppm
Selenium	0.06	0.06	0.032-0.088	ppm
Strontium	0.67	0.73	0.576-0.78	ppm
Vanadium	0.91	0.92	0.798-1.01	ppm
Zinc	0.46	0.44	0.387-0.494	ppm

Estimates of uncertainty can be provided upon request

Access Analytical Laboratories Inc.

Name: Base Property Consultants Ltd. **Address:** 45 Deer River Green S.E Calgary AB T2J 7A2 **Contact:** Brian Chikmoroff **Phone:** (403) 660-6284 **Fax:** (403) 278-9738	**Workorder:** 24270 **COC:** 37555 **Project:** ESA 872-2 **Legal Desc:** **Date Received:** Oct 10, 2008 **Date Reported:** Oct 20, 2008 **Samples:** 1 Water

Method References

Metals in Water (ICP-AES)

U.S. EPA 600/4-79-620, Method no. 200.7 9ICP-AES)

Metals in Water (ICP-MS)

U.S. EPA 600/4-79-620, Method no. 200.7 9ICP-MS). Passed proficiency testing and are awaiting notice of final accreditation.

*Results relate only to the items tested.
*Parameters reported in italics designates non-accreditation.

Appendix D – Curriculum Vitae

Brian M. Chikmoroff, P. Eng.

Education

B. Sc. (Civil Engineering) 1985, University of Calgary
B. Sc. (Environmental Biology) 1979, University of Calgary

Expertise

Mr. Chikmoroff has over twenty years expertise in the planning, design, construction and marketing of land for development, management of a land bank in excess of 4000 acres plus hands-on field experience in the environmental areas of water quality sampling, soils sampling and the freeze/thaw modeling of soils.

Mr. Chikmoroff is experienced in environmental site assessments of commercial sites, raw land and residential property, conducting over 700 hundred Phase One, Two and Three Assessments on lands that had undergone varied uses since the late 1800's. He has directed soil investigations for purposes ranging from the search for environmental contaminants through to structural investigations and has participated in water sampling programs searching for and measuring contaminants. On the research side, he has studied the use of biological monitors as a means to track the presence of pollutants in aquatic environments.

Land development experience included the management of over 4000 acres of raw land in the Calgary region. Mr. Chikmoroff has been responsible for the costing, construction, pricing and marketing of residential properties ranging from entry level through to estate properties at a volume of between two to three hundred lots per year. As a part of this development process he has coordinated planning and engineering consultants to obtain provincial and municipal approvals ranging from area structure, outline and tentative plans through to subdivision and permission to construct.

In technical expertise, Mr. Chikmoroff has designed single and multi family subdivisions as well as site services for commercial developments. He has coordinated all aspects of municipal construction projects from site grading through to paving and landscaping. Mr. Chikmoroff has been responsible for materials testing on municipal construction projects.

Experience

1994 to Present	**Base Property Consultants Ltd.** President and Senior Environmental Consultant Responsible for Phase One, Two and Three environmental site assessments (ESA's) and environmental property audits (EPA's).
1987 - 1994	**Genstar Development Co.** Development Manager/Project Manager Responsible for the management of land bank, development, construction and marketing of residential properties.
1986 to 1987	**Kellam Berg Engineering and Surveys** Municipal Design Engineer Responsible for the deep service, roadway and sidewalk design of residential and commercial developments.
1984 to 1985	**Markborough Properties Inc.** Field Coordinator Responsible for the management of new and maintenance construction of residential subdivisions.
1979 to 1981	**EBA Engineering Consultants Ltd.** Materials Technician/ Engineering Assistant Responsible for geotechnical investigations, materials testing and analytical analysis of data from a geothermal computer model.

Professional Affiliations

Member, Alberta Professional Engineers, Geologists and Geophysicists Association
Past Member, City of Calgary Environmental Advisory Committee
Past Chairman, Environmental Committee, Urban Development Institute, Calgary Chapter

Presentations

"Residential Land Development and Calgary's New Environmental Policy" (1993)
Conference on Sustainable Development - Faculty of Environmental Design