E.Killam Associates o Consulting Engineers

Project #

Project Name OSRAM-Sylvania

Memorandum to File

By: E.D.	Source:	Copies to:	File At:
Date: 9-29-98	☐ phone conversation	☐ K. Saylor	☐
Time:	☐ meeting notes	☐ D. Krysinski	☐
Follow-up required? ☒ Yes ☐ No	☒ field reconnaissance	☐	☐ pitch when completed
	☐ other:	☐	

P-1 8'-10' 1st water bearing zone encountered.

Size of Sieve Opening in.	mm	Cumulative Weight Retained oz.	g.	Cumulative Percent Retained
0.375	9.5	0.79	22.3	6.8
0.187	4.75	1.46	41.4	12.6
No. 10 mesh	2.00	1.93	54.9	16.7
0.0331	850 micro meter	1.84	52.2	15.9
0.0165	426 micro meter	1.04	29.4	9.0
0.0098	250 micro meter	0.41	11.7	3.6
0.0049	125 micro meter	0.54	15.2	4.6
0.0029	75 micro meter	0.44	12.6	3.8
Bottom Pan		3.14	89.2	27.2
Total weight of sample			328.9	100%

Original weight 11.5 oz. (328.0 g)

Project # 215128.00.02

Project Name OSRAM-Sylvania

Killam Associates Consulting Engineers

Memorandum to File

By: ED.	Source:	Copies to:	File At:
Date: 9-30-98	☐ phone conversation	☐ Cameron Mock	☐
Time:	☐ meeting notes	☐ Kent Saylor	☐
Follow-up required?	☐ field reconnaissance	☐	
☒ Yes ☐ No	☒ other: Particle size Analysis	☐	☐ pitch when completed

*Well - P1 60'-62' Stratigraphy Overlying Bedrock

Particle Size Analysis

Size of Sieve Opening		Cumulative Weight Retained		Cumulative Percent Retained
in.	mm	oz	g	
Mesh No. 10	2.00 mm	0.01	0.3	0.3
.0331	850 micro meter	0.1	1.9	1.7
.0165	425 micro meter	0.3	8.0	7.3
.0098	250 micro meter	0.4	11.4	10.4
.0049	125 micro. meter	0.8	23.6	21.4
.0029	75 micro meter	1.4	39.9	36.2
Bottom Pan		0.9	25.4	23.1
Total			110.5g	100.4%

Sample weight (dry) 3.9 oz 110.1g

TECHNICAL DATA

FilterSil® FILTRATION SANDS AND GRAVELS

Ed Davis

New Spec

FEATURES AND BENEFITS

WELL GRAVEL
MAURICETOWN, NJ

FILTERSIL® Well Gravel Sands are produced from round and subround monocrystalline industrial quartz. Chemically inert and free of organic contaminants FILTERSIL® will not alter the chemistry of water producing wells, nor distort the analytical results of effluents drawn from monitoring wells. These durable and dense sands are sized to uniformity coefficients of 1.5 or lower for more uniform down hole placement.

In water producing wells, FILTERSIL® will increase the yield from the aquifer by increasing the permeable zone around the well screen. FILTERSIL's ability to effectively bridge and filter finer or highly laminated formations at the interface offer drillers the option to use larger slot sizes for improved hydraulic transmission and faster development. With its superior permeability, FILTERSIL® will maximize hydraulic conductivity with little or no headloss through the filter pack. Excellent structural support and placement properties also make FILTERSIL® an effective gravel pack in environmental monitoring wells and a productive leachate in sanitary landfill or leak detection systems.

All FILTERSIL® grades are processed and sized with strict adherence to SPC and Unimin QIP™ statistical and quality assurance controls. FILTERSIL® meets all AWWA B-100, ANSI, and NSF-61 standards for consistently uniform and chemically inert filter media.

PARTICLE SIZE ANALYSIS AND PROPERTIES

Mean Values. These Do Not Represent A Specification.

	Mesh ASTM E-11	#4	#3	#2	#1	#0	#00N	#00	#000
	4	5.0	—	—	—	—	—	—	—
	6	41.7	2.3	—	—	—	—	—	—
Typical Mean %	8	48.0	53.3	7.6	—	—	—	—	—
Retained on	10	3.0	28.5	23.3	—	—	—	—	—
Individual Sieves	12	1.3	11.5	35.9	3.9	—	—	—	—
	14	0.6	2.9	26.6	34.4	—	—	—	—
	16	0.3	0.6	4.5	34.9	2.7	—	—	—
	18	0.1	0.4	1.5	22.2	22.2	—	—	—
	20	—	0.2	0.3	3.2	25.9	0.1	—	—
	25	—	0.2	0.2	0.8	32.2	8.3	—	—
	30	—	0.1	0.1	0.3	13.3	37.9	1.6	0.4
	35	—	—	0.1	0.2	2.7	39.8	22.6	—
	40	—	—	—	0.1	0.5	9.7	29.3	18.2
	50	—	—	—	—	0.4	3.8	39.9	34.2
	70	—	—	—	—	0.2	0.2	4.7	24.5
	100	—	—	—	—	—	0.1	1.8	14.3
	140	—	—	—	—	—	—	—	5.3
	200	—	—	—	—	—	—	—	2.8
	PAN	—	—	—	—	—	—	—	0.2
* Recommended Screen Slot Size (in.)		.090	.060	.050	.030	.025	.020	.010	.005
Effective Size (mm)		2.46	1.85	1.44	1.04	.65	.47	.31	.16
Uniformity Coefficient		1.48	1.44	1.34	1.33	1.40	1.32	1.48	1.60

Grain Shape	Subround	Visual
Hardness	7.0 Mohs	Moh Scale
Acid Solubility	< .5 %	API RP56
Specific gravity	2.55-2.70 g/cm³	ASTM C-128
Bulk density, Aerated	92-95 lb/ft³	ASTM C-29
Bulk density, Compacted	98-100 lb/ft³	ASTM C-29

MORIE SCREENINGS

* Old Morie Sand Specs

Typical Physical Analysis

Cumulative Per Cent Retained

Sieve No.	Inches	MM	Grade #4	Grade #3	Grade #2	Grade #1	Grade #0	Grade #00N	Grade #00
1/4	.250	6.30							
4	.187	4.75	0.20						
6	.132	3.35	45.20	2.80					
8	.094	2.36	86.30	54.70	7.00				
10	.079	2.00	93.80	82.40	28.30				
12	.066	1.70	97.70	96.00	66.90	4.90			
14	.056	1.40	99.20	99.10	94.40	44.20			
16	.047	1.18	99.70	99.70	98.30	81.00	4.10		
18	.039	1.00	99.80	99.90	99.00	95.30	20.10		
20	.033	0.85	99.90	100.00	99.20	99.20	59.40	0.20	
25	.028	0.71	100.00	100.00	99.30	99.60	88.50	12.20	
30	.023	0.60	100.00		99.30	99.90	97.60	45.90	1.60
35	.020	0.50			99.50	99.90	99.50	87.40	29.70
40	.017	0.43			99.60	100.00	99.70	94.50	56.40
50	.012	0.30			99.90		99.90	98.80	92.10
70	.008	0.21			100.00		100.00	99.60	98.00
PAN					100.00		100.00	100.00	100.00

Rev. 1/1/95

Per Cent Retained

Sieve No.	Inches	MM	Grade #4	Grade #3	Grade #2	Grade #1	Grade #0	Grade #00N	Grade #00
1/4	.250	6.30	0.20						
4	.187	4.75	44.90						
6	.132	3.35	41.40	2.80					
8	.094	2.36	7.40	51.90	7.00				
10	.079	2.00	3.90	27.70	21.30				
12	.066	1.70	1.50	13.60	38.60	4.90			
14	.056	1.40	0.50	3.20	27.40	39.30			
16	.047	1.18	0.20	0.50	3.90	36.80	4.10		
18	.039	1.00	0.10	0.20	0.70	14.30	16.00		
20	.033	0.85	0.00	0.10	0.30	4.00	39.30	0.20	
25	.028	0.71	0.00	0.00	0.00	0.40	29.10	12.00	
30	.023	0.60	0.00		0.00	0.20	9.10	33.80	1.60
35	.020	0.50	0.00		0.20	0.10	1.90	41.50	28.10
40	.017	0.43	0.00		0.20	0.00	0.20	7.10	26.70
50	.012	0.30			0.30		0.20	4.40	35.60
70	.008	0.21			0.10		0.10	0.80	5.90
PAN					0.00		0.00	0.40	2.00

MORIE SCREENINGS

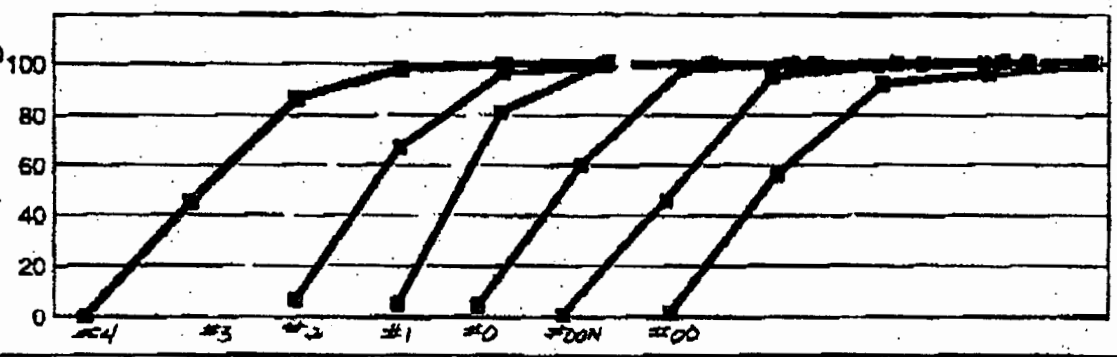
NEW JERSEY WELL GRAVELS

Old Morie Specs.

TYPICAL ANALYSIS

CUMULATIVE PER CENT RETAINED

less than 100%



US SIEVE/ SIEVE SIZE IN INCHES	14 .25	4 .187	6 .132	8 .094	12 .066	16 .047	20 .033	30 .023	40 .016	50 .012	70 .008	PAN
GRADE #4 SLOT = 80		0.2	45.6	86.3	97.7	97.7	99.8	100.0				
GRADE #3 SLOT = 60			2.8	84.7	98.0	98.7	100.0					
GRADE #2 SLOT = 50				7.0	88.9	96.3	98.2	99.3	99.6	99.8	100.0	
GRADE #1 SLOT = 30					4.9	81.0	98.2	99.8	100.0			
GRADE #0 SLOT = 20						4.1	59.4	97.6	99.7	99.9	100.0	
GRADE 00N SLOT = 15							0.2	45.9	94.5	98.8	99.6	100.0
GRADE #00 SLOT = 10								1.6	96.4	92.1	99.0	100.0

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL THAT, WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT, WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF THE WELL SCREENS.

NSF

Certified to ANSI/NSF 61

WARNING: This product contains crystalline silica. Do not breathe dust; may cause delayed lung injury (Silicosis). May also cause lung cancer, follow OSHA guidelines for control of crystalline silica; for industrial use only see Material Safety Data Sheet for detailed information. CAS No. 14808-60-7.

DISCLAIMER: All products are sold without warranty expressed or implied and seller specifically does not warrant that these products are suitable for a particular purpose or purposes or are merchantable. Buyer agrees it does not rely on seller's skill or judgement to select or furnish these products. Buyer shall make its own test to determine the suitability of such products for its purposes. Caution should be exercised when exposing these products to the elements. Staining could occur because of varying levels of iron bearing minerals in the deposits.

THE MORIE COMPANY, INC.
MINERS OF INDUSTRIAL SAND AND GRAVEL
Main Office: 1201 N. High St., Millville, NJ 08332-2580
800/257-7034 • Fax #609/327-4107

Georgia Silica Div.
Junction City, GA 31812
706/269-3294
Fax # 706/269-3191

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Tuscaloosa, AL 35403
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Tennessee Silica Div.
Camden, TN 38320
901/584-8201
Fax # 901/584-3272

MORIE
THE MORIE COMPANY, INC.

Rev. 5/11/95

Killam Associates ☐ Consulting Engineers

Subsurface Log

Page 1 of 3

Logged by:	ED	Boring ID#:	P-1
Date Started:	9-28-98	Date Completed:	9-30-98
Killam Project #: 215128.00	Task #: .02	Estimated Surface Elevation (MSL):	—
Project Name:	Osram Sylvania - RFI	Surveyed Surface Elevation (MSL):	1313.59
Date Surveyed	10/20/98		

Drilling Contractor: Eichelberger's Inc.

Rig Model / ID: CME 75

Rig Operator(s): Bob & Nate

Water Conditions Well installed: ☒

Yield (gpm)	Water Encountered (ft below land surface)	Water Encountered (MSL)
<1	8.5'	1305.1

Date / Time	SWL (ft below land surface)	SWL (MSL)
10-13-98	7.95'	1305.64

Sketch / Remarks

Lost inner bit redrilled & set well 10-7-98

Weather Conditions Air Temperature: 72 °F

Sky Conditions: ☐ clear ☒ partly cloudy ☐ overcast

Winds: ☐ calm ☒ light ☐ moderate ☐ strong

Precipitation: ☒ none ☐ rain ☐ snow ☐ _____ ☐ steady ☐ intermittent ☐ light

Depth (feet)	Sample Type (see code see below)	Sample ID	Recovery (specify %, ft/ft, or in/ft)	Standard Penetration blow counts/ 6 inches	RQD	Description	Notes/ Comments
0	S	1	12"	5-7-14-12		Brn. med. grain SS w ash, cinder & coarse gravel fill mixed, dry	
	A					Brn. med. grain sand & cobbles, moist	
	S	2	8"	2-5-8-10		Brn. sandy clay w. gry mottles & SS fragments, med. grain SS & sand, moist to wet.	
	A						
	S	3	22"	2-5-5-8		Glacial/Alluvial cobbles, very coarse gravels some washing w. little silt & sand wet	*Transmissive Zone
10						Gry. & brn. fine silts, moist	Sampled 8-10' for particle size analysis
	S	4	22"	2-4-6-7		Gry & brn fine silt, elastic, wet.	
	A						
15	S	5	19"	2-4-5-4			
	A						
20							

C = core (specify size under description) S = split spoon A = auger U = Shelby tube O = other (specify under description)

Killam Associates Consulting Engineers

Subsurface Log

Logged by:	ED	Boring ID#:	P-1
Killam Project #:	215128.00.02		

Depth (feet)	Sample Type (see codes see below)	Sample ID	(specify %, 1/2, or in/ft)	Standard Penetration blow counts/ 6 inches	RQD	Description	Notes/ Comments
20	S	6	22"	1-2-5-4		Gry & brn fine silt, elastic, wet.	
	A						
25	S	7	24"	2-2-3-4			
	A						
30	S	8	24"	2-3-5-5			
	A						
35	S	9	10"	2-1-2-1			
	A						
40	S	10	14"	4-8-9-10		Gry silt & med to very coarse gravel, wet.	
	A						
45							

C = *core* (specify size under description) S = *split spoon* A = *auger* U = *Shelby tube* O= *other* (specify under description)

Killam Associates Consulting Engineers

Subsurface Log

Logged by:	ED	Boring ID#:	P1
Killam Project #:	215128.00 02		

Depth (feet)	Sample Type (see code see below)	Sample ID	Recovery (specify %, ft/ft, or in/ft)	Standard Penetration blow counts/ 6 inches	RQD	Description	Notes/ Comments
45	S	11	8"	2-2-3-4	-	Gry., sandy silt + med. to very coarse gravel, wet	
	A						
50	S	12	6"	6-9-12-14		Gry, silty clay w. brn mottles, very coarse gravel w. some sand & silt mixing, wet.	Problem with 12' run-up of sand & gravel into auger
	A						
55	A						
60	S	13	4"	10-12-14-14		Blk, gry & brn. very fine silt, wet.	Sampled 60'-62' for particle size analysis.
	A					Light gry, fractured, calcareous, weathered siltstone & str. w. compacted silt & fine grain sand, moist.	Acid tested sample from auger bit, slight fizz.
65							65.0' Auger refusal Bedrock
70							

C = *core* (specify size under description) S = *split spoon* A = *auger* U = *Shelby tube* O= *other* (specify under description)

Killam Associates ☐ Consulting Engineers

Subsurface Log

Page 1 of 1

Logged by:	ED.	Boring ID#:	P-2
Date Started:	10-6-98	Date Completed:	10-6-98
Killam Project #:	215128 00	Task #:	02
Estimated Surface Elevation (MSL):	508	Date Surveyed	
Project Name:	Osram Sylvania - RFI	Surveyed Surface Elevation (MSL):	— —
Drilling Contractor:	Eichelberger's Inc.		
Rig Model / ID:	CME 75		
Rig Operator(s):	Bob & Nate		

Water Conditions Well installed: ☐

Yield (gpm)	Water Encountered (ft below land surface)	Water Encountered (MSL)
<1	5'-6'	

Date / Time	SWL (ft below land surface)	SWL (MSL)

Sketch / Remarks

No well installed.

Weather Conditions Air Temperature: 40 °F

Sky Conditions: ☐ clear ☒ partly cloudy ☐ overcast

Winds: ☐ calm ☒ light ☐ moderate ☐ strong

Precipitation: ☒ none ☐ rain ☐ snow ☐ _____ ☐ steady ☐ intermittent ☐ light

Depth (feet)	Sample Type (see code list below)	Sample ID	Recovery (specify %, ft/ft, or in/ft)	Standard Penetration blow counts/6 inches	RQD	Description	Notes/ Comments
0	S	1	18"	5-10-15-9		Fill Brn. silt loam, cinder, glass & coarse gravel, dry	
	A						
	S	2	10"	1-2-3-6			wet at 5.5'
	A						
						Gry, fine silt, wet.	
10	S	3	0"	50/0		Dk gry., fractured, calcareous shale, wet Difficult to auger	
	A						
15						Gry to dk gry sh. & silt stone, med hard, calcareous horizontal fracturing. Some ls layering & nodules.	Slight to mod. fizz
	C		5.5'/5.5' 100%		30"/30" 100%	Dk. gry shale, med. hard, horizontal fracturing.	Core 2" NQ
					Floor	Gry fine grain SS hard solid (no fracturing)	Bottom of core 20.0'
20							

C = core (specify size under description) S = split spoon A = auger U = Shelby tube O = other (specify under description)

Killam Associates ☐ Consulting Engineers

Subsurface Log

Page 1 of 2

RLS 2/90

Logged by:	E.D.	Boring ID#:	P-3
Date Started:	10-6-98	Date Completed:	10-7-98
Estimated Surface Elevation (MSL):	—	Date Surveyed	
Surveyed Surface Elevation (MSL):	1309.3		

Killam Project #:	215128.00
Task #:	.02
Project Name:	Osram Sylvania - RFI
Drilling Contractor:	Eichelberger's, Inc.
Rig Model / ID:	CME 75
Rig Operator(s):	Bob & Nate

Water Conditions Well installed: ☒

Yield (gpm)	Water Encountered (ft below land surface)	Water Encountered (MSL)
<1	5.0'	1301.4

Date / Time	SWL (ft below land surface)	SWL (MSL)
10-12-98	6.53	1302.90

Sketch / Remarks

Weather Conditions Air Temperature: 50 °F

Sky Conditions: ☐ clear ☐ partly cloudy ☒ overcast

Winds: ☐ calm ☒ light ☐ moderate ☐ strong

Precipitation: ☒ none ☐ rain ☐ snow ☐ _____ ☐ steady ☐ intermittent ☐ light

Depth (feet)	Sample Type (see code see below)	Sample ID	Recovery (specify %, ft/ft, or in/ft)	Standard Penetration blows per 6 inches	RQD	Description	Notes/ Comments
0							
	A					Fill - Brick fragments, glass, cinder & brn. silt, moist	
10							
15							
	A					Gry silt & clay w/ sand & coarse gravel mix, wet.	
20							

C = core (specify size under description) S = split spoon A = auger U = Shelby tube O= other (specify under description)

Killam Associates Consulting Engineers

Subsurface Log

Logged by:	Ed	Boring ID#:	P-3
Killam Project #:	215128.00.02		

Depth (feet)	Sample Type (see code below)	Sample ID	(specify %, 2/2, or in/ft)	Standard Penetration blow counts/ 6 inches	RQD	Description	Notes/ Comments
20							
	A					Gry. fractured siltstone & shale, weathered, wet.	
25							
						Auger refusal 27.0'	Bedrock at 26.5'
							8'-9' auger Turnin
	C		4.4'/5.0' 88%		31"/60" 52% Fair	Gry. to dk. gry. siltstone, calcareous w. ls layering & ls. nodules. Med. hard to med. soft w horizontal fracturing. Some highly weathered zones. (Slight fizz in siltstone to strong fizz in ls layers & nodules)	Core 2" WG
30							
							32.0' Bottom of core
35							
40							
45							

C = *core* (specify size under description) S = *split spoon* A = *auger* U = *Shelby tube* O= *other* (specify under description)

Killam Associates ☐ Consulting Engineers

Subsurface Log

Page 1 of 2

RLS 8/96

Logged by:	ED	Boring ID#:	P-4
Date Started:	10-9-98	Date Completed:	10-9-98
Estimated Surface Elevation (MSL):	—		Date Surveyed
Surveyed Surface Elevation (MSL):	1310.42		10/20/98

Killam Project #:	215128 .00
Task #:	.02
Project Name:	Osram Sylvania - RFI
Iling Contractor:	Eichelbergers Inc.
Rig Model / ID:	CME 75
Rig Operator(s):	Bob & Nate

Water Conditions Well installed: ☒

Yield (gpm)	Water Encountered (ft below land surface)	Water Encountered (MSL)
<1	8'-9'	1302

Date / Time	SWL (ft below land surface)	SWL (MSL)
10-13-98	6.54	1303.88

Sketch / Remarks

Weather Conditions Air Temperature: 58 °F

Sky Conditions: ☐ clear ☐ partly cloudy ☒ overcast

Winds: ☐ calm ☒ light ☐ moderate ☐ strong

Precipitation: ☐ none ☒ rain ☐ snow ☐ _____ ☐ steady ☐ intermittent ☒ light

Depth (feet)	Sample Type (see code see below)	Sample ID	Recovery (specify %, ft/ft, or in/ft)	Standard Penetration blow counts/ 6 inches	RQD	Description	Notes/ Comments
0	A					Fill Blacktop, gravel & sandy loam, moist	
	S	1	14"	11-11-11-11		Brn. & gry. clay w. weathered shale & fine SS mix., moist.	
	A					Brn. & gry very fine silt, sticky, wet	
10	S	2	20"	3-3-3-2			
	A						
15	S	3	13"	2-2-2-2		Brn. & gry fine grain sand, wet.	
20							

C = core (specify size under description) S = split spoon A = auger U = Shelby tube O= other (specify under description)

Killam Associates Consulting Engineers

Subsurface Log

Logged by:	ED	Boring ID#:	P-4
Killam Project #:	215128.00.02		

Depth (feet)	Sample Type (see code see below)	Sample ID	(specify %, ft/ft, or in/ft)	Standard Penetration blows counts/ 6 inches	RQD	Description	Notes/ Comments
20	S	4	14"	2-2-2-3		Brn. silt & fine grain sand, elastic, wet.	
	A						
25	S	5	12"	1-2-3-3		Brn. & gry very fine grain silt, elastic, wet.	
	A						
30	S	6	14"	10-11-10-14		Gry. silt & clay w. coarse gravel, calcareous (Slight fizz w acid) Note - Top of weathered bedrock, damp.	
	A						
35	S	7	14"	10-5-15-50/3		Sample I.D. same as sample #6 with exception of little to no moisture in spoon sample.	
							Difficult augering from 35' to 37'
40							3'-5' run-in prior to setting well.
45							

C = *core* (specify size under description) S = *split spoon* A = *auger* U = *Shelby tube* O= *other* (specify under description)

Killam Associates ☐ Consulting Engineers

Subsurface Log

Page 1 of 1

Logged by:	E.D.	Boring ID#:	MW-11
Date Started:	10-6-98	Date Completed:	10-6-98
Estimated Surface Elevation (MSL):	—		Date Surveyed
Surveyed Surface Elevation (MSL):	1318.67		10/20/98

Killam Project #:	215128.00
Task #:	.02
Project Name:	Osram Sylvania - RFI
Drilling Contractor:	Eichelbergers, Inc.
Rig Model / ID:	CME 75
Rig Operator(s):	Bob & Nate

Water Conditions Well installed: ☒

Yield (gpm)	Water Encountered (ft below land surface)	Water Encountered (MSL)
<1	7'-8'	1311

Date / Time	SWL (ft below land surface)	SWL (MSL)
10-13-98	9.67'	1309.00

Sketch / Remarks

5' screen section

2' runin when inner auger pulled

Weather Conditions Air Temperature: 62 °F

Sky Conditions: ☐ clear ☐ partly cloudy ☒ overcast

Winds: ☐ calm ☒ light ☐ moderate ☐ strong

Precipitation: ☒ none ☐ rain ☐ snow ☐ _____ ☐ steady ☐ intermittent ☐ light

Depth (feet)	Sample Type (see code see below)	Sample ID	Recovery (specify %, ft/ft, or in/ft)	Standard Penetration blows counted/ 6 inches	RQD	Description	Notes/ Comments
0	A					Railroad stone and cinder	
						Brn., silty clay w. 50% coarse gravel mix, moist. Appears to be fill.	
10						Brn., silty clay, wet.	
15							Auger to 16.0'
20							

C = core (specify size under description) S = split spoon A = auger U = Shelby tube O = other (specify under description)

Killam Associates ☐ Consulting Engineers

RLS 8/90

Subsurface Log

Page 1 of 1

Logged by:	ED	Boring ID#:	MW-12
Date Started:	10-1-98	Date Completed:	10-1-98
Estimated Surface Elevation (MSL):	—	Date Surveyed	
Surveyed Surface Elevation (MSL):	1307.89	10-26-98	

Killam Project #:	215128.00
Task #:	.02
Project Name:	OSRAM Sylvania - RFI
Drilling Contractor:	Eichelbergers Inc
Rig Model / ID:	CME 75
Rig Operator(s):	Steve & Jeff

Water Conditions Well installed: ☒

Yield (gpm)	Water Encountered (ft below land surface)	Water Encountered (MSL)
<1	≈6'-8'	1301

Date / Time	SWL (ft below land surface)	SWL (MSL)
10-13-98	8.19	1299.70

Sketch / Remarks

Weather Conditions Air Temperature: 60 °F

Sky Conditions: ☐ clear ☒ partly cloudy ☐ overcast

Winds: ☐ calm ☐ light ☐ moderate ☒ strong

Precipitation: ☒ none ☐ rain ☐ snow ☐ _____ ☐ steady ☐ intermittent ☐ light

Depth (feet)	Sample Type (see code see below)	Sample ID	Recovery (specify %, ft/ft, or in/ft)	Standard Penetration blow counts/ 6 inches	RQD	Description	Notes/ Comments
0	A					Fill containing brn., sandy loam, coarse gravel, cinder & glass, dry to wet	
10	A					Very coarse gravel to boulders, fine grain SS., some brn. silt mixing, damp to wet	
	A					Gry. clay & silt w. coarse gravel mix, damp.	
15	A					Gry to dk. gry siltstone-sh, calcareous w. clay mixing, weathered, med. hard, damp.	Auger refusal 14.5'
20							

C = core (specify size under description) S = split spoon A = auger U = Shelby tube O = other (specify under description)

Killam Associates ☐ Consulting Engineers

Subsurface Log

Page 1 of 1

Logged by:	E.D.	Boring ID#:	MW-13
Date Started:	10-2-98	Date Completed:	10-2-98
Killam Project #:	215128.00	Task #:	.02
Estimated Surface Elevation (MSL):	—	Date Surveyed	
Project Name:	Osram Sylvania - RFI	Surveyed Surface Elevation (MSL):	309.35
Drilling Contractor:	Eichelberger's Inc.		
Rig Model / ID:	CME 75		
Rig Operator(s):	Steve & Jeff		

Water Conditions Well installed: ☒

Yield (gpm)	Water Encountered (ft below land surface)	Water Encountered (MSL)
<1	6'-7'	1303

Date / Time	SWL (ft below land surface)	SWL (MSL)
10-13-98	6.60'	1302.75

Weather Conditions Air Temperature: 58 °F

Sky Conditions: ☐ clear ☒ partly cloudy ☐ overcast

Winds: ☐ calm ☒ light ☐ moderate ☐ strong

Precipitation: ☒ none ☐ rain ☐ snow ☐ _____ ☐ steady ☐ intermittent ☐ light

Sketch / Remarks

Depth (feet)	Sample Type (see code list below)	Sample ID	Recovery (specify %, ft/ft, or in/ft)	Standard Penetration blow counts/6 inches	RQD	Description	Notes/ Comments
0	S	1	10"	Weight of Hammer		Fill Sand, gravel, glass & wood, dry	
	A						
	S	2	11"	Weight of Hammer		H_2O Encountered	
	A						
10	S	3	10"	Weight of Hammer -1-1		Brn-a gray, fine silt, wet	
	A						
15							Auger to 15.0'
20							

C = core (specify size under description) S = split spoon A = auger U = Shelby tube O = other (specify under description)

Killam Associates ☐ Consulting Engineers

Subsurface Log

Page 1 of ___

R.L.S. 8/90

Logged by:	ED	Boring ID#:	MW-14
Date Started:	10-2-98	Date Completed:	10-2-98
Estimated Surface Elevation (MSL):	—	Date Surveyed	
Surveyed Surface Elevation (MSL):	[illegible]	[illegible]	

Killam Project #:	215128.00
Task #:	.02
Project Name:	Osram Sylvania - RFI
Drilling Contractor:	Eichelberger's Inc.
Rig Model / ID:	CME 75
Rig Operator(s):	Steve Naehnled & Jeff Davis

Weather Conditions Air Temperature: 44 °F

Sky Conditions: ☐ clear ☒ partly cloudy ☐ overcast

Winds: ☐ calm ☒ light ☐ moderate ☐ strong

Precipitation: ☒ none ☐ rain ☐ snow ☐ _____ ☐ steady ☐ intermittent ☐ light

Water Conditions Well installed: ☒

Yield (gpm)	Water Encountered (ft below land surface)	Water Encountered (MSL)
<1	8-9'	1302

Date / Time	SWL (ft below land surface)	SWL (MSL)
10-13-98	7.07	1303.30

Sketch / Remarks

2' of running sand

Depth (feet)	Sample Type (see code see below)	Sample ID	Recovery (specify %, ft/ft, or in/ft)	Standard Penetration blow counts/ 6 inches	RQD	Description	Notes/ Comments
0	A					Brn. silty & fine sandy loam w. coarse gravel mix, dry.	
	A					Coarse gravel & boulders mixed w. brn. silty clay, wet	
10	A					Brn. silty clay & fine grain sand.	
15							Cover to 18.0
20							

C = core (specify size under description) S = split spoon A = auger U = Shelby tube O= other (specify under description)

Killam Associates ☐ Consulting Engineers

Co. Tioga

Twp. Wellsboro Borough

Monitoring Well Construction Details

Prepared By	Prepared Date	Reviewed By	Reviewed Date	Prepare final
E.D.	10-21-98	DAK	11-5-98	1/13/99

Project #	Client/Project
215128 00.02	OSRAM Sylvania - RFI

Monitoring Well ID: MW-11

Date Well Started / Finished: 10-6-98 / 10-6-98

Geologist Installing Well: E.D

Well Contractor / Rig Operator(s): Eichelbergers, Inc. Bob & Nate

Drill Hole ID#: MW-11

Date Drilled: 10-6-98

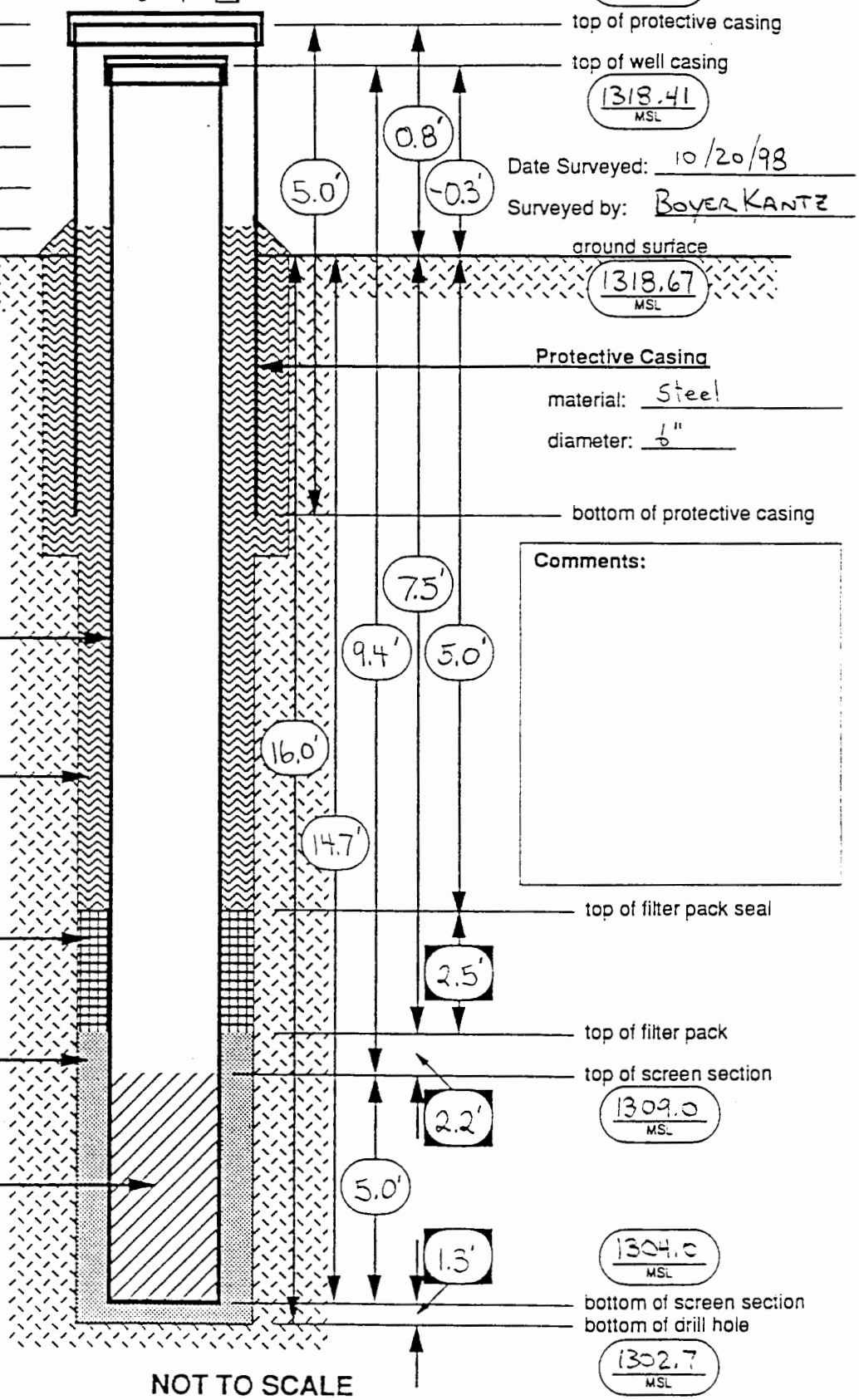
Drilling Method: Auger

Drill Hole Logged by: E.D.

Drilling Contractor: Eichelbergers

Rig Operator(s): Bob & Nate

Locking Cap? ☒



Date Surveyed: 10/20/98

Surveyed by: Boyer Kantz

Drill Hole Diameter:

6¼ ID inches, from 0' to 16.0'

____ inches, from ____ to ____

____ inches, from ____ to ____

Static Water Level:

9.67 ft, date: 10-13-98 by E.D

____ ft, date: ____ by ____

____ ft, date: ____ by ____

measuring point: Land Surface

Protective Casing

material: Steel

diameter: 6"

Comments:

Well Casing

material: Schedule 40 PVC

diameter: 4"

Annular space seal

material: SaKrete

quantity: 4 bags 320 lbs.

Filter pack seal

material: Bentonite chips

quantity: 2 bags 100 lbs

Filter pack

material: #00N well sand

quantity: 7 bags 350 lbs

Slotted/screen section

material: Sch. 40 PVC

diameter: 4"

screen/slot size: .020"

☒ Drill log / lithologic description attached

☐ Detailed installation narrative attached

NOT TO SCALE

Killam Associates Consulting Engineers

Co. Tioga

Twp. Wellsboro Borough

Monitoring Well Construction Details

Prepared By	Prepared Date	Reviewed By	Reviewed Date	Prepare final
ED	10-21-98	DAK	11-5-98	1/13/99

Project #	Client/Project
215128.00.02	OSRAM Sylvania - RFI

Monitoring Well ID: MW-12

Date Well Started / Finished: 10-1-98 / 10-1-98

Geologist Installing Well: ED

Well Contractor / Rig Operator(s): Eichelbergers Inc Steve & Jeff

Drill Hole ID#: MW-12

Date Drilled: 10-1-98

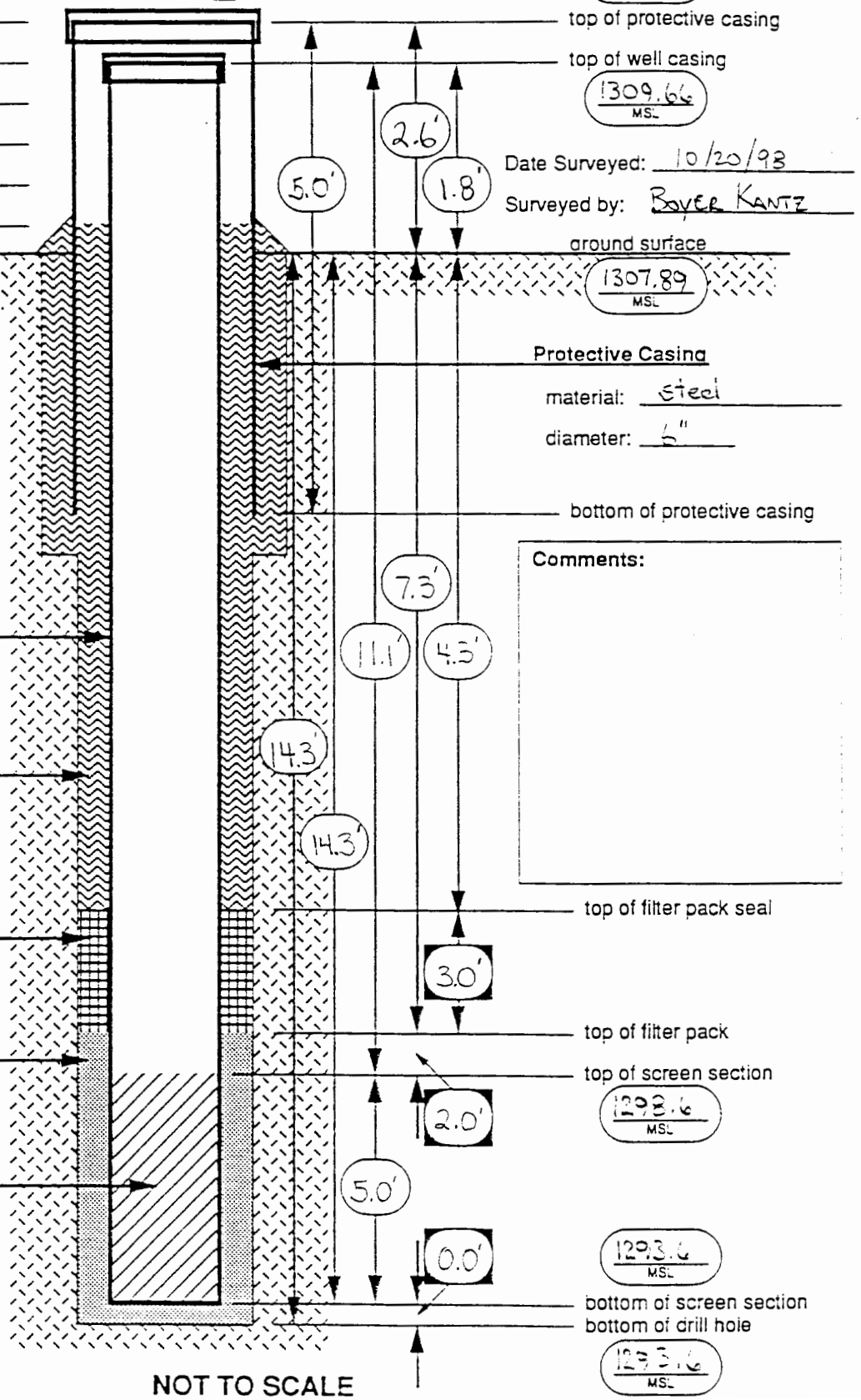
Drilling Method: Auger

Drill Hole Logged by: ED

Drilling Contractor: Eichelbergers

Rig Operator(s): Steve & Jeff

Locking Cap? ☒



Date Surveyed: 10/20/98

Surveyed by: Boyer Kantz

Drill Hole Diameter:

6 1/4 ID inches, from 0' to 14.3'

____ inches, from ____ to ____

____ inches, from ____ to ____

Static Water Level:

8.19 ft, date: 10-13-98 by ED

____ ft, date: ____ by ____

____ ft, date: ____ by ____

measuring point: Land Surface

Protective Casing

material: Steel

diameter: 6"

Comments:

Well Casing

material: Schedule 40 PVC

diameter: 4"

Annular space seal

material: SaKrete

quantity: 4 bags 320 lbs

Filter pack seal

material: Bentonite Holeplug

quantity: 2 bags 100 lbs

Filter pack

material: #00N well sand

quantity: 6.5 bags 325 lbs

Slotted/screen section

material: Sch. 40 PVC

diameter: 4"

screen/slot size: .020"

☒ Drill log / lithologic description attached

☐ Detailed installation narrative attached

NOT TO SCALE

Killam Associates ☐ Consulting Engineers

Co. Tioga

Twp. Wellsboro Borough

Monitoring Well Construction Details

Prepared By	Prepared Date	Reviewed By	Reviewed Date	Prepare final
ED	10-21-98	DAK	11-5-98	1/13/99

Project #	Client/Project
215128.00.02	OSRAM Sylvania - RFI

Monitoring Well ID: MW-13

Date Well Started / Finished: 10-2-98 / 10-2-98

Geologist Installing Well: E D

Well Contractor / Rig Operator(s): Eichelbergers, Inc. Steve & Jeff

Locking Cap? ☒

Drill Hole ID#: MW-13

Date Drilled: 10-2-98

Drilling Method: Auger

Drill Hole Logged by: E D

Drilling Contractor: Eichelbergers Inc.

Rig Operator(s): Steve & Jeff

Drill Hole Diameter:

6¼ ID inches, from 0' to 15.0'

____ inches, from ____ to ____

____ inches, from ____ to ____

Static Water Level:

6.60 ft, date: 10-13-98 by ED

____ ft, date: ____ by ____

____ ft, date: ____ by ____

measuring point: Land Surface

Well Casing

material: Schedule 40 PVC

diameter: 4"

Annular space seal

material: Sakrete

quantity: 4 bags 320 lbs

Filter pack seal

material: Bentonite Holeplug

quantity: 1 bag 50 lbs

Filter pack

material: #00N well sand

quantity: 12 bags 600 lbs

Slotted/screen section

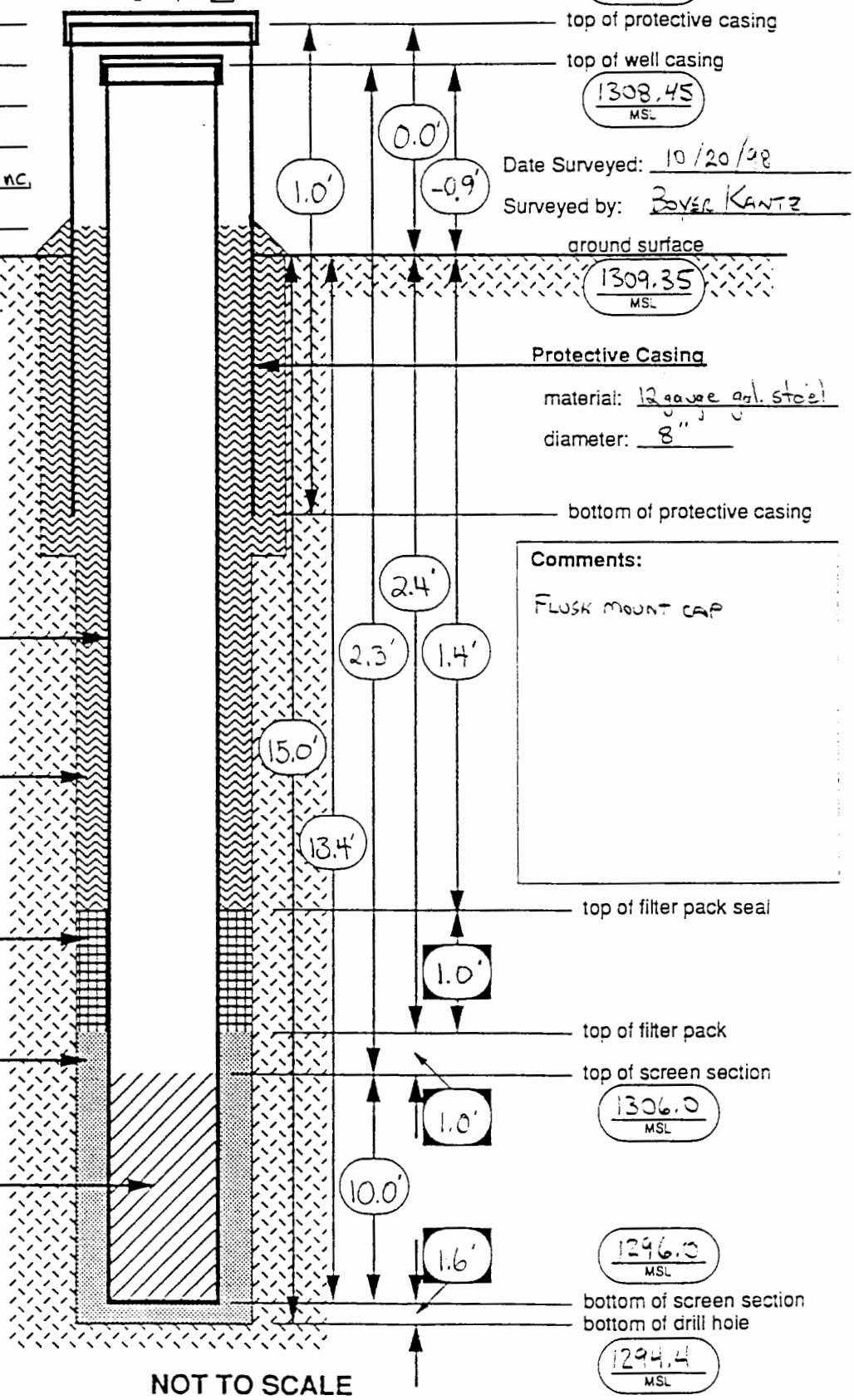
material: Sch. 40 PVC.

diameter: 4"

screen/slot size: .020"

☒ Drill log / lithologic description attached

☐ Detailed installation narrative attached



NOT TO SCALE

Killam Associates Consulting Engineers

Co. Tioga

Twp. Wellsboro Borough

Monitoring Well Construction Details

Prepared By	Prepared Date	Reviewed By	Reviewed Date	Prepare final
ED	10-21-98	DAK	11-5-98	1/13/99

Project #	Client/Project
215128.00.02	OSRAM Sylvania - RFI

Monitoring Well ID: MW-14

Date Well Started / Finished: 10-2-98 / 10-2-98

Geologist Installing Well: E.D.

Well Contractor / Rig Operator(s): Eichelberger's Inc. Steve & Jeff

Drill Hole ID#: MW-14

Date Drilled: 10-2-98

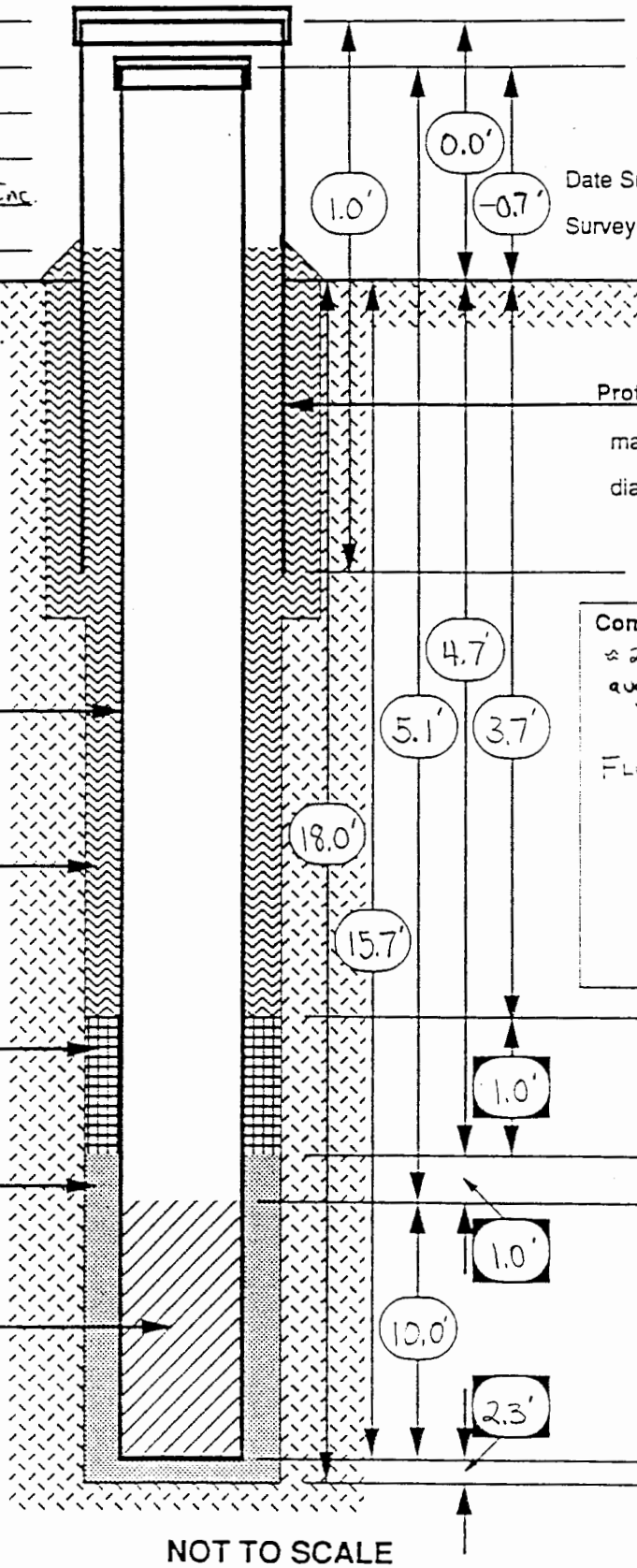
Drilling Method: Auger

Drill Hole Logged by: ED

Drilling Contractor: Eichelberger's Inc.

Rig Operator(s): Steve & Jeff

Locking Cap? ☒



Date Surveyed: 10/20/98

Surveyed by: Boyer Kantz

Drill Hole Diameter:

6¼ ID inches, from 0' to 18.0'

____ inches, from ____ to ____

____ inches, from ____ to ____

Static Water Level:

7.07 ft, date: 10-13-98 by ED

____ ft, date: ____ by ____

____ ft, date: ____ by ____

measuring point: Land surface

Protective Casing

material: 12 gauge galv. steel

diameter: 8"

Well Casing

material: Schedule 40 PVC

diameter: 4"

Annular space seal

material: Sakrete

quantity: 4 bags 320 lbs

Filter pack seal

material: Bentonite pellets & holeplug

quantity: 1 bucket & 1 bag 100 lbs

Filter pack

material: #00N well sand

quantity: 7.5 bags 375 lbs.

Slotted/screen section

material: Sch. 40 PVC

diameter: 4"

screen/slot size: .020"

Comments:

≈ 2.0' of running sand into auger.

FLUSH MOUNT CAP

☒ Drill log / lithologic description attached

☐ Detailed installation narrative attached

NOT TO SCALE

Killam Associates ☐ Consulting Engineers

Co. Tioga

Twp. Wellsboro Borough

Monitoring Well Construction Details

Prepared By	Prepared Date	Reviewed By	Reviewed Date	Prepare final
ED	10-20-98	DAK	11-5-98	1/13/99

Project #	Client/Project
215128.00.02	OSRAM Sylvania - RFI

Monitoring Well ID: P1

Date Well Started / Finished: 10-7-98 / 10-7-98

Geologist Installing Well: ED

Well Contractor / Rig Operator(s): Eichelbergers Inc. Bob & Nate

Drill Hole ID#: P1

Date Drilled: 10-7-98

Drilling Method: Auger

Drill Hole Logged by: ED

Drilling Contractor: Eichelbergers, Inc.

Rig Operator(s): Bob & Nate

Drill Hole Diameter:

6 1/4 ID inches, from 0' to 65'

____ inches, from ____ to ____

____ inches, from ____ to ____

Static Water Level:

7.95 ft, date: 10-13-98 by ED.

____ ft, date: ____ by ____

____ ft, date: ____ by ____

measuring point: Land Surface

Well Casing

material: Schedule 40 PVC

diameter: 4"

Annular space seal

material: Bentonite Grout

quantity: 12 bags 1,152 lbs

Filter pack seal

material: Bentonite pellets

quantity: 1 bucket 50 lbs

Filter pack

material: #00N well sand

quantity: 7.5 bags 375 lbs

Slotted/screen section

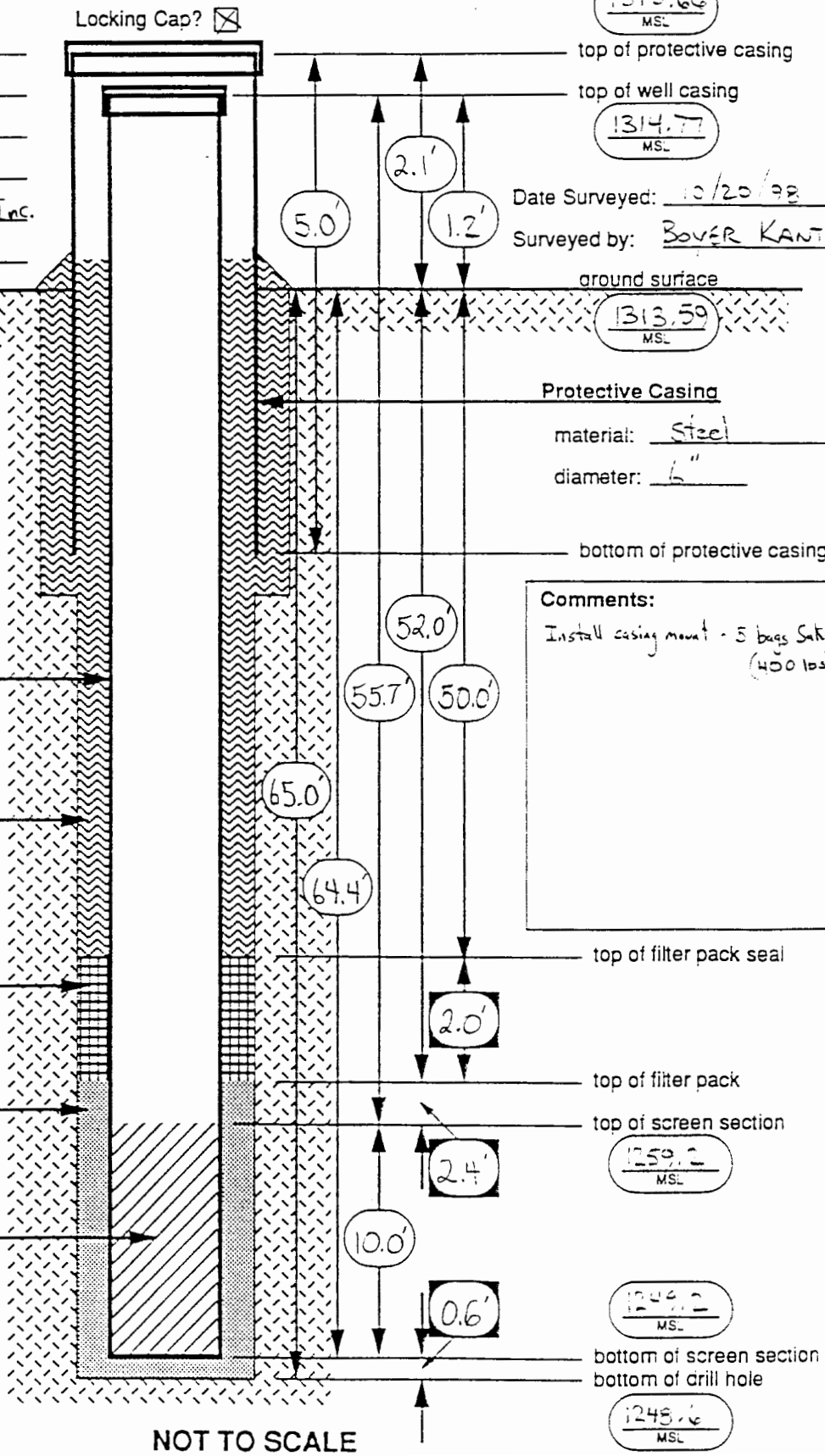
material: Sch. 40 PVC

diameter: 4"

screen/slot size: .020"

☒ Drill log / lithologic description attached

☐ Detailed installation narrative attached



Comments:

Install casing mount - 5 bags Sakrete (400 lbs)

Killam Associates ☐ Consulting Engineers

Co. Tioga

Twp. Wellsboro Borough

Monitoring Well Construction Details

Prepared By	Prepared Date	Reviewed By	Reviewed Date	Prepare final
ED	10-20-98	DAK	11-5-98	1/13/99

Project #	Client/Project
215128.00.02	OSRAM Sylvania - RFI

Monitoring Well ID: P3

Date Well Started / Finished: 10-7-98 / 10-7-98

Geologist Installing Well: E.D.

Well Contractor / Rig Operator(s): Eichleberger's, Inc. Bob & Nate

Drill Hole ID#: P-3

Date Drilled: 10-6-98 10-7-98

Drilling Method: Auger

Drill Hole Logged by: E.D.

Drilling Contractor: Eichleberger's Inc

Rig Operator(s): Bob & Nate

Drill Hole Diameter:

6¼ ID inches, from 0' to 27.1'

____ inches, from ____ to ____

____ inches, from ____ to ____

Static Water Level:

2.53 ft, date: 10-13-98 by E.D.

____ ft, date: ____ by ____

____ ft, date: ____ by ____

measuring point: Land Surface

Well Casing

material: Schedule 40 PVC

diameter: 4"

Annular space seal

material: Bentonite Grout

quantity: 4 bags 384 lbs

Filter pack seal

material: Bentonite pellets

quantity: 1 bucket 50 lbs

Filter pack

material: #00N well sand

quantity: 7 bags 350 lbs

Slotted/screen section

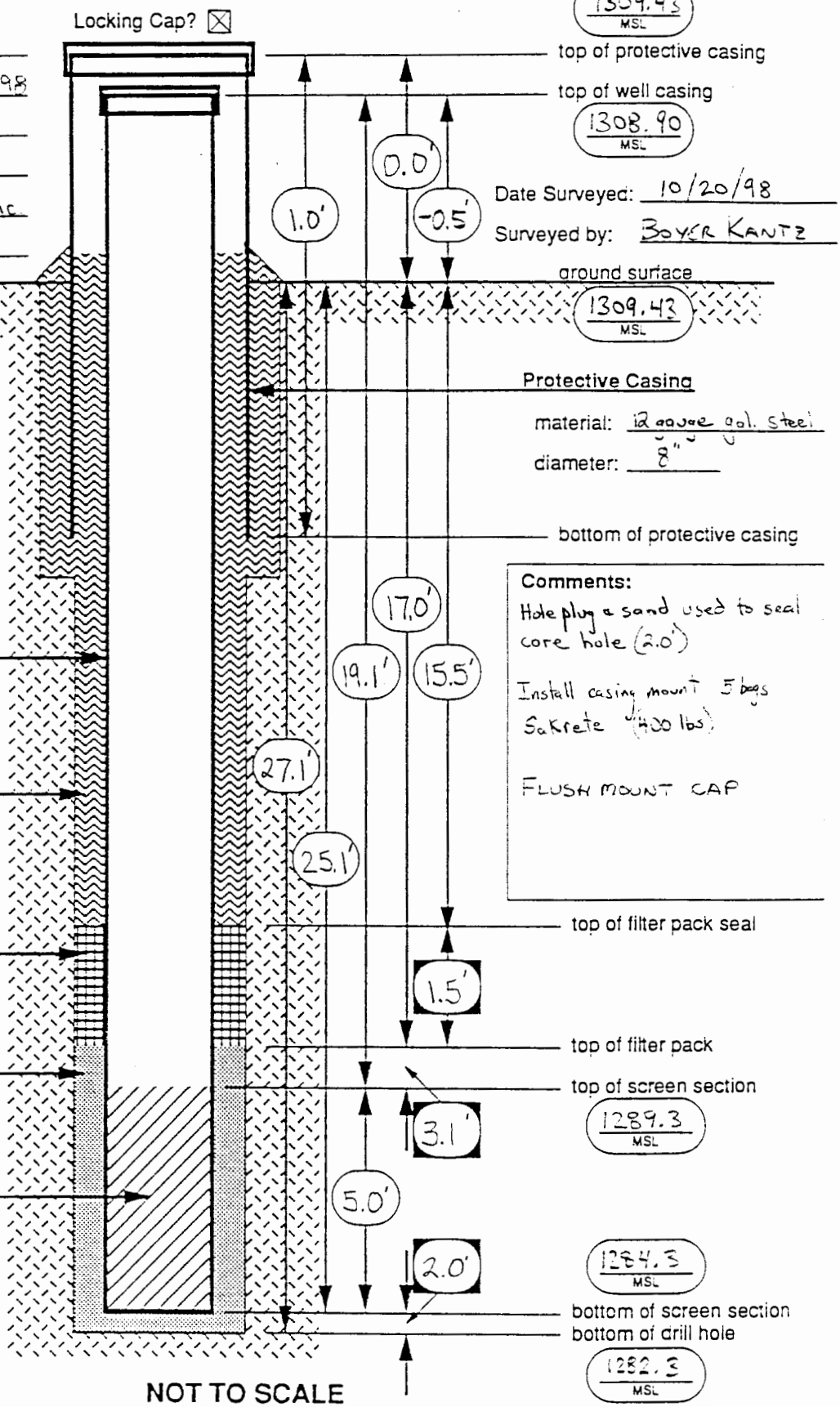
material: Sch. 40 PVC

diameter: 4"

screen/slot size: .020"

☒ Drill log / lithologic description attached

☐ Detailed installation narrative attached



NOT TO SCALE

Killam Associates ☐ Consulting Engineers

Co. Tioga

Twp. WELLSBORO BOROUGH

Monitoring Well Construction Details

Prepared By	Prepared Date	Reviewed By	Reviewed Date	Prepare final
ED	10-21-98	DAK	11-5-98	1/13/99

Project #	Client/Project
215128 00.02	OSRAM Sylvania - RFI

Monitoring Well ID: P-4

Date Well Started / Finished: 10-9-98 / 10-9-98

Geologist Installing Well: ED

Well Contractor / Rig Operator(s): Eichelbergers Inc. Bob-Nate

Drill Hole ID#: P-4

Date Drilled: 10-9-98

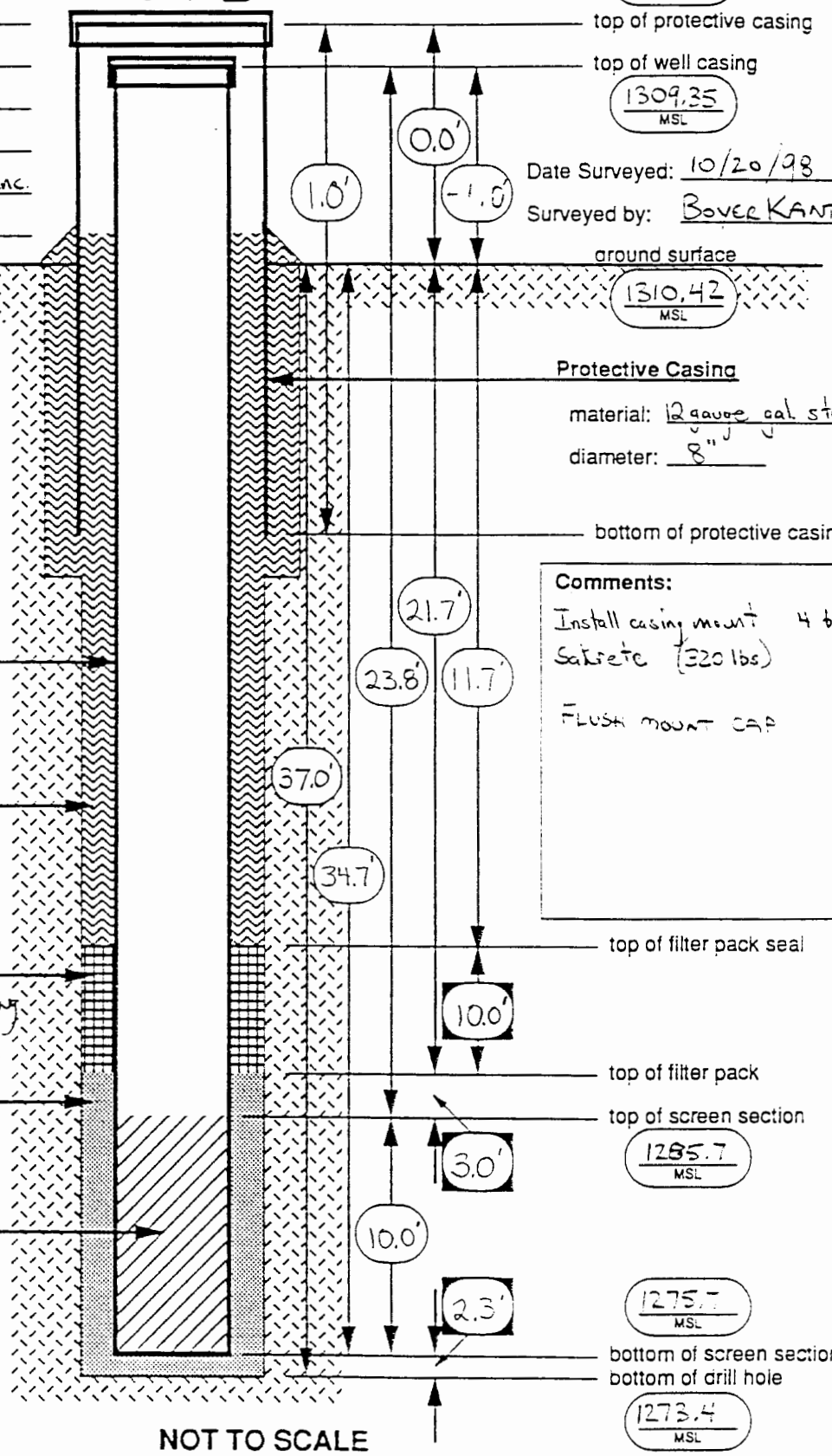
Drilling Method: Auger

Drill Hole Logged by: ED

Drilling Contractor: Eichelbergers Inc.

Rig Operator(s): Bob-Nate

Locking Cap? ☒



Date Surveyed: 10/20/98

Surveyed by: BOVER KANTZ

natural ground

Drill Hole Diameter:

6 1/4 ID. inches, from 0' to 37'

____ inches, from ____ to ____

____ inches, from ____ to ____

Static Water Level:

6.54 ft, date: 10-13-98 by ED

____ ft, date: ____ by ____

____ ft, date: ____ by ____

measuring point: Land Surface

Well Casing

material: Schedule 40 PVC

diameter: 4"

Annular space seal

material: Bentonite Grout

quantity: 3 bags 288 lbs.

Filter pack seal

material: Bentonite Pellets - Holeplug

quantity: 1 bucket + 3 bags 200 lbs.

Filter pack

material: #00N well sand

quantity: 13 bags 650 lbs

Slotted/screen section

material: Sch. 40 PVC

diameter: 4"

screen/slot size: .020"

Protective Casing

material: 12 gauge gal. steel

diameter: 8"

Comments:

Install casing mount 4 bags Sakrete (320 lbs)

FLUSH MOUNT CAP

☒ Drill log / lithologic description attached

☐ Detailed installation narrative attached

NOT TO SCALE

APPALACHIAN GEOPHYSICAL SURVEYS

276 PA Route 366-Mamont
Apollo, Pennsylvania 15613
Telephone (724) 327-8119
(800) 653-8119

KILLAM ASSOCIATES
Thorn Hill Industrial park
100 Allegheny Drive
Warrendale, PA 15086-7565

October 19, 1998

Attn: Dale Krysinski
re: OSRAM SYLVANIA SITE
Geophysical Borehole Logging
Production Well 947 (Out of Service)

Dear Mr. Krysinski:

This letter is to confirm our telephone discussion of this afternoon concerning the interpretation of the geophysical borehole logs and video logs made at the captioned well. That conversation can be summarized in three points:

1) None of the logging sondes were able to descend below 57 feet in depth as measured from the surface well cover. Obviously the well has silted in or collapsed from its reported drilled depth of 81 feet. No large voids were observed on the caliper or video logs which would indicate a collapse. It is possible that the pump may have sucked silt or sand into the well to a point just below the installed depth.
2) The sonic log clearly indicated that the casing is uncemented. The direct amplitude measurement made by the computer as well as subjective inspection of the individual wave forms indicate that the casing is free to vibrate with the sonic pulse. Both methods indicated near maximum amplitude from the water level to 50.5 ft. (bottom of casing). Of course these measurements can not be made above water level.
3) The temperature curve demonstrates a thermal anomaly at or near the bottom of casing. Anomalies of this type germanely indicate groundwater inflow. This is in part substantiated by a local increase in porosity at the same depth on the neutron porosity log.

These observations lead to the conclusion that the well was probably drilled with cable tools and that the casing was driven and most likely not installed with cement grouting methods. It would be reasonable to assume that a well installed in this manner could provide hydrologic communication between the surface and deeper horizons. It might be prudent to verify these conclusions with packer tests.

Pleased be advised that these conclusions are preliminary in nature and are based on the observations made on the geophysical logs, coupled with the information about the well you have provided and our experience with common drilling practice. Other interpretations may be possible.

Respectfully Submitted,

Craig B. Clemmens
Managing Partner

RECEIVED
OCT 21 1998
KILLAM ASSOCIATES
DLA DIVISION

APPALACHIAN GEOPHYSICAL SURVEYS
276 PA Route 366-Mamont
Apollo, Pennysivania 15613
Telephone (412) 327-8119
(800) 653-8119

BOREHOLE VIDEO RECORD

CAMERA CONFIGURATION

Client: KILLAM & ASSOCIATES
Site: OSRAM SYLVANIN

View: AXIAL
Lights: STRUT
Compass: ON

Hole#: OLD PRODUCTION WELL # 947
Date: 10/8/98

DEPTH in ft.	PRELIMINARY FIELD OBSERVATION
2.5	Top of casing in well pit
4.5	Water level - Water turbid visibility poor
	Water clears somewhat 2-3 ft. down
21	Pitting ans scaling noted on casing - minor.
30	Casing joint
50.5	Bottom of casing
	Water very dark -orange color - possible Iron forming bacteria
56	Visibility zero
57	Bottom of well