

*Attachment A*  
*Soil Boring and Well*  
*Construction Logs*



3352 128th Avenue  
Holland, MI 49424  
P: 616-399-3500

PROJECT:  
Grand Haven Board of Light and Power  
CCR Cell Installation  
1231 N 3rd Street  
Grand Haven, Michigan

BORING # **MW-01**

ERM PROJECT # 0387368

SHEET 1 OF 1

DRILLING CONTRACTOR	EDAC Holland, MI	ERM REPRESENTATIVE	Brian Beach
DRILLING FOREMAN	Sean Smith	OFFICE LOCATION	Holland, MI
DRILLING METHOD	Hollow-Stem Augers	DATE: START	01/18/2017
DRILLING EQUIPMENT	Gus Peck	FINISH	01/18/2017

HORIZONTAL DATUM (NAD 1983 StatePlane Michigan South (US Feet))	BOREHOLE DEPTH	10 ft
NORTHING	176201.037	BOREHOLE DIAMETER
EASTING	3847934.632	DEPTH TO ATER (INITIAL) ▼ 5 ft
VERTICAL DATUM (NGVD 29 (US Feet)) ELEVATION	96.08 ft	DEPTH TO ATER (FINAL) ▾

DEPTH	ELEVATION	STRATA DESCRIPTION	DEPTH	USCS	GRAPHIC LOG	SAMPLING DATA		
						SAMPLE TYPE	RECOVERY	Observations / Remarks
		SAND (SP) rly graded, fine grained SAND; l se, little gravel, m ist, dark br wn t black		SP				
95		SAND (G -S ) well graded, fine grained SAND; l se, some gravel, m ist, br wn t grayish br wn	1	S G -				
2		SAND (SP) fine grained SAND; l se, m ist, black, [B tt m ash.]	2	SP				
		SILTY SAND (SP) rly graded, fine grained SAND; l se, little clay, m ist t wet, dark br wn t black, [C ncrete, metal and w d fragments. et @ 5']	3					
4								
6	90			SP				
8								
		SILT (OL) soft, little clay, trace fine sand, wet t m ist, dark grayish br wn	9	OL				

REMARKS:  
Elevation data established from referenced benchmark set at 100.00'.

LAB ANALYSIS:

BORING LOG GHBLP 0387368 CCR ELLS.GPJ ERM DATA TEMPLATE.GDT



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BORING # **MW-02**

ERM PROJECT # 0387368

SHEET 1 OF 1

DRILLING CONTRACTOR EDAC  
Holland, MI  
DRILLING FOREMAN Sean Smith  
DRILLING METHOD Hollow-Stem Augers  
DRILLING EQUIPMENT Gus Peck

ERM REPRESENTATIVE Brian Beach  
OFFICE LOCATION Holland, MI  
DATE: START 01/18/2017  
FINISH 01/18/2017

HORIZONTAL DATUM (NAD 1983 StatePlane Michigan South (US Feet))  
NORTHING 176247.026  
EASTING 3847865.054  
VERTICAL DATUM (NGVD 29 (US Feet)) ELEVATION 104.49 ft

BOREHOLE DEPTH 21 ft  
BOREHOLE DIAMETER  
DEPTH TO ATER (INITIAL) 15 ft  
DEPTH TO ATER (FINAL)

DEPTH ELEVATION	STRATA DESCRIPTION	DEPTH	USCS	GRAPHIC LOG	SAMPLING DATA		
					SAMPLE TYPE	RECOVERY	Observations / Remarks
5	SILTY CLAY (CL) medium stiff, some silt, trace fine gravel, trace fine sand; m ist, m ttled, br wn and gray		CL				
10	SAND (G -S ) well graded, fine grained SAND; l se, some gravel, little silt, trace clay; m ist, dark br wnish gray t black, [ d fragments]	11	G - S				
15	SILTY CLAY (CL) soft, little fine sand, trace gravel, m ist, dark gray t black, [Glass, w d, lastic debris]	13	CL				
	SILTY CLAY (CL) soft, some silt, trace fine sand, m ist, dark gray t dark br wnish gray	14	CL				
	SAND (SP) rly graded, fine grained SAND; l se, wet, light grayish br wn, [silt/clay stringers thr ugh ut.]	14.9	SP				
	SILTY CLAY (CL) soft, some silt, wet, dark gray t dark br wnish gray, [Grey fine sand seams thr ugh ut]	17.25	CL				
20	SAND (SP) rly graded, fine grained SAND; l se, little clay, laminated, gray t dark gray	19	SP				
	SILTY CLAY (CL) soft, some silt, wet, dark gray t dark br wnish gray	20	CL				
		21					

REMARKS:  
Elevation data established from referenced benchmark set at 100.00'.

LAB ANALYSIS:

BORING-LOG GHBLP-0387368 CCR ELLS.GPJ ERM DATA TEMPLATE.GDT



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PROJECT:  
Grand Haven Board of Light and Power  
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BORING # **MW-03**

ERM PROJECT # 0387368

SHEET 1 OF 1

DRILLING CONTRACTOR	EDAC Holland, MI	ERM REPRESENTATIVE	Brian Beach
DRILLING FOREMAN	Sean Smith	OFFICE LOCATION	Holland, MI
DRILLING METHOD	Hollow-Stem Augers	DATE: START	01/18/2017
DRILLING EQUIPMENT	Gus Peck	FINISH	01/18/2017

HORIZONTAL DATUM (NAD 1983 StatePlane Michigan South (US Feet))	BOREHOLE DEPTH	17 ft	
NORTHING	176214.1	BOREHOLE DIAMETER	
EASTING	3847846.674	DEPTH TO ATER (INITIAL) ▼	13 ft
VERTICAL DATUM (NGVD 29 (US Feet)) ELEVATION	102.17 ft	DEPTH TO ATER (FINAL) ▾	

DEPTH	ELEVATION	STRATA DESCRIPTION	DEPTH	USCS	GRAPHIC LOG	SAMPLING DATA		
						SAMPLE TYPE	RECOVERY	Observations / Remarks
2	100	SAND (S ) well graded, fine grained SAND; l se, some silt, little gravel, m ist, grayish br wn, [Brick and concrete fragments.]		S				
4								
6		SAND (S ) well graded, fine grained SAND; l se, little silt, little gravel, m ist, grayish br wn t dark br wn	6	S				
8		SAND (S ) well graded, fine grained SAND; l se, some silt, some gravel, trace clay; m ist, grayish br wn t dark br wn, [ d fragments.]	8	S				
10								
12	90	CLAYEY SILT (ML) soft, trace fine sand, m ist, dark grayish br wn t dark br wn	12	ML				
		SAND (SP) rly graded, fine grained SAND; l se, m ist t wet, gray, [ et @ 13']	12.75	SP				
14								
16		SANDY SILT (OL) soft, little clay, trace fine sand, m ist t wet, dark gray t dark br wnish gray, [Silt l am.]	14.5	OL				
18	85		17					

REMARKS:  
Elevation data established from referenced benchmark set at 100.00'.

LAB ANALYSIS:

BORING LOG GHBLP 0387368 CCR ELLS.GPJ ERM DATA TEMPLATE.GDT



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BORING # **MW-0**

ERM PROJECT # 0387368

SHEET 1 OF 1

DRILLING CONTRACTOR EDAC  
Holland, MI  
DRILLING FOREMAN Sean Smith  
DRILLING METHOD Hollow-Stem Augers  
DRILLING EQUIPMENT Gus Peck

ERM REPRESENTATIVE Brian Beach  
OFFICE LOCATION Holland, MI  
DATE: START 01/18/2017  
FINISH 01/18/2017

HORIZONTAL DATUM (NAD 1983 StatePlane Michigan South (US Feet))  
NORTHING 176182.574  
EASTING 3847848.69  
VERTICAL DATUM (NGVD 29 (US Feet)) ELEVATION 100.60 ft

BOREHOLE DEPTH 17 ft  
BOREHOLE DIAMETER  
DEPTH TO ATER (INITIAL) 8.5 ft  
DEPTH TO ATER (FINAL)

DEPTH	ELEVATION	STRATA DESCRIPTION	DEPTH	USCS	GRAPHIC LOG	SAMPLING DATA			
						SAMPLE TYPE	RECOVERY	Observations / Remarks	
100		GRAVELLY SAND (S) well graded, fine grained SAND; l se, some gravel, m ist, br wn, [C ncrete fragments]							
2				S					
4									
95		GRAVELLY SAND (SP) rly graded, fine grained SAND; l se, some gravel, m ist, dark br wn t black	5.5	SP					
6			6.5	S					
		SAND (S) well graded, fine grained SAND; l se, m ist, br wn	7	SC					
8		CLAYEY SAND (SC) soft, some silt, little gravel, m ist, br wn t dark gray, [R ts]	7.5	S					
		SAND (S) well graded, fine grained SAND; l se, some silt, some gravel, m ist, dark br wn, [C ncrete and w d fragments.]	8.5	S					
10		SAND (S) well graded, medium t coarse grained SAND; l se, wet, dark grayish br wn t black, [B tt m ash and concrete fragments.]	10	SP					
90		SAND (SP) rly graded, fine grained SAND; l se, wet, dark grayish br wn	10.5	OL					
12		SANDY SILT (OL) soft, m ist, dark grayish br wn, [Silt l am.]	11.5	SP					
		SAND (SP) rly graded, fine grained SAND; l se, wet, gray	12.5	OL					
14		SANDY SILT (OL) soft, trace fine sand, trace clay, m ist, dark grayish br wn, [Clay stringer (14 - 14.25). Grey fine sand seam (14.25 - 14.5).]	14.5	MLS					
16		SANDY SILT (MLS) soft, little clay, m ist, dark grayish br wn, [ d fragments. Grey fine sand seam (15.75 - 16); (16.25 - 16.5); (16.75 - 17).]							
18									

REMARKS:  
Elevation data established from referenced benchmark set at 100.00'.

LAB ANALYSIS:

BORING LOG GHBLP 0387368 CCR ELLS.GPJ ERM DATA TEMPLATE.GDT



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Grand Haven, Michigan

BORING # **MW-01**

ERM PROJECT # 38 7368

SHEET 1 OF 1

DRILLING CO TRACTOR EDAC  
Holland, MI  
DRILLING FOREMAN Sean Smith  
DRILLING METHOD Hollow-Stem Augers  
DRILLING EQUIPMENT Gus Peck

ERM REPRESENTATIVE Brian Beach  
OFFICE LOCATION Holland, MI  
DATE: START 1/18/2017  
FINISH 1/18/2017

GEOGRAPHIC COORDINATES  
(NAD 1983 StatePlane Michigan South (US Feet))  
ORTHING 17621.37  
EASTING 38793.632  
Elevation/Top of Casing Elevation 6.8 ft / 99.35 ft

WELL CONSTRUCTION  
Riser Screen  
Material: Schedule 40 PVC Schedule 40 PVC, 0.010-slot  
Diameter (ID): 2-inch 2-inch  
Coupling: Threaded Threaded  
Well Permit #: No permit required.

WELL DEVELOPMENT  
Method: Overpumping  
Duration: 0.5 hours  
Gals. Purged: 30

WELL CONSTRUCTION: GHBLP\_3873\_68\_CCR\_WELLS.GPJ ERM DATA TEMPLATE.GDT

DEPTH	ELEVATION	STRATA DESCRIPTIO	DEPTH	USCS	GRAPHIC LOG	WELL CONSTRUCTION
						Casing Type: 6-inch Diameter Steel Stickup
		SAND (SP) poorly graded, fine grained SAND; loose, little gravel, moist, dark brown to black		SP		
95		SAND (GW-SW) well graded, fine grained SAND; loose, some gravel, moist, brown to grayish brown	1	GW-SW		Schedule PVC Riser
2		SAND (SP) fine grained SAND; loose, moist, black, [Bottom ash.]	2	SP		
		SILTY SAND (SP) poorly graded, fine grained SAND; loose, little clay, moist to wet, dark brown to black, [Concrete, metal and wood fragments. Wet @ 5']	3	SP		
6	9			SP		
8				SP		1 - slot Schedule PVC Screen
		SILT (OL) soft, little clay, trace fine sand, wet to moist, dark grayish brown	9	OL		

REMARKS:  
Elevation data established from referenced benchmark set at 10. '.

WELL INSTALLATION NOTES:



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BORING # **MW-02**

ERM PROJECT # 38 7368

SHEET 1 OF 1

DRILLING CO TRACTOR EDAC  
Holland, MI  
DRILLING FOREMAN Sean Smith  
DRILLING METHOD Hollow-Stem Augers  
DRILLING EQUIPMENT Gus Peck

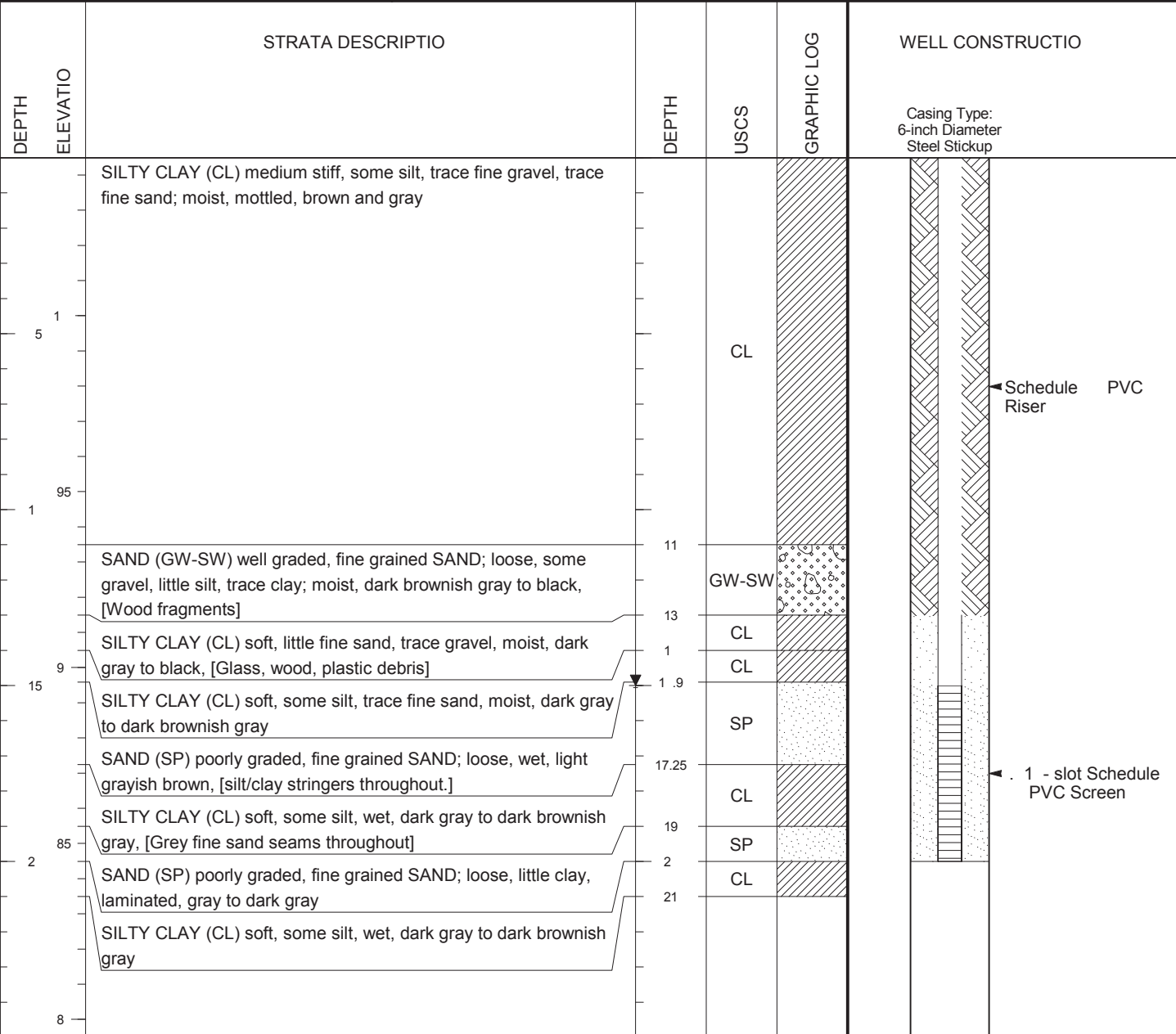
ERM REPRESENTATIVE Brian Beach  
OFFICE LOCATION Holland, MI  
DATE: START 1/18/2017  
FINISH 1/18/2017

GEOGRAPHIC COORDINATES  
(NAD 1983 StatePlane Michigan South (US Feet))  
ORTHING 17627.26  
EASTING 387865.5  
Elevation/Top of Casing Elev. 0.9 ft / 107.75 ft

WELL CONSTRUCTION		WELL DEVELOPMENT
Riser	Screen	
Material: Schedule 40 PVC	Schedule 40 PVC, 0.010-slot	Method: Overpumping
Diameter (ID): 2-inch	2-inch	Duration: 0.5 hours
Coupling: Threaded	Threaded	Gals. Purged: 30

Well Permit #: No permit required.

WELL CONSTRUCTION: GHBLP\_3873\_68\_CCR\_WELLS.GPJ ERM DATA TEMPLATE.GDT



REMARKS:  
Elevation data established from referenced benchmark set at 10. . .

WELL INSTALLATION NOTES:



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BORING # **MW-03**

ERM PROJECT # 38 7368

SHEET 1 OF 1

DRILLING CO TRACTOR EDAC  
Holland, MI  
DRILLING FOREMAN Sean Smith  
DRILLING METHOD Hollow-Stem Augers  
DRILLING EQUIPMENT Gus Peck

ERM REPRESENTATIVE Brian Beach  
OFFICE LOCATION Holland, MI  
DATE: START 1/18/2017  
FINISH 1/18/2017

GEOGRAPHIC COORDINATES  
(NAD 1983 StatePlane Michigan South (US Feet))  
ORTHING 176214.1  
EASTING 387846.67  
Elevation/Top of Casing Elev. 102.17 ft / 105.2 ft

WELL CONSTRUCTION  
Riser: Material: Schedule 40 PVC, Diameter (ID): 2-inch, Coupling: Threaded  
Screen: Schedule 40 PVC, 0.010-slot 2-inch Threaded  
Well Permit #: No permit required.

WELL DEVELOPMENT  
Method: Overpumping  
Duration: 0.5 hours  
Gals. Purged: 30

WELL CONSTRUCTION: GHBLP\_3873\_68\_CCR\_WELLS.GPJ ERM DATA TEMPLATE.GDT

DEPTH	ELEVATION	STRATA DESCRIPTIO	DEPTH	USCS	GRAPHIC LOG	WELL CONSTRUCTION	
						Casing Type:	6-inch Diameter Steel Stickup
2	1	SAND (SW) well graded, fine grained SAND; loose, some silt, little gravel, moist, grayish brown, [Brick and concrete fragments.]		SW		<p>Schedule PVC Riser</p> <p>1 - slot Schedule PVC Screen</p>	
6	95	SAND (SW) well graded, fine grained SAND; loose, little silt, little gravel, moist, grayish brown to dark brown	6	SW			
8	1	SAND (SW) well graded, fine grained SAND; loose, some silt, some gravel, trace clay; moist, grayish brown to dark brown, [Wood fragments.]	8	SW			
12	9	CLAYEY SILT (ML) soft, trace fine sand, moist, dark grayish brown to dark brown	12	ML			
12.75			12.75	SP			
1		SAND (SP) poorly graded, fine grained SAND; loose, moist to wet, gray, [Wet @ 13']	1.5	SP			
16		SANDY SILT (OL) soft, little clay, trace fine sand, moist to wet, dark gray to dark brownish gray, [Silt loam.]	17	OL			
18							

REMARKS:  
Elevation data established from referenced benchmark set at 10. ' .

WELL INSTALLATION NOTES:





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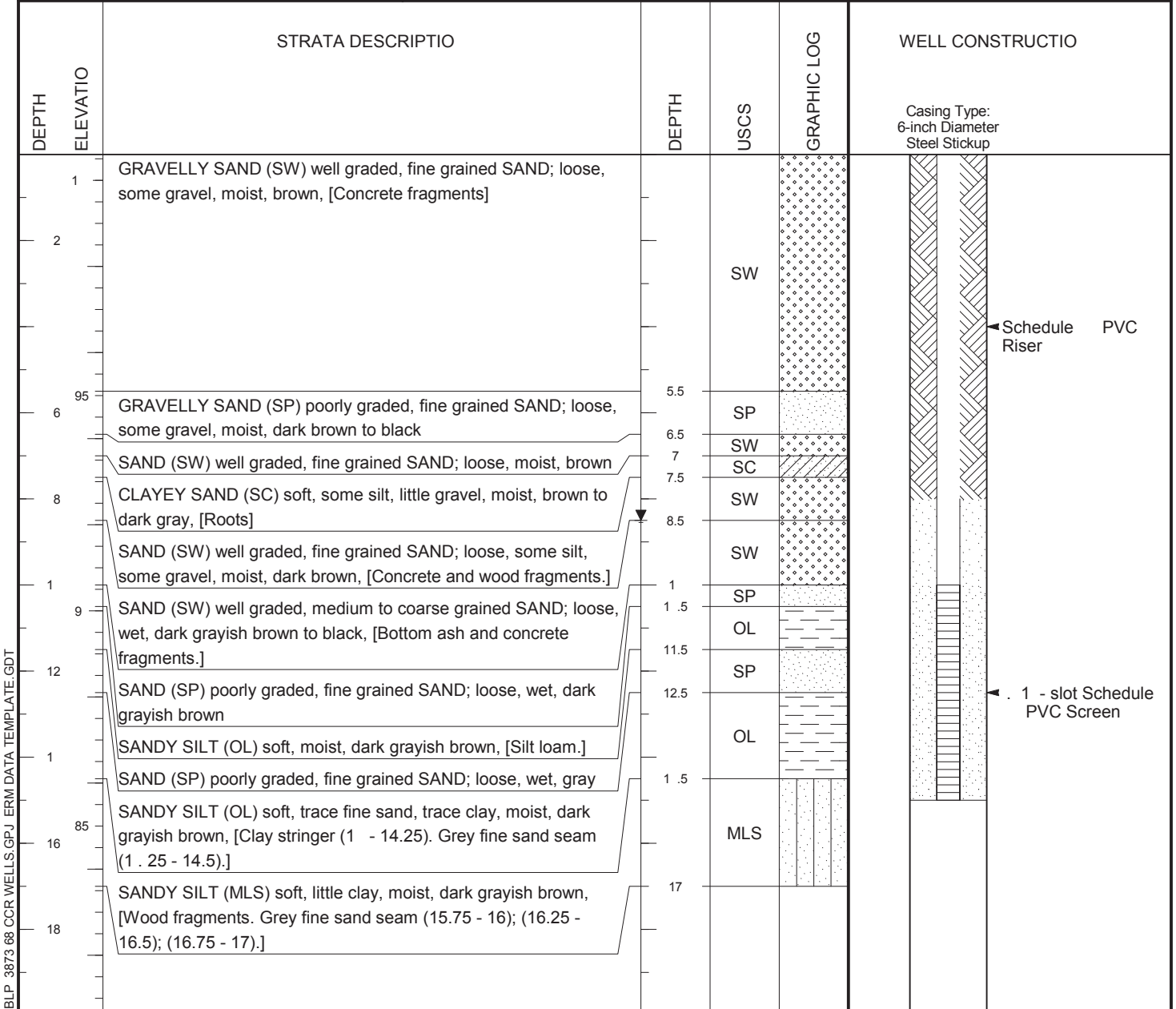
PROJECT:  
Grand Haven Board of Light and Power  
CCR Well Installation  
1231 N 3rd Street  
Grand Haven, Michigan

BORING # **MW-0**  
ERM PROJECT # 38 7368  
SHEET 1 OF 1

DRILLING CO TRACTOR EDAC  
Holland, MI  
DRILLING FOREMAN Sean Smith  
DRILLING METHOD Hollow-Stem Augers  
DRILLING EQUIPMENT Gus Peck

ERM REPRESENTATIVE Brian Beach  
OFFICE LOCATION Holland, MI  
DATE: START 1/18/2017  
FINISH 1/18/2017

GEOGRAPHIC COORDINATES		WELL CONSTRUCTION		WELL DEVELOPMENT
(NAD 1983 StatePlane Michigan South (US Feet))		Riser	Screen	
ORTHING	176182.574	Material: Schedule 40 PVC	Schedule 40 PVC, 0.010-slot	Method: Overpumping
EASTING	387848.69	Diameter (ID): 2-inch	2-inch	Duration: 0.5 hours
Elevation/Top of Casing Elev	103.59 ft	Coupling: Threaded	Threaded	Gals. Purged: 30
Well Permit #: No permit required.				



REMARKS:  
Elevation data established from referenced benchmark set at 10. ' .

WELL INSTALLATION NOTES:

WELL CONSTRUCTION: GHBLP\_3873\_68\_CCR\_WELLS.GPJ ERM DATA TEMPLATE.GDT