Appendix A

Investigative Derived Waste Disposal Records

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TRMNI-017726

NON-HAZARDOUS WASTE MANIFEST

(Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No. NY0570024273	Manifest Document No. 00019	2. Page 1 of 1
3. Generator's Name and Mailing Address: Niagara Falls Air Reserve Station, 914 MSG/CEV, 1405 Franklin Drive, Niagara Falls, NY 14304-5063 9HM 4. Generator's Phone ( ) 716-236-3123		Same	
5. Transporter 1 Company Name: OP-TECH Environmental Services, Inc.	6. US EPA ID Number: NYD988693753	A. State Transporter's ID 28845JS B. Transporter 1 Phone 716-625-1882	
7. Transporter 2 Company Name	8. US EPA ID Number	C. State Transporter's ID D. Transporter 2 Phone	
9. Designated Facility Name and Site Address: American Ref-Fuel of Niagara, 100 Energy Blvd. & 56th St., Niagara Falls, NY 14304	10. US EPA ID Number: NYD988693054 3	E. State Facility's ID F. Facility's Phone 716-278-6509	

11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. NON DOT Regulated Liquids,NOS (Cont. Water)	18	DM	2500	G
b. NON DOT Regulated Solids,NOS(Cont. Soil)	5	DM	9HM 1000	P
c.				
d. LAST ITEM 9HM				

G. Additional Descriptions for Materials Listed Above

a. Job # FEAE0019

b. N/A

c. N/A

d. N/A

H. Handling Codes for Wastes Listed Above

a. B

b. B

c.

d.

15. Special Handling Instructions and Additional Information

In Case of Emergency call 1-800-225-6750. This material has been verified as approval # 7603 NYSDEC 08-010.

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date (Month Day Year)
JAMES H. NAGELHOUT	James H. Nagelhout	05 28 14

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)
Michael K Clukey	Michael K Clukey	5 28 14

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name	Signature	Date (Month Day Year)
Kathy Steele	Kathy	6 5 14

NON-HAZARDOUS WASTE MANIFEST

Please print or type . (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NY0570024273

Manifest Document No. 10019

2. Page 1 of

3. Generator's Name and Mailing Address
Niagara Falls Air Reserve Station,914 MSG/CEV
2405 Franklin Drive, Niagara Falls, NY 14304-5063

Same

4. Generator's Phone ( ) 716-236-3123

5. Transporter 1 Company Name: OP-TECH Environmental Services, Inc.

US EPA ID Number: N Y D 9 8 6 9 8 0 7 5 3

A. State Transporter's ID 43321ME

B. Transporter 1 Phone 716-625-1982

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address
American Ref-Fuel of Niagara
100 Energy Blvd. & 56th St.
Niagara Falls, NY 14304

10. US EPA ID Number: N Y D 9 8 8 9 3 0 5 4 3

E. State Facility's ID

F. Facility's Phone 716-278-8509

11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. NON DOT Regulated Liquids,NOS (Cont. Water)	2	DM	~~600~~ 110	G
b. NON DOT Regulated Solids,NOS(Cont. Soil)	11	DM	2000	P
c.				
d.				

LAST ITEM

GENERATOR

G. Additional Descriptions for Materials Listed Above

a. Job # FEAE0019
b. N/A
c. N/A
d. N/A

H. Handling Codes for Wastes Listed Above

a. B
b. B
c.
d.

15. Special Handling Instructions and Additional Information

In Case of Emergency call 1-800-225-6750. This material has been verified as approval # 7603 NYSDEC 08-010.

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: Kim Powell
Signature: Kim Powell
Date: Month 08 Day 27 Year 14

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Michael K Clucksy
Signature: Mike Clucksy
Date: Month 8 Day 27 Year 14

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name
Signature
Date: Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name: Kathy Steele
Signature
Date: Month 9 Day 10 Year 14

Appendix C

Site 10 - Logs

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Appendix C-1

MIP Logs

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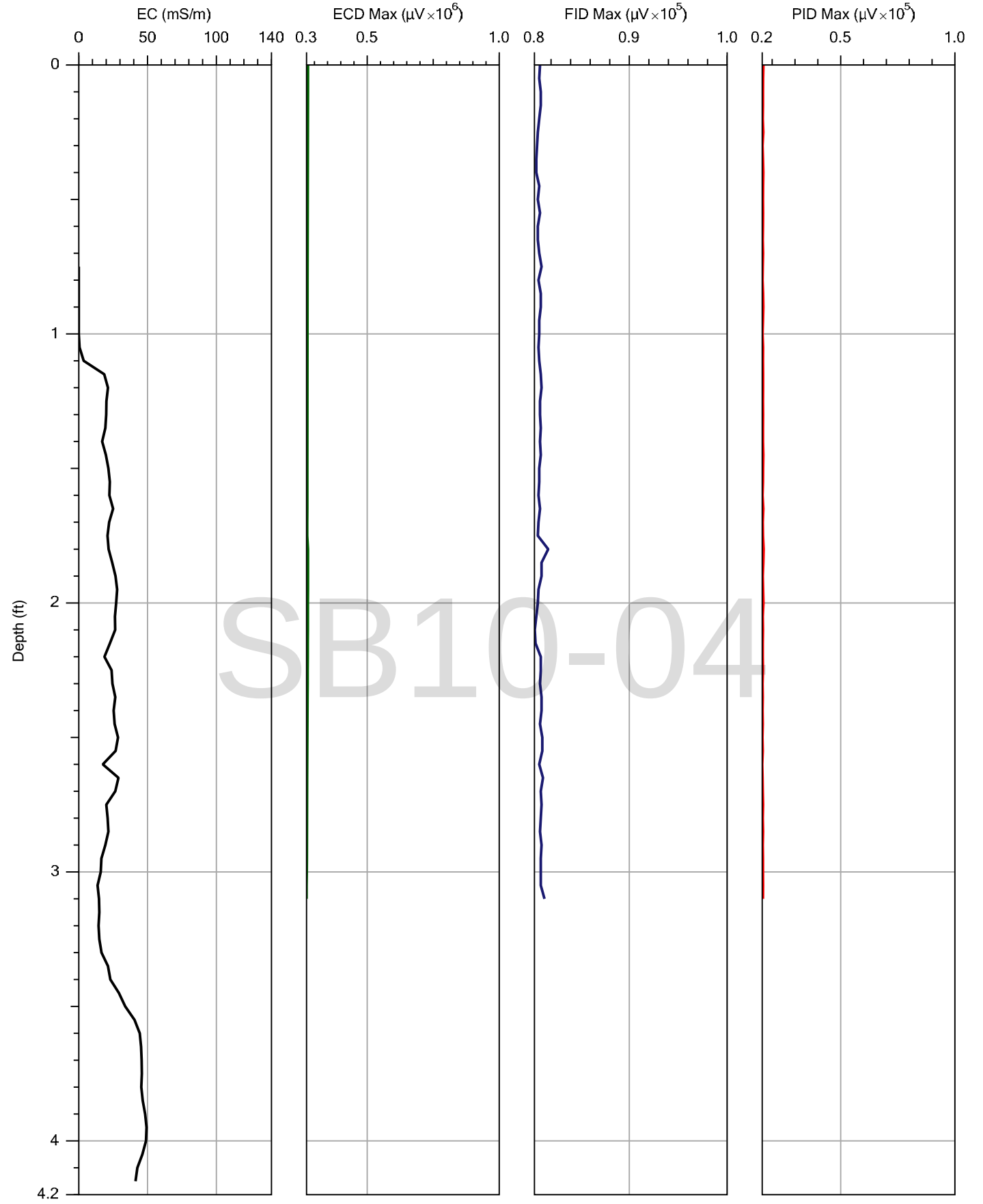

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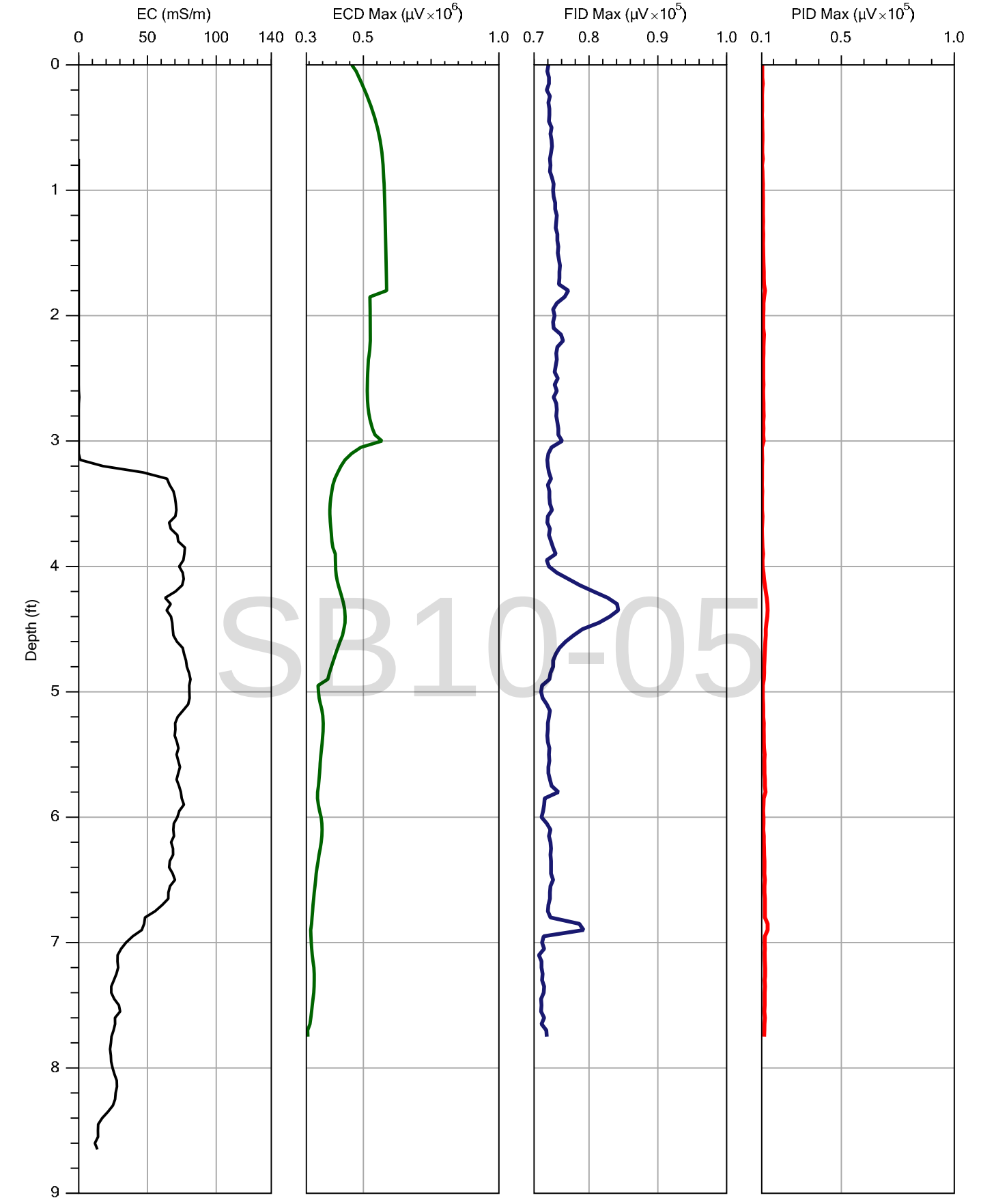

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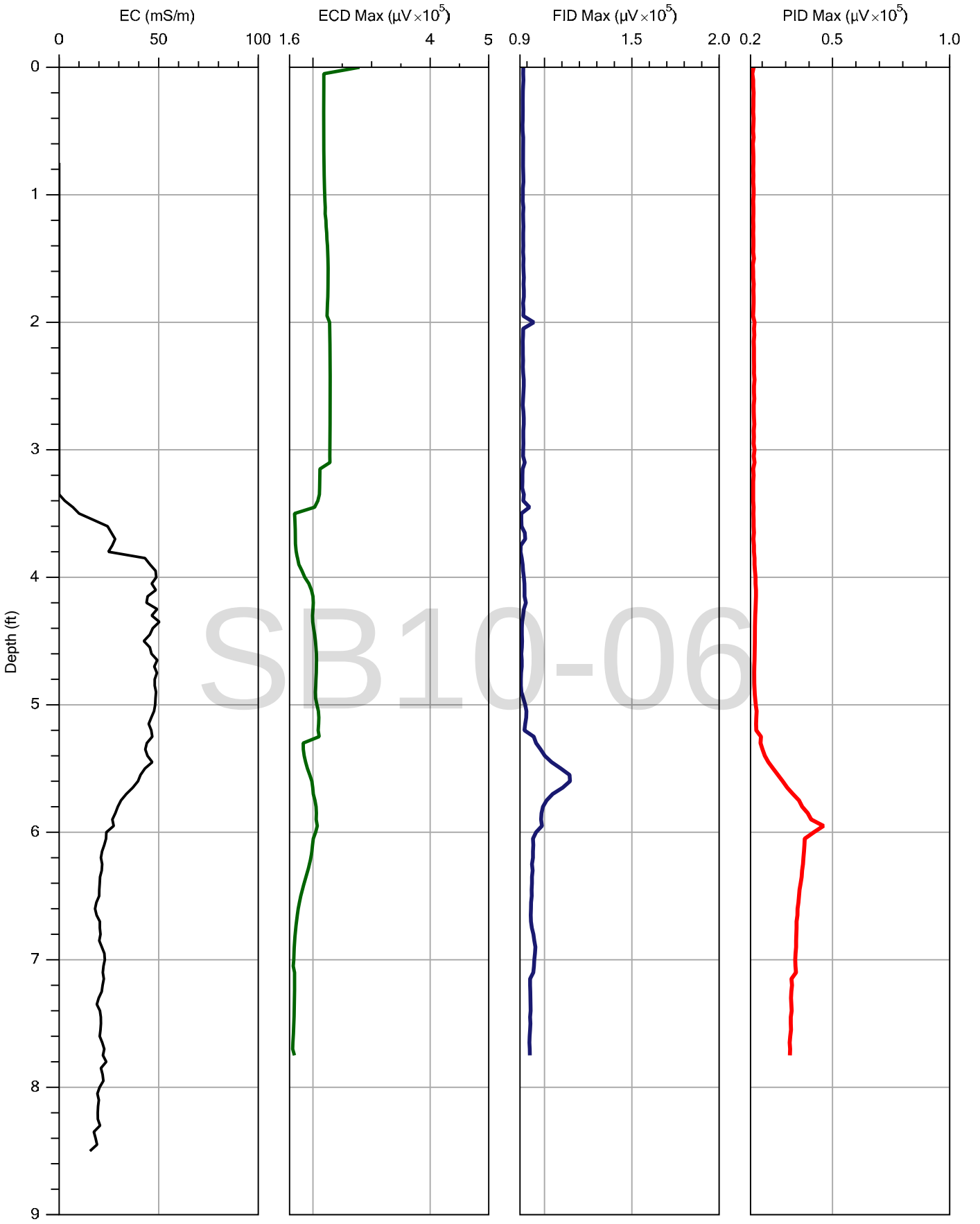

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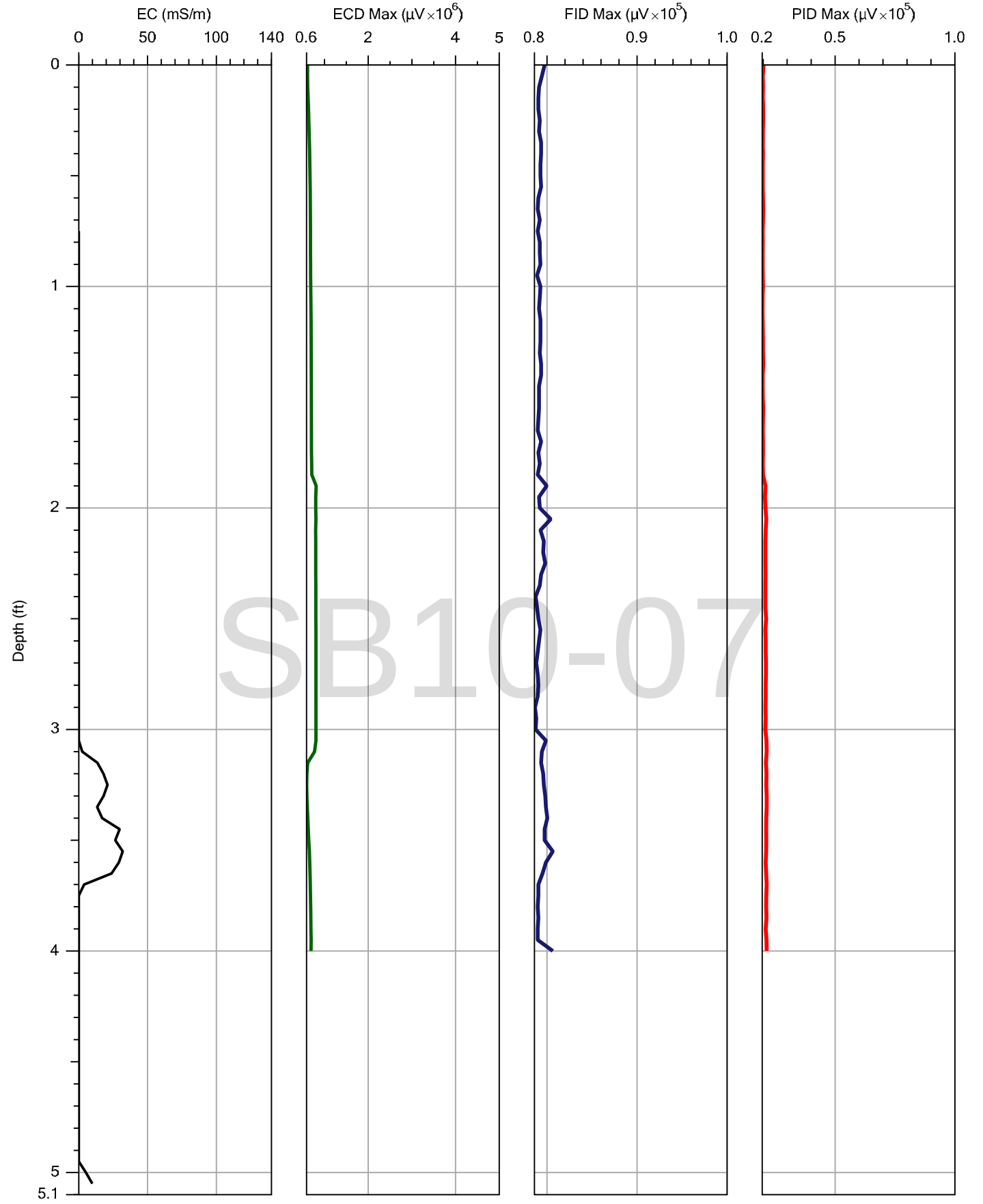

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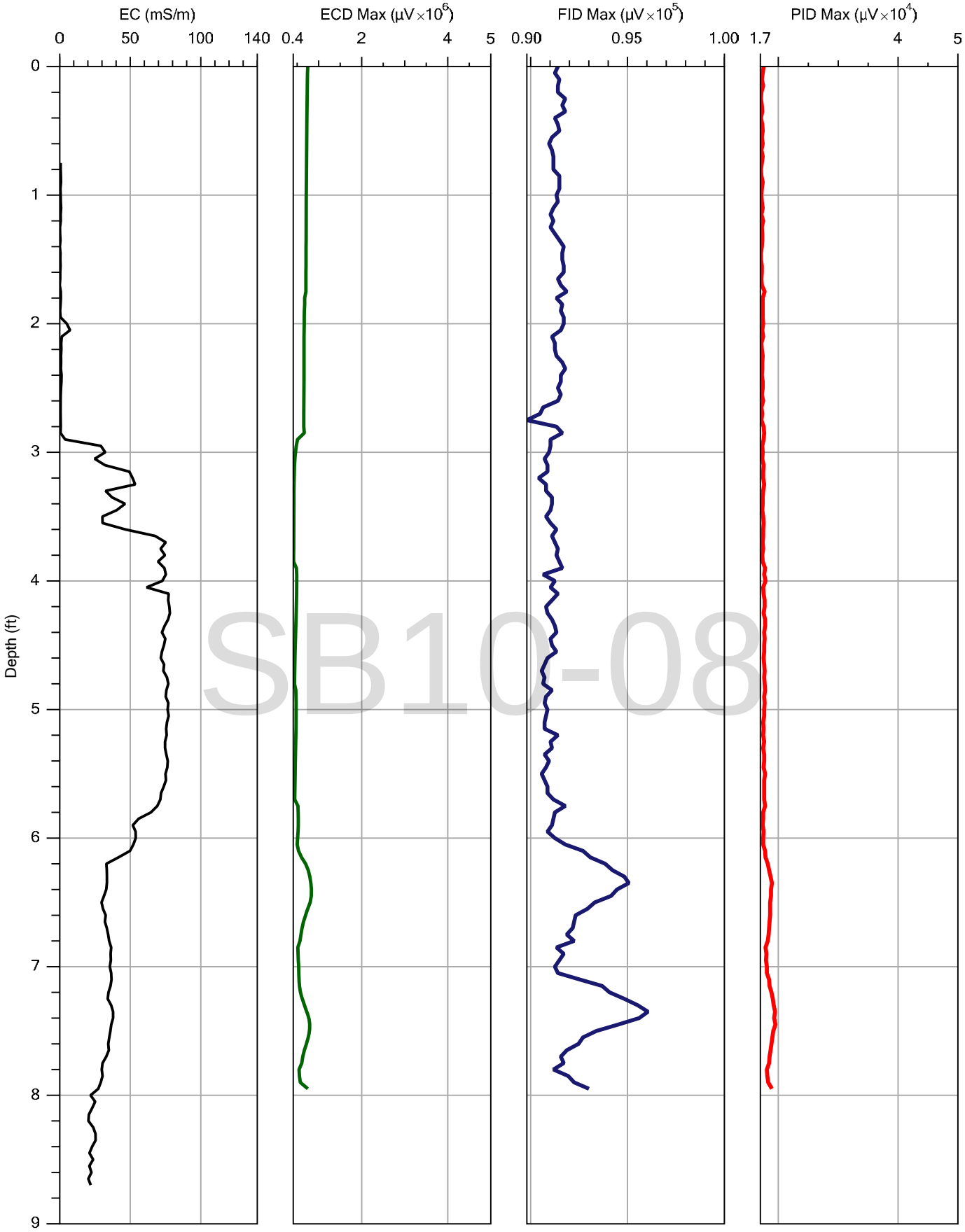

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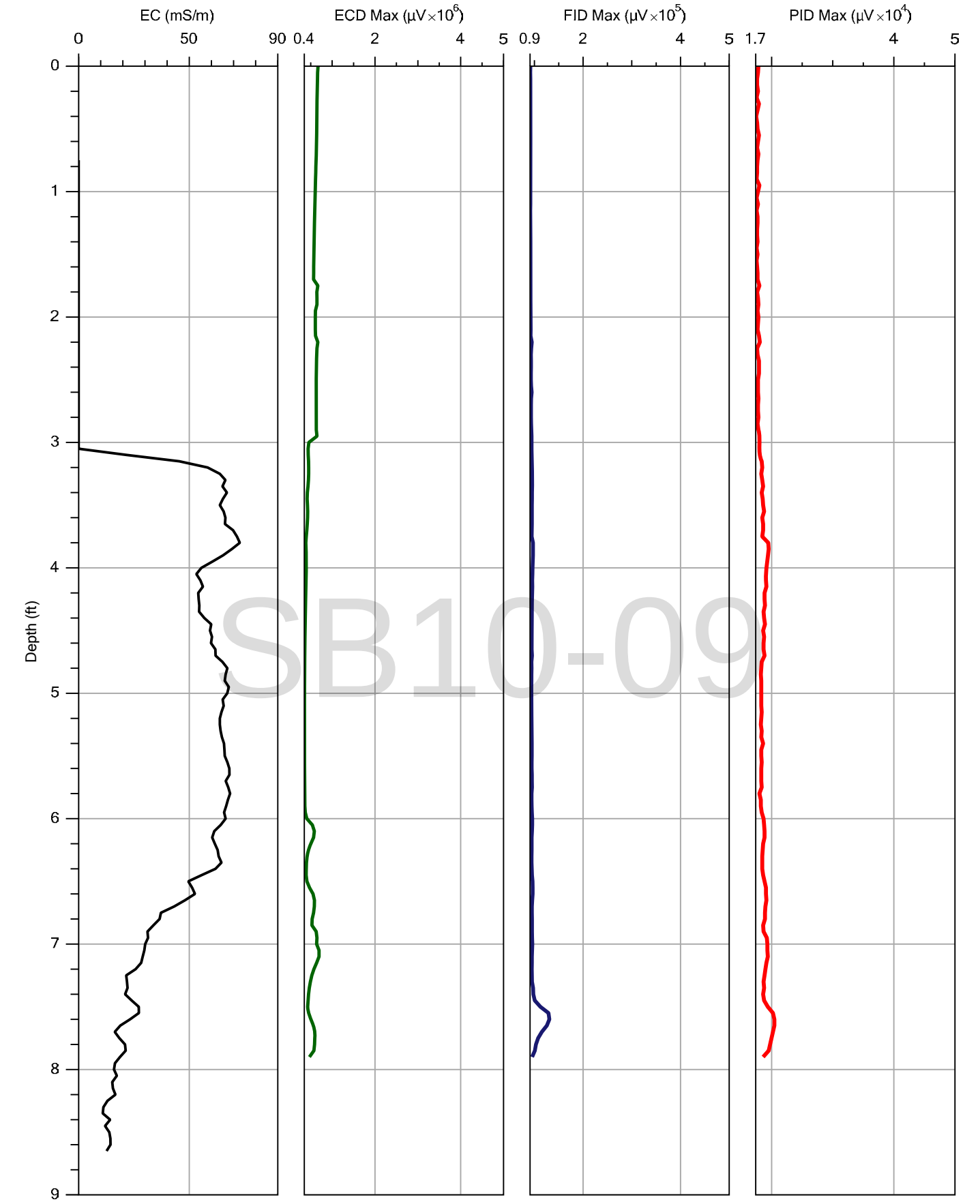

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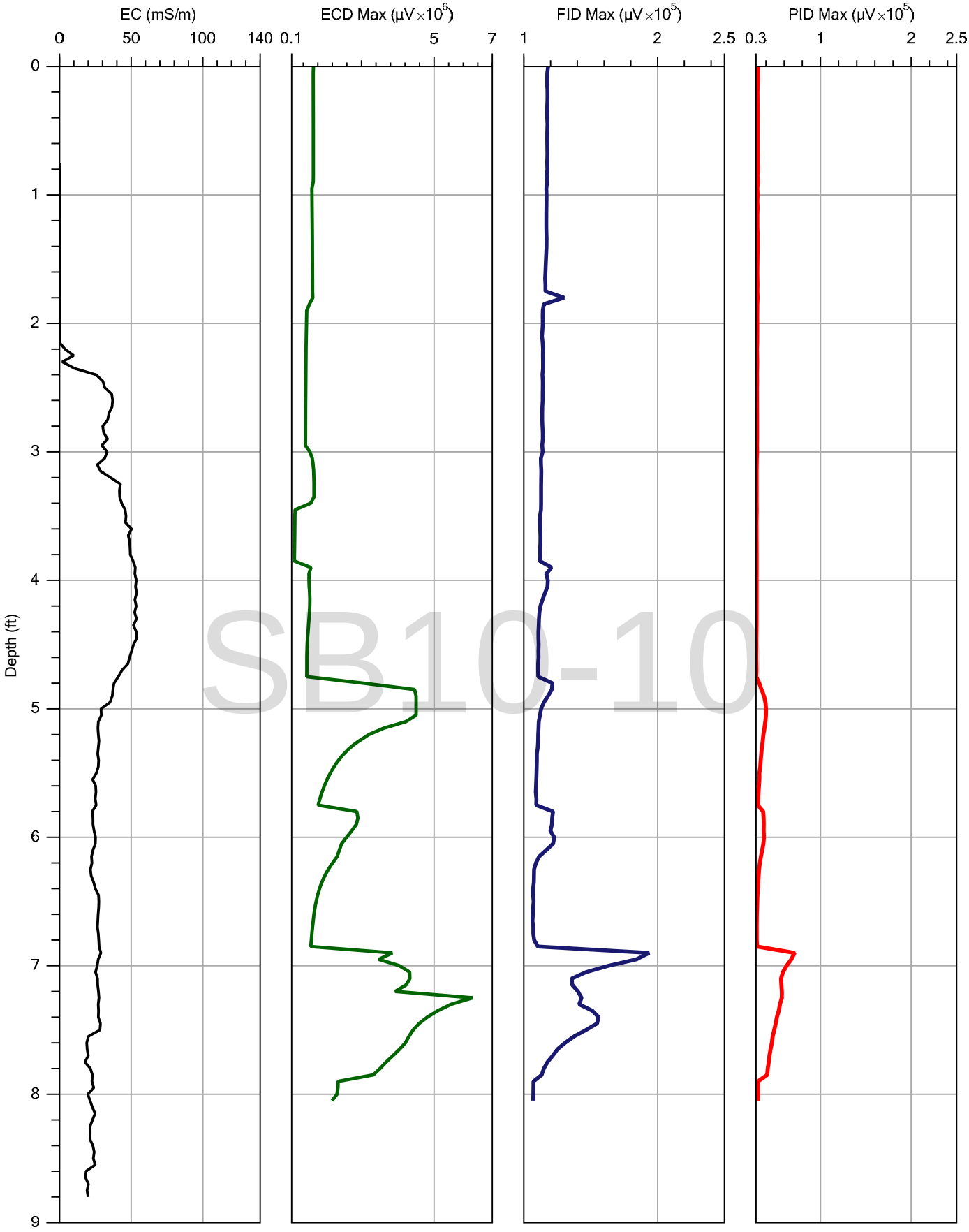

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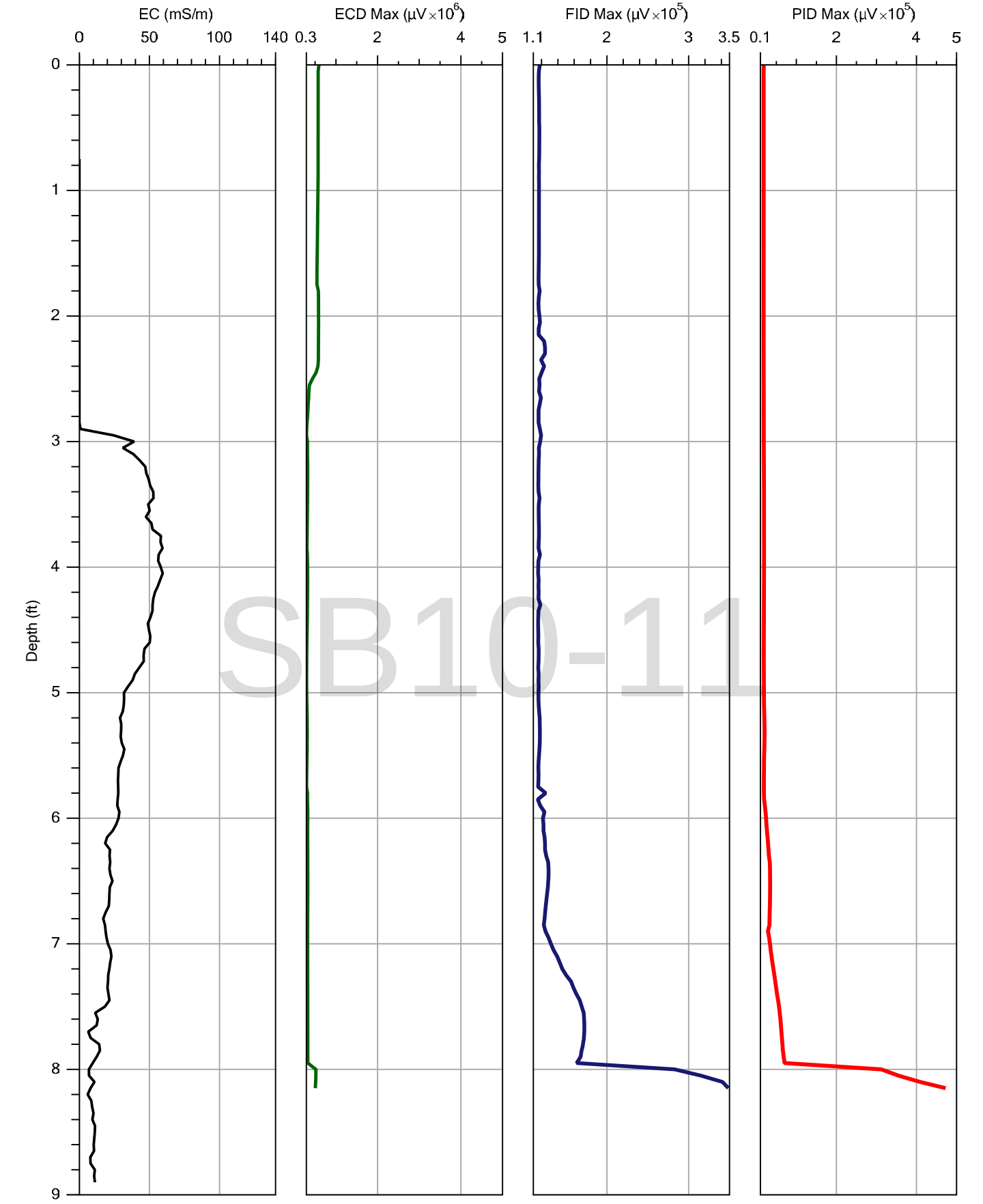

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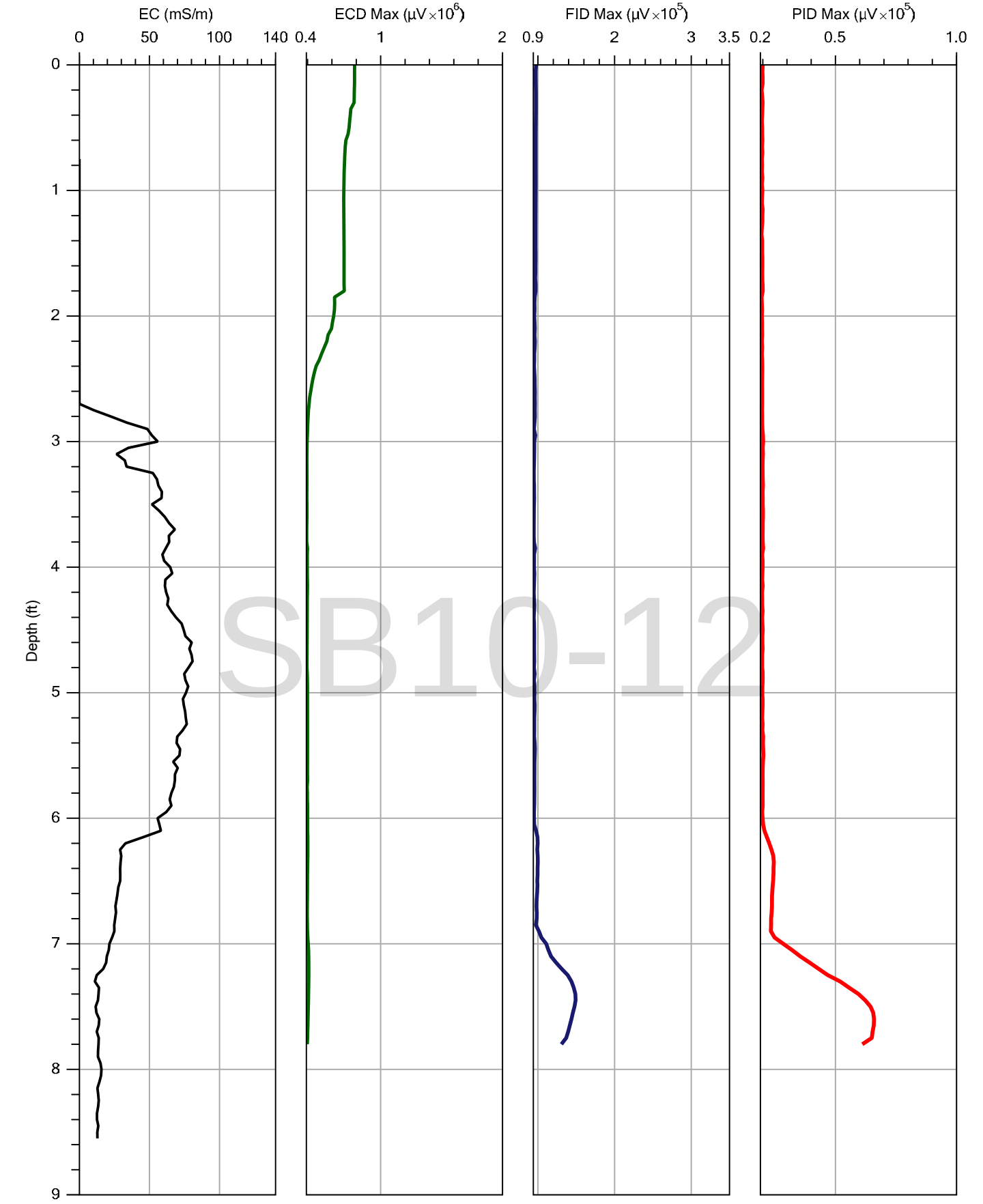

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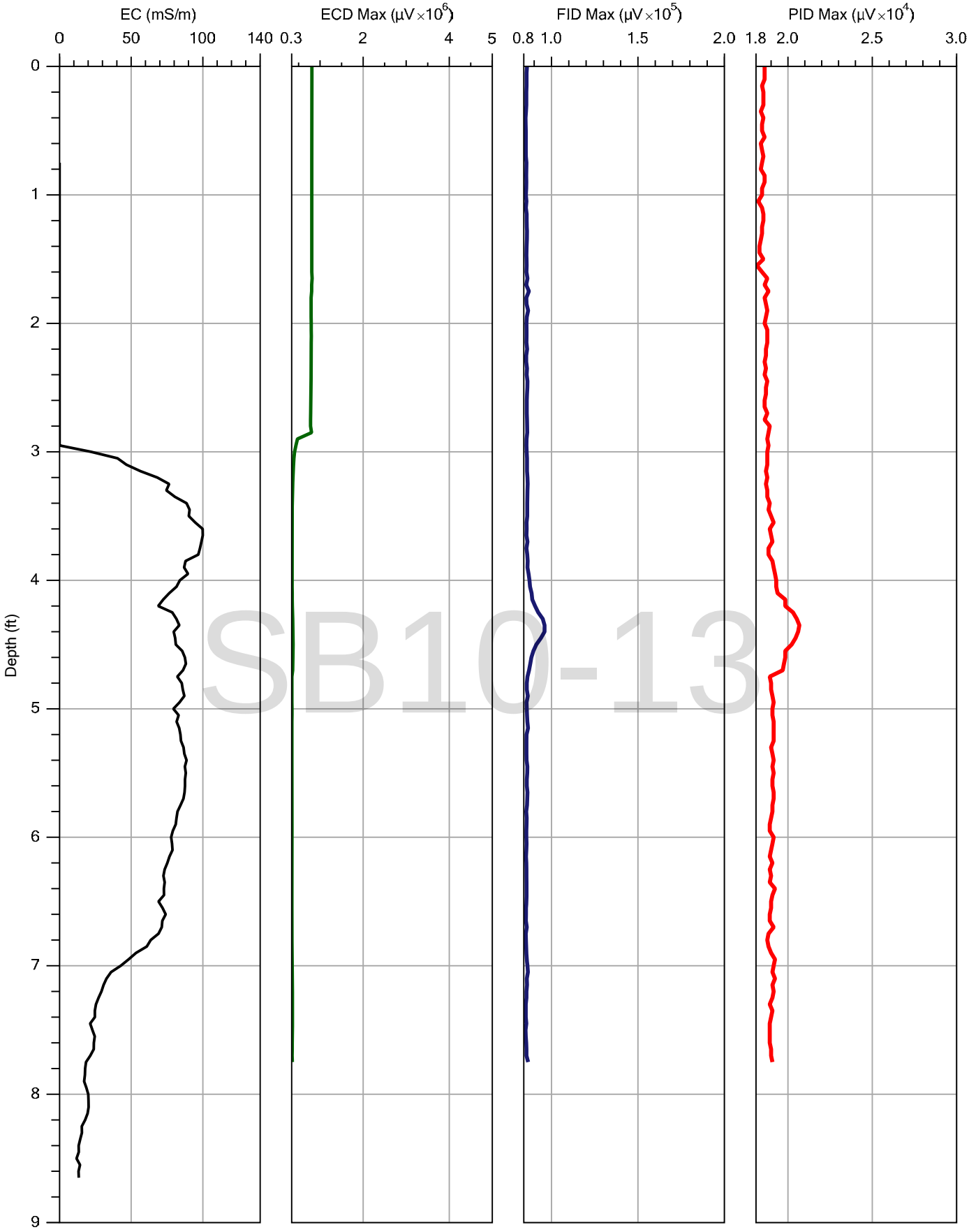

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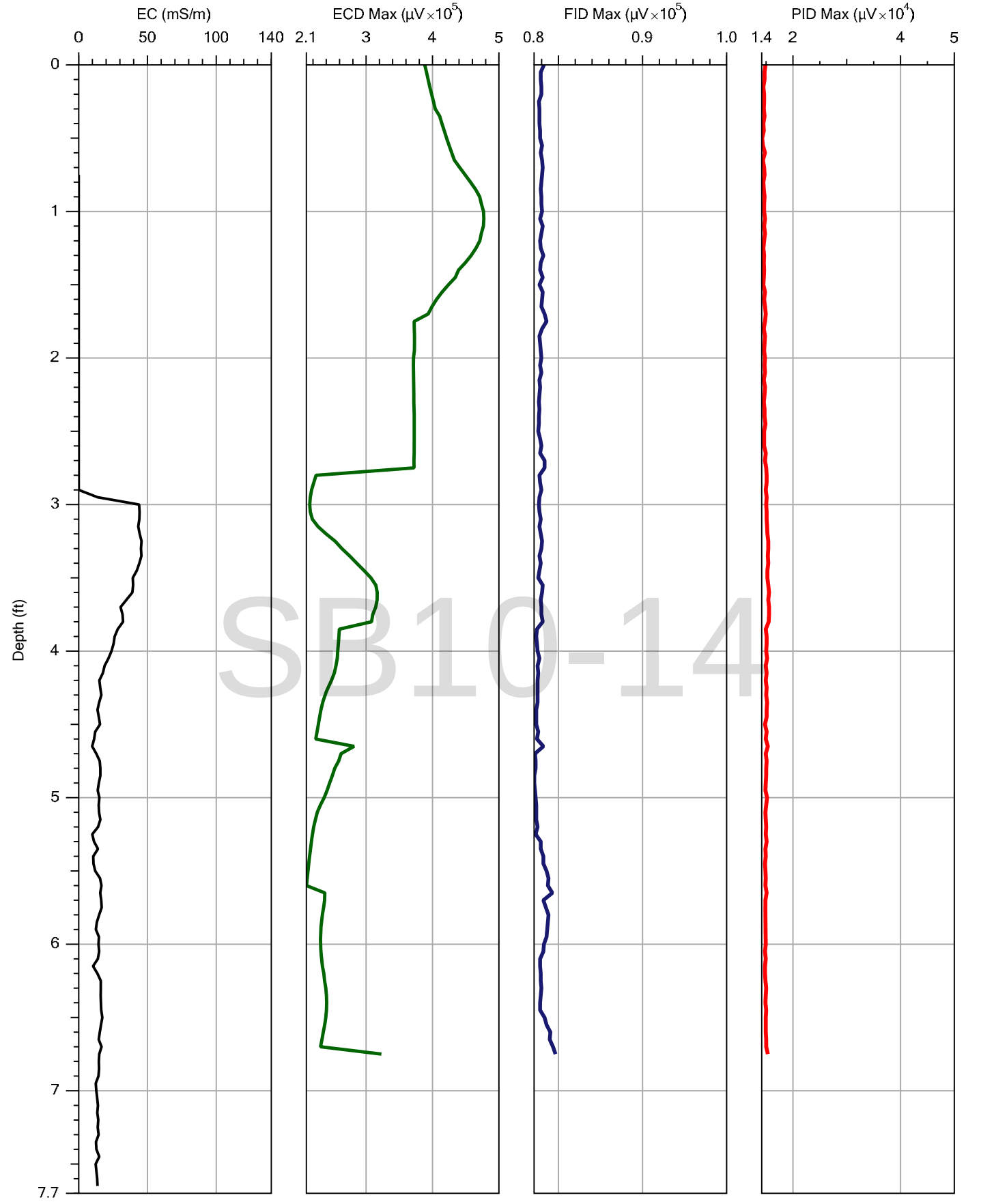

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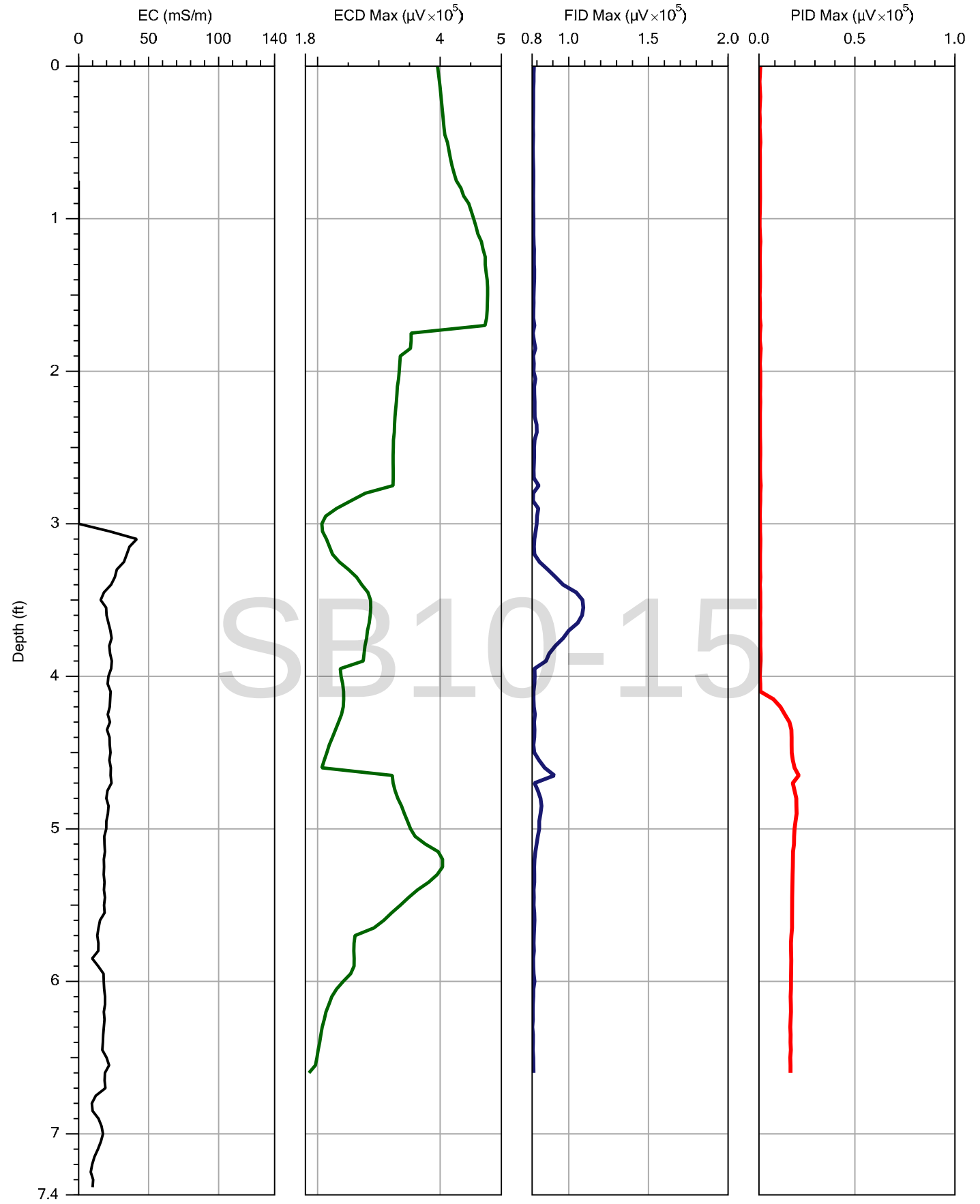

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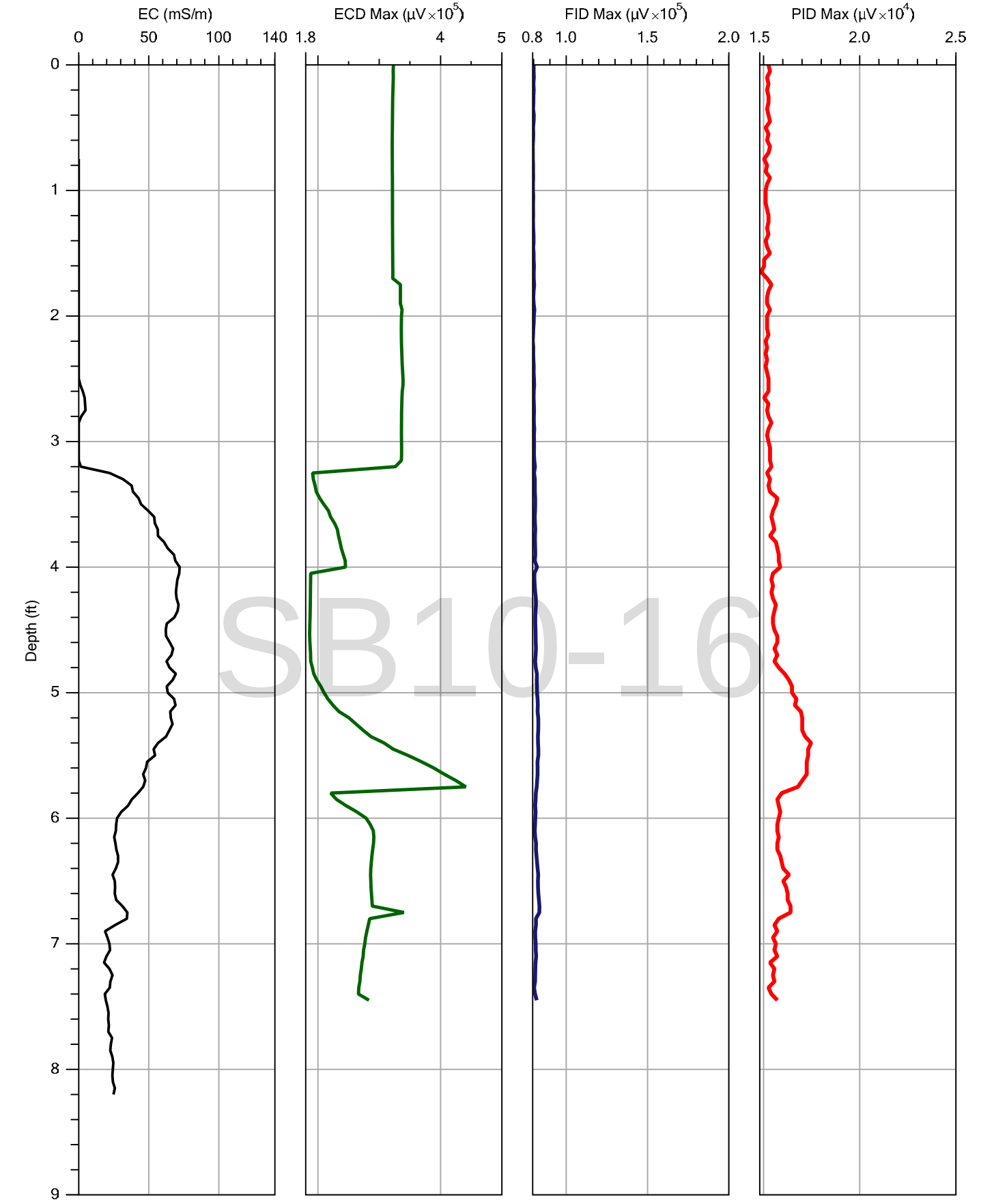

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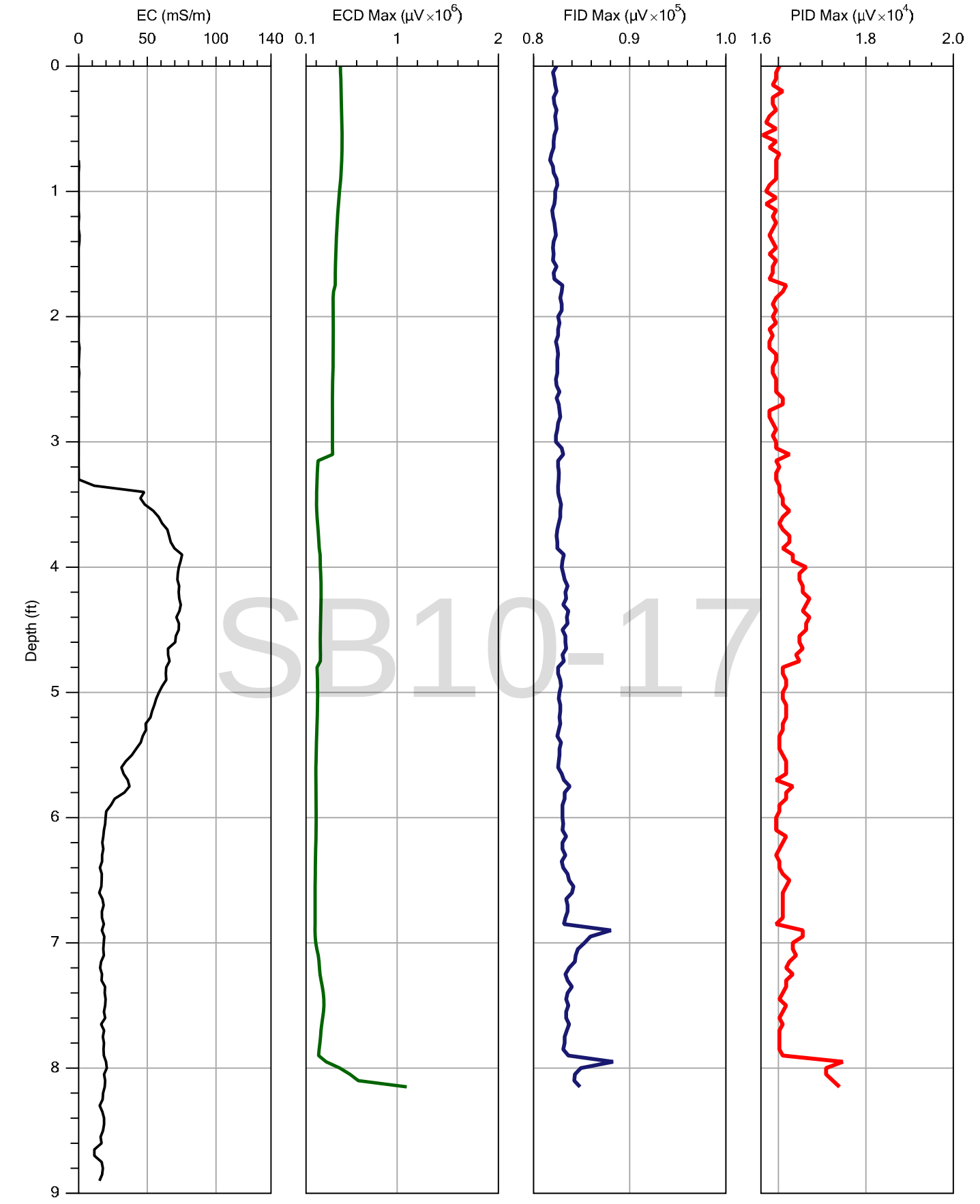

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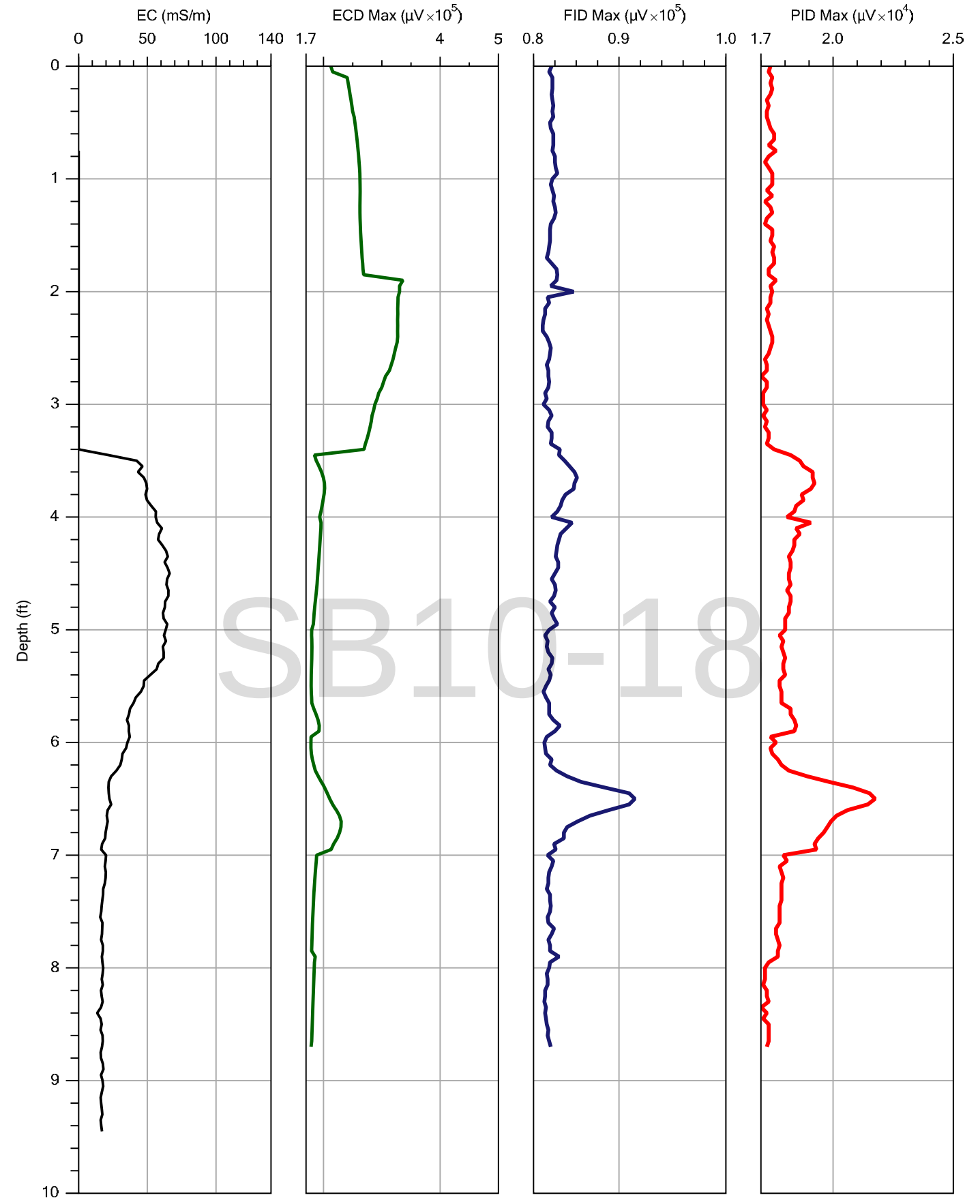

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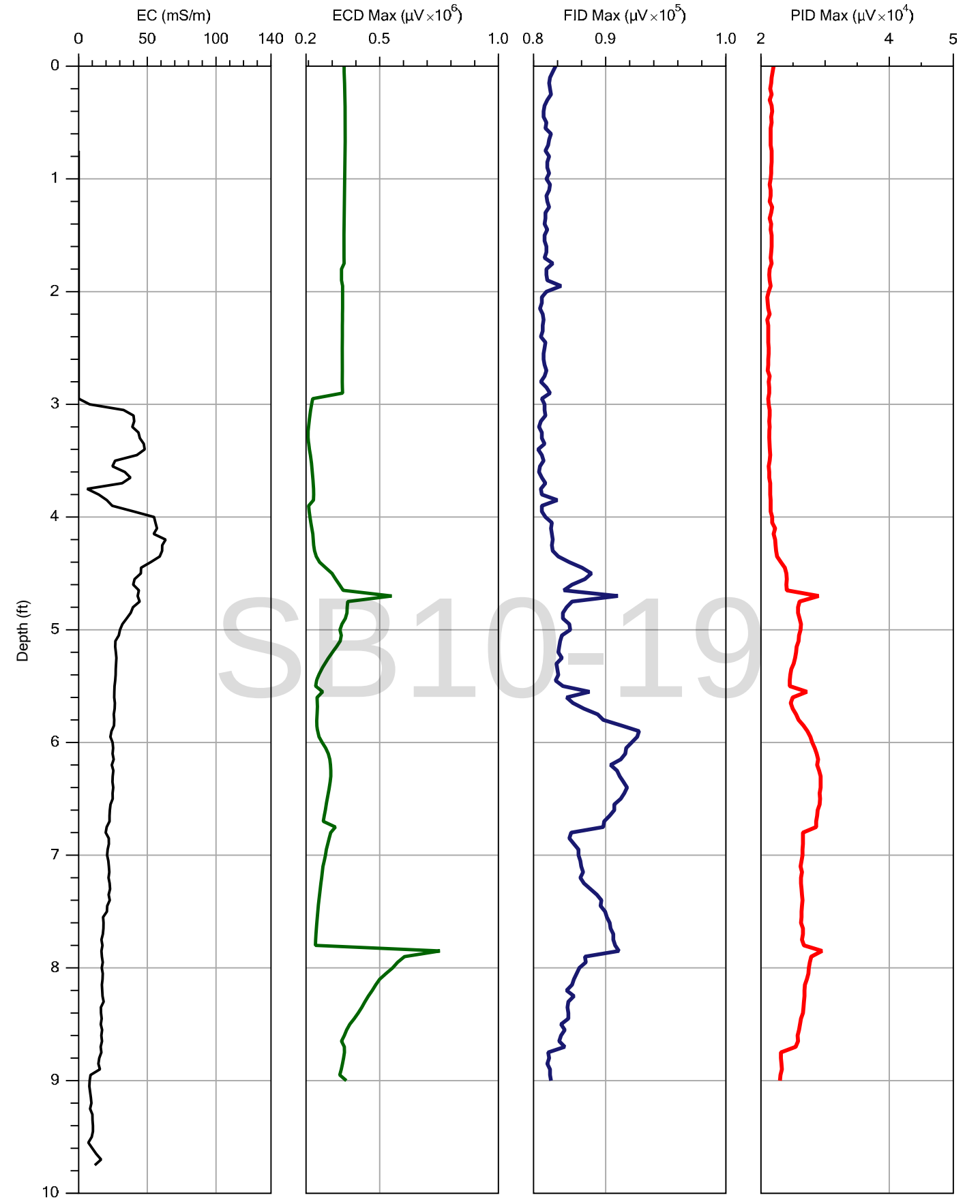

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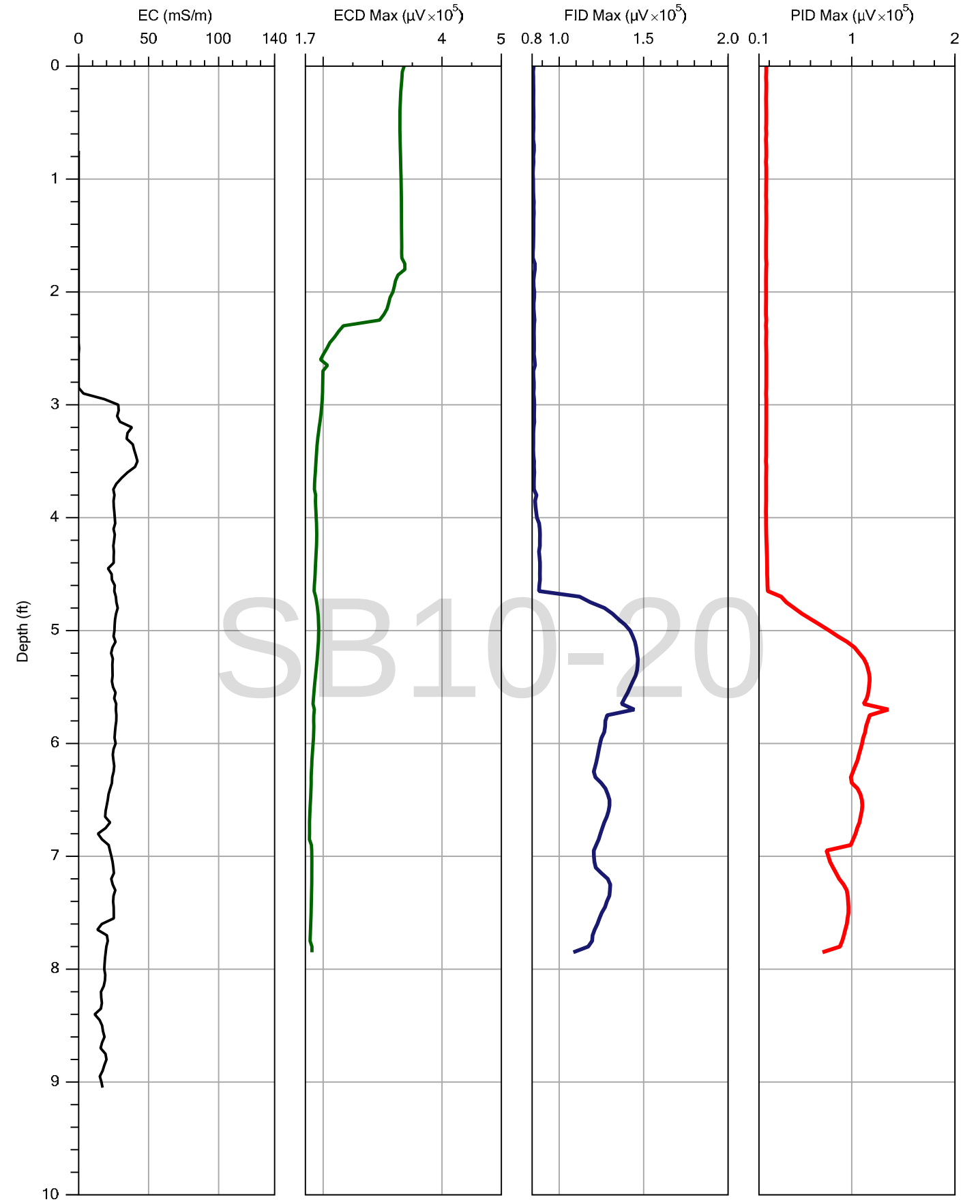

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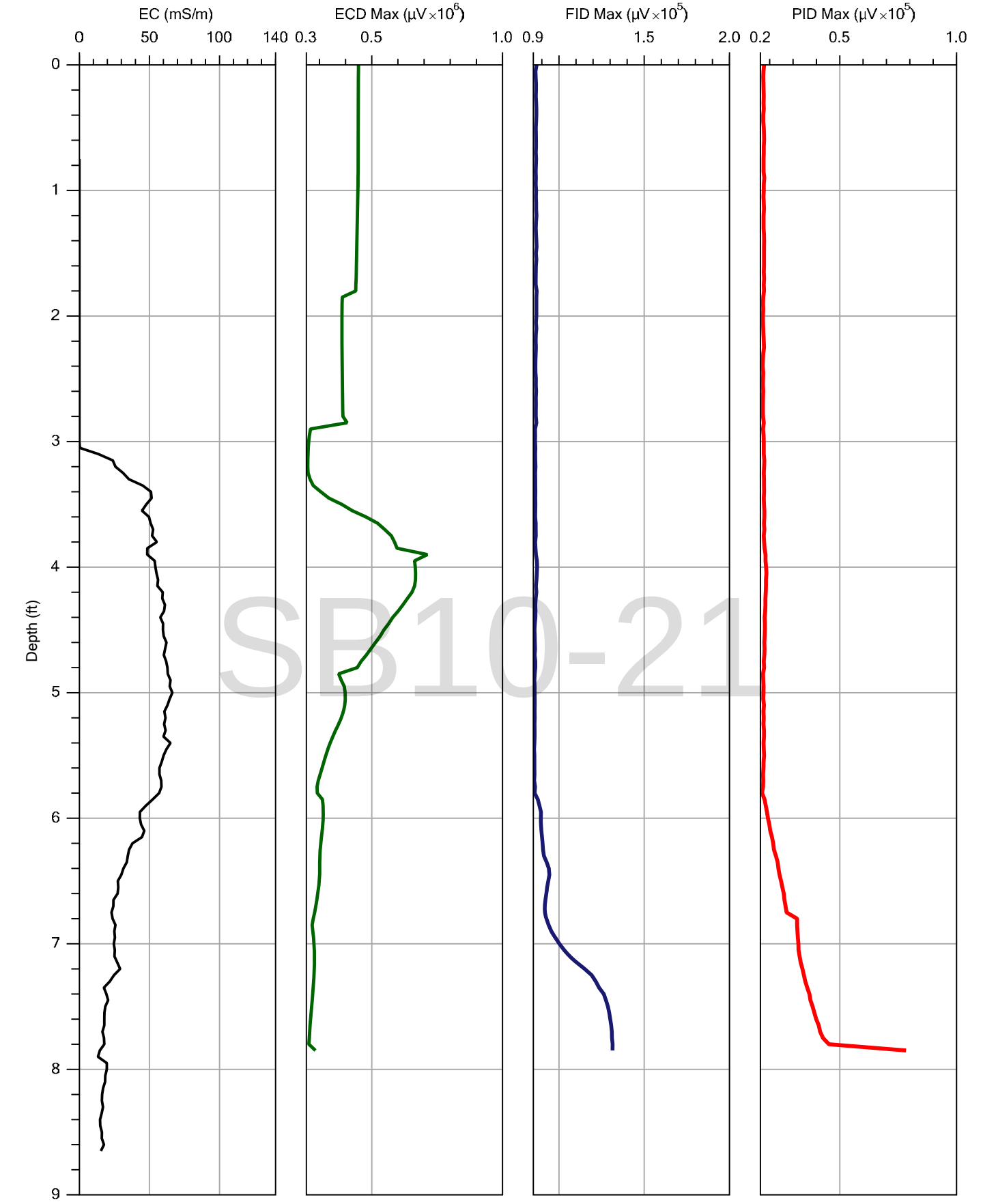

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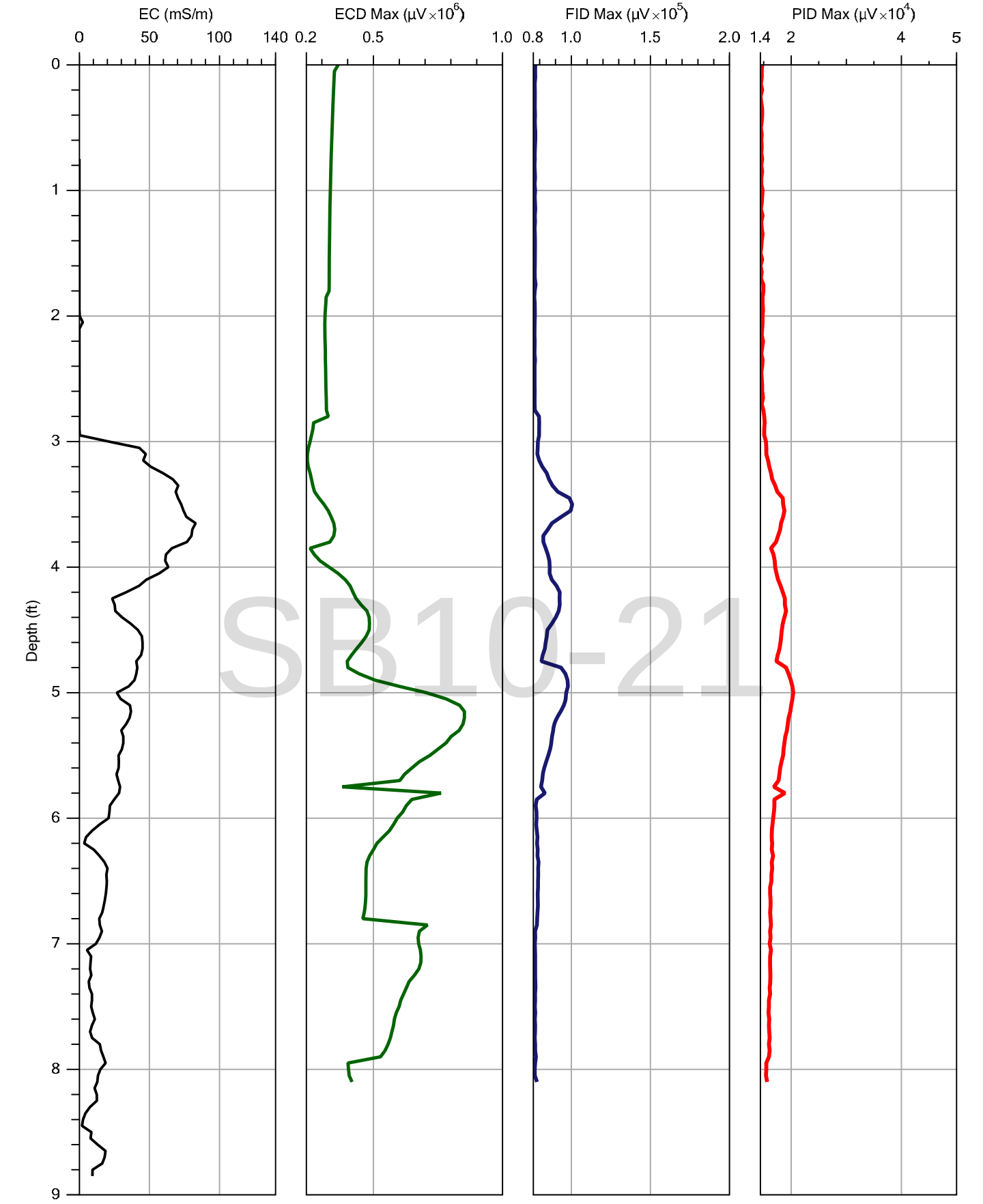

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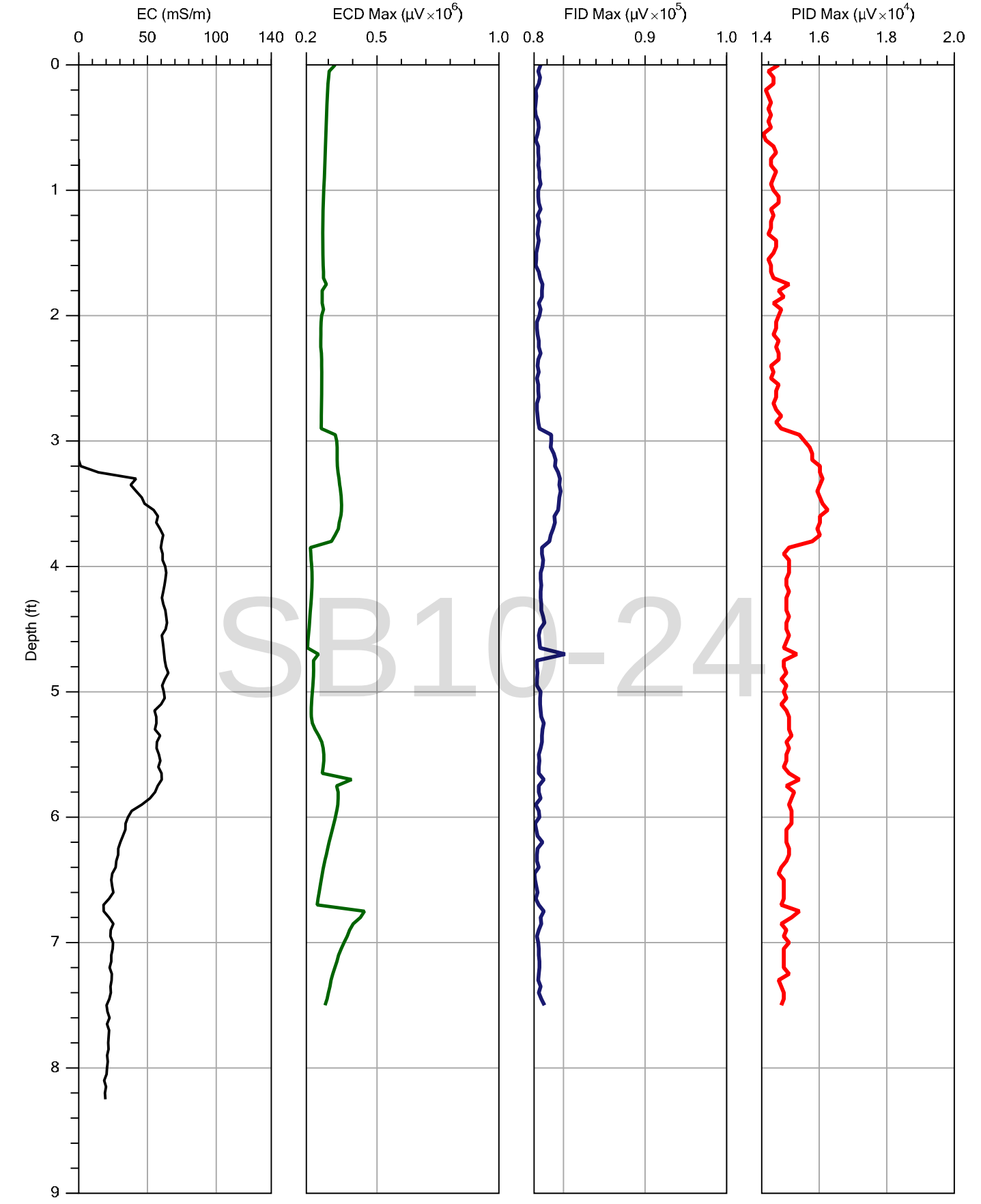

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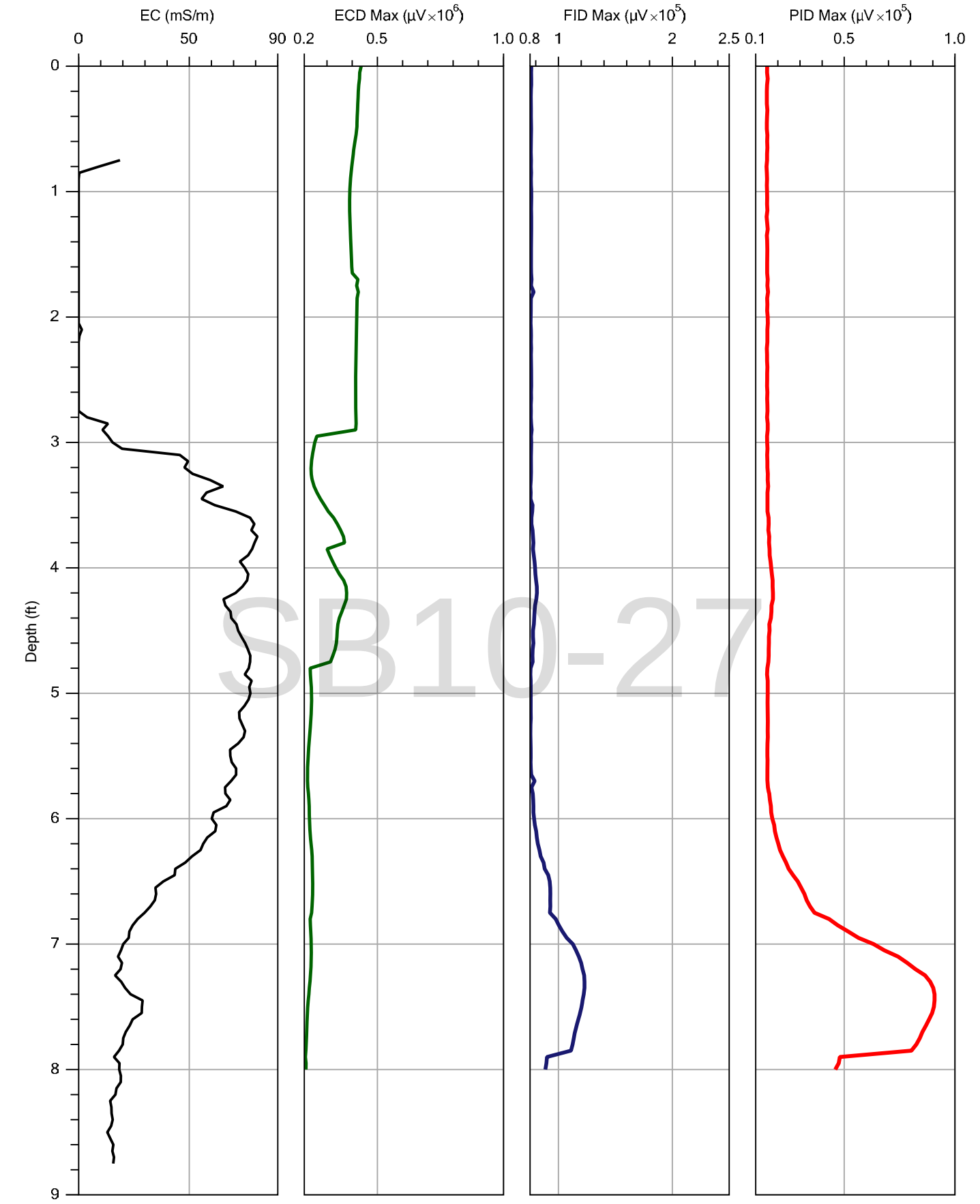

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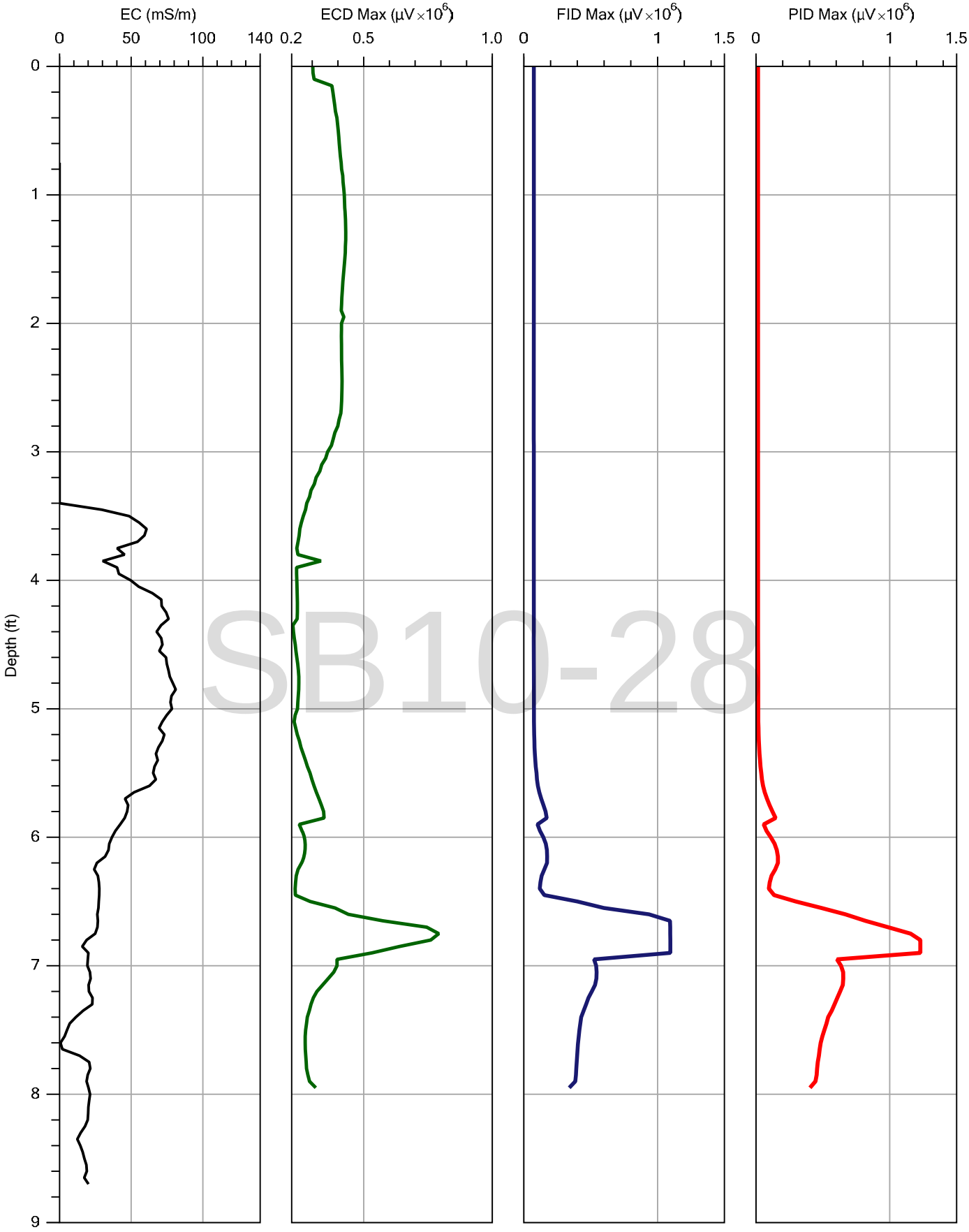

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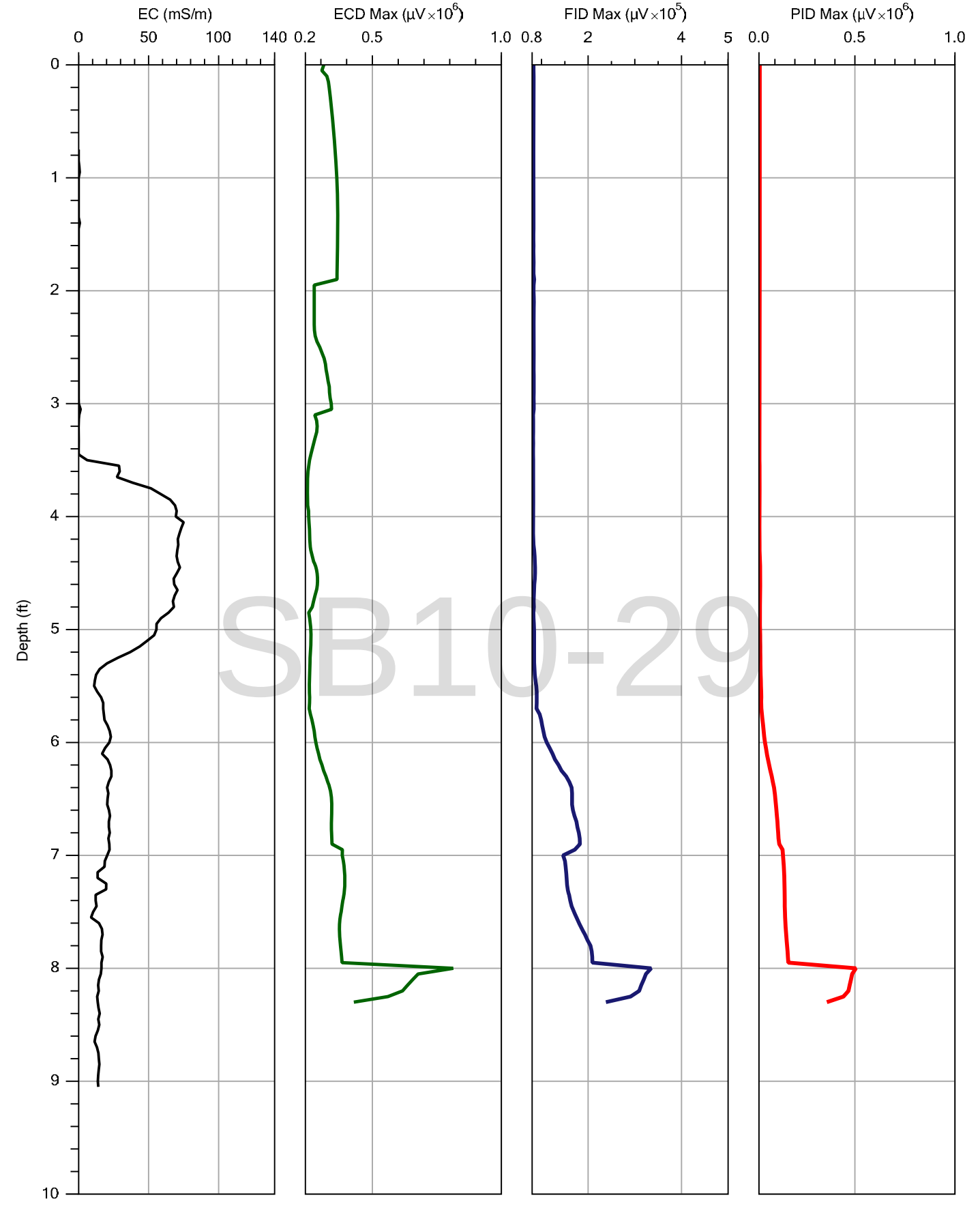

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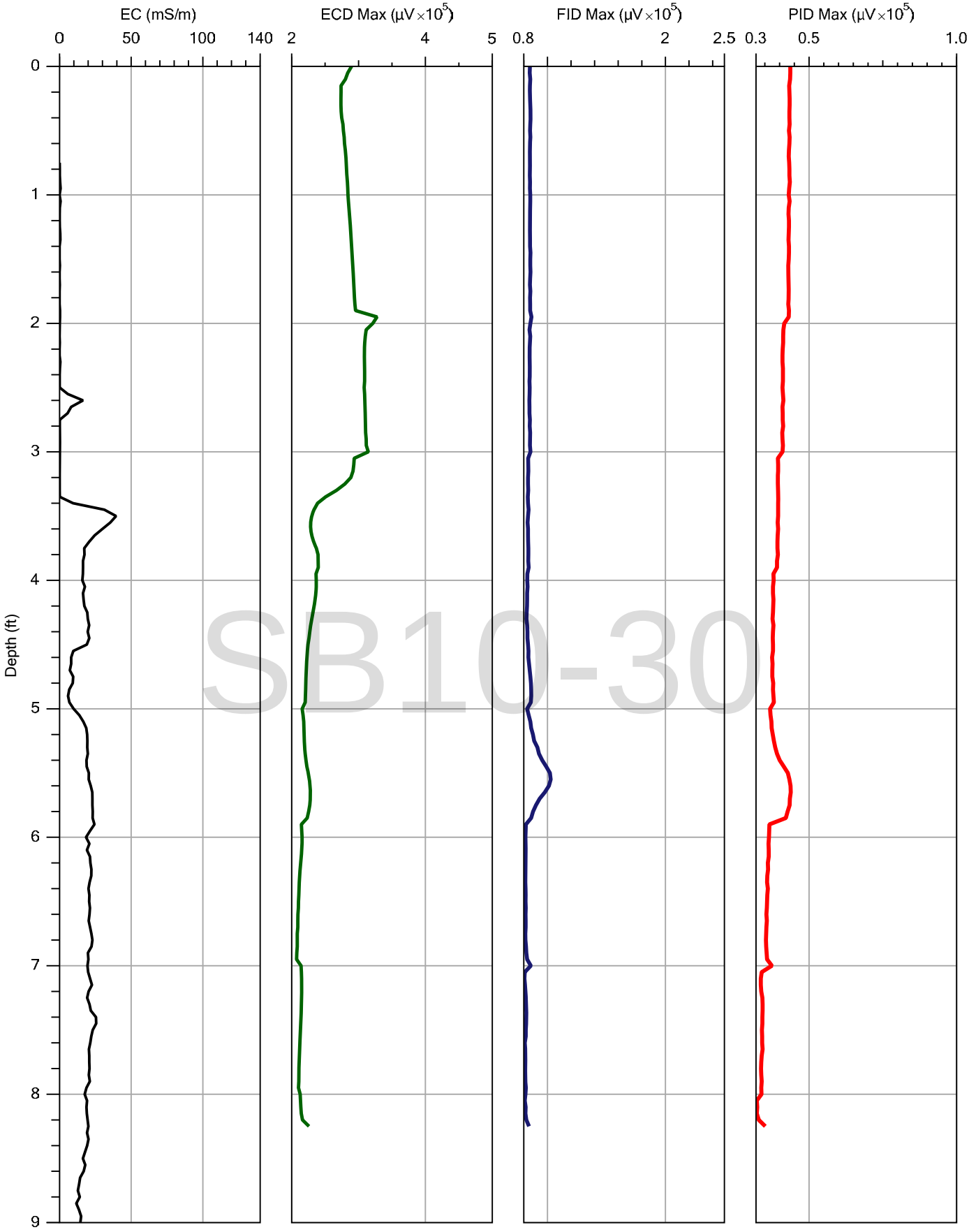

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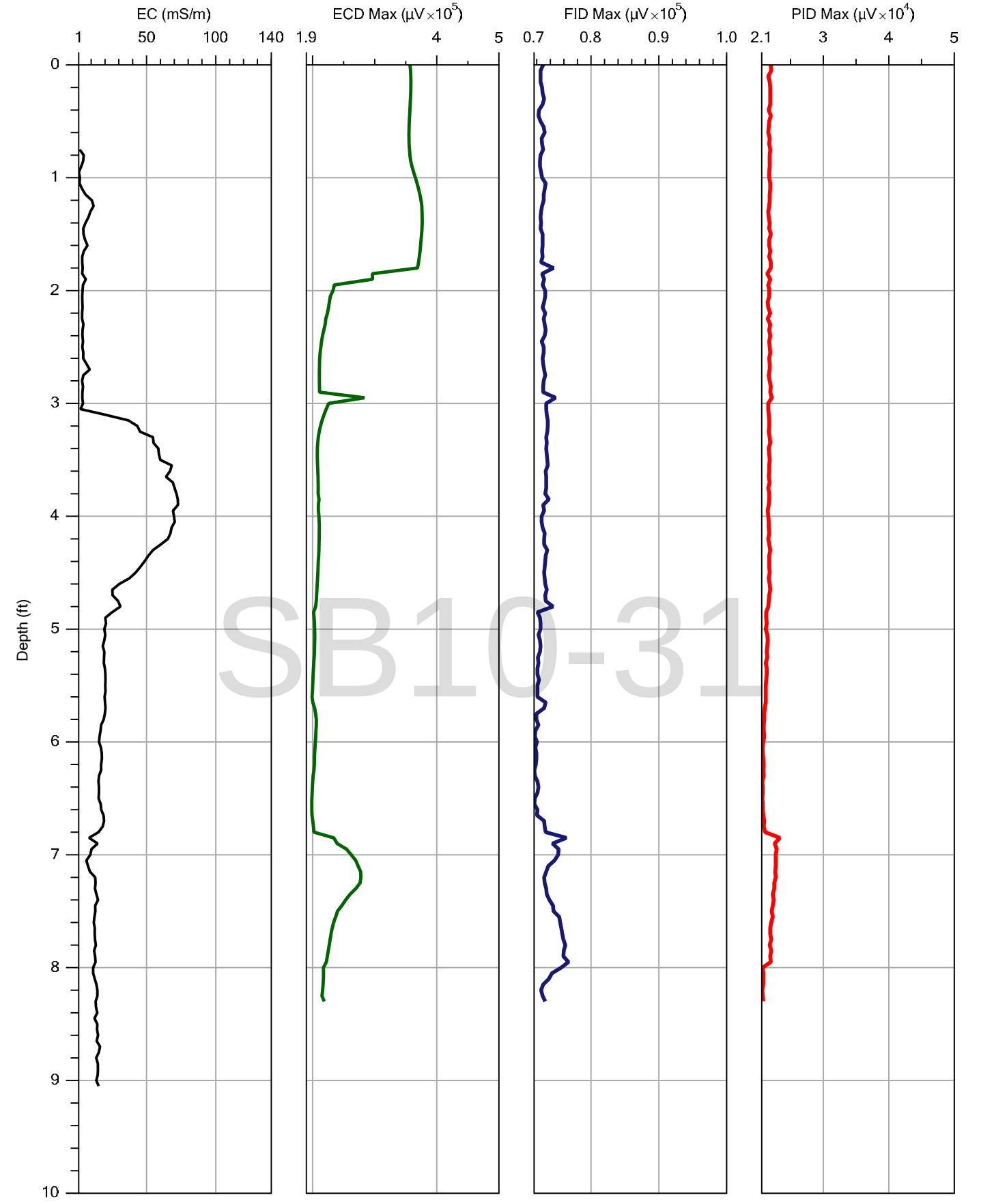

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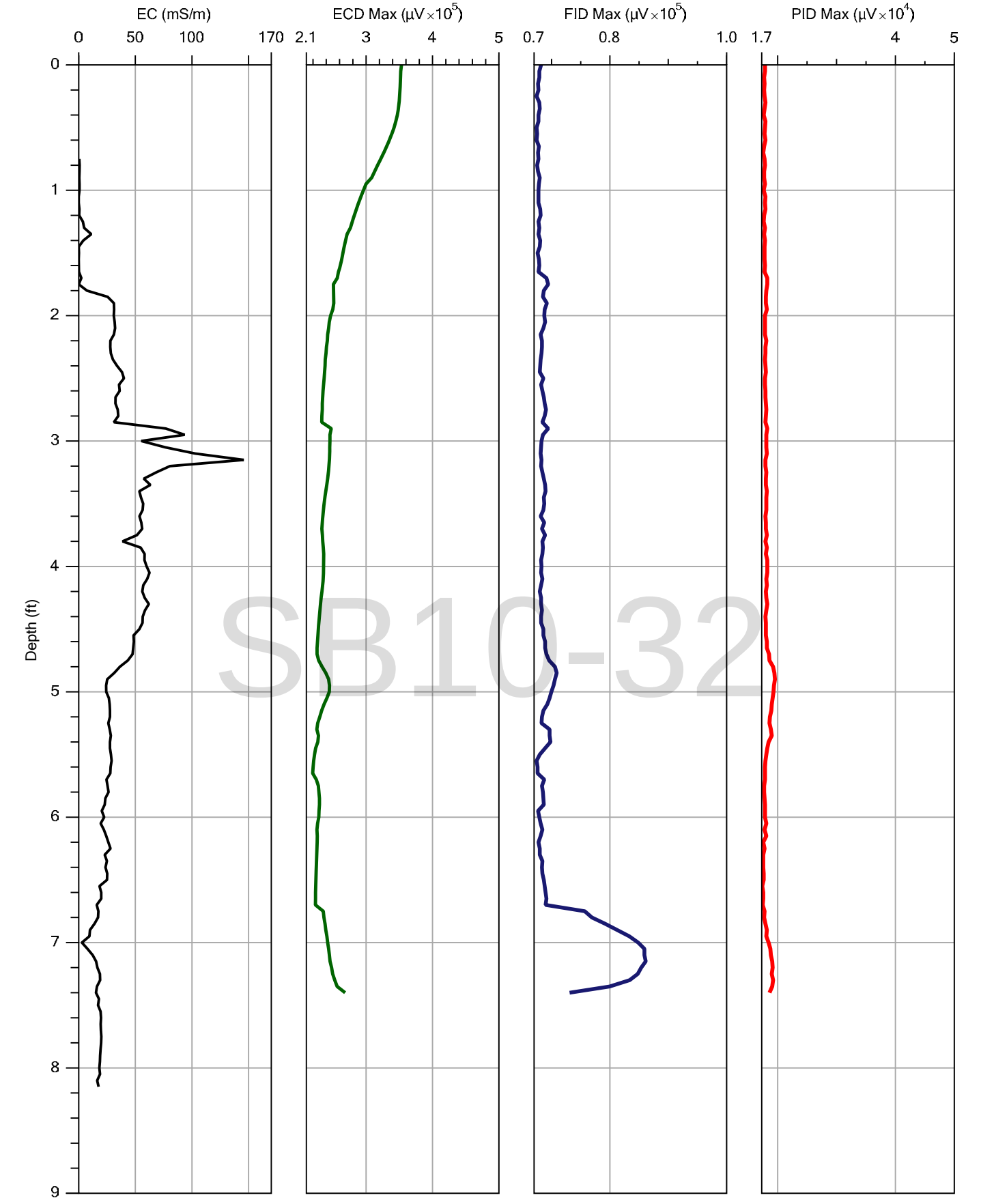

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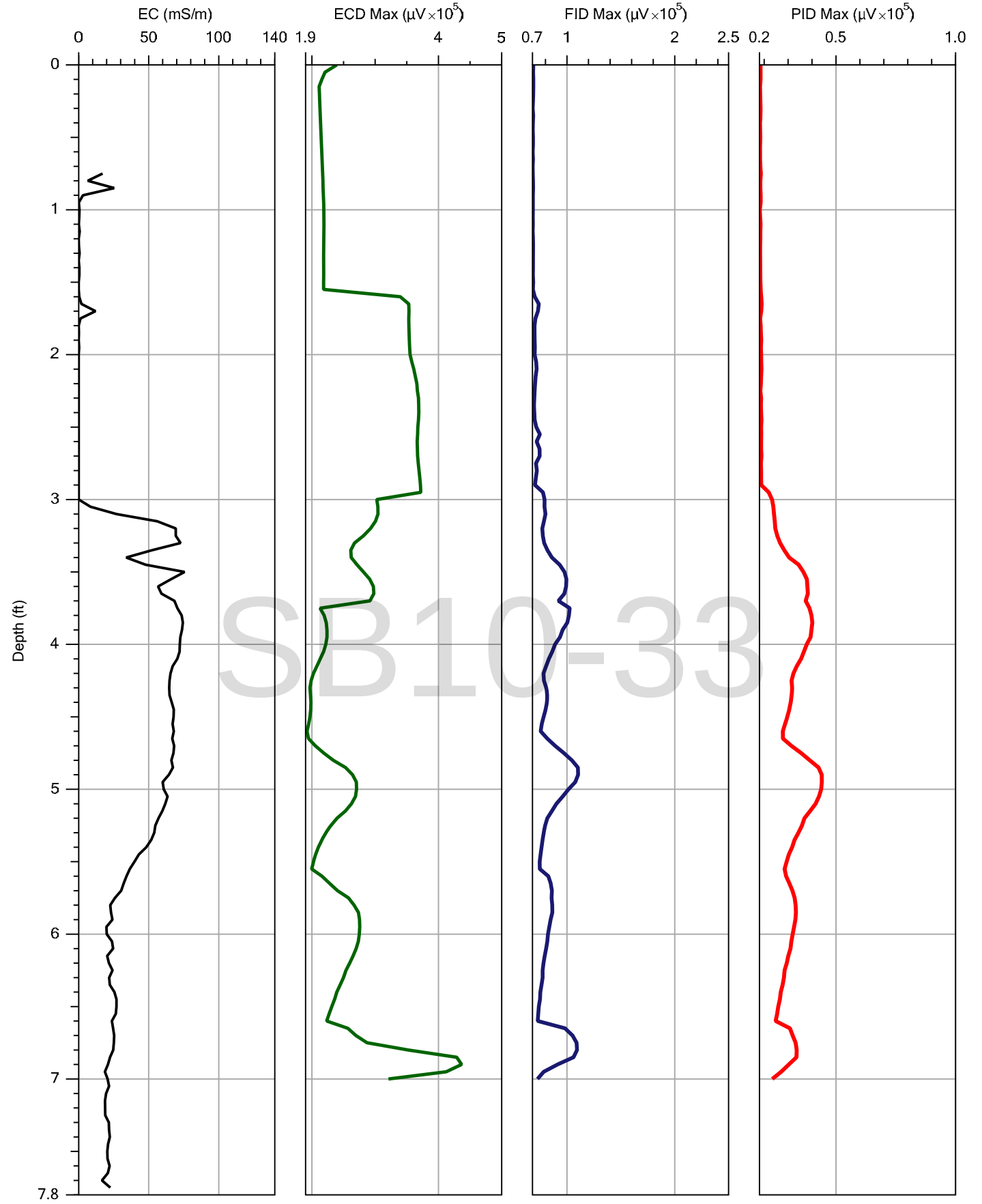

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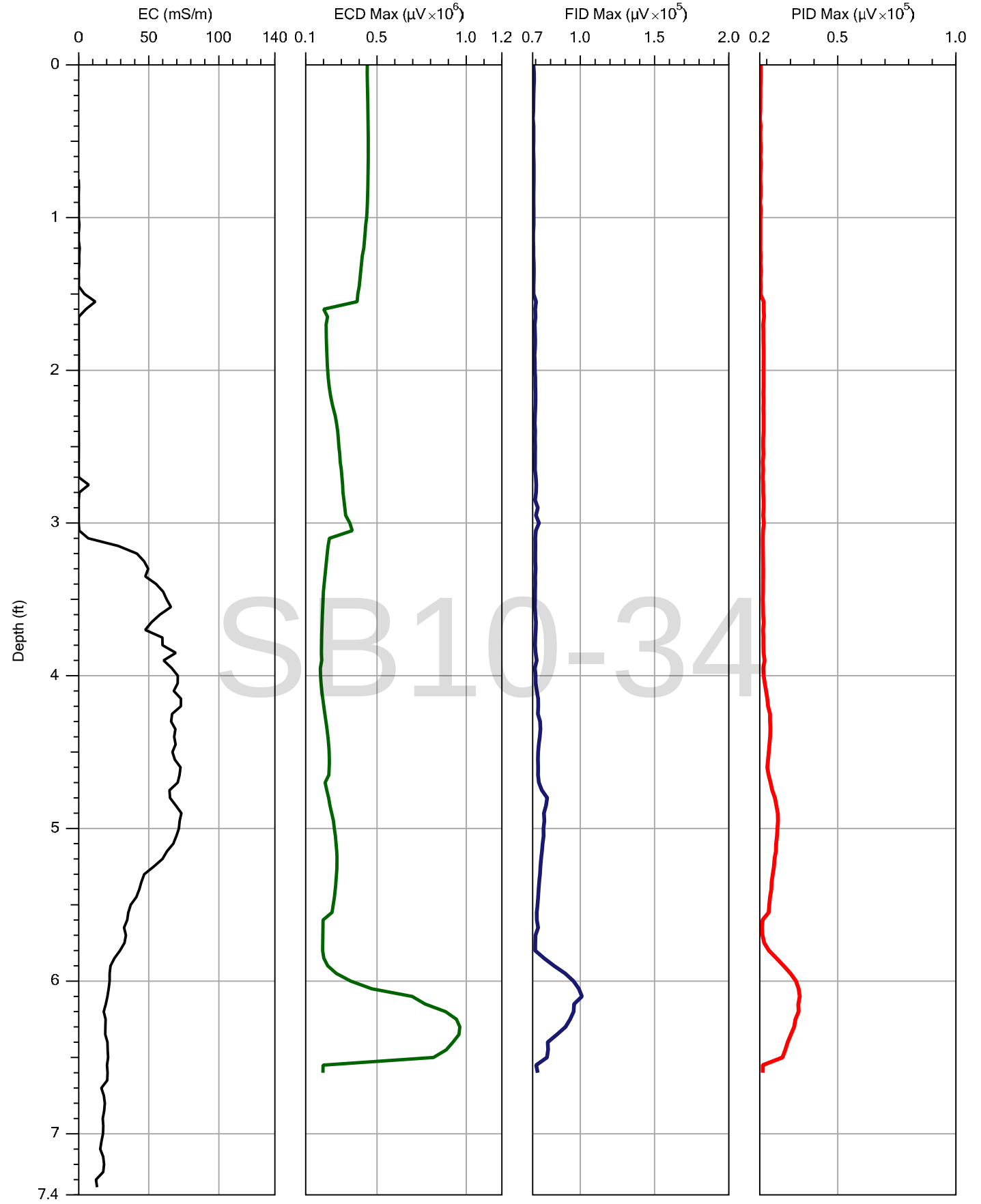

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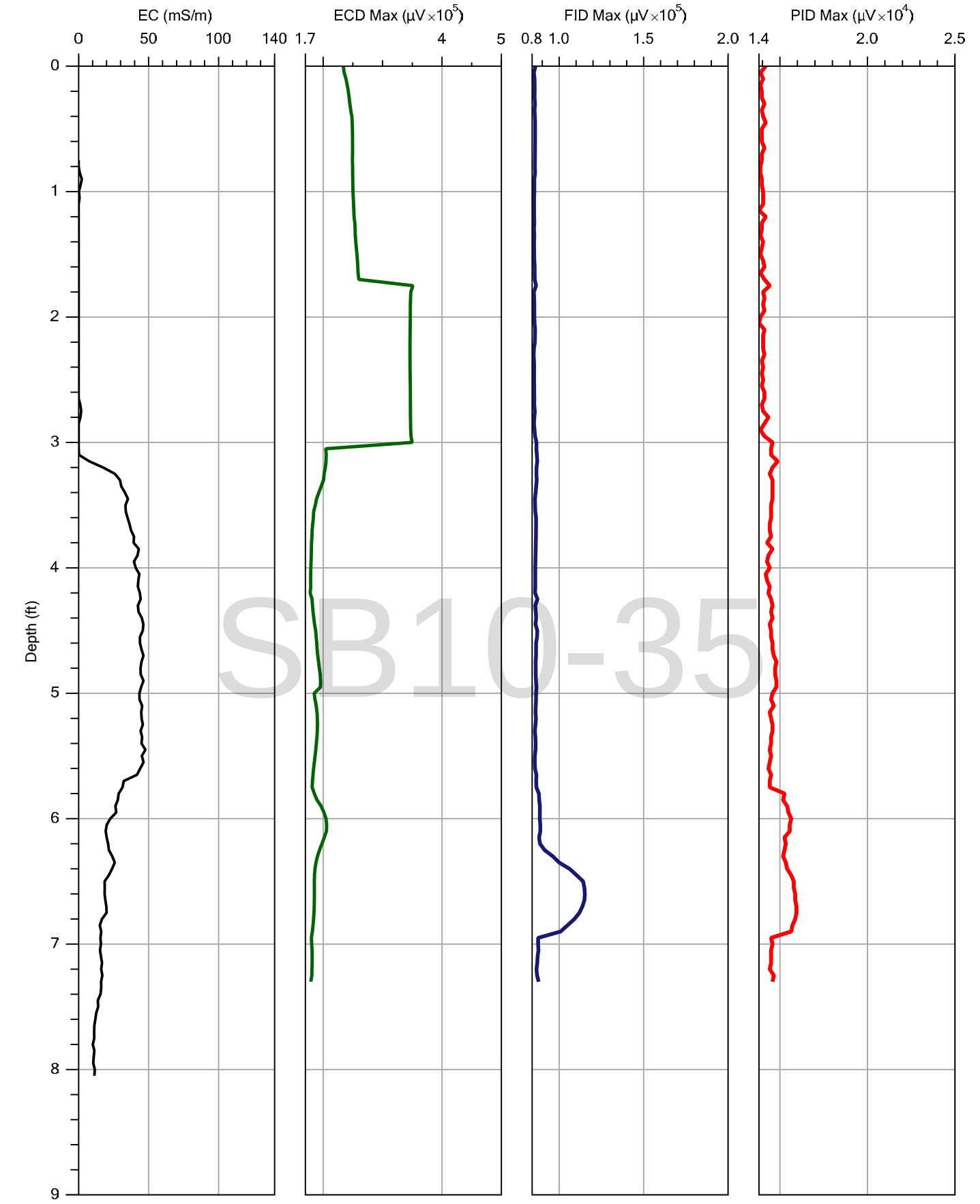

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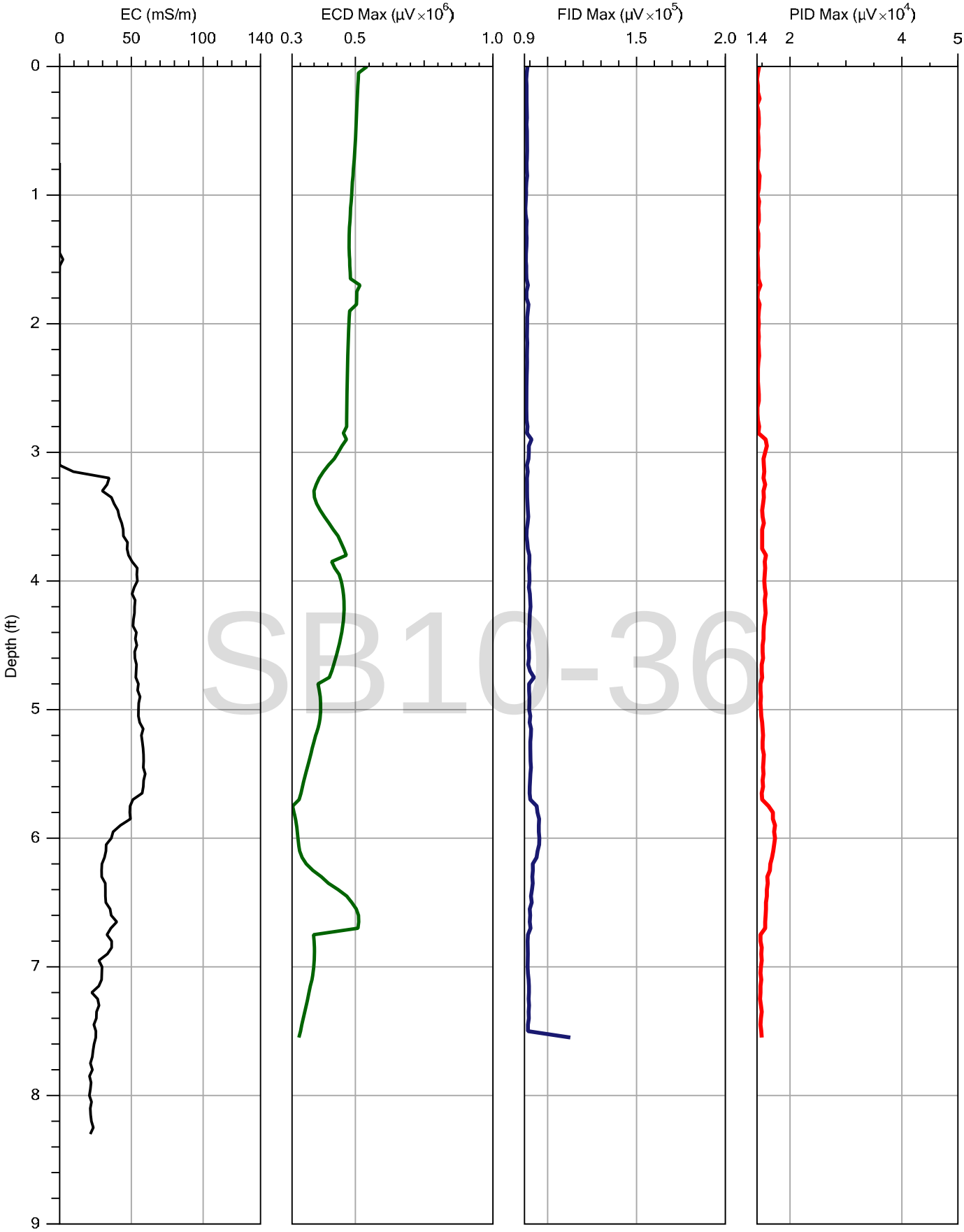

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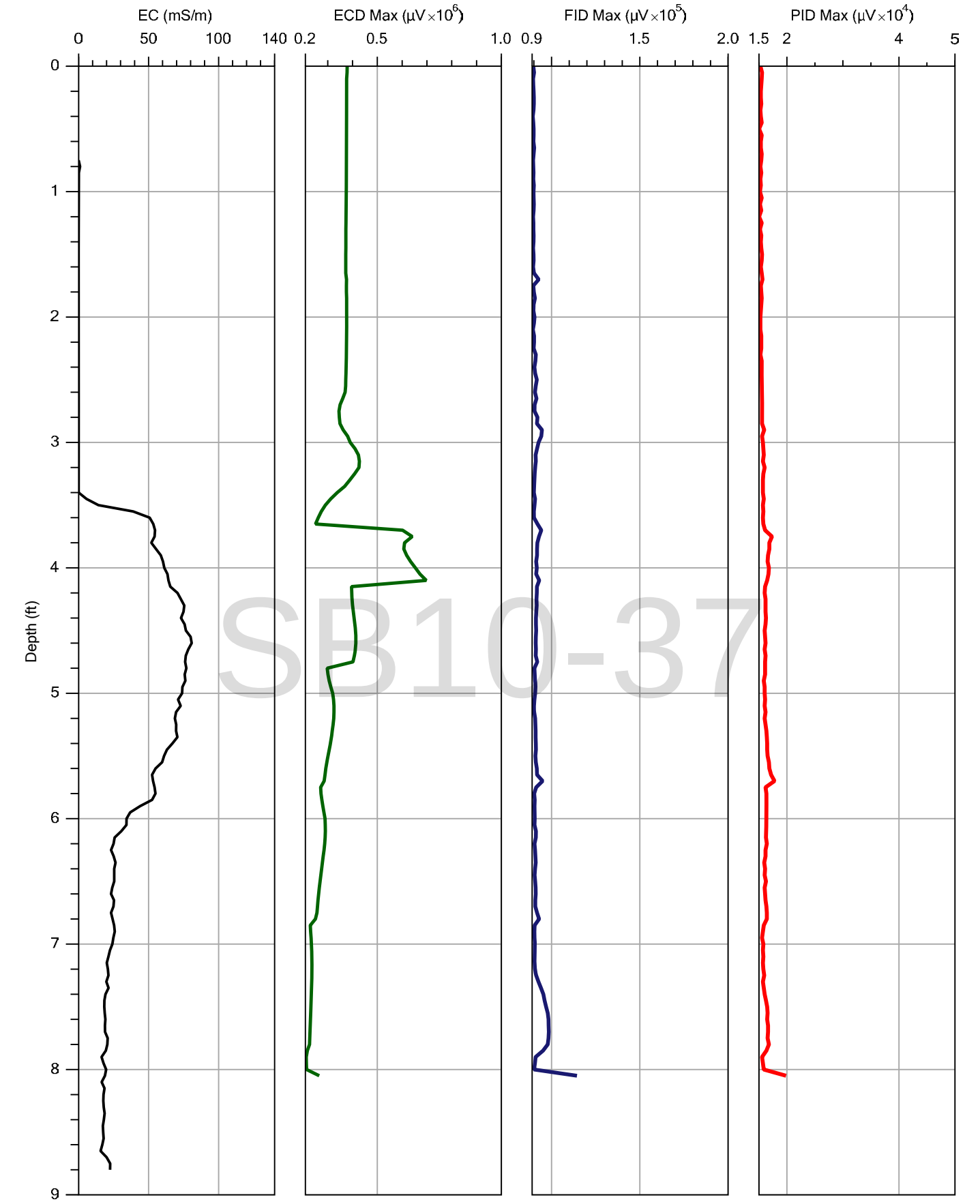

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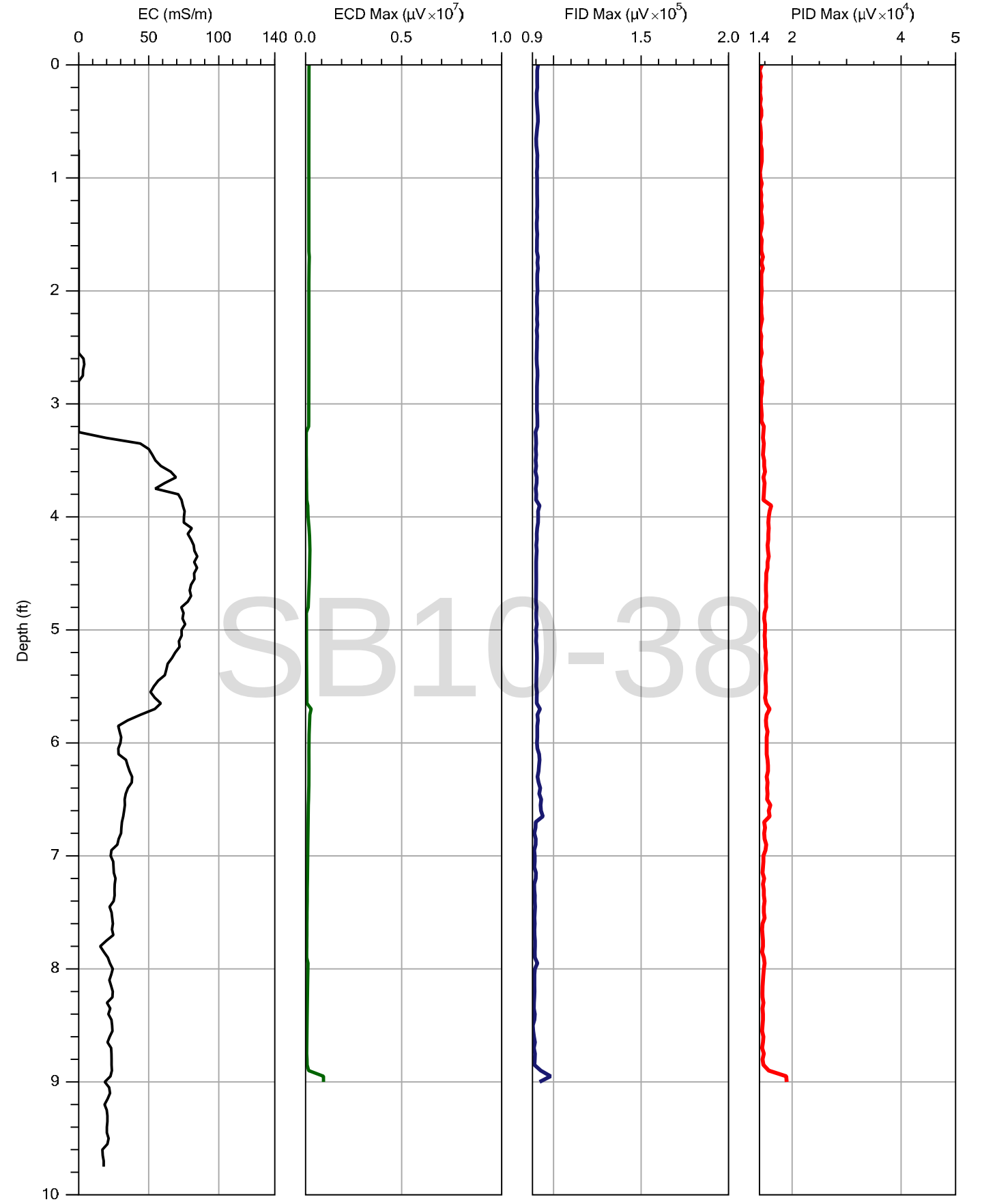

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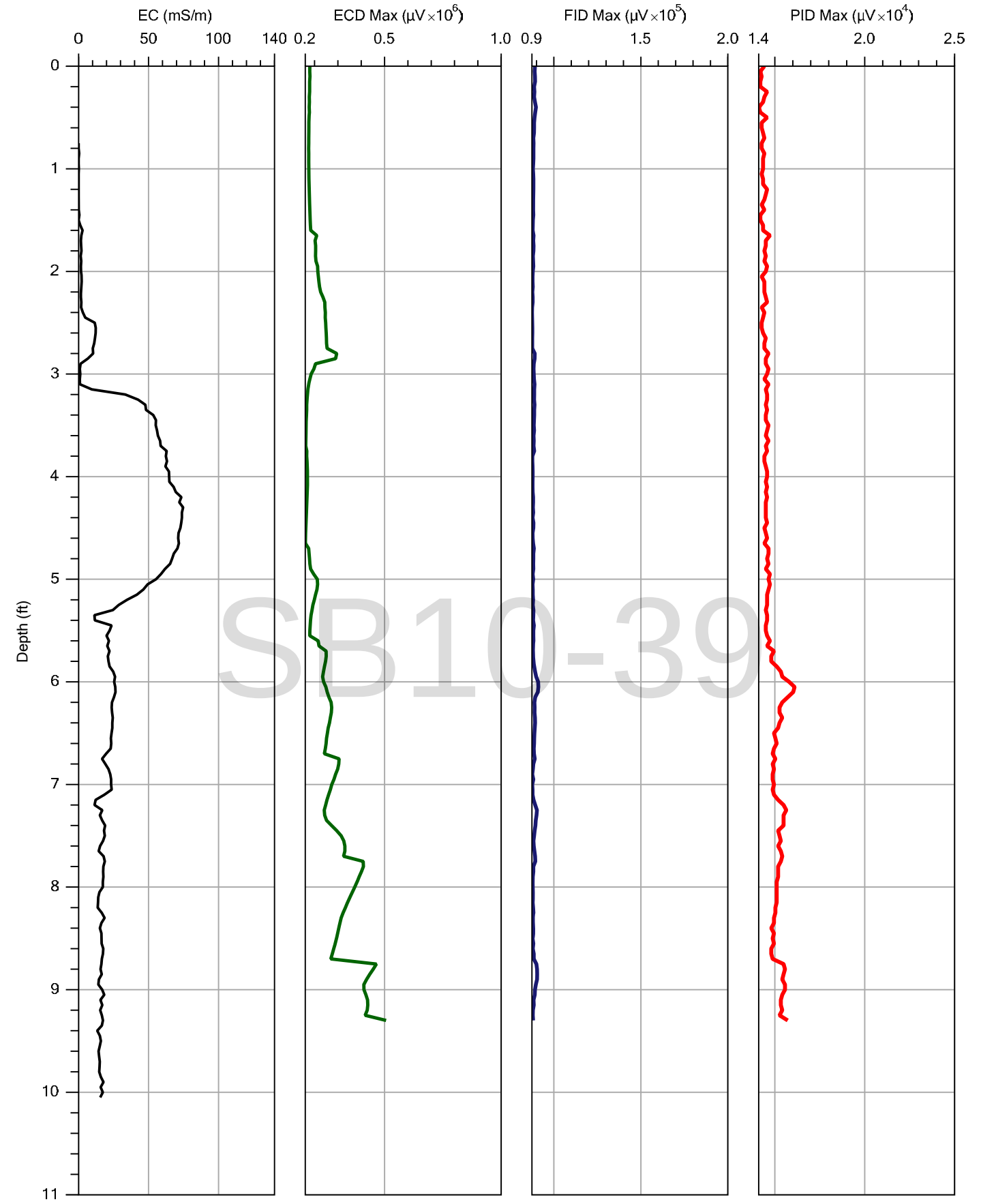

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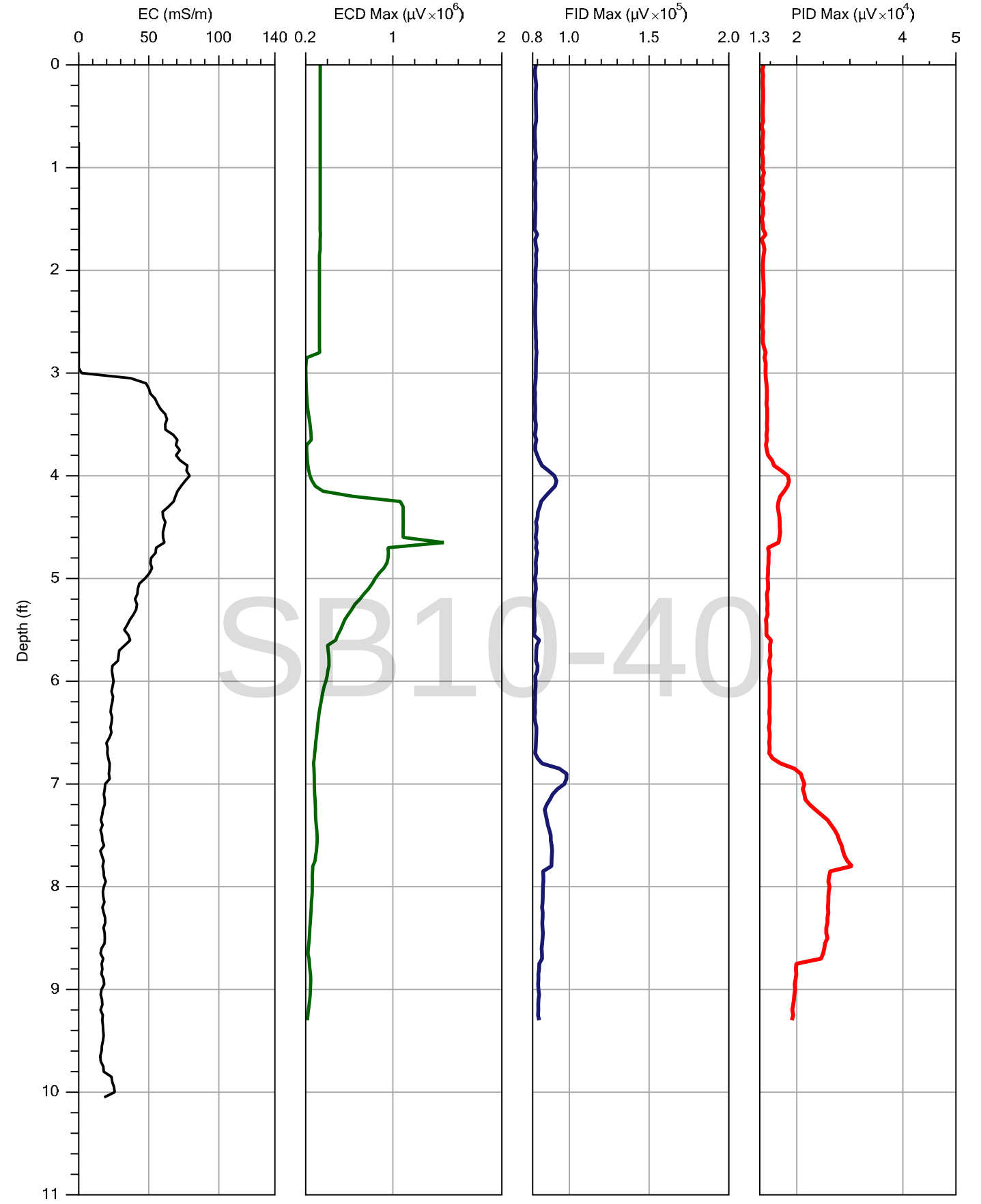

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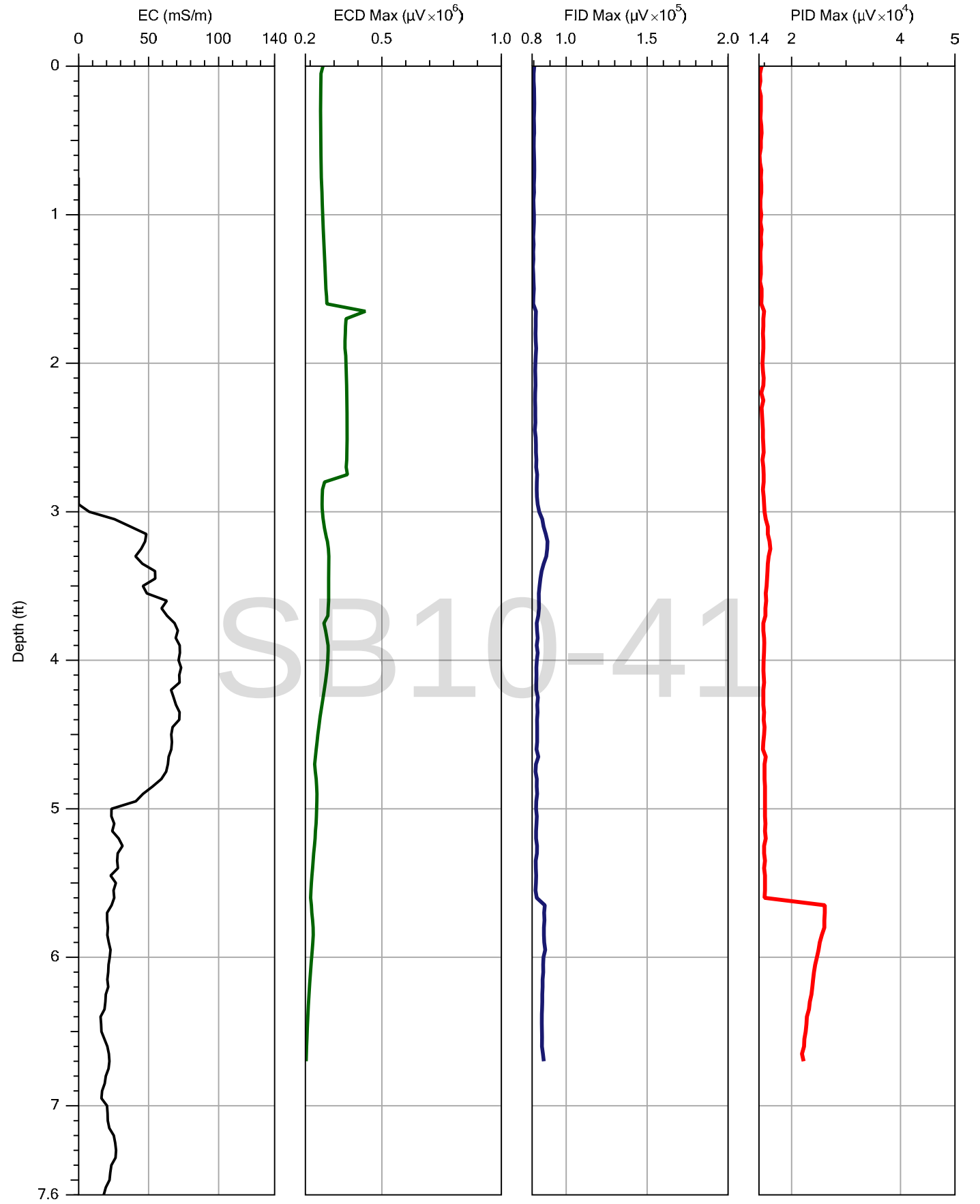

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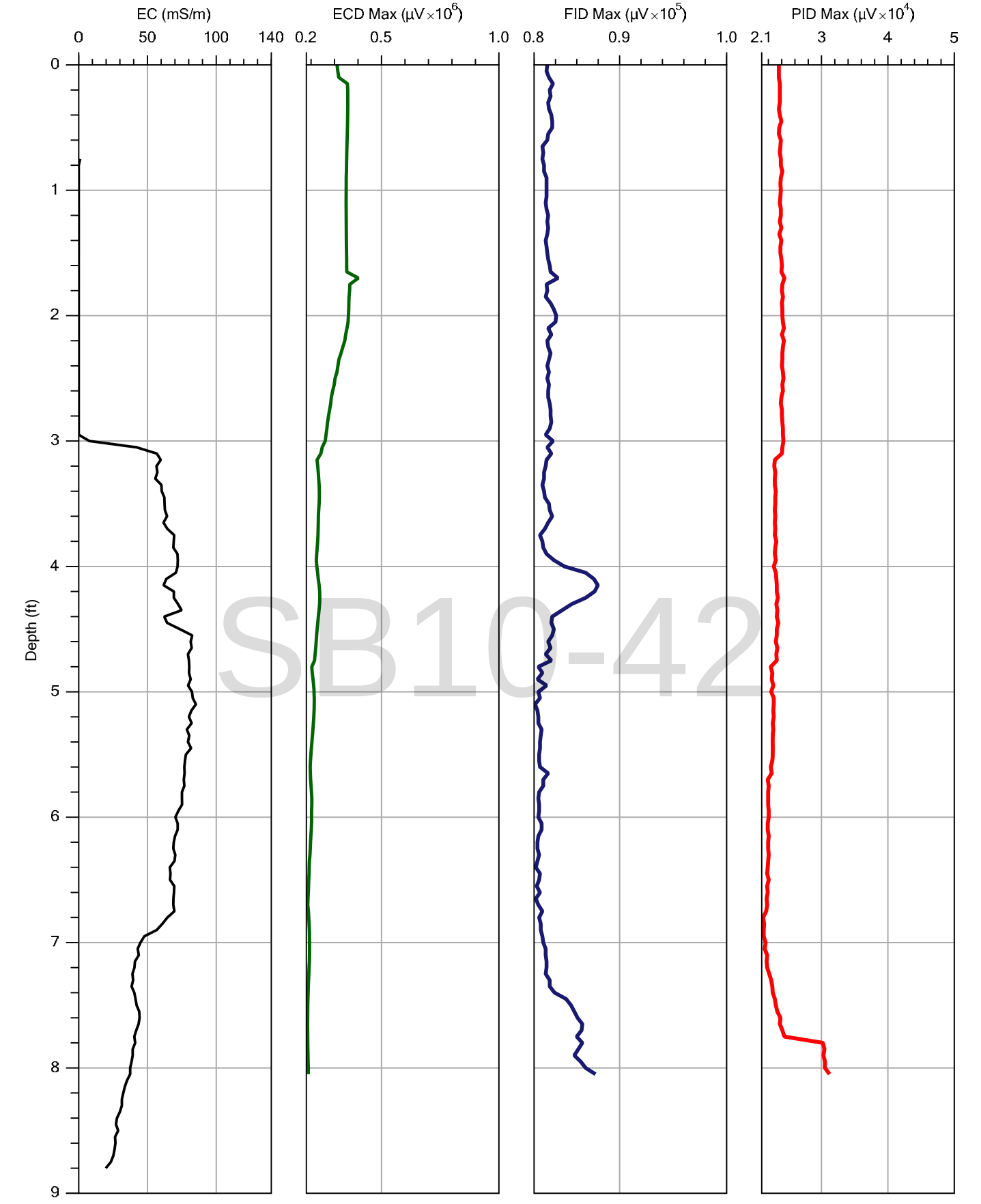

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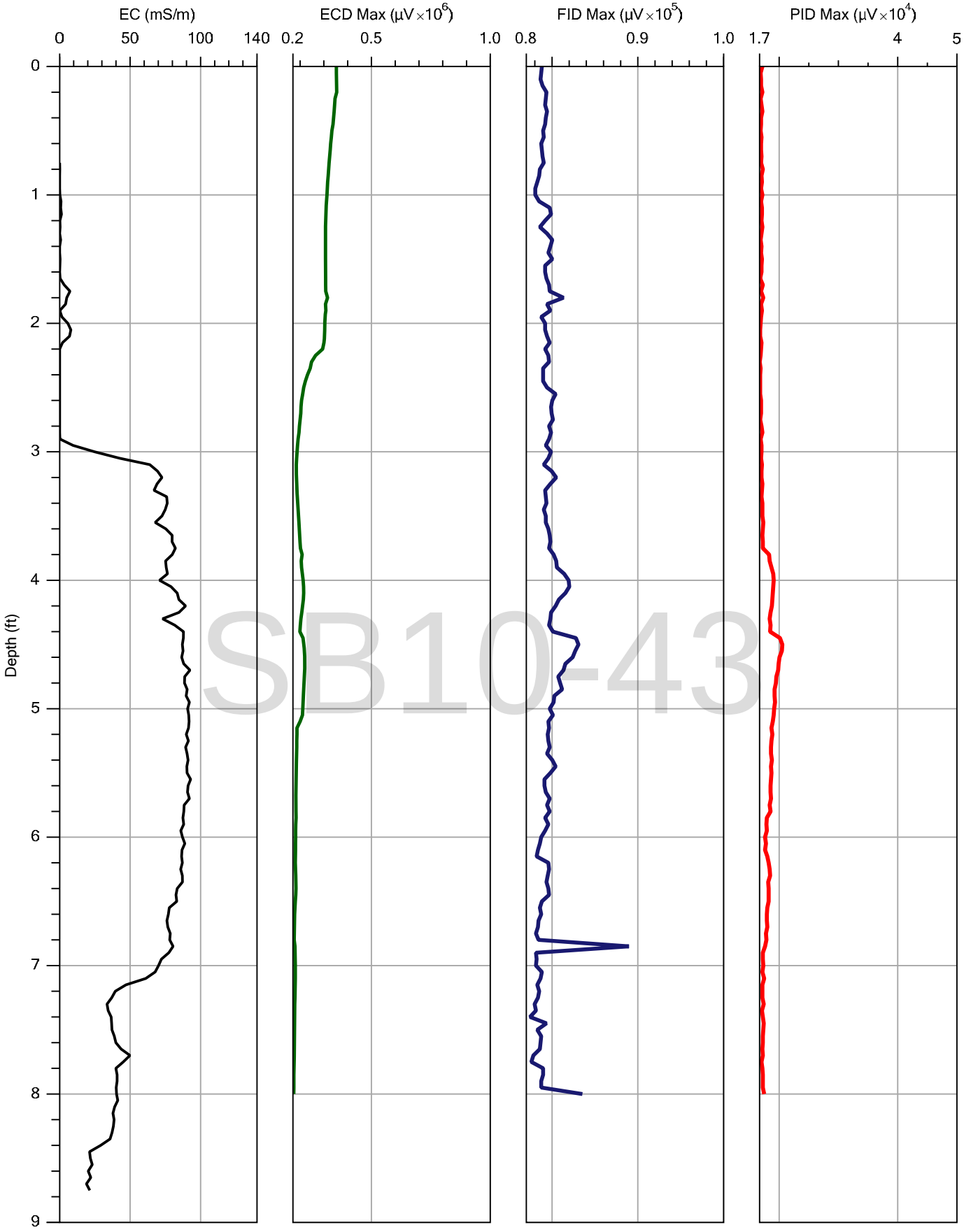
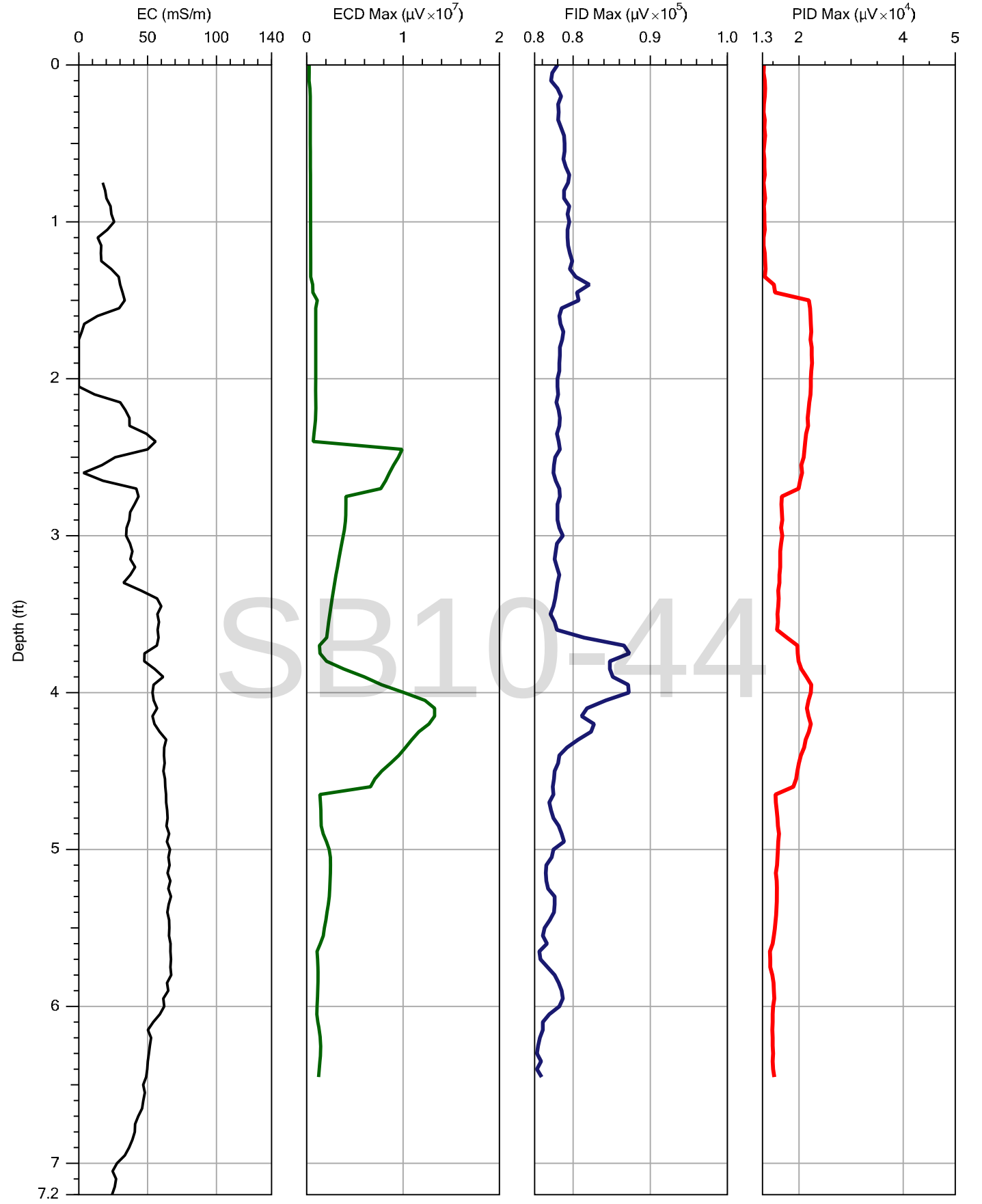
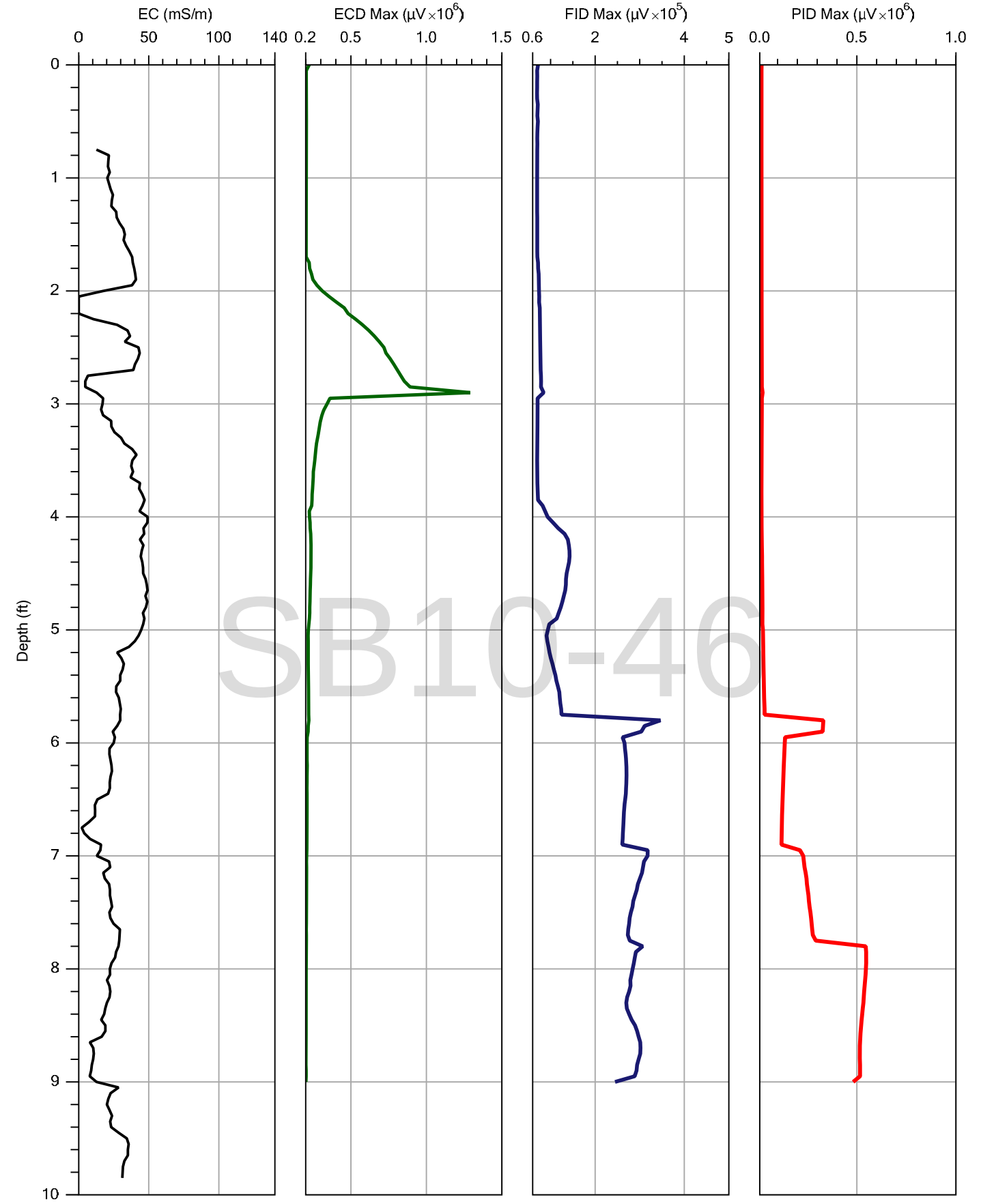
Project ID: EA - 6265401		Client: EA	Location:



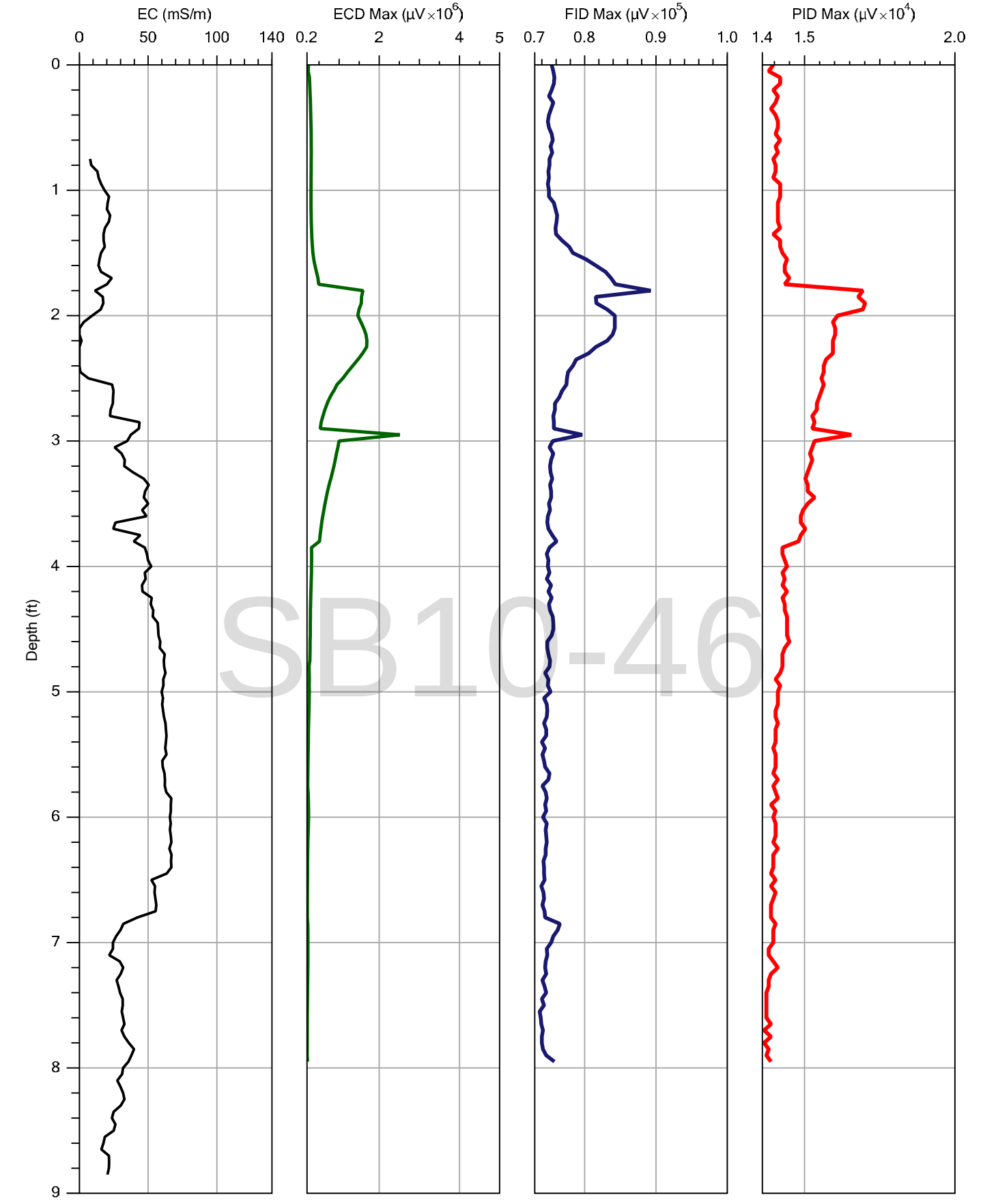
		File: SB10-43.MIP
Company: ZEBRA Environmental	Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401	Client: EA	Location:



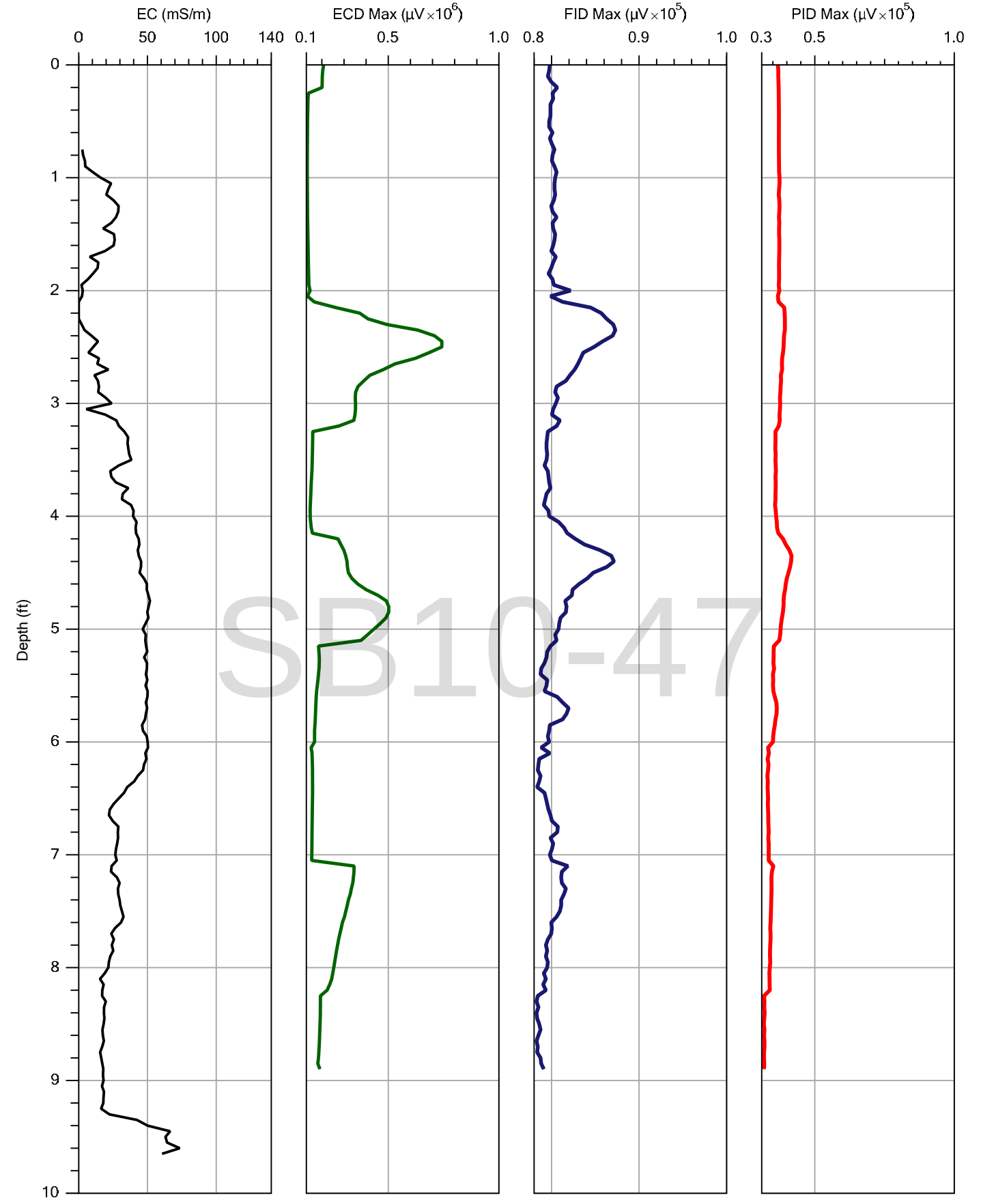
			File: SB10-44.MIP
Company: ZEBRA Environmental	Operator: Zach		Date: 4/2/2014
Project ID: EA - 6265401	Client: EA		Location:



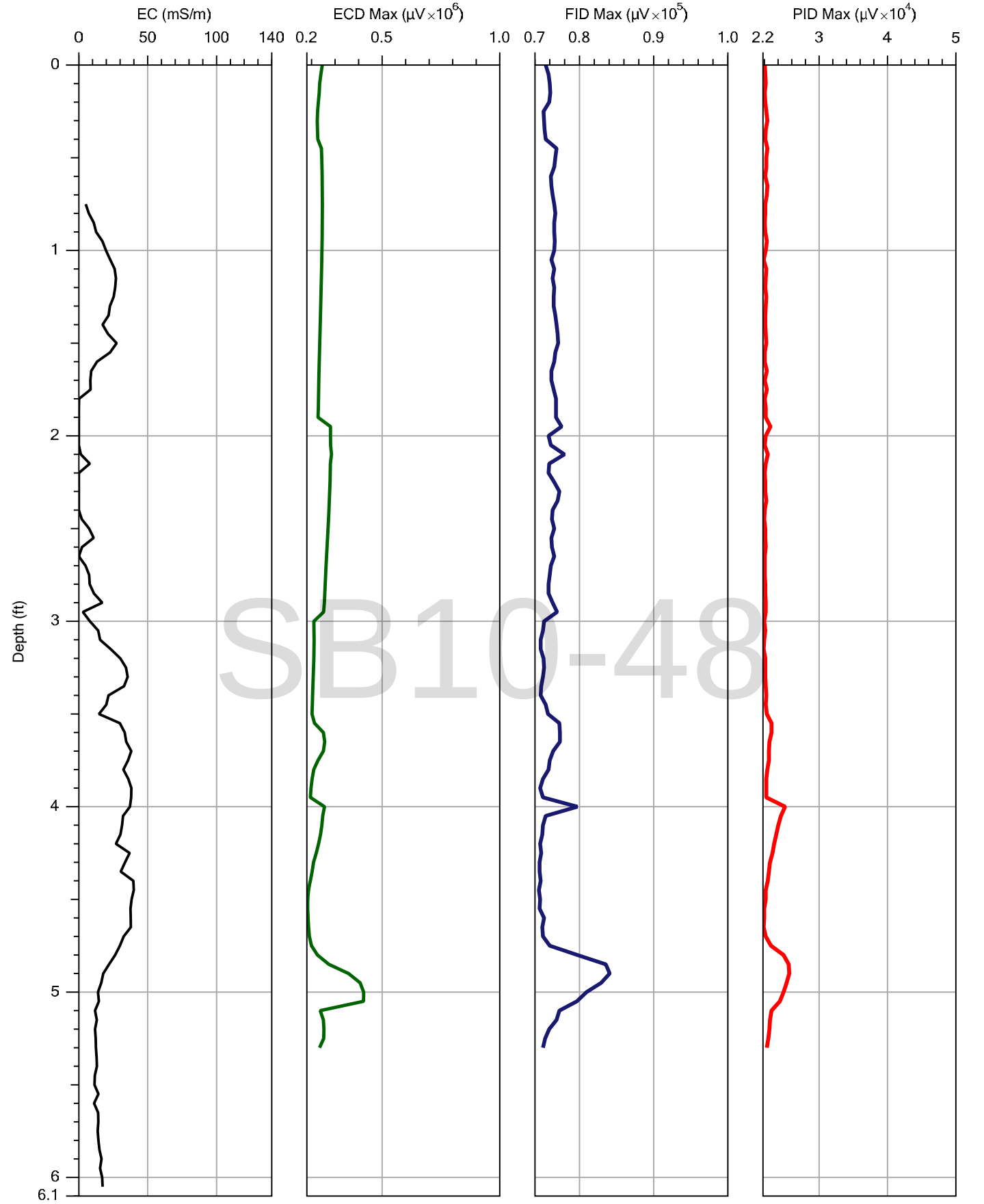
			File: SB10-45.MIP
Company: ZEBRA Environmental		Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401		Client: EA	Location:



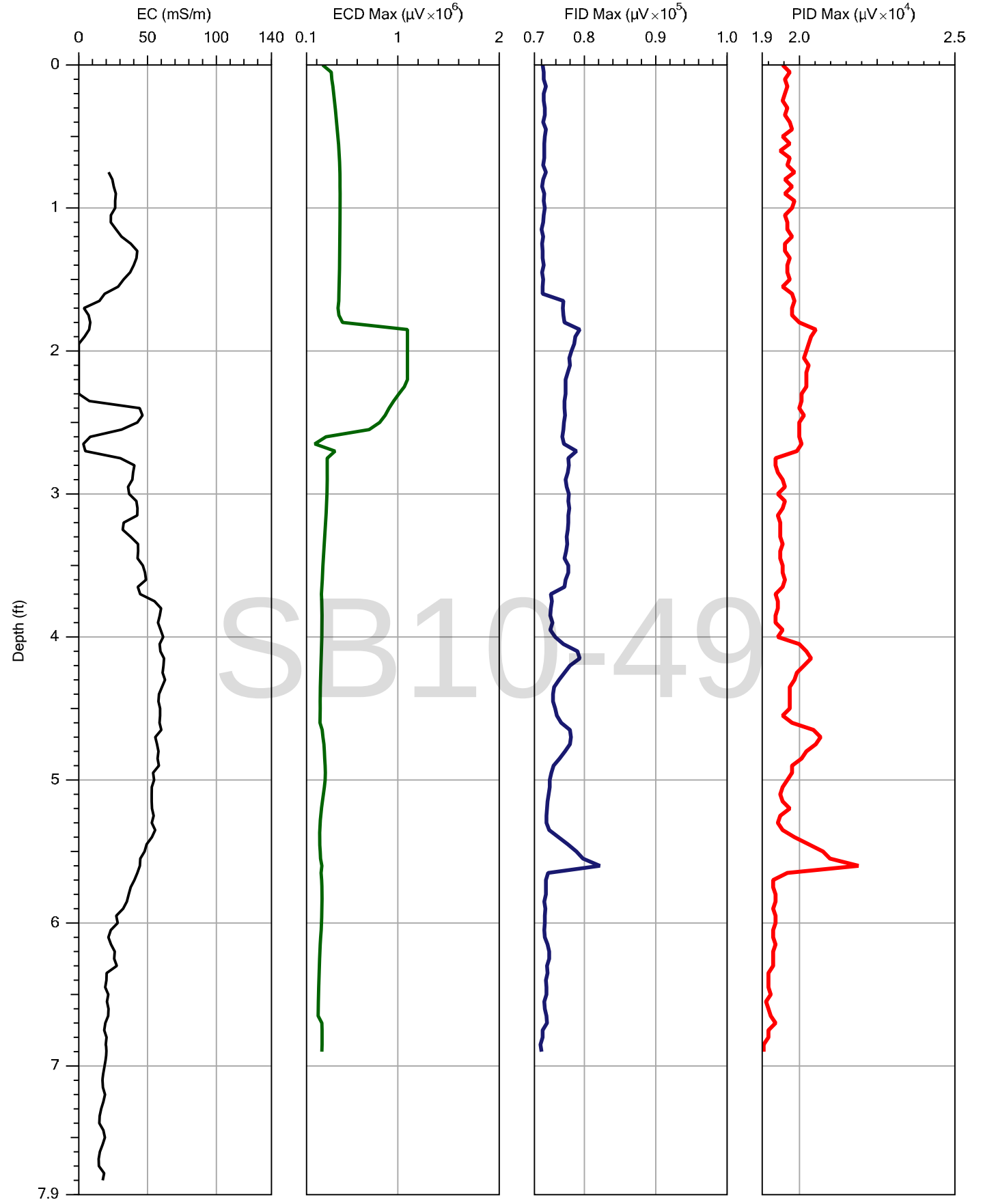
		File: SB10-46.MIP
Company: ZEBRA Environmental	Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401	Client: EA	Location:



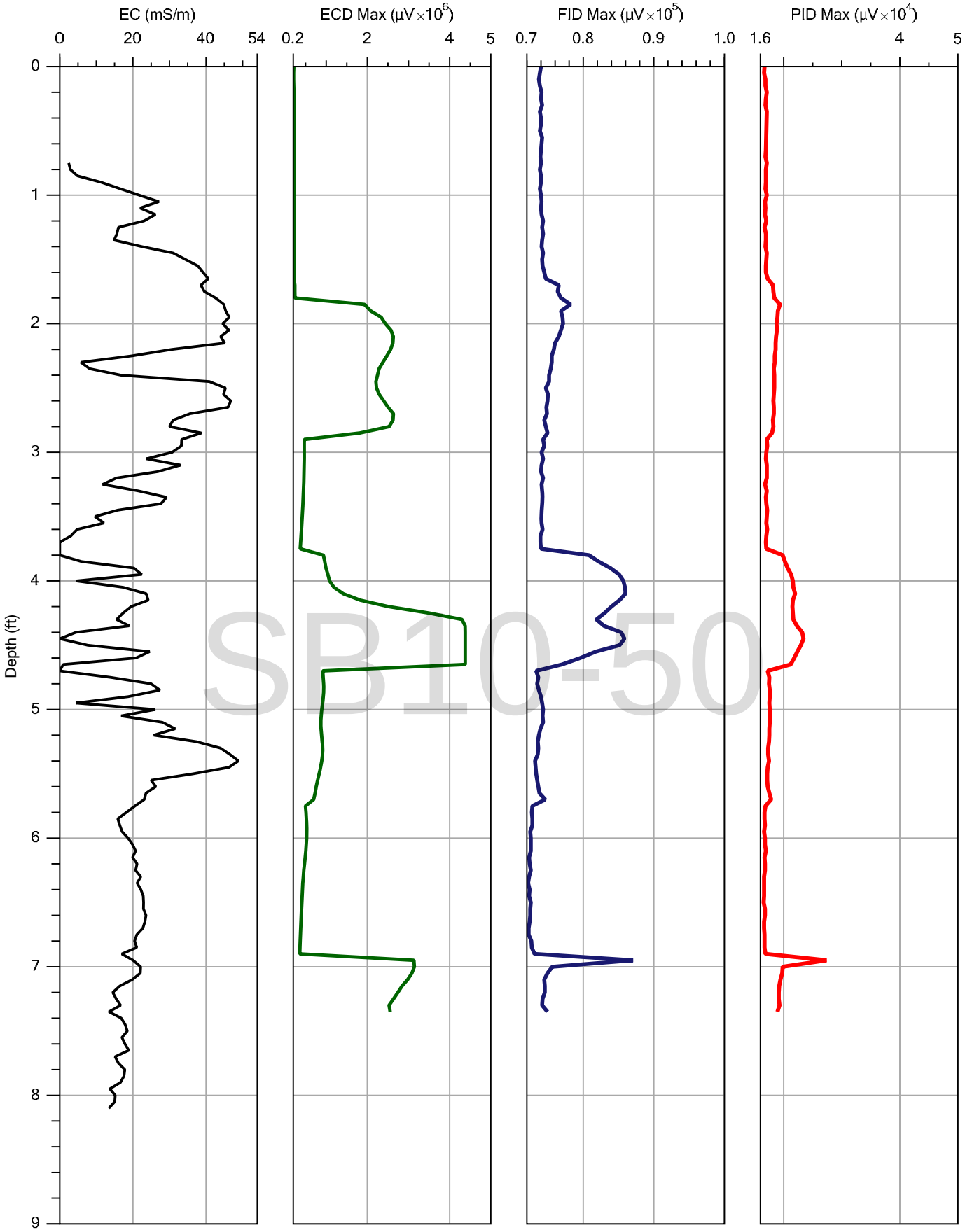
			File: SB10-47.MIP
Company: ZEBRA Environmental		Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401		Client: EA	Location:



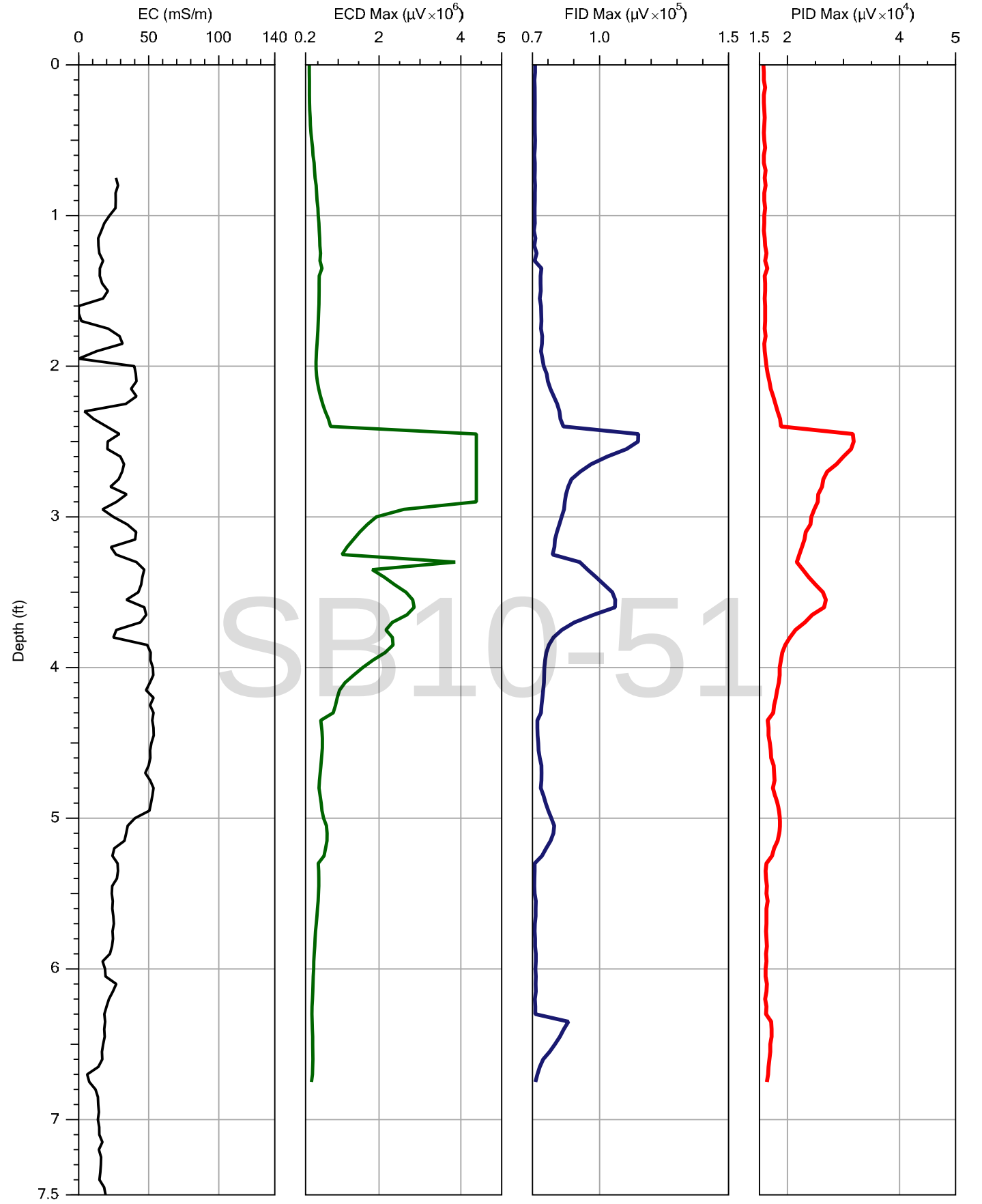
		File: SB10-48.MIP
Company: ZEBRA Environmental	Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401	Client: EA	Location:



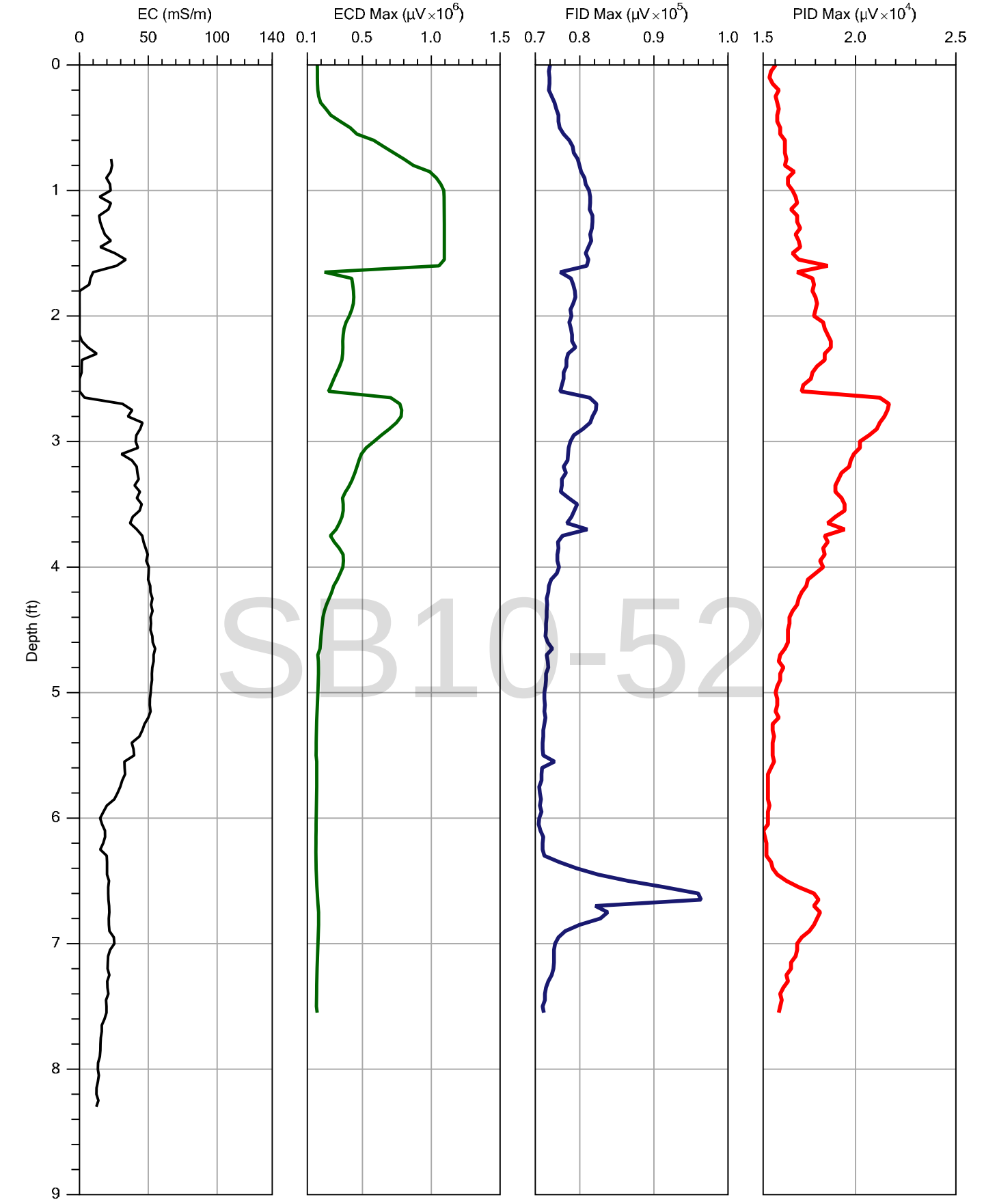
		File: SB10-49.MIP
Company: ZEBRA Environmental	Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401	Client: EA	Location:



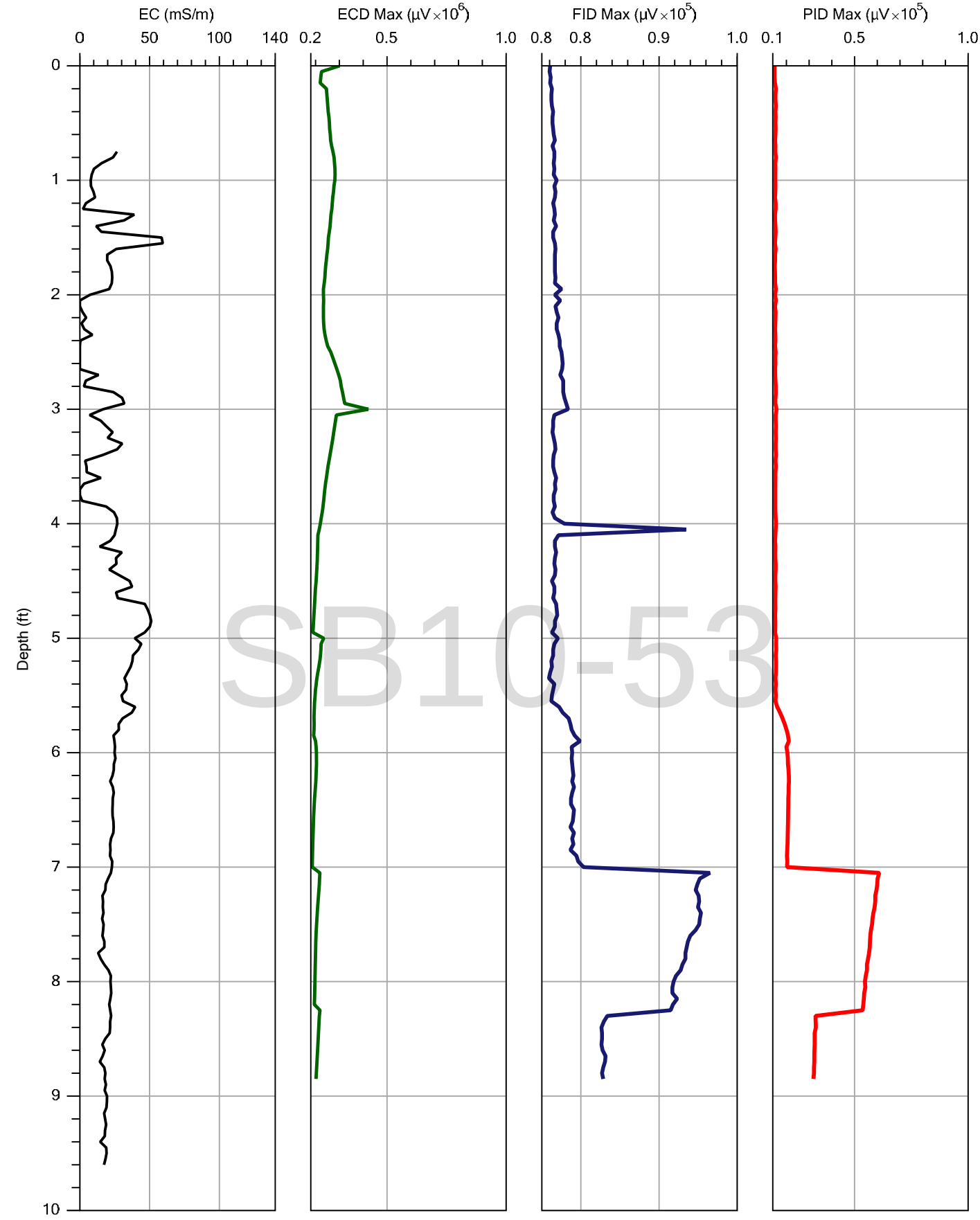
		File: SB10-50.MIP
Company: ZEBRA Environmental	Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401	Client: EA	Location:



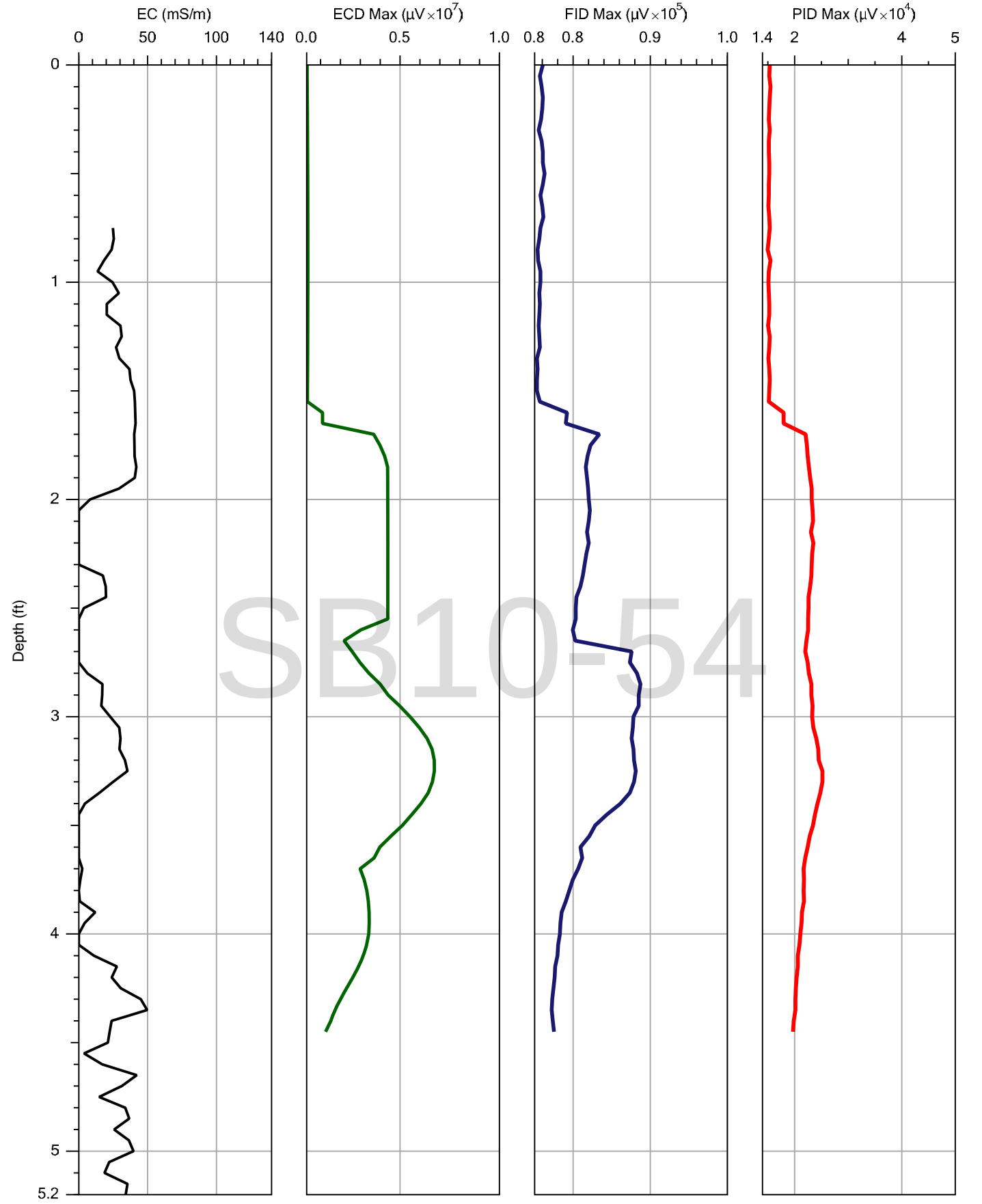
		File: SB10-51.MIP
Company: ZEBRA Environmental	Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401	Client: EA	Location:



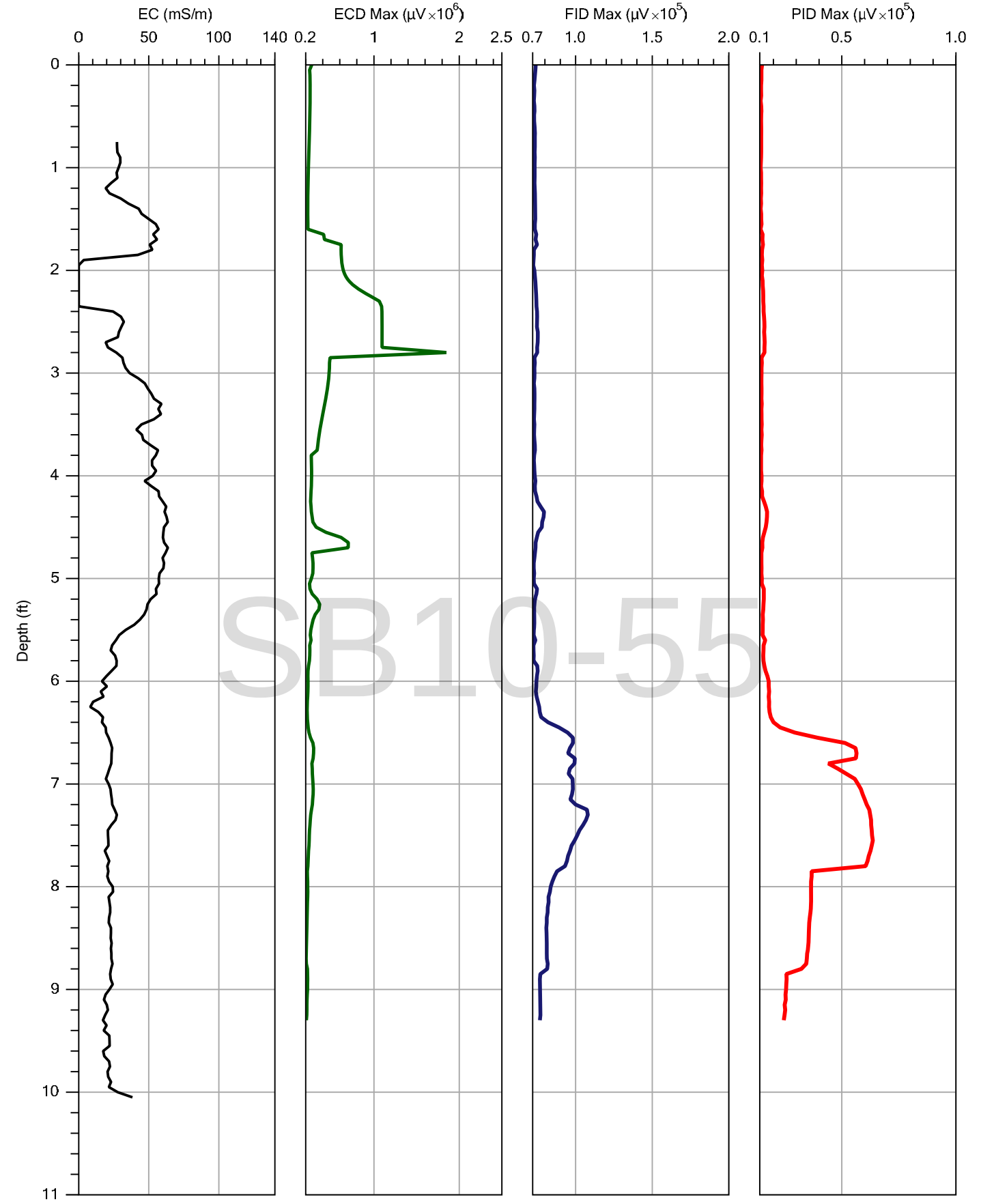
		File: SB10-52.MIP
Company: ZEBRA Environmental	Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401	Client: EA	Location:



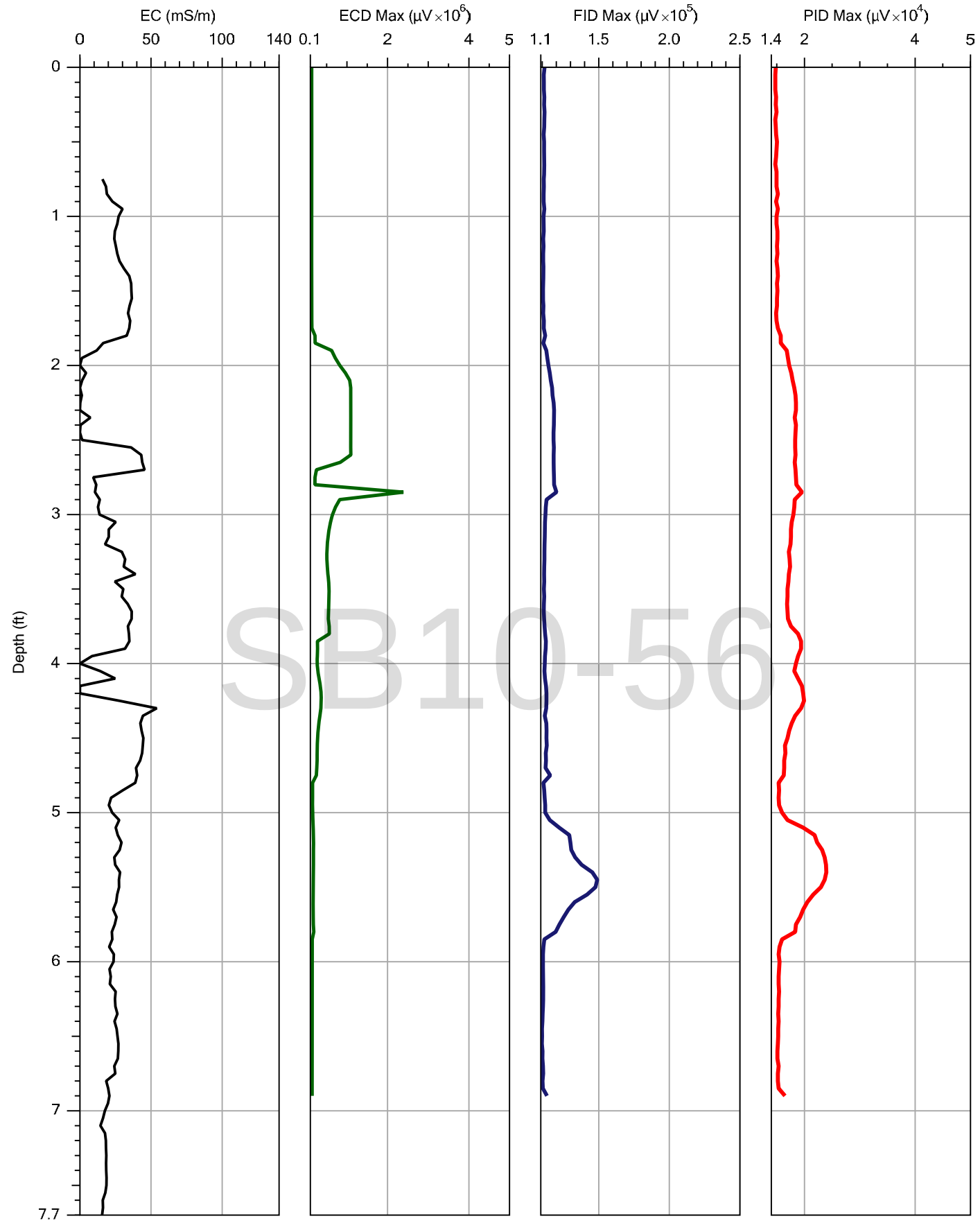
		File: SB10-53.MIP
Company: ZEBRA Environmental	Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401	Client: EA	Location:



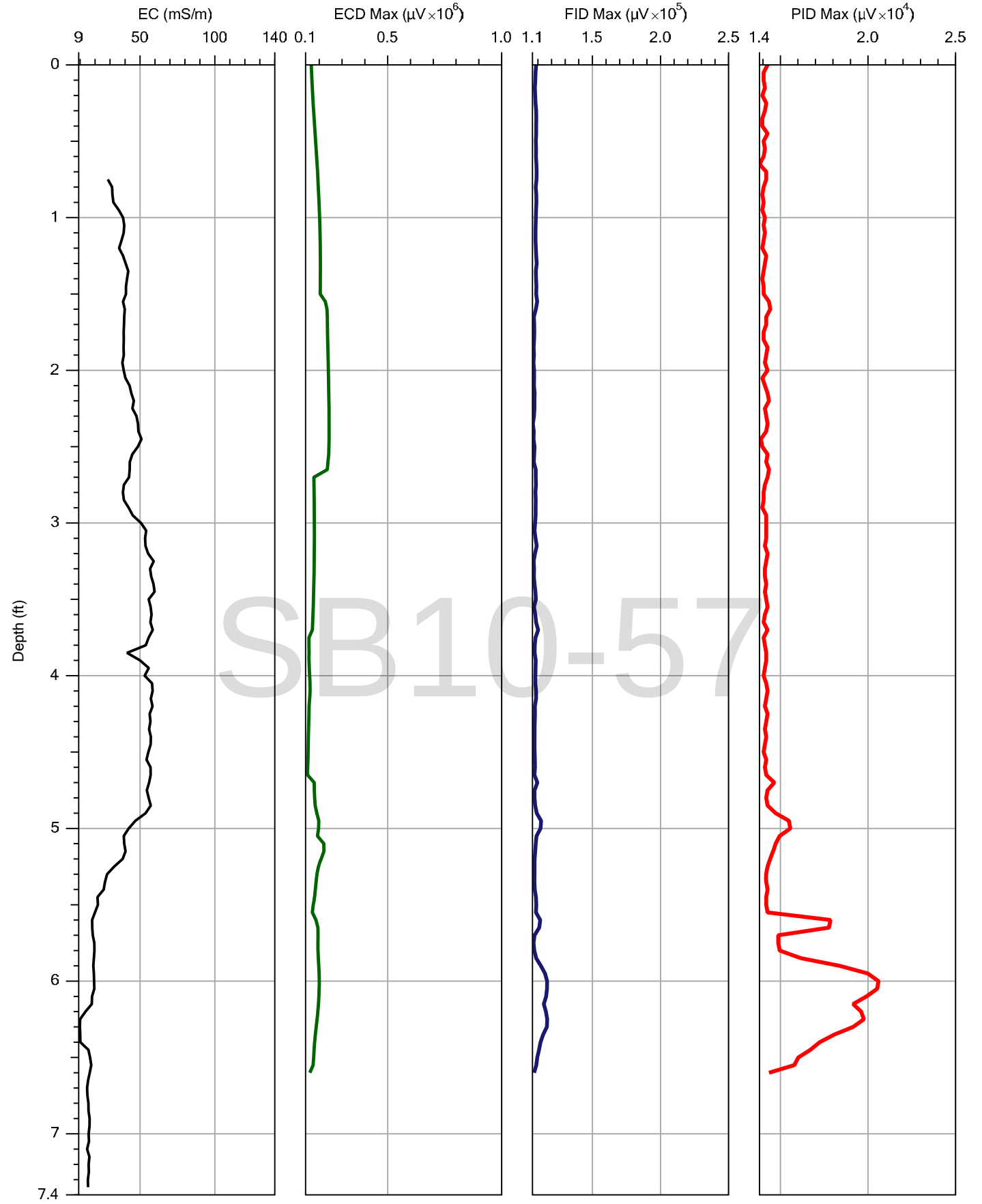
		File: SB10-54.MIP
Company: ZEBRA Environmental	Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401	Client: EA	Location:



			File: SB10-55.MIP
Company: ZEBRA Environmental		Operator: Zach	Date: 4/2/2014
Project ID: EA - 6265401		Client: EA	Location:



		File: SB10-56.MIP
Company: ZEBRA Environmental	Operator: Zach	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:



			File: SB10-57.MIP
Company: ZEBRA Environmental	Operator: Zach		Date: 4/3/2014
Project ID: EA - 6265401	Client: EA		Location:

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Appendix C-2

HPT Logs

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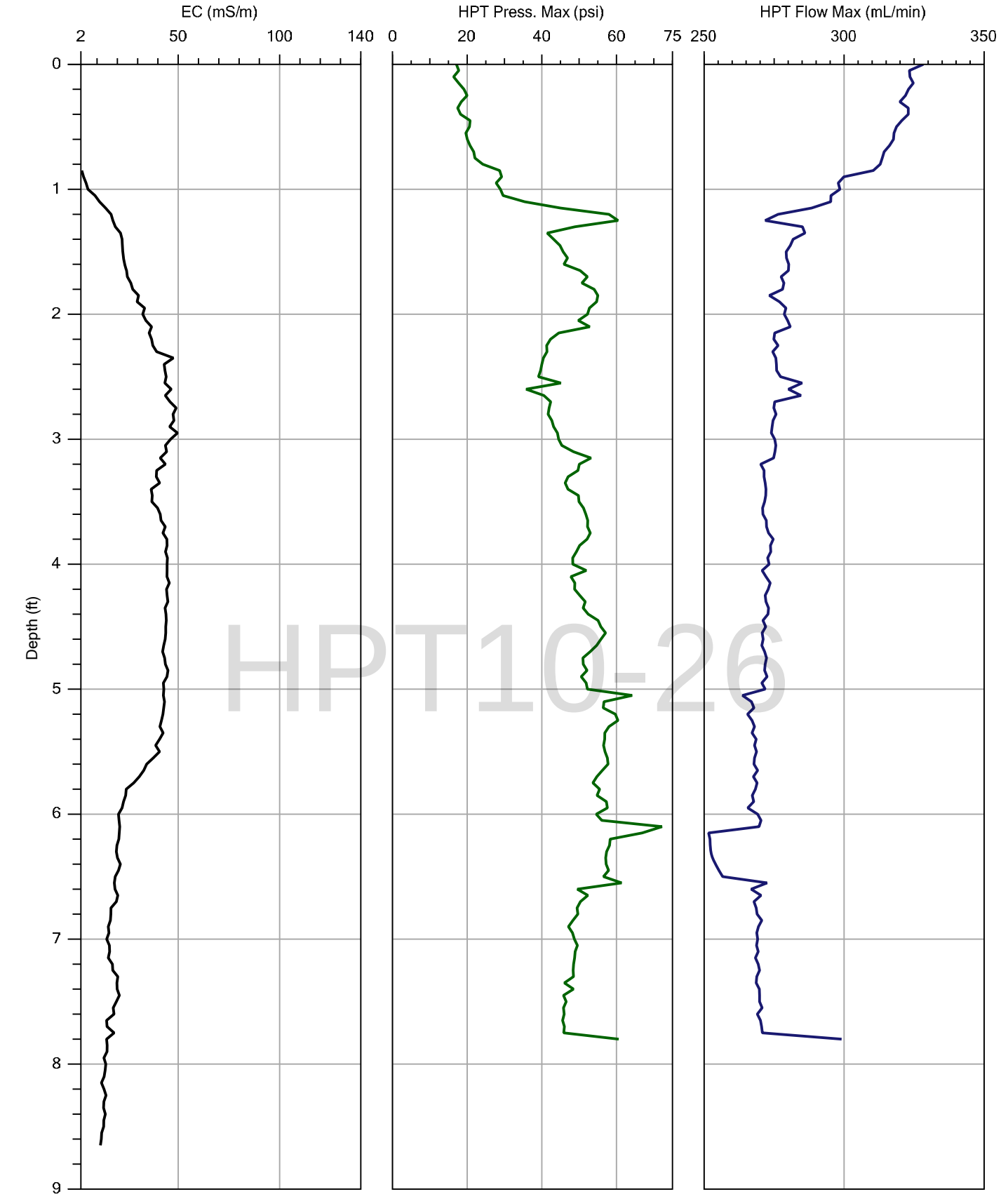
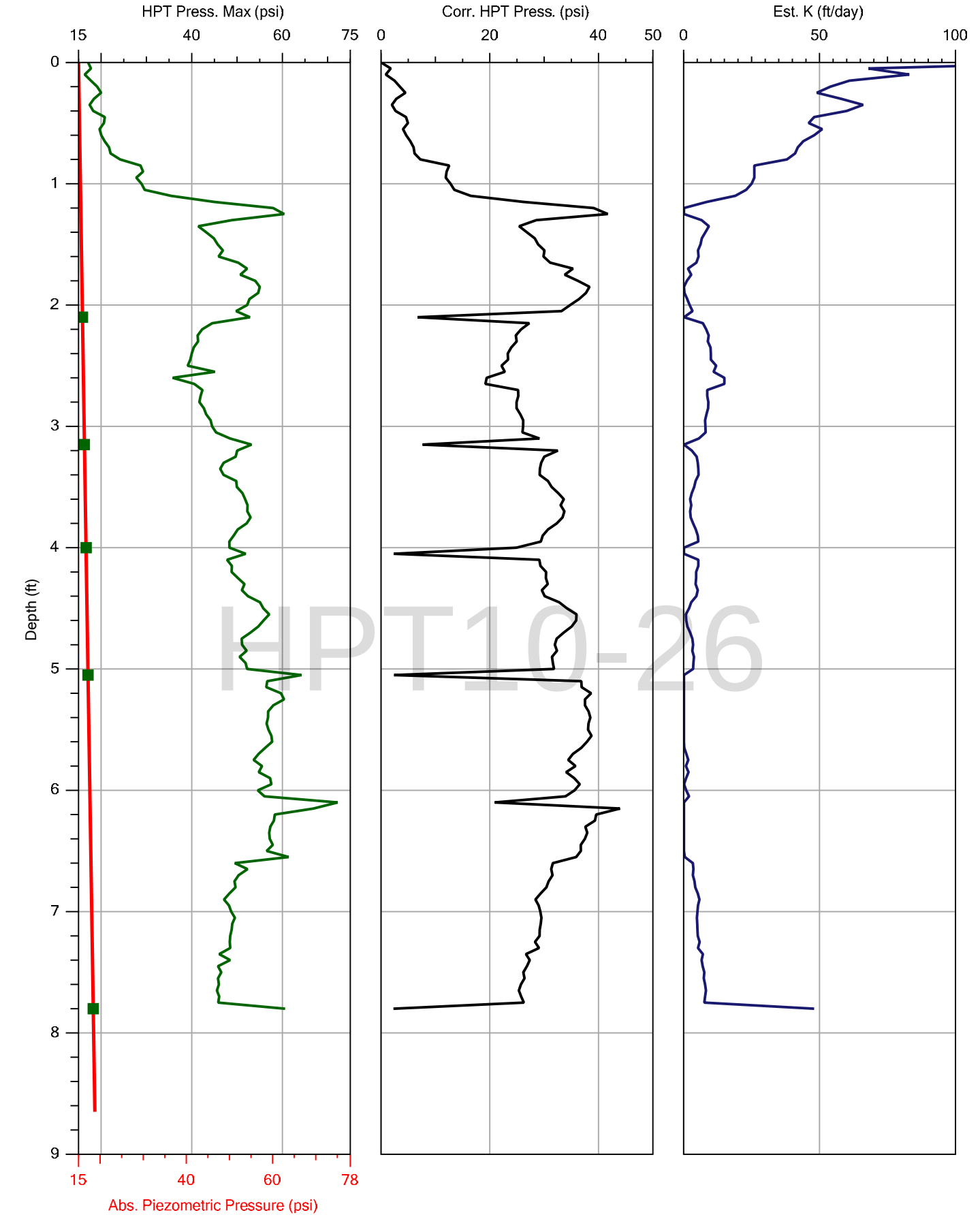
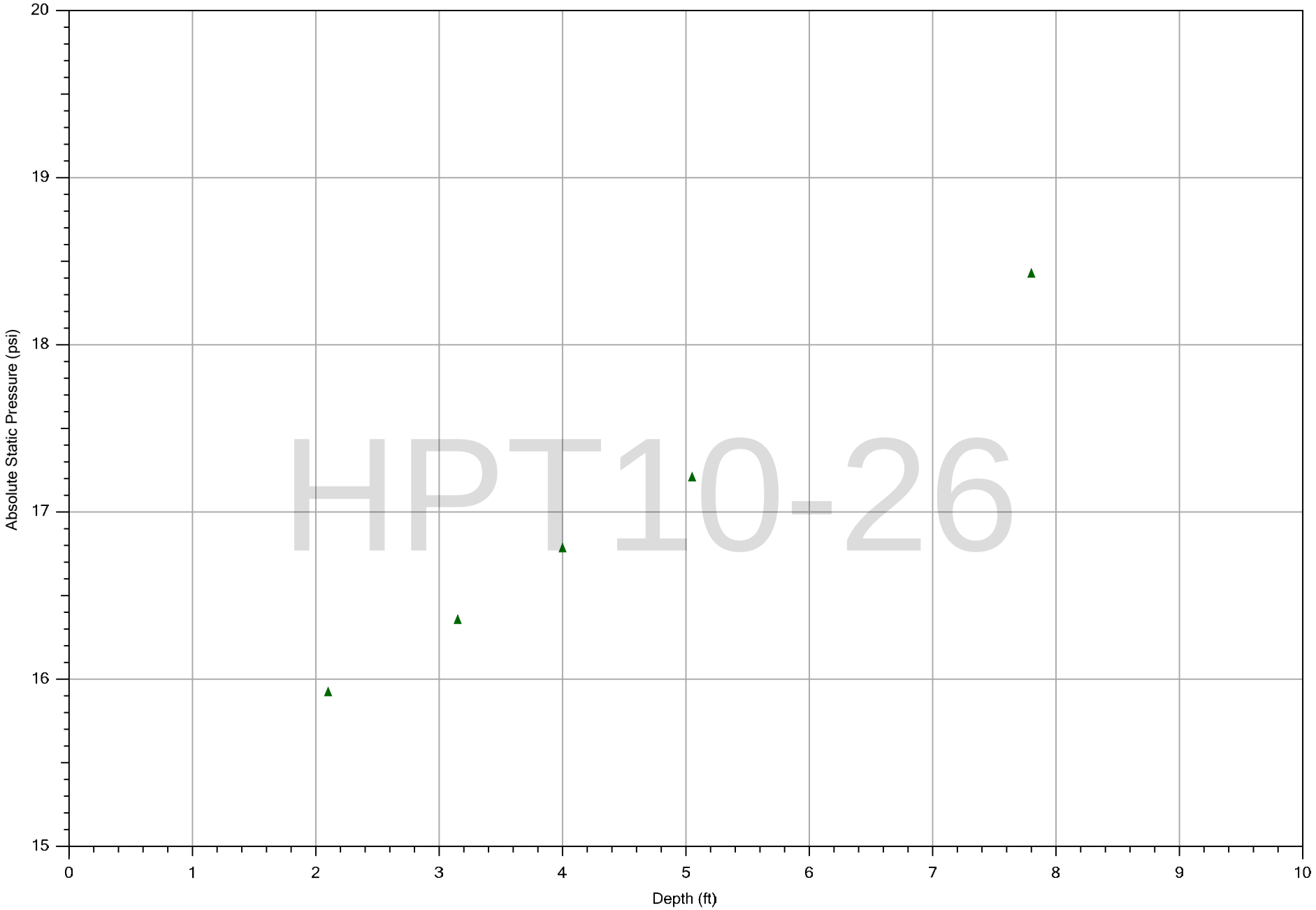


			File: HPT10-26.HPT
Company: ZEBRA Environmental		Operator: Zach	Date: 4/3/2014
Project ID: EA - 6265401		Client: EA	Location:



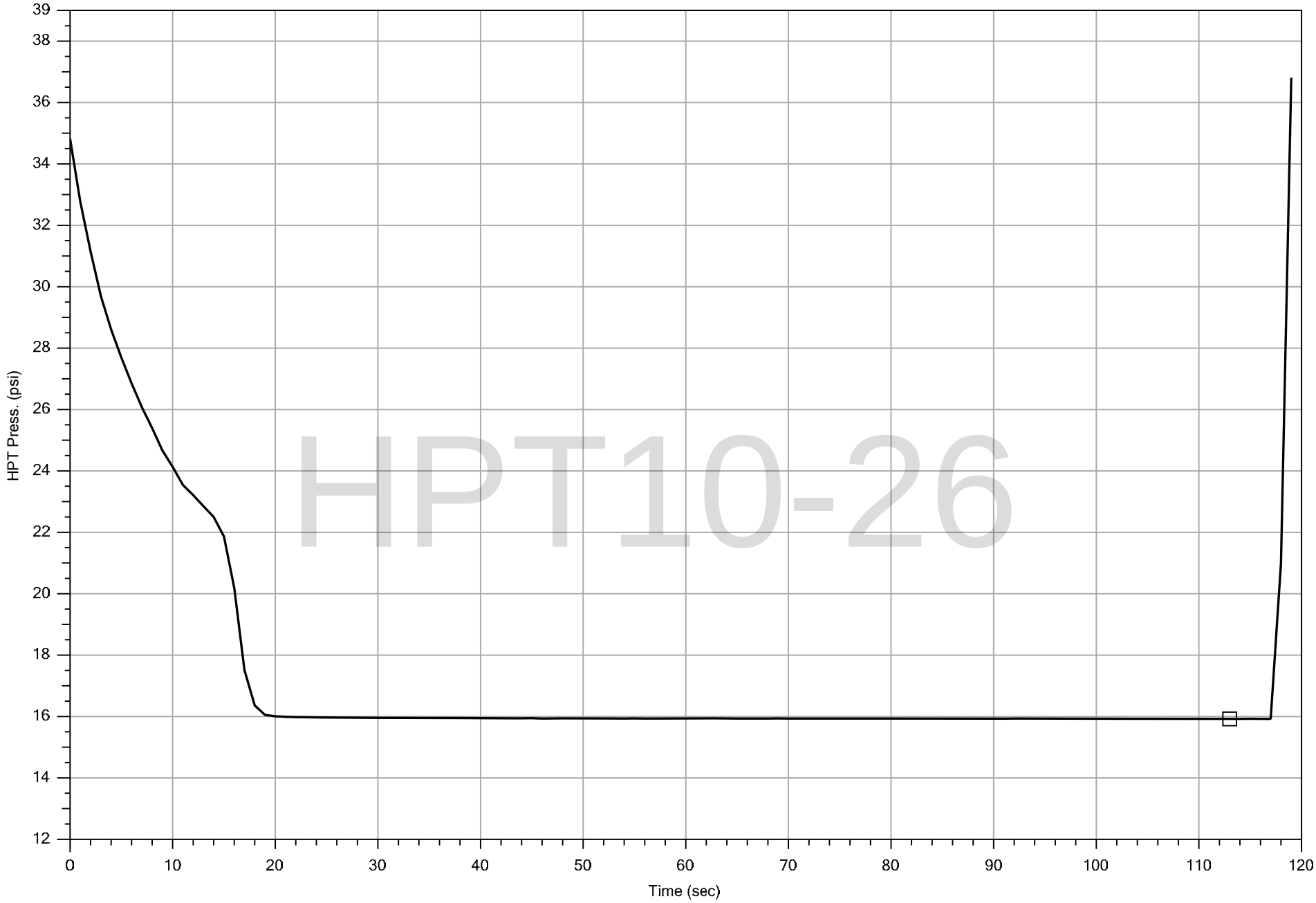
		File: HPT10-26.HPT
Company: ZEBRA Environmental	Operator: Zach	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:



ABSOLUTE STATIC PRESSURE

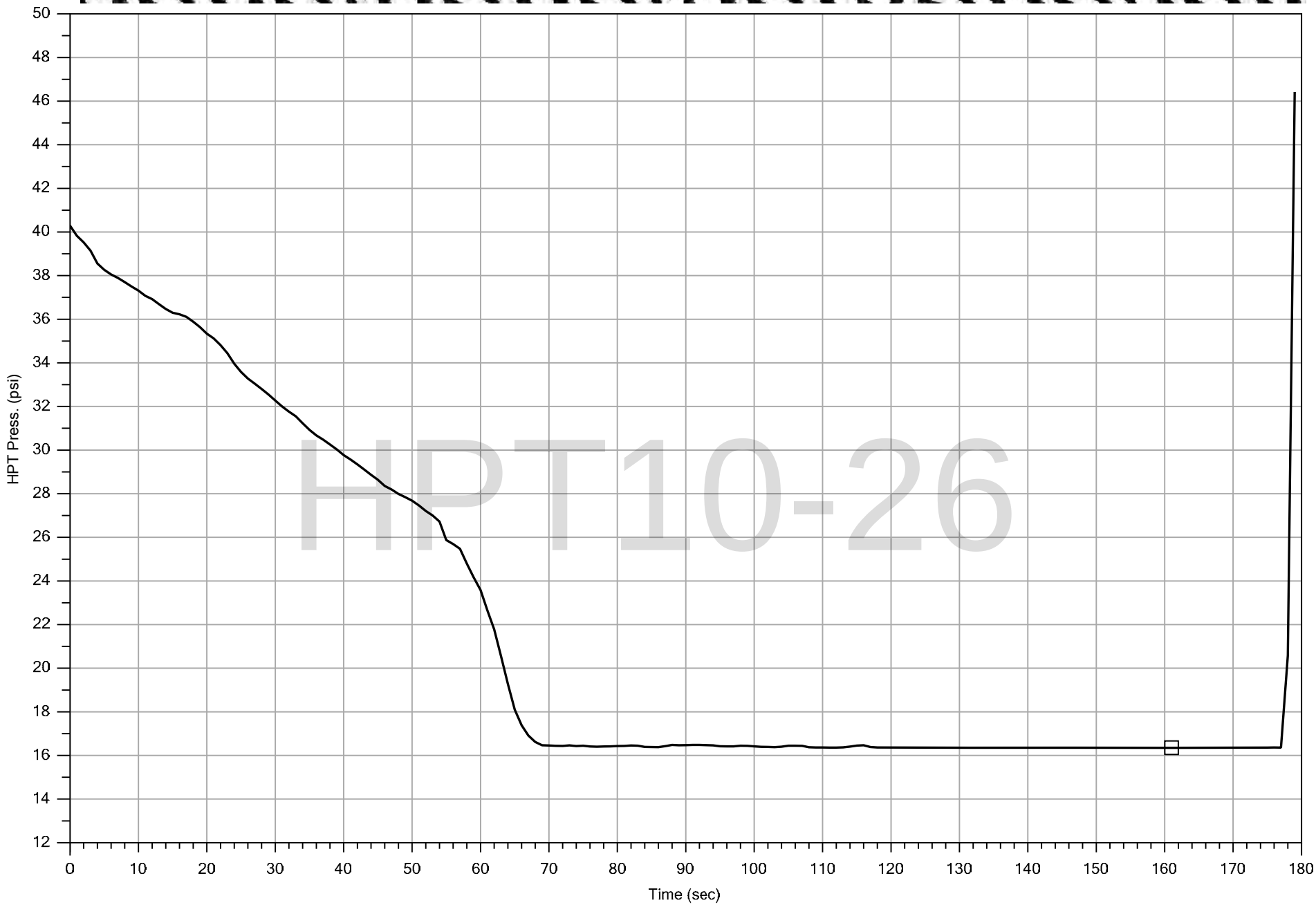
Company: ZEBRA Environmental	Operator: Zach
Project ID: EA - 6265401	Client: EA

▲ HPT05-05.HPT 4/3/2014
▲ HPT10-26.HPT 4/3/2014



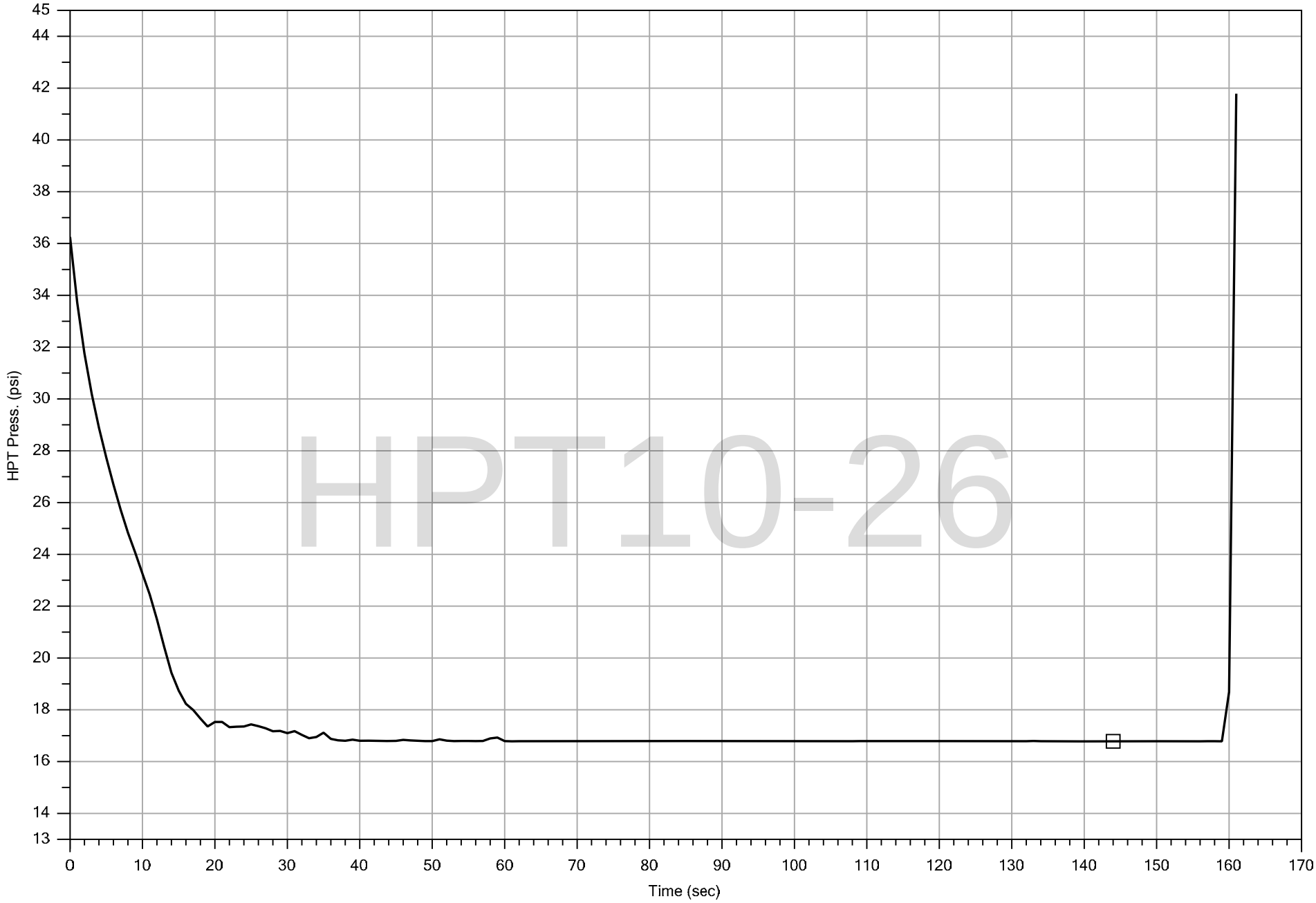
HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA Environmental	Operator: Zach	File: HPT10-26.TIM	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:	Sensor: HPT Press.
		Depth: 2.10 ft	Test: 1



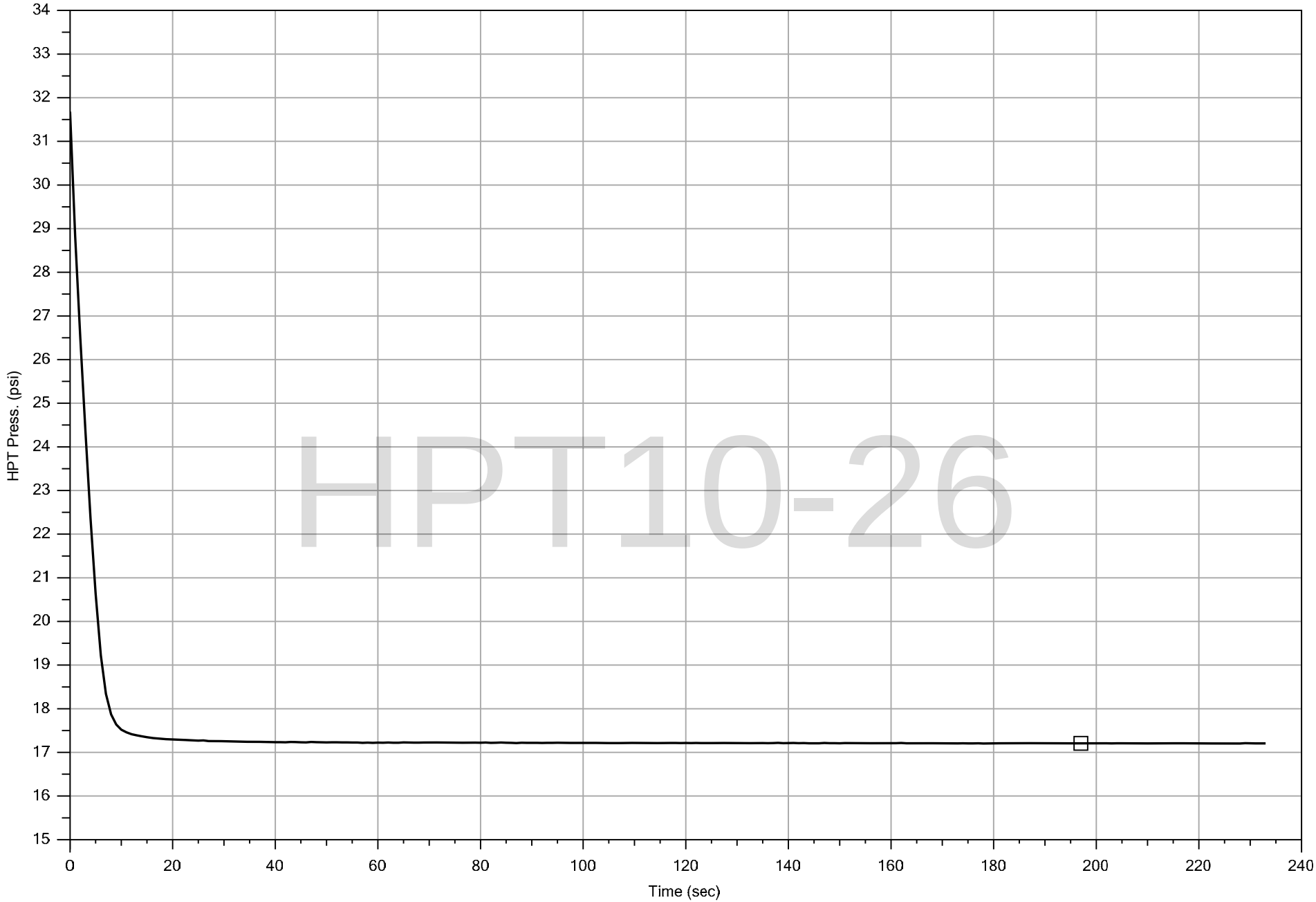
HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA Environmental	Operator: Zach	File: HPT10-26.TIM	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:	Sensor: HPT Press.
		Depth: 3.15 ft	Test: 1



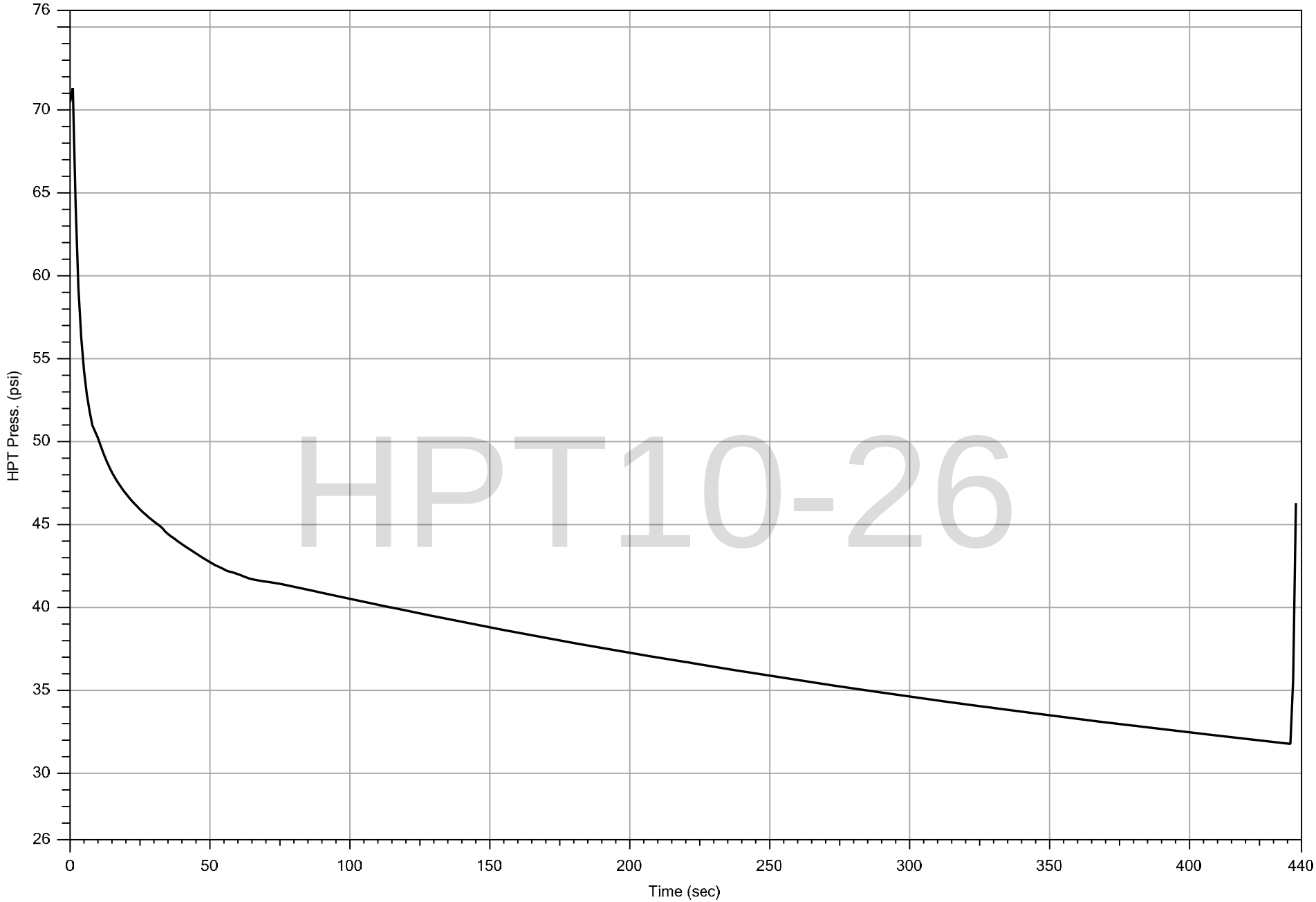
HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA Environmental	Operator: Zach	Location:	Sensor: HPT Press.
Project ID: EA - 6265401	Client: EA	Depth: 4.00 ft	Test: 1
File: HPT10-26.TIM			Date: 4/3/2014



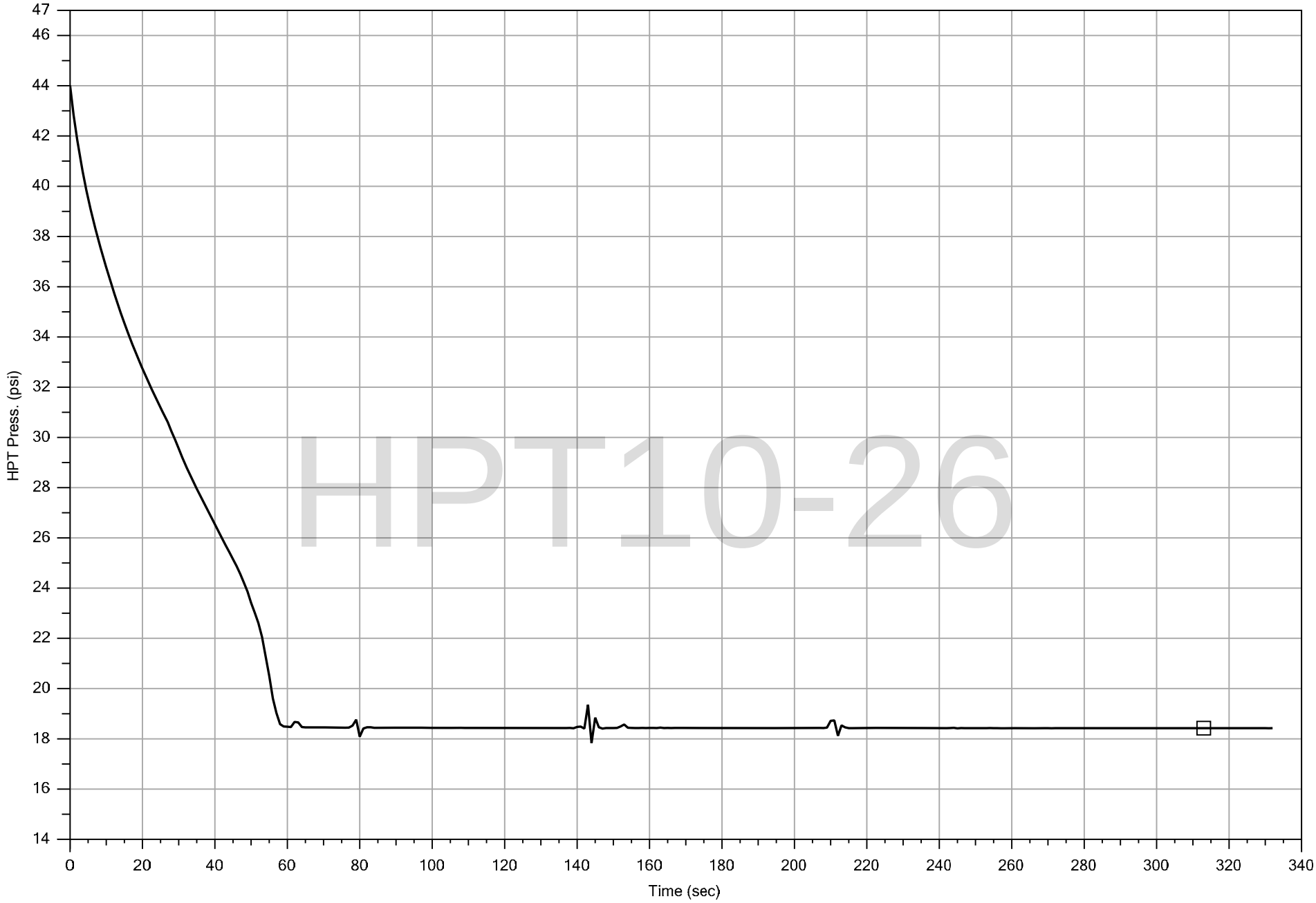
HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA Environmental	Operator: Zach	File: HPT10-26.TIM	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:	Sensor: HPT Press.
		Depth: 5.05 ft	Test: 1



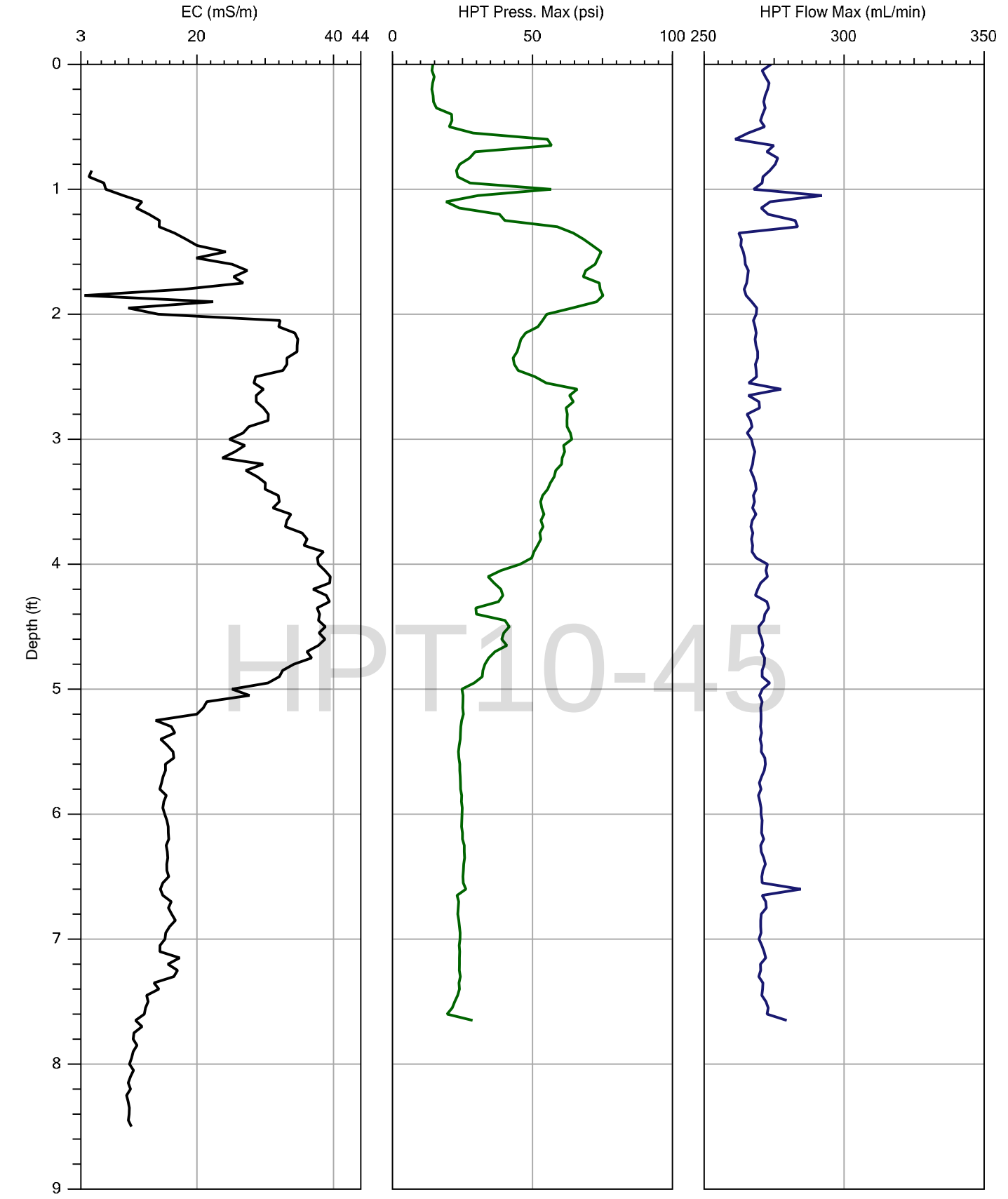
HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA Environmental	Operator: Zach	File: HPT10-26.TIM	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:	Sensor: HPT Press.
		Depth: 6.10 ft	Test: 1

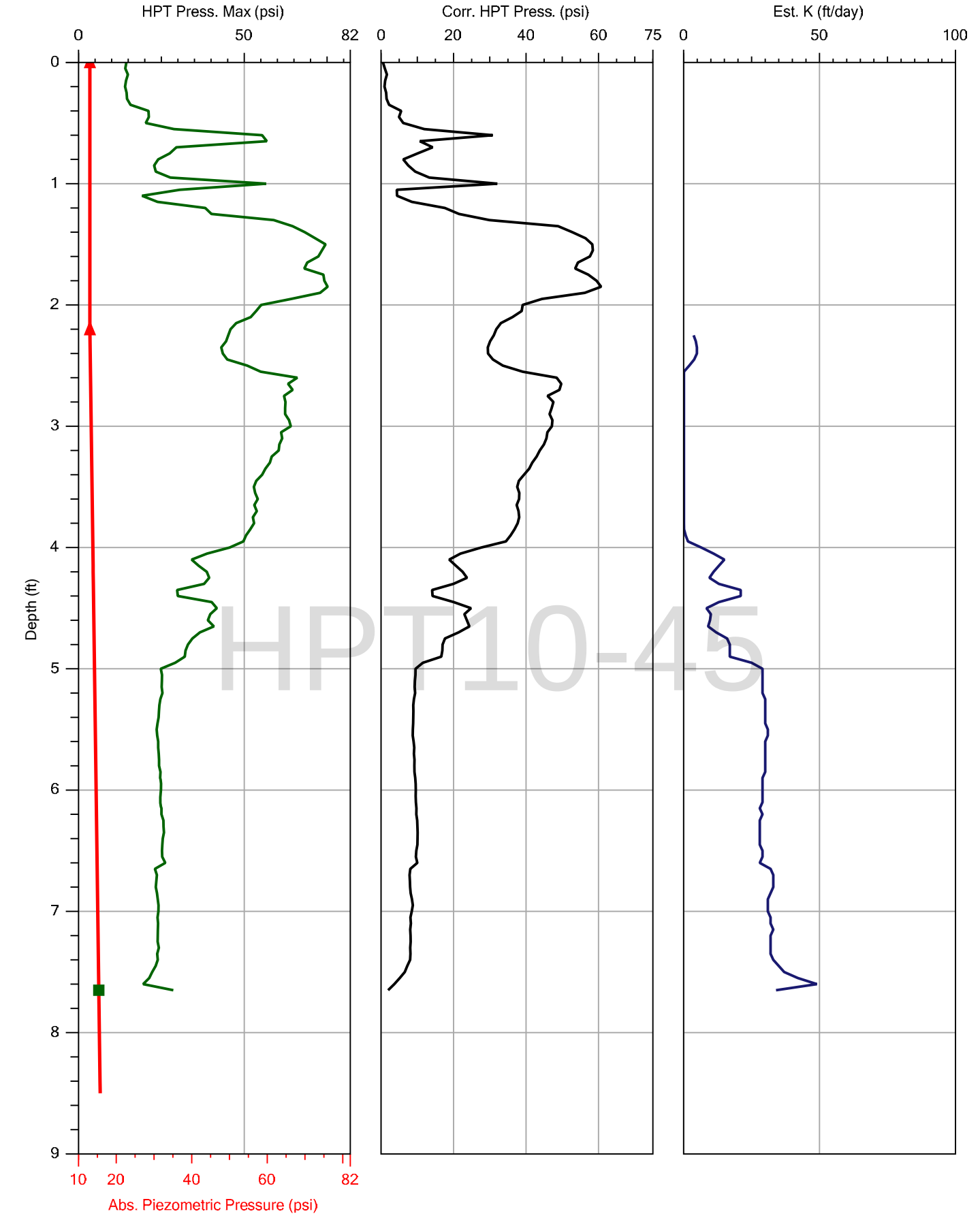


HPT DISSIPATION (SINGLE CASE)

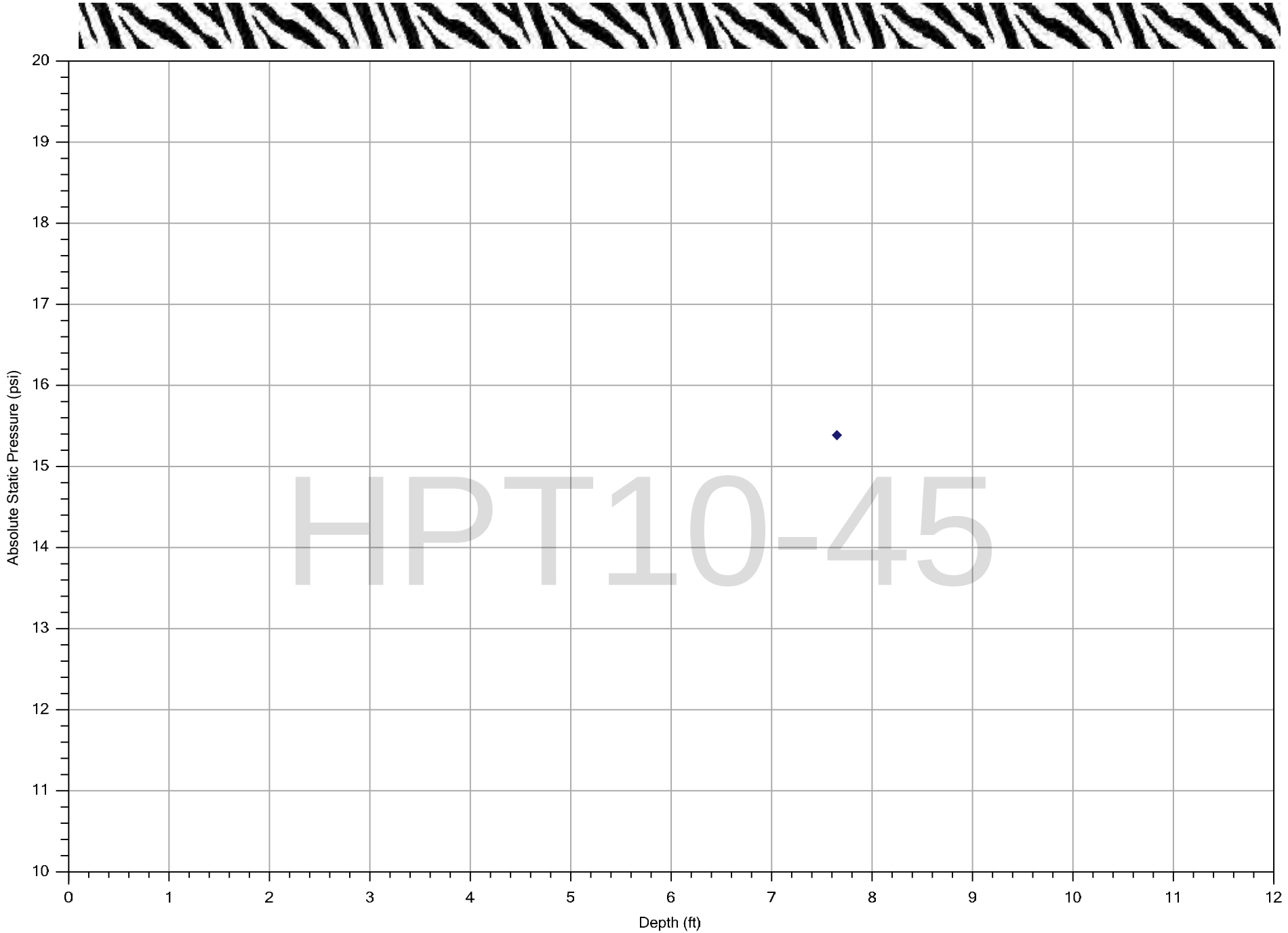
Company: ZEBRA Environmental	Operator: Zach	File: HPT10-26.TIM	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:	Sensor: HPT Press.
		Depth: 7.80 ft	Test: 1



			File: HPT10-45.HPT
Company: ZEBRA Environmental		Operator: Zach	Date: 4/3/2014
Project ID: EA - 6265401		Client: EA	Location:



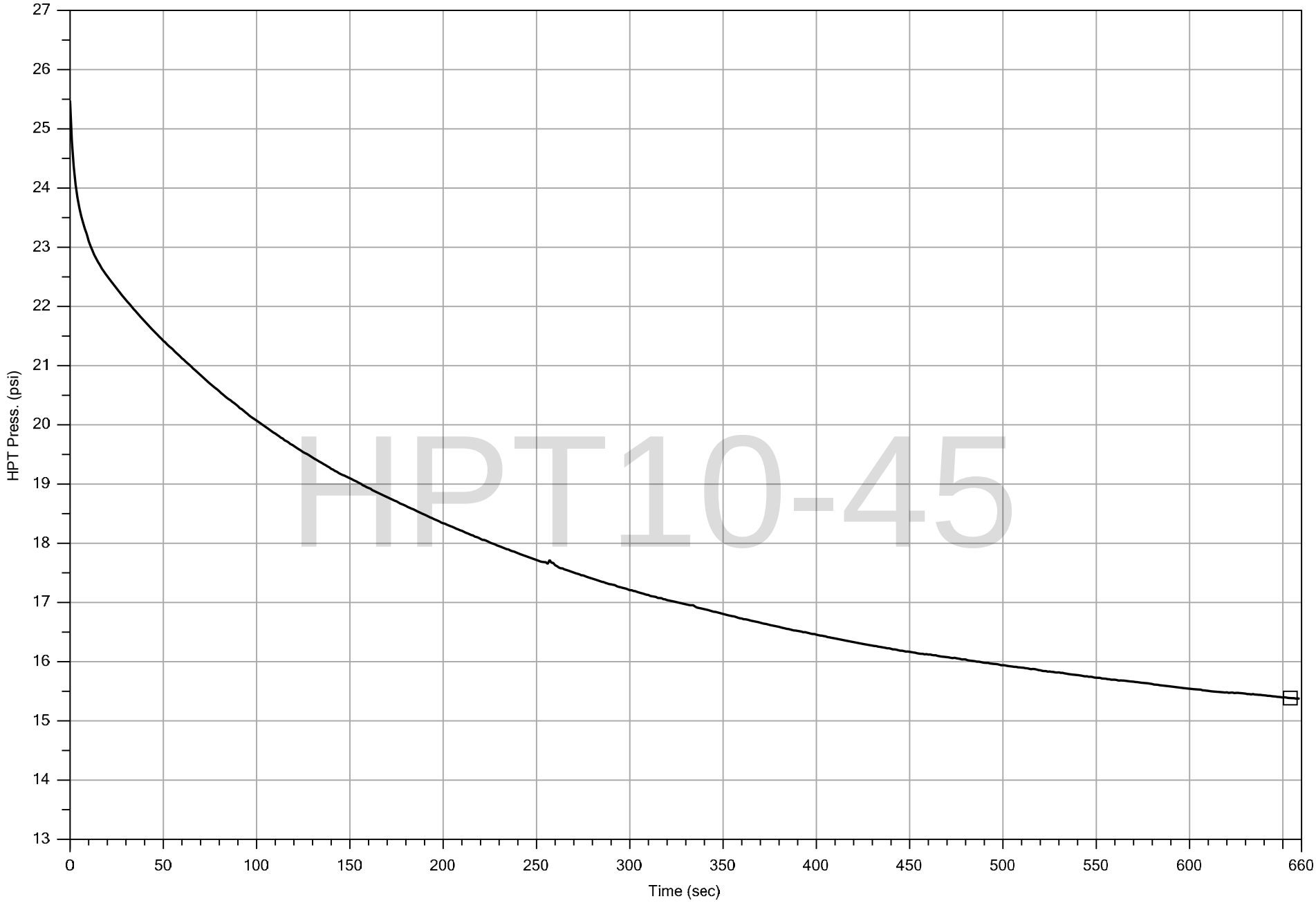
		File: HPT10-45.HPT
Company: ZEBRA Environmental	Operator: Zach	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:



ABSOLUTE STATIC PRESSURE

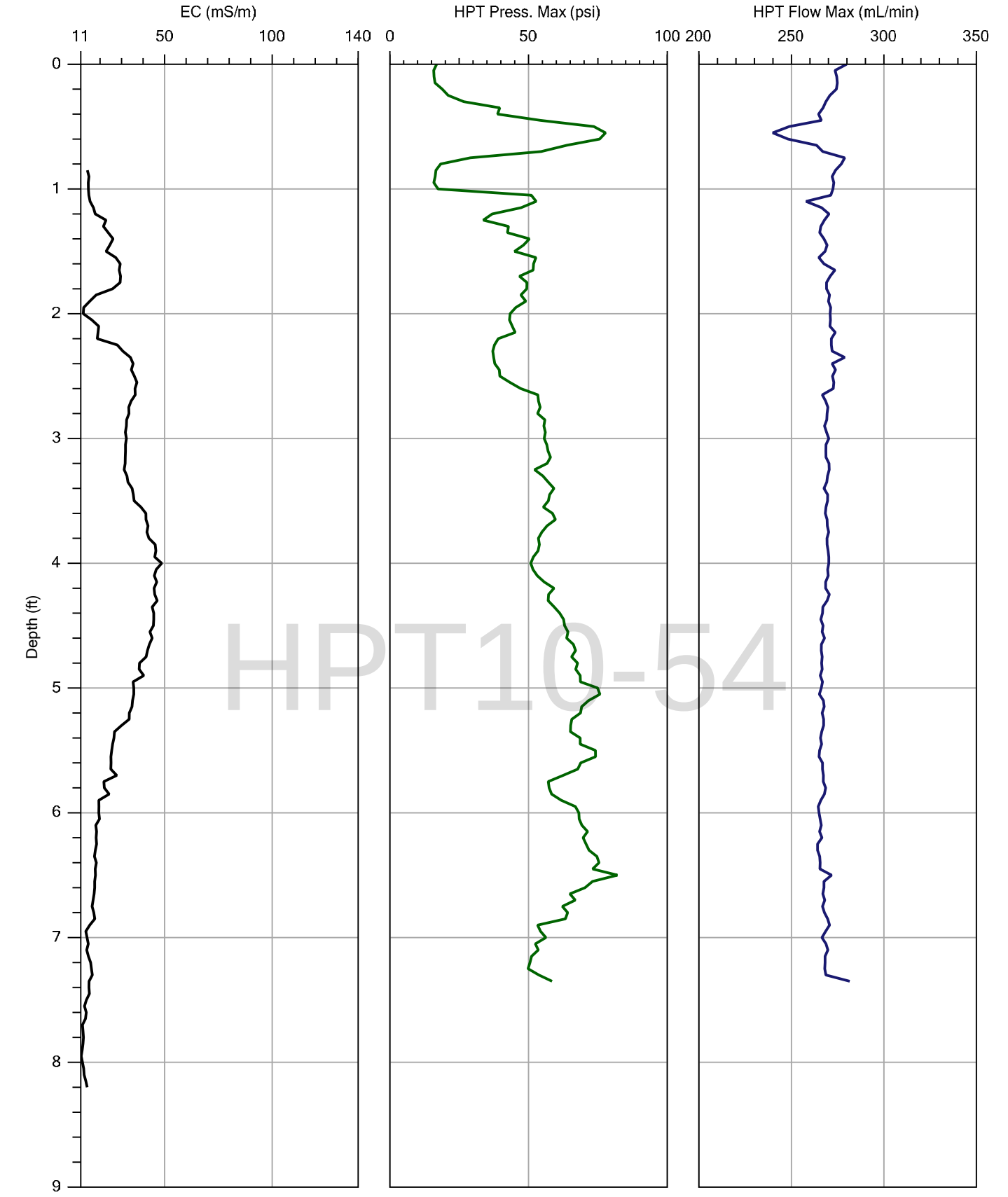
Company: ZEBRA Environmental	Operator: Zach
Project ID: EA - 6265401	Client: EA

◆ HPT05-05.HPT 4/3/2014
HPT10-26.HPT 4/3/2014
HPT10-45.HPT 4/3/2014

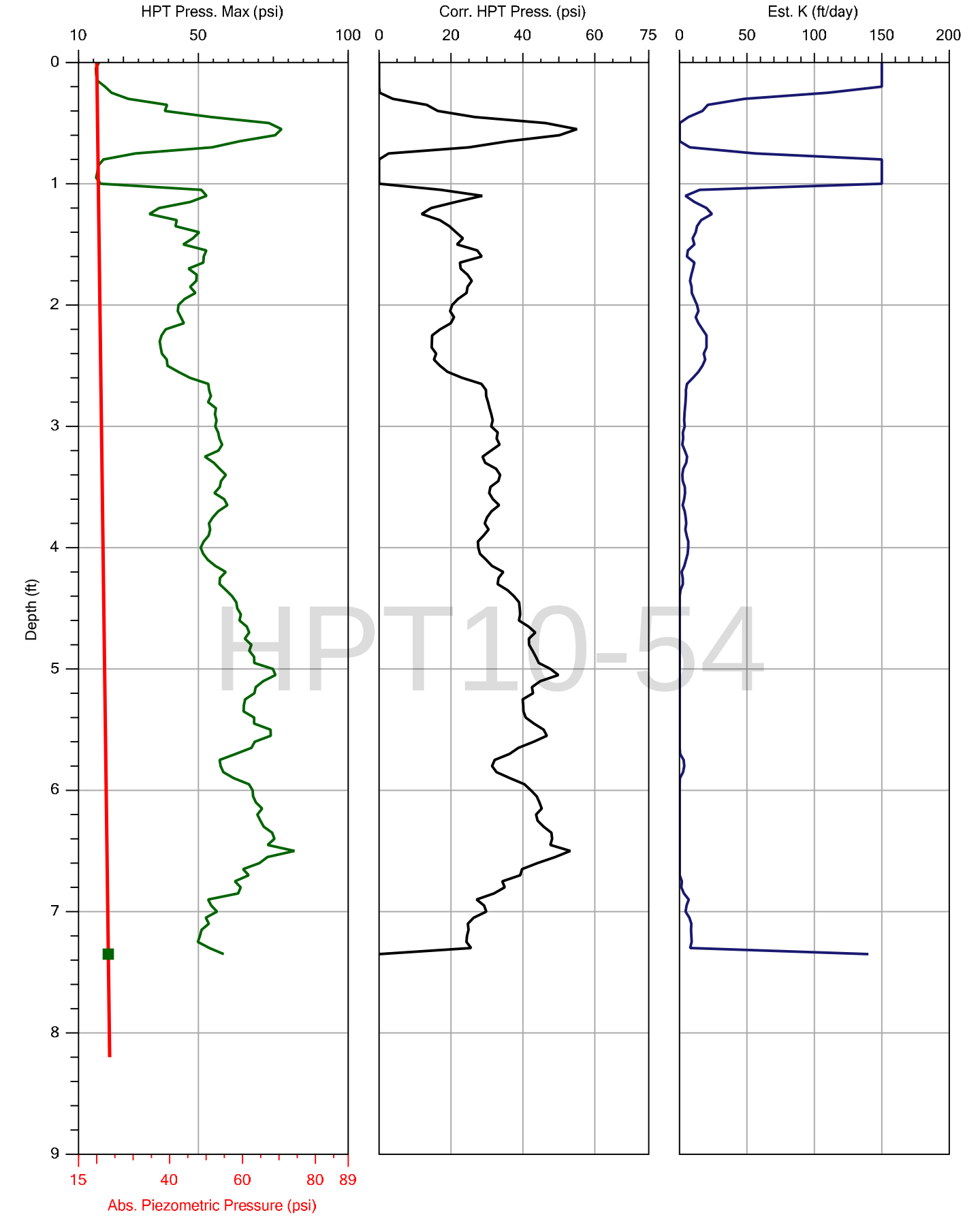


HPT DISSIPATION (SINGLE CASE)

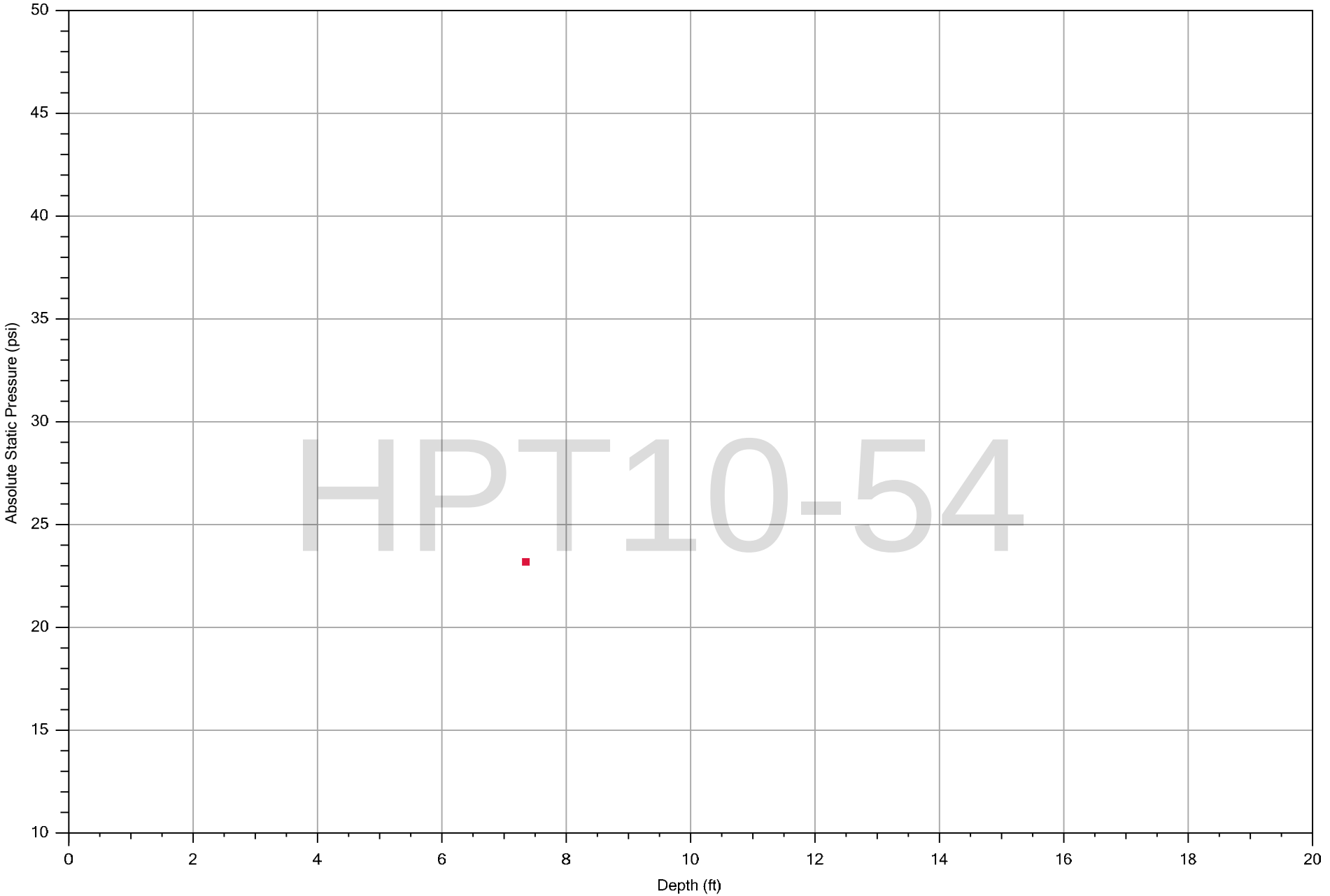
Company: ZEBRA Environmental	Operator: Zach	File: HPT10-45.TIM	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:	Sensor: HPT Press.
		Depth: 7.65 ft	Test: 1



			File: HPT10-54.HPT
Company: ZEBRA Environmental		Operator: Zach	Date: 4/3/2014
Project ID: EA - 6265401		Client: EA	Location:



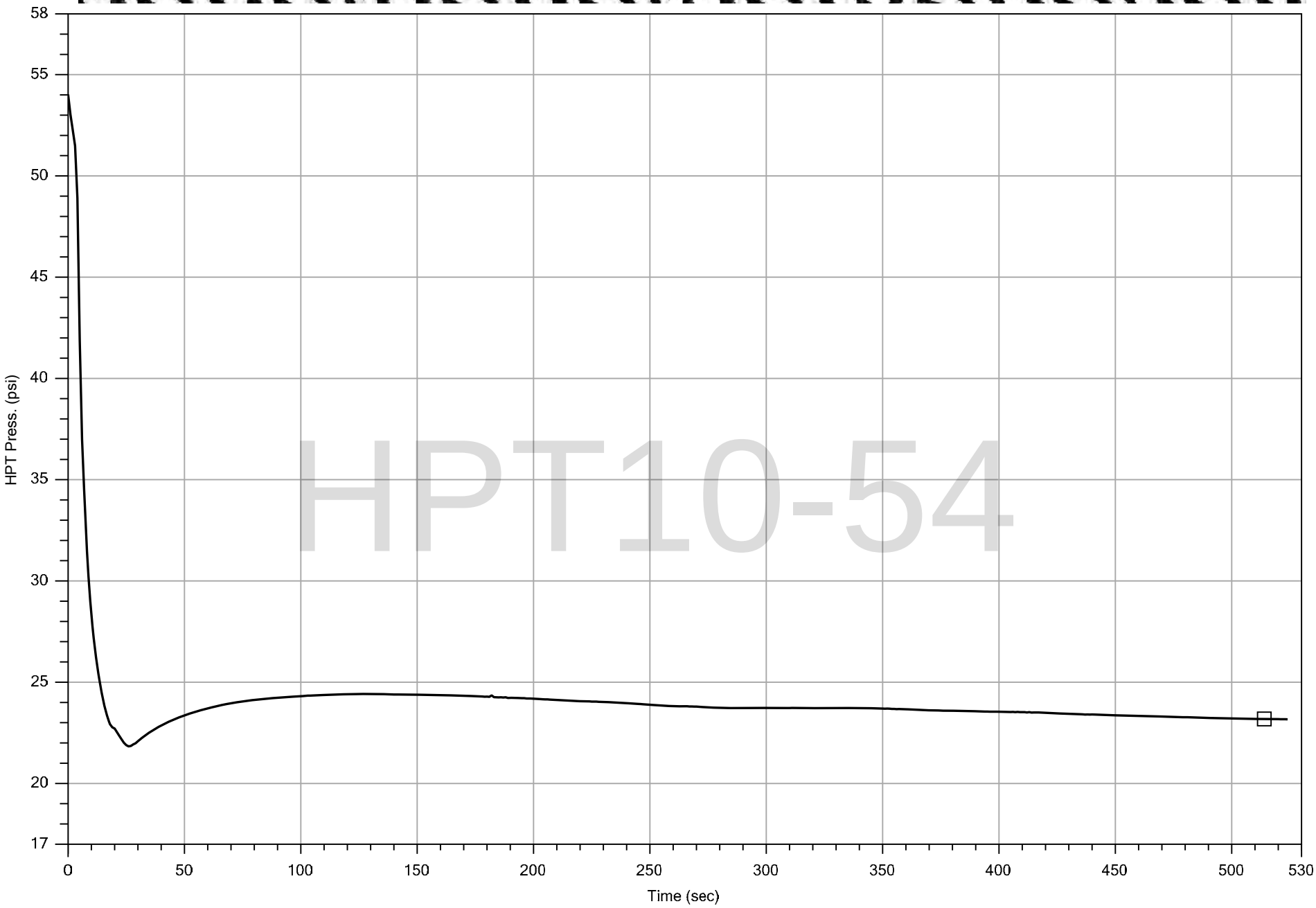
		File: HPT10-54.HPT
Company: ZEBRA Environmental	Operator: Zach	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:



ABSOLUTE STATIC PRESSURE

Company: ZEBRA Environmental	Operator: Zach
Project ID: EA - 6265401	Client: EA

HPT05-05.HPT	4/3/2014
HPT10-26.HPT	4/3/2014
HPT10-45.HPT	4/3/2014
HPT10-54.HPT	4/3/2014



HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA Environmental	Operator: Zach	File: HPT10-54.TIM	Date: 4/3/2014
Project ID: EA - 6265401	Client: EA	Location:	Sensor: HPT Press.
		Depth: 7.35 ft	Test: 1

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Appendix C-3

Soil Boring Logs

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FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: GeoProbe		Soil Boring Number: SB10-22
Sampling Method: 4-ft Poly MacroCore Sleeves		Sheet 1 of 1

Water Lev. / Time					Drilling Start	Drilling Finish
					03/31/2014 14:10	03/31/2014 14:20

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet		USCS Log	Surface Conditions: Grass, fill Weather: Sunny, 3-5, mph WNW Temperature: 40 F
	4/4		0.0	0		GM	0.0 - 1.8': Dark brown medium-coarse GRAVEL and SILT and fine SAND; loose and moist (GM).
			0.0	1		CL	1.8 - 8.0': Reddish brown silty CLAY, trace fine Sand; trace organic material; slightly mottled; stiff and dry (CL).
			0.0	2			
			0.0	3			
	4/3.5		71.2	4			
			0/0	5			
			7.5	6			
				7			
				8			Refusal at 8.0 ft bgs
				9			
				10			
				11			
				12			
				13			
				14			
				15			
				16			
				17			
				18			
				19			
				20			

Logged by: Rob Peterson Date: 03/31/14

Drilling Contractor: Zebra Environmental Driller: Phillip Orsi

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: GeoProbe		Soil Boring Number: SB10-23
Sampling Method: 4-ft Poly MacroCore Sleeves		Sheet 1 of 1

Water Lev.					Drilling Start	Drilling Finish
Time					04/01/2014 10:28	04/01/2014 10:55

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet		USCS Log	Surface Conditions: Grass/Fill Weather: Overcast Temperature: 38 F
	4/4		0.0	0		CL	0.0 - 1.5': Dark brown silty CLAY with medium to coarse angular Gravel; trace angular fine Gravel; trace root material; well compacted and moist (CL).
			0.0	1			1.5 - 6.5': Reddish brown silty CLAY; trace fine Gravel, trace root material; slighty mottled; hard and dry (CL).
			0.0	2			
			0.0	3			
	4/4		0.0	4			
			0.0	5			
			0.0	6			
				7			
				8			Refusal at 8 ft bgs
				9			
				10			
				11			
				12			
				13			
				14			
				15			
				16			
				17			
				18			
				19			
				20			

Logged by: Rob Peterson Date: 4/01/2014

Drilling Contractor: Zebra Environmental Driller: Phillip Orsi

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: GeoProbe		Soil Boring Number: SB10-24
Sampling Method: 4-ft Poly MacroCore Sleeves		Sheet 1 of 1

Water Lev.					Drilling Start	Drilling Finish
Time					04/01/2014 10:05	04/01/2014 10:23

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet		USCS Log	Surface Conditions: Grass/Fill Weather: Overcast Temperature: 38 F
	4/4		0.0	0		CL	0.0 - 1.0': Dark brown silty CLAY with medium to coarse angular Gravel; trace fine Gravel; trace root material; well compacted and moist (CL).
			0.0	1			1.0 - 4.0': Reddish brown silty CLAY with root material; trace fine Gravel; moderate to low plasticity; slight mottling; hard and dry (CL).
			0.1	2			
			0.0	3			
	4/3.5		0.0	4			4.5 - 7.5': Reddish brown silty CLAY with fine Gravel; moderate to high plasticity; stiff and moist (CL).
			0.4	5			
			0.7	6			
				7			
							Refusal at 7.5 ft bgs
				8			
				9			
				10			
				11			
				12			
				13			
				14			
				15			
				16			
				17			
				18			
				19			
				20			

Logged by: Rob Peterson Date: 4/01/2014

Drilling Contractor: Zebra Environmental Driller: Phillip Orsi

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: GeoProbe		Soil Boring Number: SB10-25
Sampling Method: 4-ft Poly MacroCore Sleeves		Sheet 1 of 1

					Drilling	
Water Lev.					Start	Finish
Time					03/31/2014 10:15	03/31/2014 10:30

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet		USCS Log	
							Surface Conditions: Grass, Topsoil
							Weather: Sunny, 3-5, mph WNW
							Temperature: 40 F
	4/4		0.0	0		CL	0.0 - 1.0': Dark gray silty CLAY with coarse Sand and fine Gravel; trace coarse subrounded Gravel; stiff and moist (CL).
			0.0	1			1.0 - 9.0': Reddish brown silty CLAY; trace fine Gravel; slightly mottled; moderate plasticity; stiff and moist to dry (CL).
			0.1	2			
			0.0	3			
	4/4		0.0	4			
			0.0	5			
			0.0	6			
				7			
				8			
				9			Refusal at 9.0 ft bgs
				10			
				11			
				12			
				13			
				14			
				15			
				16			
				17			
				18			
				19			
				20			

Logged by: Rob Peterson Date: 03/31/14

Drilling Contractor: Zebra Environmental Driller: Phillip Orsi

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: GeoProbe		Soil Boring Number: SB10-26
Sampling Method: 4-ft Poly MacroCore Sleeves		Sheet 1 of 1

Water Lev. / Time					Drilling Start	Drilling Finish
					03/31/2014 10:53	03/31/2014 11:05

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet		USCS Log	Surface Conditions: Grass, Topsoil Weather: Sunny, 3-5 mph WNW Temperature: 40 F
	4/4		0.0	0		GM	0.0 - 0.5': Dark gray medium to coarse GRAVEL with fine to medium Sand; trace silt; loose and moist (GM).
			0.0	1			0.5 - 1.5': Dark brown silty CLAY; trace fine Gravel; low plasticity; stiff and dry (CL).
			0.0	2			1.5 - 7.5': Reddish brown silty CLAY; trace fine Gravel; slight gray mottling; stiff and dry to moist (CL).
			0.0	3		CL	
	4/3.5		20.3	4			
			579	5			
			180	6			
				7			
							Refusal at 7.5 ft bgs
				8			
				9			
				10			
				11			
				12			
				13			
				14			
				15			
				16			
				17			
				18			
				19			
				20			

Logged by: Rob Peterson Date: 3/31/14

Drilling Contractor: Zebra Environmental Driller: Phillip Orsi

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: GeoProbe		Soil Boring Number: SB10-46
Sampling Method: 4-ft Poly MacroCore Sleeves		Sheet 1 of 1

Water Lev.					Drilling Start	Drilling Finish
Time					0/4/02/2014 10:34	0/4/02/2014 10:50

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet		USCS Log	
							Surface Conditions: Grass, Fill
							Weather: Sunny, 10-12 mph WNW
							Temperature: 40 F
	4/4		0.0	0		GM	0.0 - 1.0': Dark brown fine sandy SILT with fine to medium angular Gravel; trace root material; well compacted and moist (GM).
			0.0	1		CL	1.0 - 1.8': Dark brown clayey SILT with root material; trace fine Gravel; low plasticity; tight and dry (CL).
			0.0	2			1.8 - 7.0': Reddish brown silty CLAY; moderate plasticity; heavy mottling; very hard and dry (CL).
			0.0	3			
	4/4		0.0	4			
			0.0	5			
			0.0	6			
				7			7.0 - 8.5': Reddish brown silty CLAY; trace sub-angular fine Gravel; high plasticity; stiff and moist (CL).
	4/0.5			8			Refusal at 8.5 ft bgs
				9			
				10			
				11			
				12			
				13			
				14			
				15			
				16			
				17			
				18			
				19			
				20			

Logged by: Rob Peterson Date: 4/2/14

Drilling Contractor: Zebra Environmental Driller: Phillip Orsi

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: GeoProbe		Soil Boring Number: SB10-51
Sampling Method: Poly MacroCore Sleeves		Sheet 1 of 1

					Drilling	
Water Lev.					Start	Finish
Time					0/4/02/2014 13:54	0/4/02/2014 14:10

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet		USCS Log	
							Surface Conditions: Grass, Fill
							Weather: Sunny, 10-12 mph WNW
							Temperature: 40 F
			0.0	0		SM	0.0 - 1.8': Dark brown silty F-SAND; trace angular fine Gravel; trace organic material; stiff and moist (SM).
			0.0	1			
	4/4		0.1	2		CL	1.8 - 6.0': Reddish brown silty CLAY; trace organic material; moderate plasticity; heavy mottling; hard and dry (CL).
			0.0	3			
			0.0	4			
			0.0	5			
	4/4		0.0	6			6.0 - 8.0': Reddish brown silty CLAY with rounded fine Gravel; moderate plasticity; slightly mottled; stiff and moist (CL).
				7			
				8			Refusal at 8.0 ft bgs
				9			
				10			
				11			
				12			
				13			
				14			
				15			
				16			
				17			
				18			
				19			
				20			

Logged by: Rob Peterson Date: 4/2/14

Drilling Contractor: Zebra Environmental Driller: Phillip Orsi

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Appendix D

Site 3 - Logs

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Appendix D-1

Soil Boring Logs

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FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:	1135106.63, 1056458.82
Surface Elevation:	588.20
Casing Below Surface:	588.07
Reference Elevation:	NAVD 88
Reference Description:	NAD 83 Datum

Job. No. 6265401	Client: AFCEC / NFARS Project: PDI	Location: NFARS, Niagara Falls, NY	
Drilling Method: 4.25 in. Augers		Soil Boring Number: MW3-3A	
Sampling Method: 4-ft Poly MacroCore Sleeves		Sheet 1 of 1	
		Drilling	
Water Lev.		Start: 6/17/2014	Finish: 6/17/2014
Time			

Surface Conditions: Grass, Topsoil
Weather: Sunny, 5-8 mph SW
Temperature: 77 F

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet	USCS Log	
2, 5, 6, 12	2.0/2.0		0.0, 0.1	0, 1	OH	0.0' - 0.2': Brown, Silty CLAY; small percentage of fine sand and fine gravel; rounded and subangular sand and gravel particles; numerous vertical root holes; firm and moist (OH). 0.2' - 1.9': Brown, CLAY; trace fine sand; small percentage of organic material; high plasticity and slightly motteled; firm and moist (OH).
7	1.6/1.6		0.8	2	SM	1.9' - 2.0': Brown, silty fine SAND; rounded and subangular sand grains; firm and moist (SM).
9, 34, 50/1			1.0	3	CL	2.0' - 3.0': Brown, silty CLAY; trace fine sand and fine gravel; rounded to subangular gravel particles; moist and stiff (CL). 3.0' - 3.6': Reddish brown, silty CLAY with medium to coarse gravel; angular gravel particles 1.0in. maximum diameter; low plasticity; stiff and moist (CL).
				4		Refusal at 3.6' bgs. Drilled augers to 4.0' bgs.
				5		
				6		
				7		
				8		
				9		
				10		
				11		
				12		
				13		
				14		
				15		
				16		
				17		
				18		
				19		
				20		

Monitoring Well Construction Information

Monitoring Well Diameter:	2.0 in.		
Bottom of Monitoring Well:	4.0 ft bgs		
Stick Up or Flush Mount:	Flush Mount		
Screen Interval:	3.0	to	4.0
Riser Interval:	0.0	to	3.0
Sand Pack Interval:	2.0	to	4.0
Bentonite Seal:	0.0	to	2.0

Logged by: Robert Peterson Date: 6/18/14

Drilling Contractor: SJB Drilling Driller: Dan Delude

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates: 1135250.21, 1056466.92
Surface Elevation: 588.30
Casing Below Surface: 588.11
Reference Elevation: NAVD 88
Reference Description: NAD 83 Datum

Job. No.	Client:	AFCEC / NFARS	Location:
6265401	Project:	PDI	NFARS, Niagara Falls, NY

Drilling Method: 4.25 in. Augers
Soil Boring Number: PZ3-06
Sampling Method: 4-ft Poly MacroCore Sleeves
Sheet 1 of 1

Water Lev.					Drilling Start	Drilling Finish
Time					6/17/2014	6/17/2014

Surface Conditions: Grass, Topsoil
Weather: Sunny, 5-8 mph SW
Temperature: 77 F

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet	USCS Log	
2, 5, 6, 12	2.0/2.0		0.0, 0.1	0, 1	OH	0.0' - 0.2': Brown, Silty CLAY; small percentage of fine sand and fine gravel; rounded and subangular sand and gravel particles; numerous vertical root holes; firm and moist (OH). 0.2' - 1.9': Brown, CLAY; trace fine sand; small percentage of organic material; high plasticity and slightly motteled; firm and moist (OH).
7	1.6/1.6		0.8	2	SM	1.9' - 2.0': Brown, silty fine SAND; rounded and subangular sand grains; firm and moist (SM).
9, 34, 50/1			1.0	3	CL	2.0' - 3.0': Brown, silty CLAY; trace fine sand and fine gravel; rounded to subangular gravel particles; moist and stiff (CL). 3.0' - 3.6': Reddish brown, silty CLAY with medium to coarse gravel; angular gravel particles 1.0in. maximum diameter; low plasticity; stiff and moist (CL).
				4		Refusal at 3.6' bgs. Drilled augers to 4.0' bgs.
				5		
				6		
				7		
				8		
				9		
				10		
				11		
				12		
				13		
				14		
				15		
				16		
				17		
				18		
				19		
				20		

Monitoring Well Construction Information

Monitoring Well Diameter:	2.0 in.		
Bottom of Monitoring Well:	4.0 ft bgs		
Stick Up or Flush Mount:	Flush Mount		
Screen Interval:	3.0	to	4.0
Riser Interval:	0.0	to	3.0
Sand Pack Interval:	2.0	to	4.0
Bentonite Seal:	0.0	to	2.0

Logged by: Robert Peterson Date: 6/18/14

Drilling Contractor: SJB Drilling Driller: Dan Delude

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates: 1135116.91, 1056303.29
Surface Elevation: 588.70
Casing Below Surface: 588.25
Reference Elevation: NAVD 88
Reference Description: NAD 83 Datum

Job. No.	Client:	AFCEC / NFARS	Location:
6265401	Project:	PDI	NFARS, Niagara Falls, NY

Drilling Method: 4.25 in. Augers
Soil Boring Number: PZ3-09
Sampling Method: 4-ft Poly MacroCore Sleeves
Sheet 1 of 1

Water Lev.					Drilling Start	Drilling Finish
Time					6/16/2014	6/17/2014

Surface Conditions: Grass, Topsoil
Weather: Sunny, 5-8 mph SW
Temperature: 77 F

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet	USCS Log	
1 / 3 / 5 / 5	2.0/2.0		0.0 / 0.1	0 / 1	OH	0.0' - 0.3': Brown, Silty CLAY; small percentage of fine sand and fine gravel; rounded and subangular sand and gravel particles; numerous vertical root holes; firm and moist (OH). 0.3' - 2.1': Brown, CLAY; trace fine sand; small percentage of organic material; high plasticity and slightly motteled; firm and moist (OH).
5 / 13 / 24 / 33	1.6/1.6		0.8 / 1.0	2 / 3	CL	2.1' - 3.0': Brown, silty CLAY; trace fine sand and fine gravel; rounded to subangular gravel particles; moist and stiff (CL). 3.0' - 4.8': Reddish brown, silty CLAY with medium to coarse gravel; angular gravel particles 1.0in. maximum diameter; low plasticity; stiff and moist (CL).
17 / 15				4		Refusal at 4.8' bgs.
				5 / 6 / 7		
				8 / 9 / 10 / 11		
				12 / 13 / 14 / 15		
				16 / 17 / 18 / 19 / 20		

Monitoring Well Construction Information

Monitoring Well Diameter:	2.0 in.		
Bottom of Monitoring Well:	4.8 ft bgs		
Stick Up or Flush Mount:	Flush Mount		
Screen Interval:	2.8	to	4.8
Riser Interval:	0.0	to	2.8
Sand Pack Interval:	1.8	to	4.8
Bentonite Seal:	0.0	to	1.8

Logged by: Robert Peterson Date: 6/17/14
Drilling Contractor: SJB Drilling Driller: Dan Delude

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:	1135119.92, 1056302.15
Surface Elevation:	588.50
Casing Below Surface:	591.05
Reference Elevation:	NAVD 88
Reference Description:	NAD 83 Datum

Job. No.	Client:	AFCEC / NFARS	Location:
6265401	Project:	PDI	NFARS, Niagara Falls, NY
Drilling Method: Drive & Wash, Rotary			Soil Boring Number: PZ3-9D
Sampling Method: NQ Wireline			Sheet 1 of 2
			Drilling
Water Lev.			Start: 6/16/2014
Time			Finish: 6/18/2014
Date			

Surface Conditions: Grassy, Topsoil
Weather: Sunny, 5-8 mph SW
Temperature: 77F

Penetration Rate (Feet Drvn/Ft. Recvrd)	Boring Diagram	Run	Depth in Feet	RQD	
			0		0.0' - 5.0': Silty CLAY; see log of PZ3-9 for description.
			1		
			2		
			3		
			4		
			5		Bedrock at 5.0' bgs (Lockport Dolostone).
					Roller-bit rock socket set at 7.0' bgs. 4 in. diameter steel casing grouted in on 6/16/14
			6		
					Run 1: 0 gallons of drilling water lost.
20 min. / 5 ft.	5.2 ft. / 5.2 ft.	R1	7	65% FAIR	7.0' - 12.2': Lockport Dolostone: grey, with horizontal bedding planes. Many small vugs throughout,
					with some containing secondary calcite, dolomite, and sphalerite.
			8		Heavily fractured zones from 7.0' - 7.8' and 8.3' - 9.1'.
					Horizontal fractures at 9.7', 10.0', 10.9', 11.1', and 11.9'.
			9		
			10		
			11		
					Run 2: 0 gallons of drilling water lost.
20 min. / 5 ft.	5.2 ft. / 5.2 ft.	R2	12	47% POOR	12.2' - 17.4': Lockport Dolostone: grey, with horizontal bedding planes. Many small vugs, with some
					containing secondary calcite, dolomite, and sphalerite. Vugs decrease near bottom of Run 2.
			13		Horizontal fractures at 12.4', 12.8', 15.9', 16.0', 16.4', 16.8, and 16.9'.
					Vertical fracture at 13.0'.
			14		
			15		
			16		
			17		
20 min. / 5 ft	5.0 ft. / 5.0 ft.	R3		98% EXCELLENT	Run 3: 40 gallons of drilling water lost.
			18		17.4' - 22.4': Lockport Dolostone: grey, with horizontal bedding planes. Coral from 21.5' to 22.4'.
					Horizontal fractures at 18.0', 18.6', 18.9', 19.9', 21.5', and 21.9'.
			19		
			20		

Logged by: Robert Peterson Date: 6/18/14

Drilling Contractor: SJB Drilling Driller: Brian and Dan Delude

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:	1135119.92, 1056302.15
Surface Elevation:	588.50
Casing Below Surface:	591.05
Reference Elevation:	NAVD 88
Reference Description:	NAD 83 Datum

Job. No. 6265401	Client: AFCEC / NFARS Project: PDI				Location: NFARS, Niagara Falls, NY
Drilling Method: Drive & Wash, Rotary					Soil Boring Number: PZ3-9D
Sampling Method: NQ Wireline					Sheet 2 of 2
					Drilling
Water Lev.	9 ft bgs				Start: 6/16/2014 — Finish: 6/18/2014
Time					
Date	22-Apr-12				

Penetration Rate (Feet Drvn/Ft. Recvrd)	Boring Diagram	Run	Depth in Feet	RQD	
					Surface Conditions: Grassy, Topsoil
					Weather: Sunny, 5-8 mph SW
					Temperature: 77F
20 min. / 5 ft 5.0 ft. / 5.0 ft.		R3	21 22		End of boring at 22.4' bgs.
			23		Completed stick up on 6/18/14.
			24		
			25		
			26		
			27		
			28		
			29		
			30		
			31		
			32		
			33		

Logged by: Robert Peterson Date: 4/22/14

Drilling Contractor: SJB Drilling Driller: Brian and Dan Delude

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Appendix D-2

Groundwater Purge Forms

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EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: PZ3-1D	**EA Personnel:** R. Peterson	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Sunny / 67F / 3-6 mph NNE
Sounding Method: Solinst WLM	**Gauge Date:** 6/10/2014 **Gauge Time:** 7:10:00	**Measurement Ref:** TOC
Stick Up/Down (ft): Down, -0.5 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 2.5"

Purge Date: 10-Jun-14	**Purge Time:** 725
Purge Method: Low Flow	**Field Technician:** AK/RP

Well Volume

A. Well Depth (ft): 12.22	**D. Well Volume (ft):** 0.255	**Depth/Height of Top of PVC:** Down, -0.5 ft
B. Depth to Water (ft): 2.86	**E. Well Volume (gal) (C*D):** 2.39	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 9.36	**F. Three Well Volumes (gal) (E3):** 7.16	**Pump Intake Depth:** 12.0 ft btoc

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
730	7.85	0.897	470	0.13	12.43	-142	3.52	0.30	0
733	7.81	0.90	413	0.00	12.59	-156	3.69	0.30	0.9
740	7.78	0.91	358	0.00	12.74	-166	3.80	0.30	1.8
743	7.74	0.936	297	0.00	12.34	-184	3.94	0.30	2.7
746	7.74	0.952	276	0.00	12.31	-200	4.20	0.30	3.6
749	7.73	0.967	248	0.00	12.15	-216	4.35	0.30	4.5
752	7.72	0.981	237	0.00	12.18	-232	4.40	0.30	5.4
755	7.68	1.11	200	0.00	12.11	-248	4.5	0.30	6.3
758	7.59	1.29	161	0.00	11.97	-273	4.6	0.30	7.2
801	7.54	1.59	133	0.00	11.95	-292	4.6	0.30	8.1
804	7.49	1.83	109	0.00	11.84	-302	4.65	0.30	9
807	7.45	2.05	84.3	0.00	11.78	-302	4.65	0.30	9.9
810	7.42	2.16	70.5	0.00	11.80	-304	4.63	0.30	10.8
813	7.38	2.24	63.7	0.00	11.80	-315	4.6	0.30	11.7
816	7.36	2.28	54.3	0.00	11.75	-326	4.58	0.30	12.6
819	7.34	2.31	49.8	0.00	11.75	-340	4.58	0.30	13.5
822	7.32	2.33	46.5	0.00	11.78	-344	4.55	0.30	14.4
825	7.32	2.35	43.7	0.00	11.83	-346	4.55	0.30	15.3

Total Quantity of Water Removed (gal):	4.04	**Sampling Time:**	830
Samplers:	R. Peterson	**Split Sample With:**	DUP
Sampling Date:	6/10/2014	**Sample Type:**	Grab

COMMENTS AND OBSERVATIONS: PZ3-FD-140610 Collected. Pump battery died @ 0736. Had to connect to car

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: MW3-4DA	**EA Personnel:** R. Peterson	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Sunny / 67 F / 3-6 mph NNE
Sounding Method: Solinst WLM	**Gauge Date:** 6/10/2014 **Gauge Time:** 7:00:00	**Measurement Ref:** TOC
Stick Up/Down (ft): up, + 2.2 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 2"

Purge Date: 10-Jun-14	**Purge Time:** 724
Purge Method: Low Flow	**Field Technician:** R. Peterson

Well Volume

A. Well Depth (ft): 15.59	**D. Well Volume (ft):** 0.163	**Depth/Height of Top of PVC:** up, + 2.2 ft
B. Depth to Water (ft): 1.06	**E. Well Volume (gal) (C*D):** 2.37	**Pump Type:** Grundfos
C. Liquid Depth (ft) (A-B): 14.53	**F. Three Well Volumes (gal) (E3):** 7.11	**Pump Intake Depth:** 14.5' btoc

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
724	7.36	1.64	12.82	4.13	12.98	77	2.97	0.30	0
727	7.34	1.65	13.2	0.69	13.20	48	3.01	0.30	0.9
730	7.33	1.65	17	0.00	13.23	28	3.02	0.30	1.8
733	7.31	1.65	9.2	0.00	13.22	-38	3.02	0.30	2.7
736	7.29	1.65	3.7	0.00	13.10	-79	3.02	0.30	3.6
739	7.27	1.65	2.9	0.00	13.06	-84	3.02	0.30	4.5
742	7.25	1.65	2.1	0.00	13.04	-86	3.02	0.30	5.4
745	7.25	1.65	1.7	0.00	13.01	-86	3.02	0.30	6.3
748	7.24	1.65	1.7	0.00	12.96	-86	3.02	0.30	7.2
751	7.23	1.65	1.6	0.00	13.00	-86	3.02	0.30	8.1

Total Quantity of Water Removed (gal):	2.14	**Sampling Time:**	800
Samplers:	R. Peterson	**Split Sample With:**	MS/MSD
Sampling Date:	6/10/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS:

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: MW3-9D (CH3-01)	**EA Personnel:** H.Williams & C. Yarrington	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** New	**Weather:** Partly Sunny / 72F
Sounding Method: Solinst WLM	**Gauge Date:** 6/26/2014	**Measurement Ref:**
	Gauge Time: 10:15:00	TOC
Stick Up/Down (ft): Up, ~2.5	**PID Headspace Reading:** NA	**Well Diameter (in):** 4"

Purge Date: 26-Jun-14	**Purge Time:** 10:18
Purge Method: Low Flow	**Field Technician:** HW & CY

Well Volume

A. Well Depth (ft): 24.3	**D. Well Volume (ft):** 0.653	**Depth/Height of Top of PVC:** Up, ~2.5
B. Depth to Water (ft): 1.05	**E. Well Volume (gal) (C*D):** 15.18	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 23.25	**F. Three Well Volumes (gal) (E3):** 45.55	**Pump Intake Depth:** NA

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (°C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
1020	9.17	1.36	535	1.72	19.9	-50	1.10	0.30	0
1028	11.77	1.06	269	0.38	18.81	-88	1.08	0.30	0.9
1031	11.73	1.05	245	0.00	19.14	-102	1.09	0.30	1.8
1034	11.82	1.04	266	0.00	18.68	-121	1.09	0.30	2.7
1037	11.75	1.02	229	0.00	18.89	-126	1.09	0.30	3.6
1040	11.71	0.983	206	0.00	19.49	-134	1.09	0.30	4.5
1043	11.69	0.98	173	0.00	19.46	-135	1.09	0.30	5.4
1046	11.63	0.969	143	0.00	19.51	-137	1.09	0.30	6.3
1049	11.58	0.95	105	0.00	19.3	-139	1.09	0.30	7.2
1052	11.54	0.938	102	0.00	19.43	-139	1.09	0.30	8.1
1055	11.47	0.923	99.8	0.00	19.1	-141	1.09	0.30	9
1058	11.39	0.894	64.9	0.00	19.48	-141	1.09	0.30	9.9
1101	11.3	0.881	74.4	0.00	19.36	-139	1.09	0.30	10.8
1104	11.22	0.864	60.3	0.00	19.63	-138	1.09	0.30	11.7
1107	11.02	0.85	57.8	0.00	19.65	-134	1.09	0.30	12.6
1110	10.92	0.832	56.4	0.00	19.4	-132	1.09	0.30	13.5
1113	10.96	0.819	99.4	0.00	19.3	-131	1.09	0.30	14.4
1118	10.98	0.82	76.1	0.00	19.7	-44	1.09	0.30	15.9
1121	10.89	0.82	47.30	0.00	19.75	-56	1.09	0.30	16.8
1124	10.87	0.82	47.40	0.00	19.82	-78	1.09	0.30	17.7
1127	10.88	0.81	43.10	0.00	19.87	-95	1.09	0.30	18.6
1130	10.88	0.81	40.20	0.00	20.42	-100	1.09	0.30	19.5

Total Quantity of Water Removed (gal):	15.9	**Sampling Time:**	1130
Samplers:	HW/CY	**Split Sample With:**	DUP
Sampling Date:	6/26/2014	**Sample Type:**	GW Grab

COMMENTS AND OBSERVATIONS: CH3-FD-140626

called MW3-9D in QAPP, mislabeled CH3-01 in field

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.:	EA Personnel:	Client:
PZ3-9	H.Williams & C. Yarrington	NFARS
Location:	**Well Condition:**	**Weather:**
Niagara Falls, NY	New	Overcast/ 70 F
Sounding Method:	**Gauge Date:** 6/26/2014	**Measurement Ref:**
Solinst WLM	**Gauge Time:** 9:37:00	TOC
Stick Up/Down (ft):	**PID Headspace Reading:**	**Well Diameter (in):**
down	NA	2"

Purge Date:	Purge Time:
26-Jun-14	940
Purge Method:	**Field Technician:**
Low Flow	H.Williams & C. Yarrington

Well Volume

A. Well Depth (ft):	D. Well Volume (ft):	Depth/Height of Top of PVC:
4.11	0.163	down
B. Depth to Water (ft):	**E. Well Volume (gal) (C*D):**	**Pump Type:**
2.33	0.29	peristaltic
C. Liquid Depth (ft) (A-B):	**F. Three Well Volumes (gal) (E3):**	**Pump Intake Depth:**
1.78	0.87	4.1'

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
943	7.01	2.33	233	0	16.71	-52	2.75	0.20	0
946	6.95	2.14	46.5	0.00	17.18	-2	2.84	0.20	0.6
949	6.9	2.13	14.3	0.00	17.42	-8	2.99	0.20	1.2
952	6.89	2.14	8.2	0.00	17.33	-7	3.07	0.20	1.8
955	6.88	2.15	5.6	0.00	17.34	-7	3.22	0.20	2.4
958	6.88	2.19	5.0	0.00	17.17	-6	3.37	0.20	3
1001	6.87	2.21	4.7	0.00	17.23	-6	3.42	0.20	3.6

Total Quantity of Water Removed (gal):	0.95	Sampling Time:	1005
Samplers:	HW/CY	Split Sample With:	MS/MSD
Sampling Date:	6/26/2014	Sample Type:	GW grab

COMMENTS AND OBSERVATIONS: PZ3-9-2014-06-26

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.:	EA Personnel:	Client:
PZ3-6	H.Williams & C. Yarrington	NFARS
Location:	**Well Condition:**	**Weather:**
Niagara Falls, NY	New	Overcast/ 70 F
Sounding Method:	**Gauge Date: 6/26/2014**	**Measurement Ref:**
Solinst WLM	**Gauge Time: 8:55:00**	TOC
Stick Up/Down (ft):	**PID Headspace Reading:**	**Well Diameter (in):**
down 0.3"	NA	2"

Purge Date:	Purge Time:
26-Jun-14	923
Purge Method:	**Field Technician:**
Low Flow	H.Williams & C. Yarrington

Well Volume

A. Well Depth (ft):	D. Well Volume (ft):	Depth/Height of Top of PVC:
3.26	0.163	down 0.3"
B. Depth to Water (ft):	**E. Well Volume (gal) (C*D):**	**Pump Type:**
2.86	0.07	peristaltic
C. Liquid Depth (ft) (A-B):	**F. Three Well Volumes (gal) (E3):**	**Pump Intake Depth:**
0.4	0.20	3.2'

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
926	7.14	2.2	52	9.13	17.54	-13	3.16	0.30	0
928	7.11	2.20	44.6	2.55	17.70	-12	3.26	0.20	0.9
929									1.5

Total Quantity of Water Removed (gal):	0.4	Sampling Time:	1005
Samplers:	HW/CY	**Split Sample With:**	NA
Sampling Date:	6/27/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS:

Allowed well to recharge overnight. Grab sample collected at 10:05 27 june 2014. DTW at time of sample: 3.18' btoc

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: MW3-3A (PZ3-8)	**EA Personnel:** H.Williams & C. Yarrington	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** New	**Weather:** Overcast/ 70 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/26/2014 **Gauge Time:** 8:50:00	**Measurement Ref:** TOC
Stick Up/Down (ft): down 0.2"	**PID Headspace Reading:** NA	**Well Diameter (in):** 2"

Purge Date: 26-Jun-14	**Purge Time:** 905
Purge Method: Low Flow	**Field Technician:** H.Williams & C. Yarrington

Well Volume

A. Well Depth (ft): 5.1	**D. Well Volume (ft):** 0.163	**Depth/Height of Top of PVC:** down 0.2"
B. Depth to Water (ft): 2.12	**E. Well Volume (gal) (C*D):** 0.49	**Pump Type:** peristaltic
C. Liquid Depth (ft) (A-B): 2.98	**F. Three Well Volumes (gal) (E3** 1.46	**Pump Intake Depth:** 5'

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivit (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperatur (°C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
910	0.00	1.57	737	0	16.25	-40	3.92	0.30	0
913	0	1.45	363	0.00	16.36	-25	4.3	0.30	0.9
916	2.73	1.36	216	0.00	16.61	-10	4.77	0.20	1.8
919	5.32	1.41	561	0.00	16.83	-8	4.9	0.20	2.4
921	6.24	1.4	598	0.00	16.78	0	5.1	-	3.0
921	-	-	-	-	-	-	--	-	-
1100	-	-	-	-	-	-	-	-	-

Total Quantity of Water Remov	0.79	**Sampling Time:**	1107
Samplers:	CY/RP/HW	**Split Sample With:**	none
Sampling Date:	6/26/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: PH meter on Honba must be off

Called MW3-3A in QAPP revision, mislabeled as PZ3-8 in field

Appendix E

Site 13 – Groundwater Purge Forms

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EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: PZ13-3D	**EA Personnel:** AK/HW	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Overcast, drizzle / ~66 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/11/2014	**Measurement Ref:** TOC
	Gauge Time: 7:45:00	
Stick Up/Down (ft): Down, ~0.8 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 4"

Purge Date: 11-Jun-14	**Purge Time:** 800
Purge Method: Low flow grundfos	**Field Technician:** H. Williams / A. Kohn

Well Volume

A. Well Depth (ft): 17.91	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down, ~0.8 ft
B. Depth to Water (ft): 7.6	**E. Well Volume (gal) (C*D):** 3.78	**Pump Type:** Grundfos
C. Liquid Depth (ft) (A-B): 10.31	**F. Three Well Volumes (gal) (E3):** 11.35	**Pump Intake Depth:** 16 ft

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
803	7.30	4.11	197	1.01	16.17	-151	8.17	0.30	0
806	7.20	4.33	390	0.00	15.16	-146	8.6	0.30	0.9
819	7.19	4.35	386	0.00	15.63	-112	8.65	0.30	4.8
822	7.13	4.36	366	0.00	15.68	-118	9.1	0.30	5.7
825	7.13	4.35	327	0.00	16.01	-126	9.35	0.30	6.6
828	7.13	4.36	309.0	0.00	16.68	-133	9.4	0.30	7.5
836	7.22	4.36	299.0	0.00	15.78	-111	9.55	0.30	8.4
839	7.14	4.37	270.0	0.00	15.51	-112	9.72	0.30	9.3
842	7.11	4.36	253.0	0.00	16.09	-118	9.8	0.30	10.2
850	7.22	4.34	228.0	0.00	15.59	-104	9.72	0.30	11.1
853	7.13	4.37	206.0	0.00	15.54	-103	9.8	0.30	12
856	7.10	4.37	209.0	0.00	15.96	-109	9.83	0.30	12.9
915	7.14	4.31	199	0.00	16.77	-97	9.4	0.30	13.8
918	7.09	4.35	168	0.00	17.02	-100	9.4	0.30	14.7
921	7.07	4.36	143	0.00	17.66	-103	9.4	0.30	15.6
924	7.06	4.39	145	0.00	17.74	-105	9.6	0.30	16.5
927	7.06	4.39	122	0.00	17.15	-104	9.83	0.30	17.4
930	7.06	4.39	113	0.00	17.66	-107	9.87	0.30	18.3
933	7.05	4.38	102	0.00	18.02	-109	9.89	0.30	19.2
936	7.06	4.4	89	0.00	17.06	-108	10.28	0.30	20.1
939	7.05	4.4	77.7	0.00	17.09	-106	10.41	0.30	21
942	7.05	4.39	73.2	0.00	17.5	-109	10.49	0.30	21.9
945	7.06	4.39	73.2	0.00	17.4	-112	10.72	0.30	22.8
948	7.06	4.39	64.2	0.00	16.56	-107	11.05	0.30	23.7
951	7.04	4.39	54.1	0.00	16.9	-108	11.11	0.30	24.6
954	7.04	4.39	49.8	0.00	17.04	-110	11.25	0.30	25.5
957	7.05	4.38	48.3	0.00	16.95	-109	11.3	0.30	26.4
1000	7.05	4.37	47.6	0.00	17.3	-110	11.3	0.30	27.3

Total Quantity of Water Removed (gal):	7.21	**Sampling Time:**	1005
Samplers:	HW/AK	**Split Sample With:**	DUP
Sampling Date:	6/11/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: Pump faulted, generator stopped @ 0809, @ 0830, @ 0844 @ 0856

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: MW13-5D	**EA Personnel:** H. Williams	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Overcast / ~75F
Sounding Method: Solinst WLM	**Gauge Date:** 6/11/2014	**Measurement Ref:** TOC
	Gauge Time: 11:35:00	
Stick Up/Down (ft): Up ~2 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 2"

Purge Date: 11-Jun-14	**Purge Time:** 1140
Purge Method: High flow 3 well volumes, low flow stabilization/sampling	**Field Technician:** H. Williams / R. Peterson

Well Volume

A. Well Depth (ft): 20.75	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Up ~2 ft
B. Depth to Water (ft): 16.15	**E. Well Volume (gal) (C*D):** 6.35	**Pump Type:** Grundfos
C. Liquid Depth (ft) (A-B): 17.3	**F. Three Well Volumes (gal) (E3):** 19.05	**Pump Intake Depth:** 20 ft

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
1143	7.90	4.06	516	6.60	16.4	131	18.35	0.30	
1146	7.87	4.10	436	5.76	16.44	137	18.82	0.30	
1149	7.74	4.16	155	4.32	16.71	131	19.53	0.30	
1152	7.6	4.21	106	3.06	17.54	125	below pump	0.30	2.7
well went dry @ 1157. let recharge and turned off pump									
1201	see comment below							18.65	
1207								18.53	
1015								1.00	
1232									
1240									
1241	8.3	4.17	37.0	7.94	18.21	98	19.24	0.30	3.6
1244	8.17	4.14	109.0	5.47	17.24	108	below pump	0.30	4.5
well went dry @ 1250. turned off pump will let recharge									
1305							17.8		
1320							16.82		
1330							16.25		

Total Quantity of Water Removed (gal):	1.19	**Sampling Time:**	1340
Samplers:	H. Williams	**Split Sample With:**	MS/MSD
Sampling Date:	6/11/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: Turned off PW13-1 @ 1205 per phone call w F. Desantis. Hopefully will help well recharge

1340 - TOC, metals sulfide gravved, then well went dry; let recharge

1415 recharged to DTW of 7.15; began sampling again - finished sulfide, got nitrate/nitrite/COD started BOD (2/3)

1515 recharged to DTW of 6.20, began sampling again; 1555 recharged to 16.77 - installed PDB for semi-annual event

Appendix F

Site 7 - Logs

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Appendix F-1

HPT Logs

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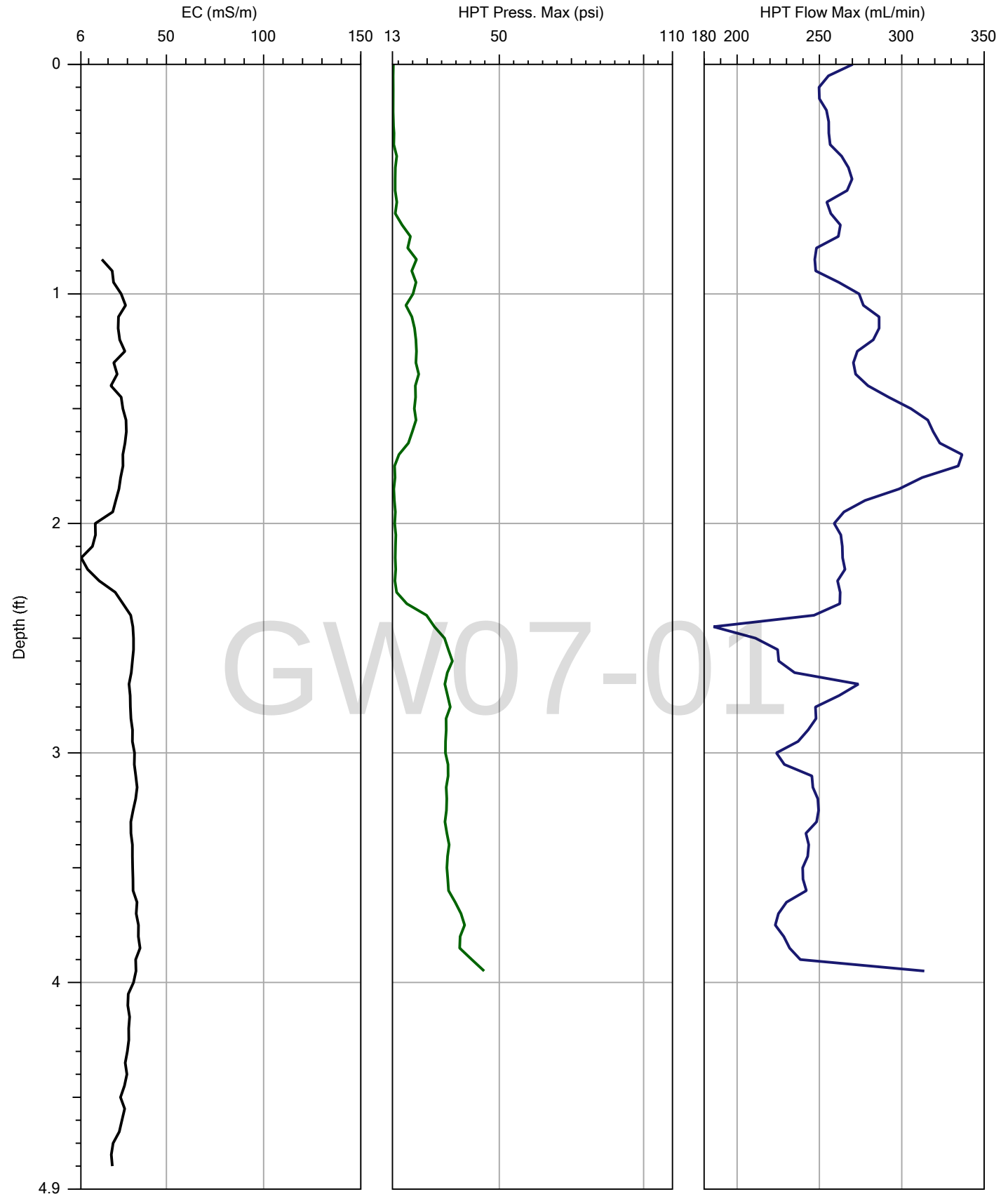

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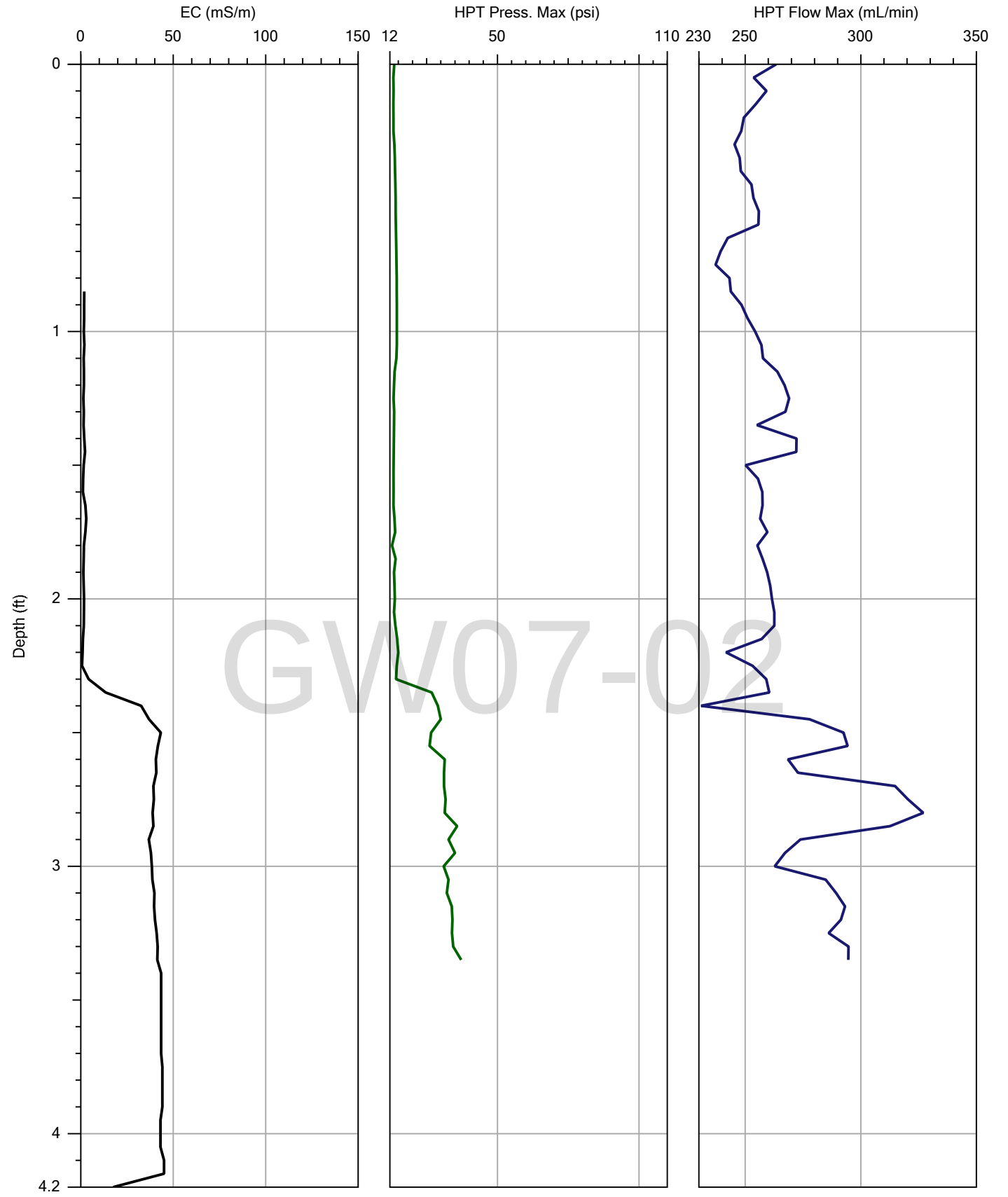
Company: ZEBRA	Operator: Will M		Date: 4/29/2014
Project ID: Site-07	Client: EA Engineering		Location:

		File: GW7-01.HPT
Company: ZEBRA	Operator: Will M	Date: 4/29/2014
Project ID: Site-07	Client: EA Engineering	Location:



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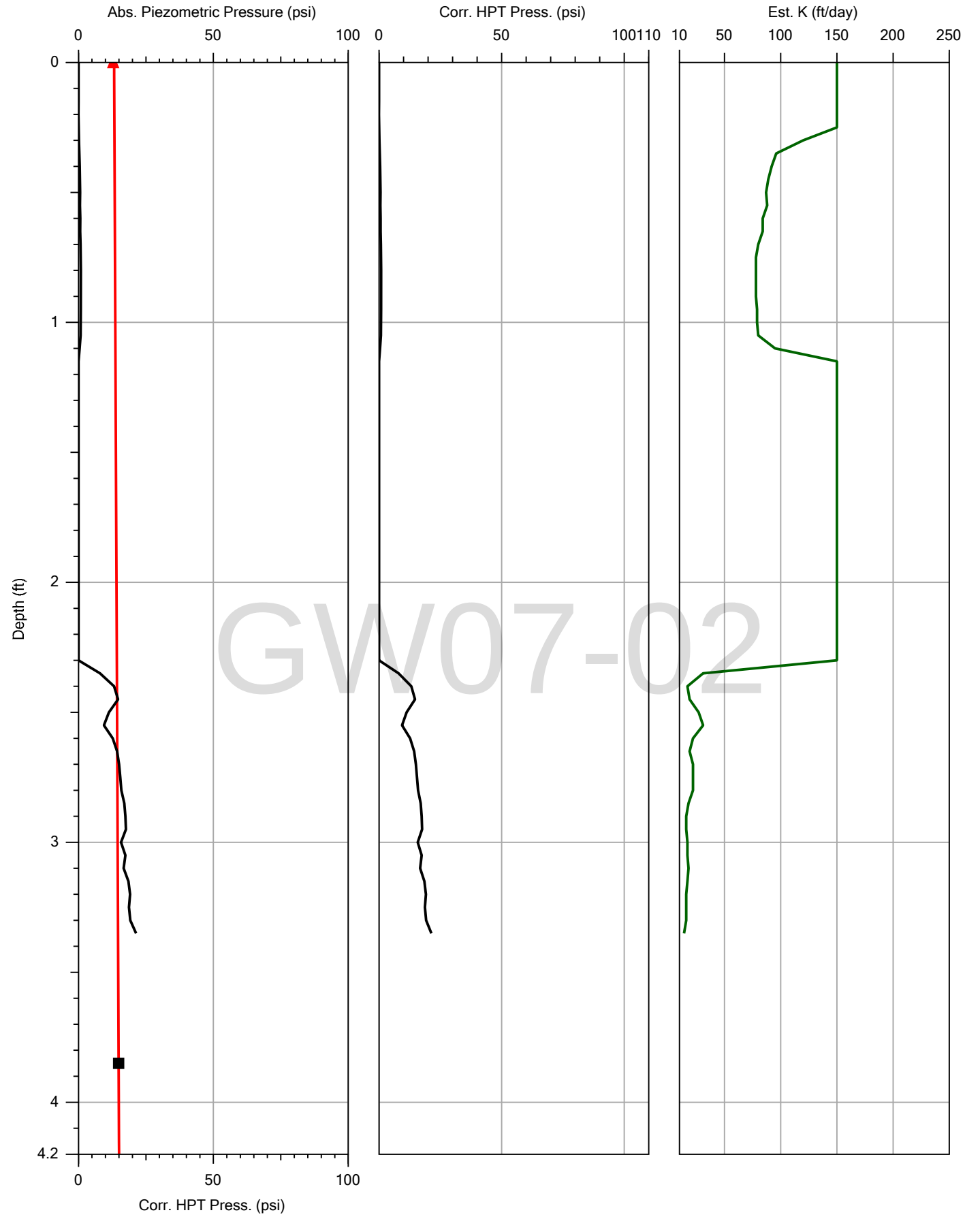

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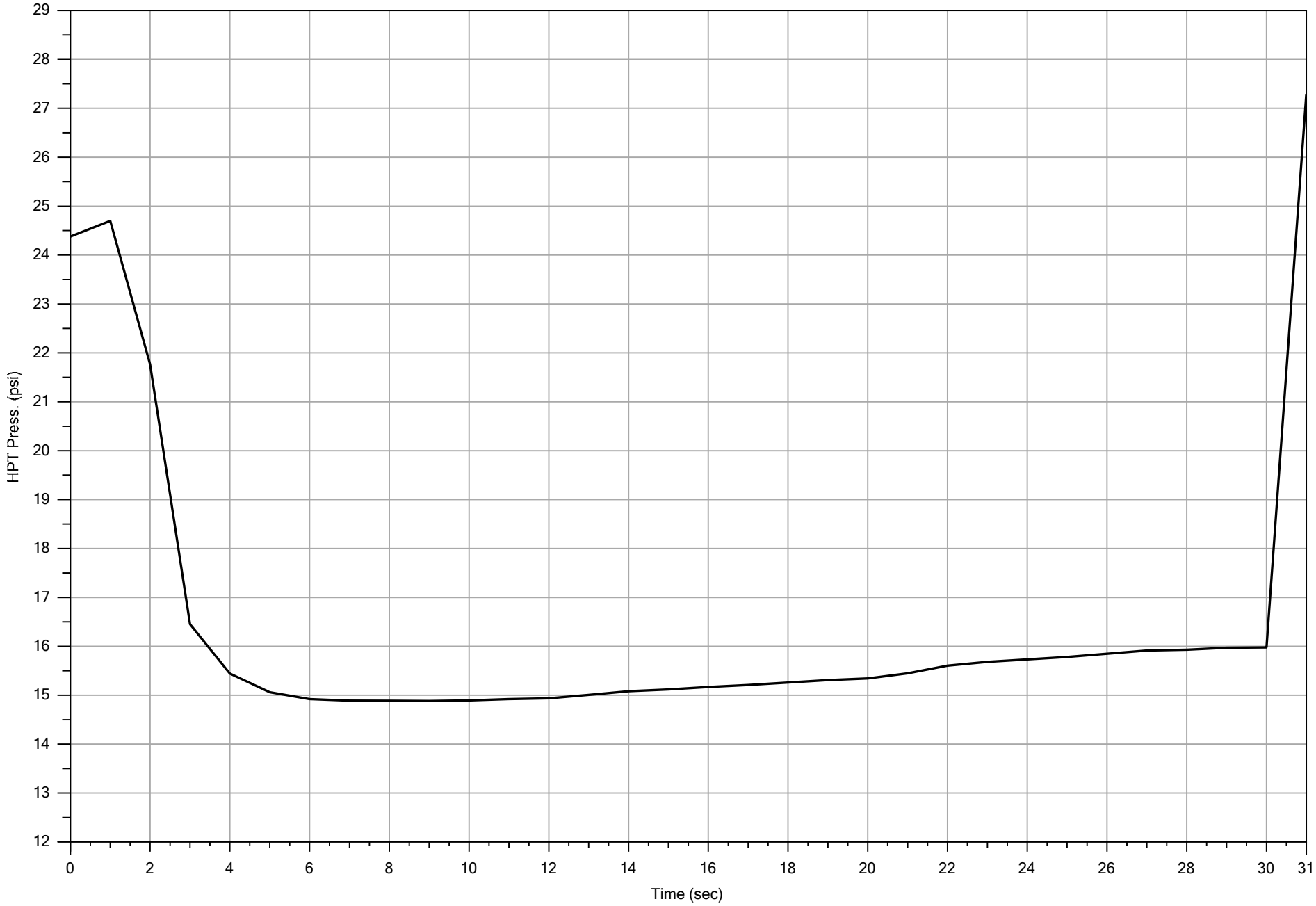
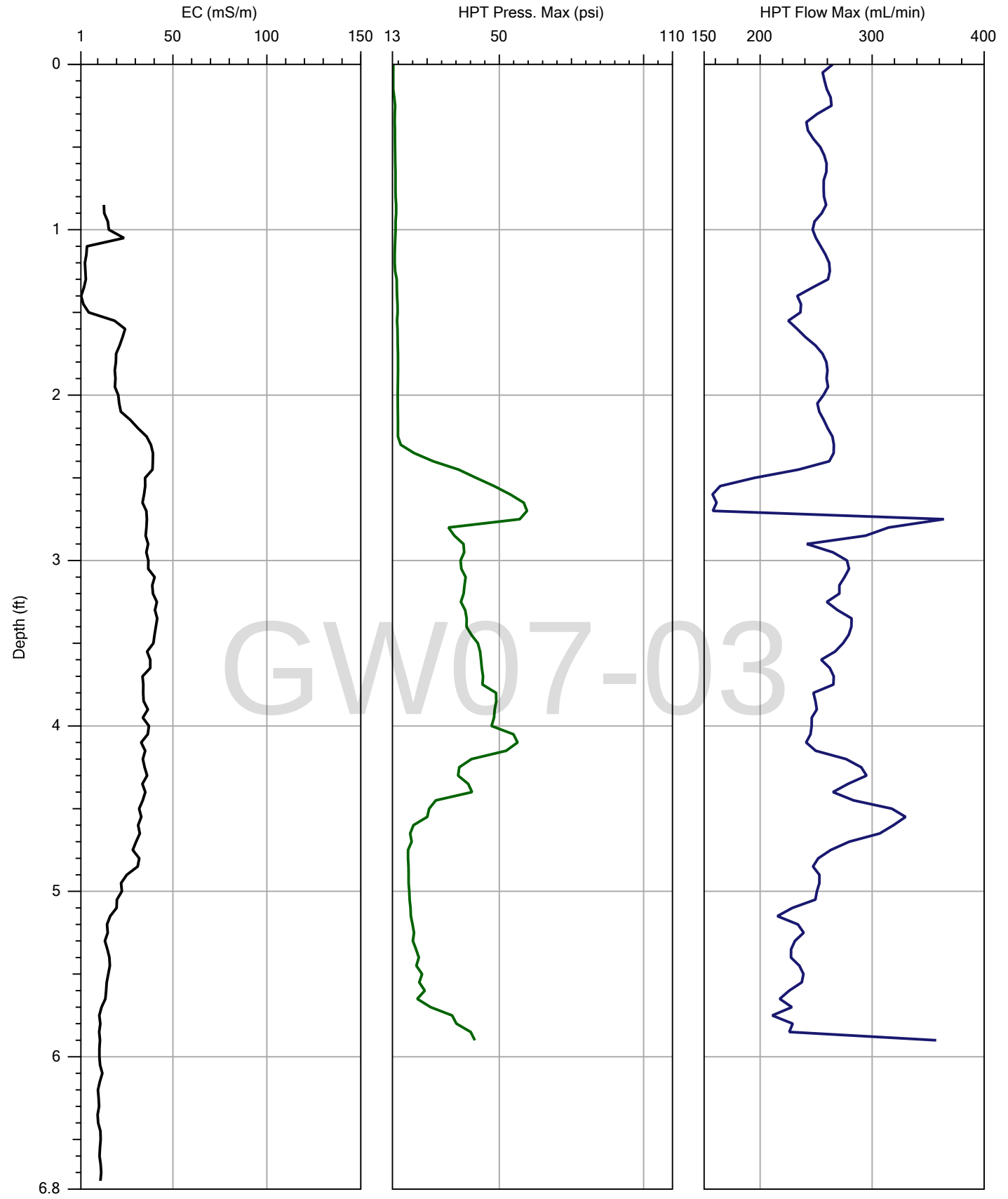
Project ID: Site-07	Client: EA Engineering	Location:



HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA	Operator: Will M	File: GW7-02.TIM	Date: 4/29/2014
Project ID: Site-07	Client: EA Engineering	Location:	Sensor: HPT Press.
		Depth: 3.85 ft	Test: 1



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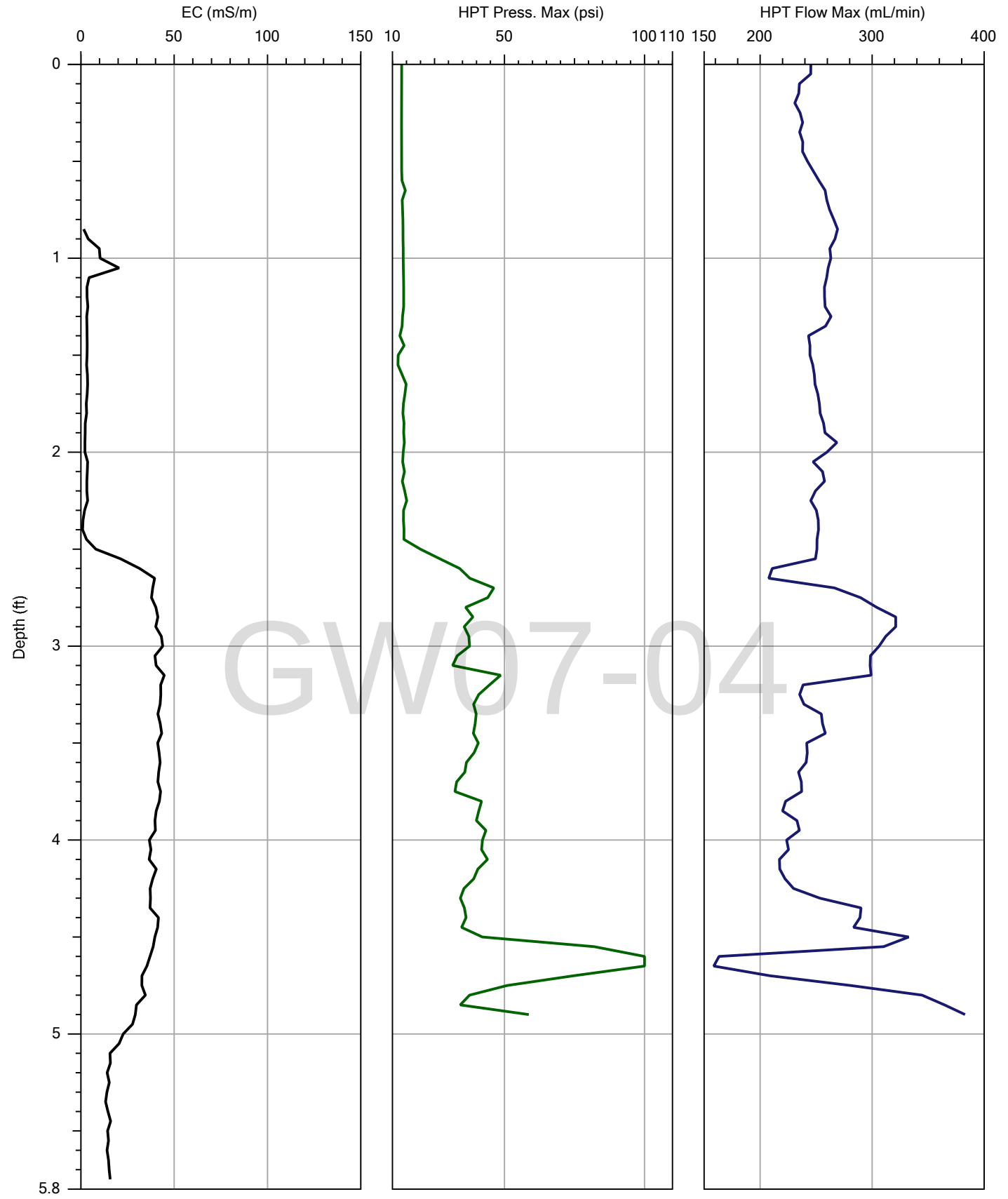
Project ID: Site-07	Client: EA Engineering		Location:



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Project ID: Site-07	Client: EA Engineering		Location:

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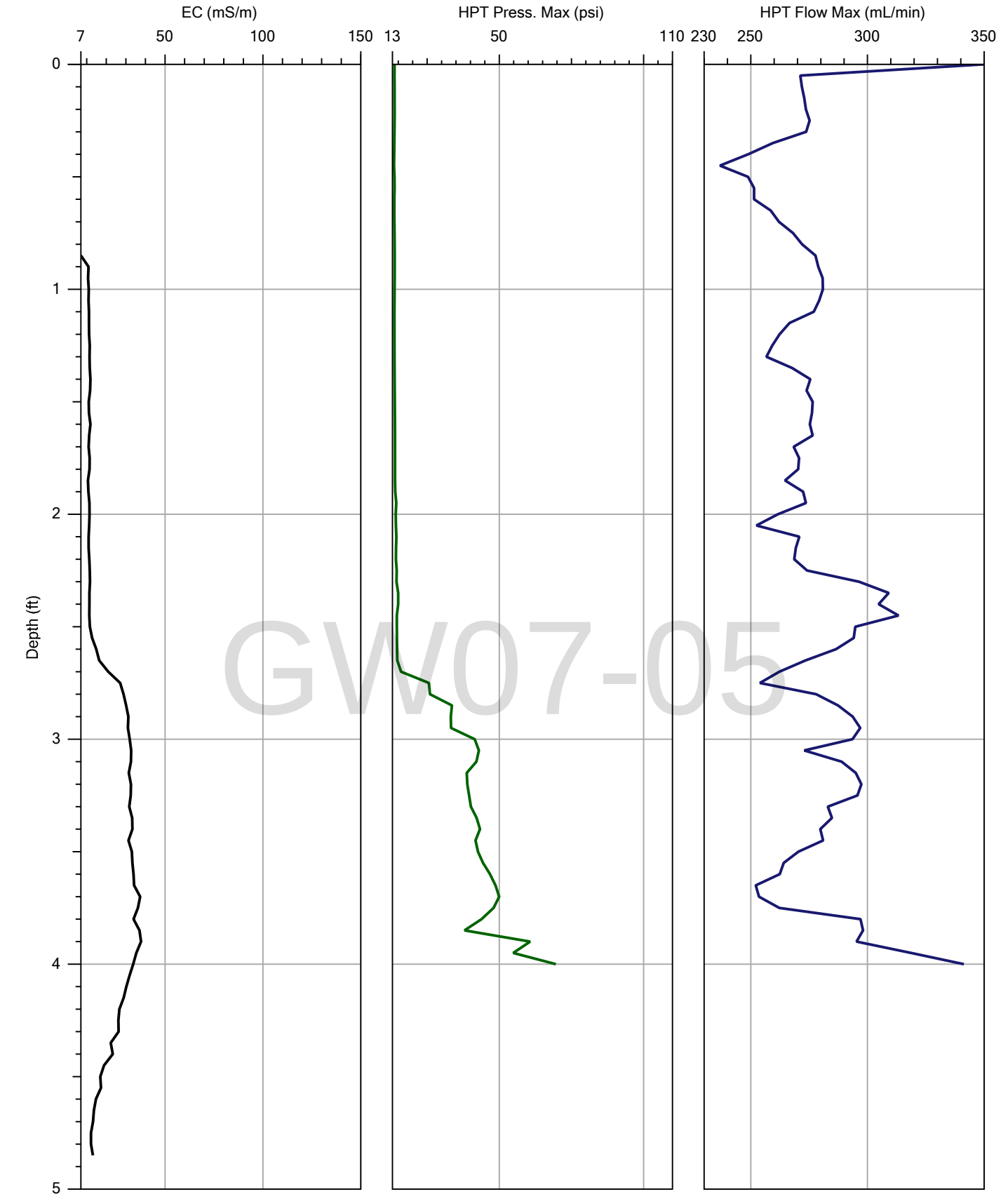
Company: ZEBRA	Operator: Will M	Date: 4/29/2014
Project ID: Site-07	Client: EA Engineering	Location:



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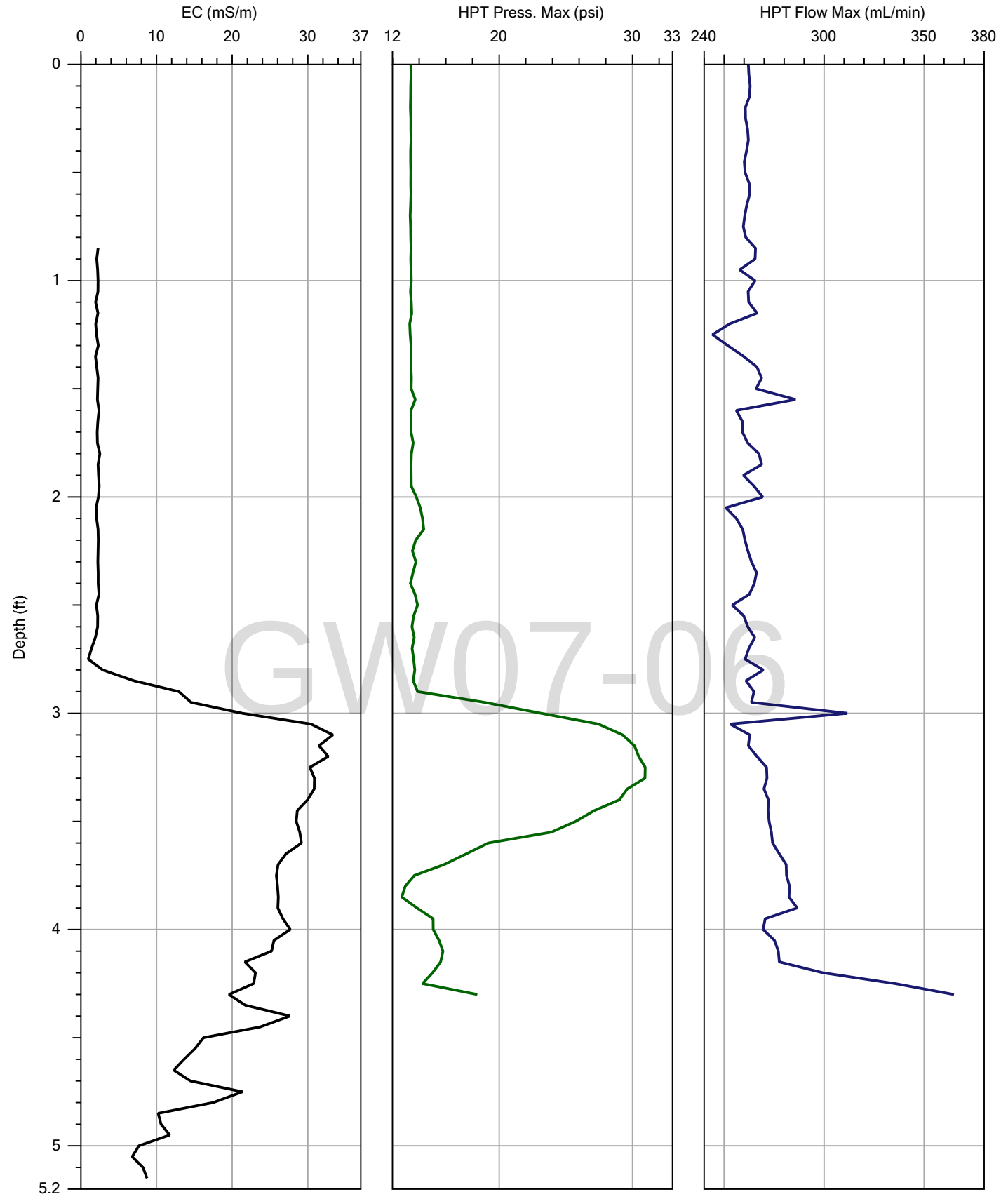

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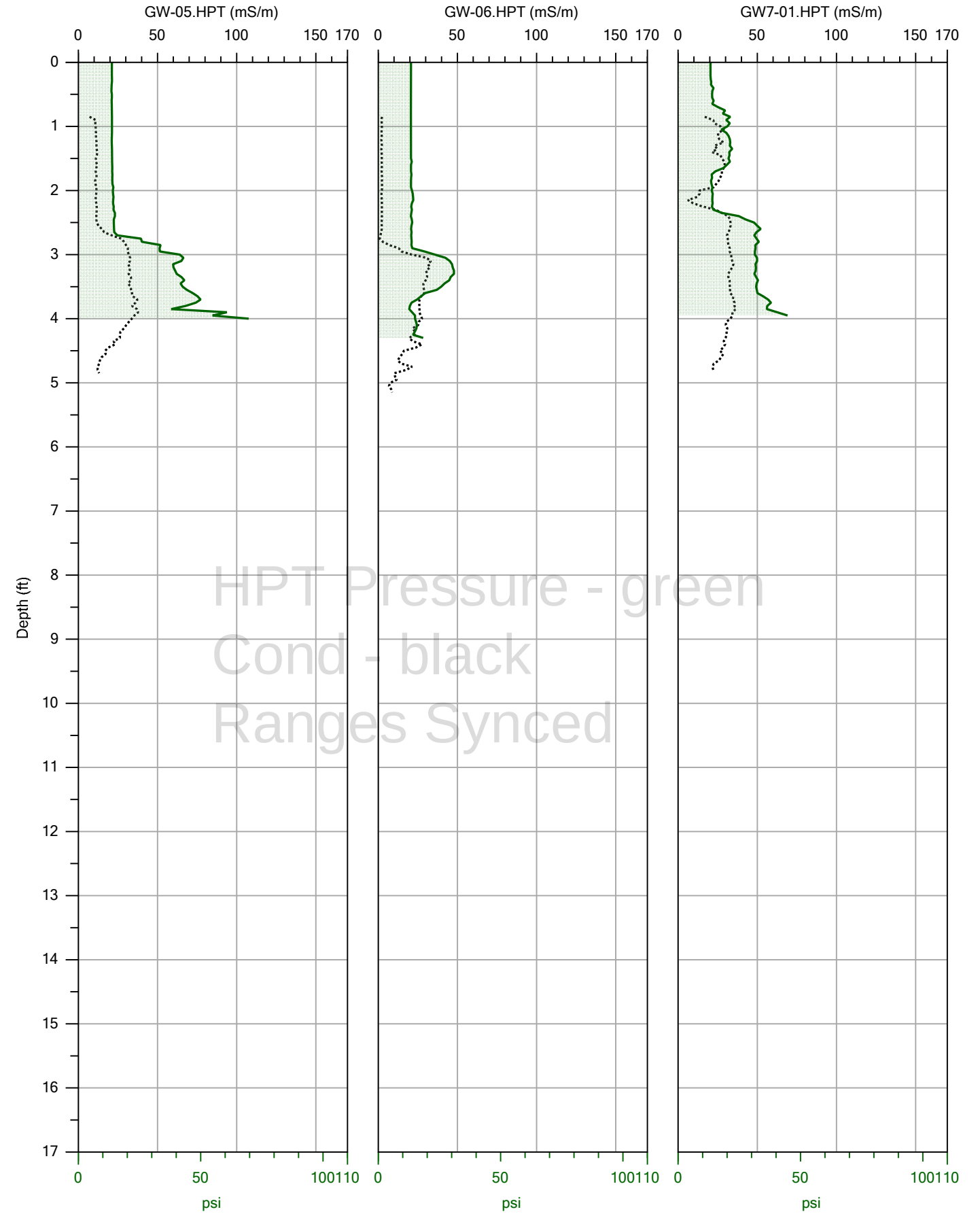
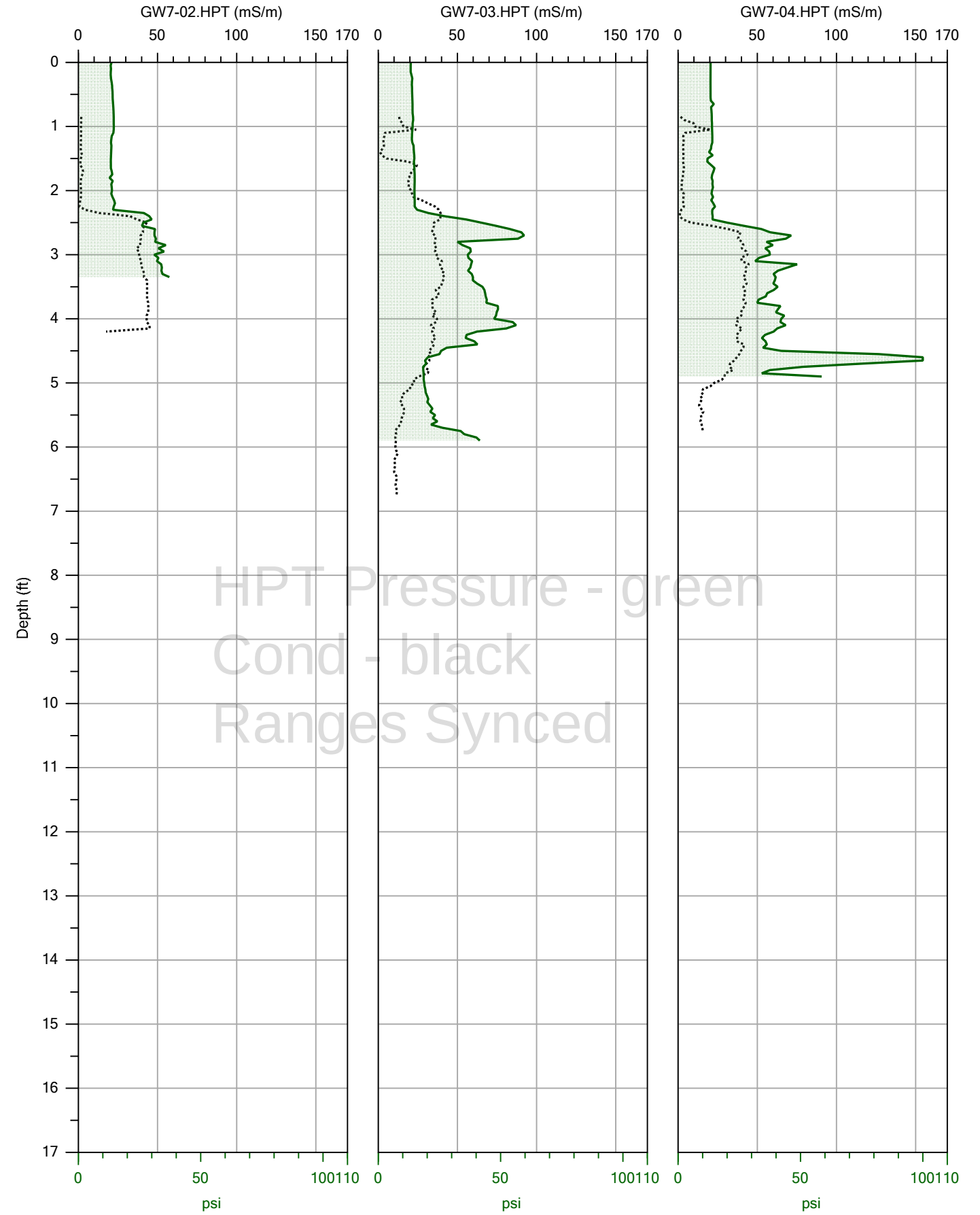
Project ID: Site-07		Client: EA Engineering	Location:



EC / HPT Press. Max

Company: ZEBRA	Operator: Will M
Project ID:	Client: EA Engineering

GW-05.HPT	4/29/2014
GW-06.HPT	4/29/2014
GW7-01.HPT	4/29/2014



EC / HPT Press. Max

Company: ZEBRA	Operator: Will M
Project ID:	Client: EA Engineering

GW7-02.HPT	4/29/2014
GW7-03.HPT	4/29/2014
GW7-04.HPT	4/29/2014

Appendix F-2

Soil Boring Logs

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FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: Geoprobe		Soil Boring Number: SB7-01
Sampling Method: 4-ft MacroCores		Sheet 1 of 1

					Drilling	
Water Lev.					Start	Finish
Time					4/29/2014	4/29/2014

Surface Conditions: Grass/Topsoil
Weather: Overcast, Rain
Temperature: 55F

Blow Counts (140-lb) Feet / Drvn/Ft. / Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet	USCS Log	
		1.3	0	OL	0.0 - 0.3' : Dark brown clayey SILT with f-Sand; trace rounded f-gravel particles; low plasticity, organic material present; well compacted and moist (OL).
		1.0	1		0.3 - 1.5': Light brown silty CLAY with rounded f-Gravel particles; trace root material; moderate plasticity; well compacted and moist (CL).
4/4		0.9	2	CL	1.5 - 4.5': Reddish brown silty CLAY, trace rounded f-m Gravel particles; heavily motteled (Light gray), moderate plasticity; hard and moist (CL).
		2.7	3		
		317	4		End of Boring at 4.5' bgs
			5		
4/0.5			6		Collected samples for TCL VOC, metals/mercury, %solids, and TOC analysis: SB7-01-3.5-4.5 at 0950 (MS/MSD) SB7-FD-140429 collected
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		

Logged by: Robert Peterson Date: 4/29/14

Drilling Contractor: Zebra Environmental Driller: Will McAllister

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Appendix F-3

Groundwater Purge Forms

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EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: MW7-1D	**EA Personnel:** HW	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Overcast ~75 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/9/2014 **Gauge Time:** 13:00:00 AM	**Measurement Ref:** TOC
Stick Up/Down (ft): Down, ~0.3 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 4"

Purge Date: 9-Jun-14	**Purge Time:** 1315
Purge Method: Low flow grundfos	**Field Technician:** H. Williams

Well Volume

A. Well Depth (ft): 10.92	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down, ~0.3 ft
B. Depth to Water (ft): 6.2	**E. Well Volume (gal) (C*D):** 1.732	**Pump Type:** Grundfos
C. Liquid Depth (ft) (A-B): 4.72	**F. Three Well Volumes (gal) (E3):** 5.197	**Pump Intake Depth:** Middle of Screen

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
1318	7.46	0.261	288	0.00	14.29	-19	6.95	0.30	0.9
1321	7.31	0.29	185	0.00	14.69	-38	6.95	0.30	1.8
1324	7.28	0.312	159	0.00	15.03	-46	6.95	0.30	2.7
1327	7.22	0.339	122	0.00	15.25	-57	---	0.30	3.6
1330	7.17	0.378	74.9	0.00	15.55	-71	6.92	0.30	4.5
1333	7.16	0.391	65.5	0.00	15.52	-78	6.93	0.30	5.4
1336	7.16	0.409	47.5	0.00	15.6	-83	---	0.30	6.3
1339	7.15	0.424	38.2	0.00	15.8	-87	6.93	0.30	7.2
1342	7.14	0.453	21.9	0.00	15.77	-90	---	0.30	8.1
1345	7.14	0.468	20.7	0.00	15.52	-92	---	0.30	9
1348	7.14	0.486	13.3	0.00	15.75	-93	---	0.30	9.9
1351	7.15	0.498	8.8	0.00	15.87	-94	6.92	0.30	10.8
1354	7.14	0.512	9.6	0.00	15.86	-95	6.92	0.30	11.7
1357	7.15	0.529	8.8	0.00	15.87	-96	6.92.	0.30	12.6

Total Quantity of Water Removed (gal):	3.30	**Sampling Time:**	1410
Samplers:	H. Williams	**Split Sample With:**	MS/MSD, Dup
Sampling Date:	6/9/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: Collect samples for metals, geochemical parameters, VOCs

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: MW7-2	**EA Personnel:** A. Kohn	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Sunny ~80 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/9/2014 **Gauge Time:** 13:00:00 PM	**Measurement Ref:** TOC
Stick Up/Down (ft): Flush	**PID Headspace Reading:** NA	**Well Diameter (in):** 2"

Purge Date: 9-Jun-14	**Purge Time:** 1317
Purge Method: Low Flow	**Field Technician:** A. Kohn

Well Volume

A. Well Depth (ft): 5.87	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Flush
B. Depth to Water (ft): 4.7	**E. Well Volume (gal) (C*D):** 0.429	**Pump Type:** Grundfos
C. Liquid Depth (ft) (A-B): 1.17	**F. Three Well Volumes (gal) (E3):** 1.288	**Pump Intake Depth:** 5.80 (6 inches from bottom)

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
1320	7.50	0.46	243	0.53	26.19	-27	4.86	0.20	0.6
1323	7.39	0.469	227	0.37	25.94	-27	4.89	0.20	1.2
1326	7.27	0.485	166	0.02	24.28	-30	4.91	0.20	1.8
1329	7.21	0.486	160	0.01	23.45	-36	4.94	0.20	2.4
1332	7.35	0.491	62.7	0.00	22.21	-42	4.97	0.20	3
1335	7.32	0.499	41	0.00	22.24	-37	5.00	0.20	3.6
1338	7.26	0.503	32.5	0.00	22.02	-38	5.01	0.20	4.2
1341	7.25	0.506	30.2	0.00	21.94	-48	5.01	0.20	4.8
1344	7.25	0.505	43.6	0.00	21.9	-51	5.02	0.20	5.4
1347	7.26	0.503	38	0.00	21.81	-36	5.03	0.20	6
1350	7.26	0.503	39.8	0.00	21.79	-30	5.04	0.20	6.6
1353	7.26	0.505	38.5	0.00	21.72	-36	5.05	0.20	7.2

Total Quantity of Water Removed (gal):	1.90	**Sampling Time:**	1400
Samplers:	A. Kohn	**Split Sample With:**	N/A
Sampling Date:	6/9/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: collect samples for metals, geochemical parameters, VOCs

Appendix G

Site 8 - Logs

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Appendix G-1

HPT Logs

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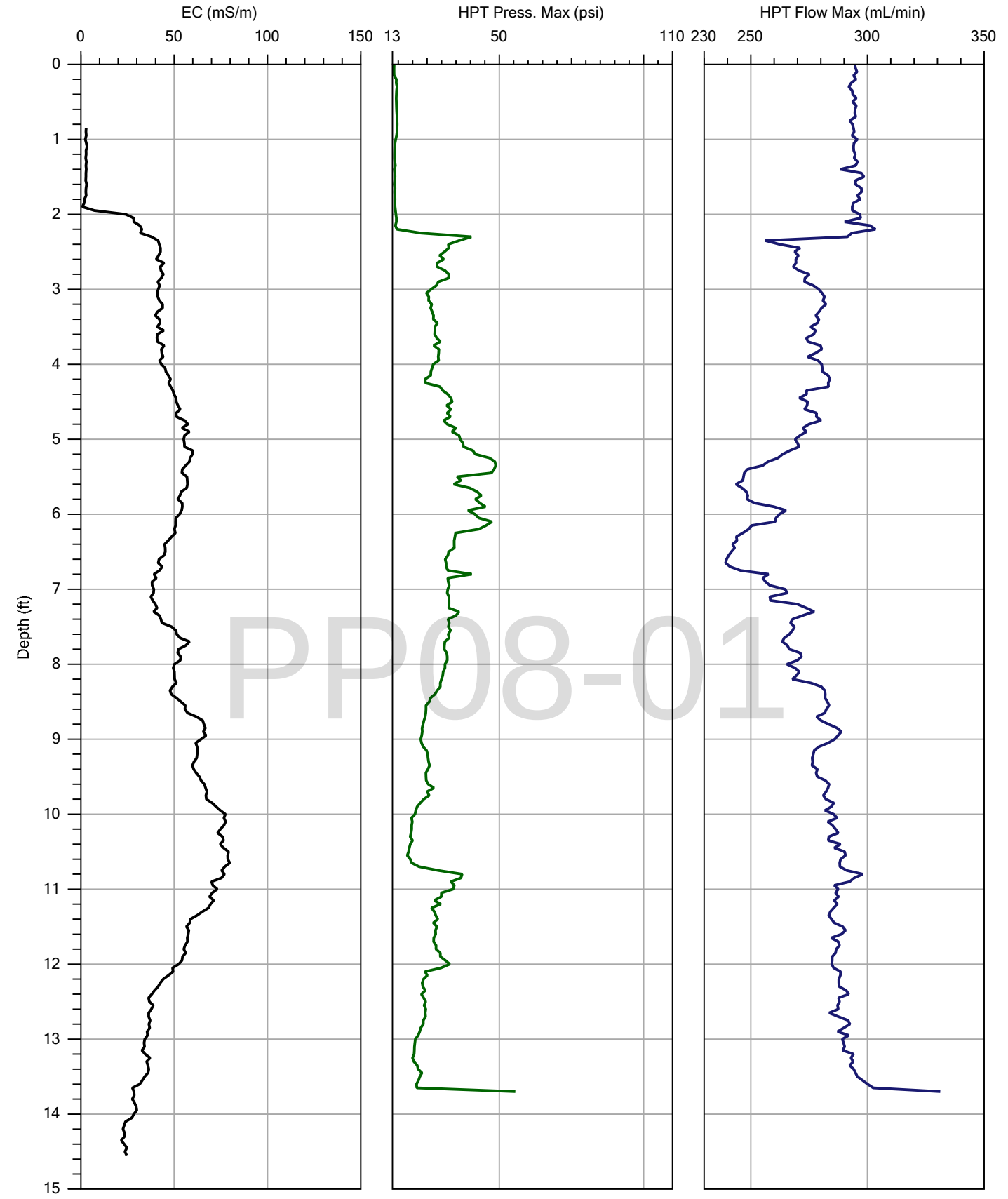

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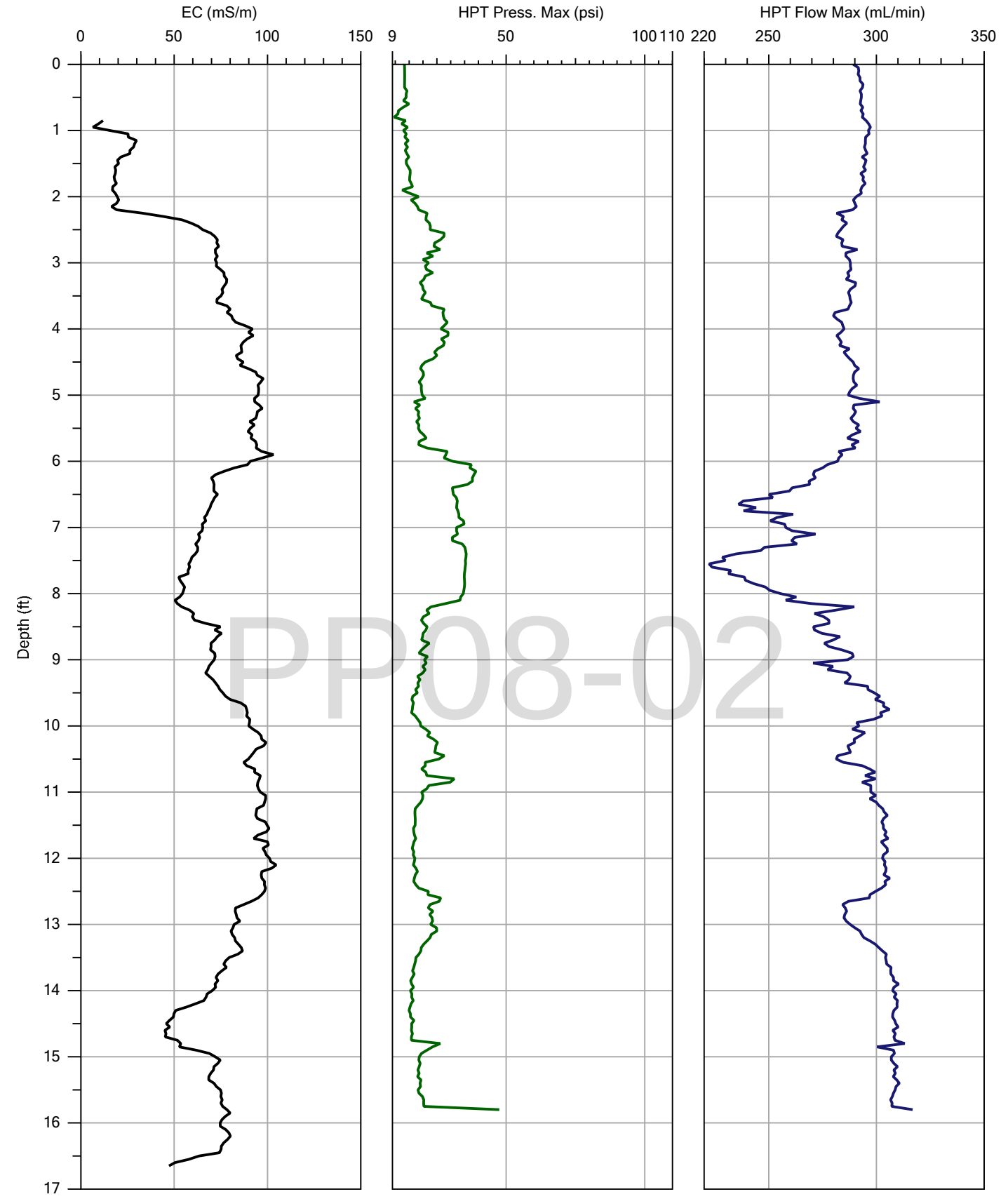

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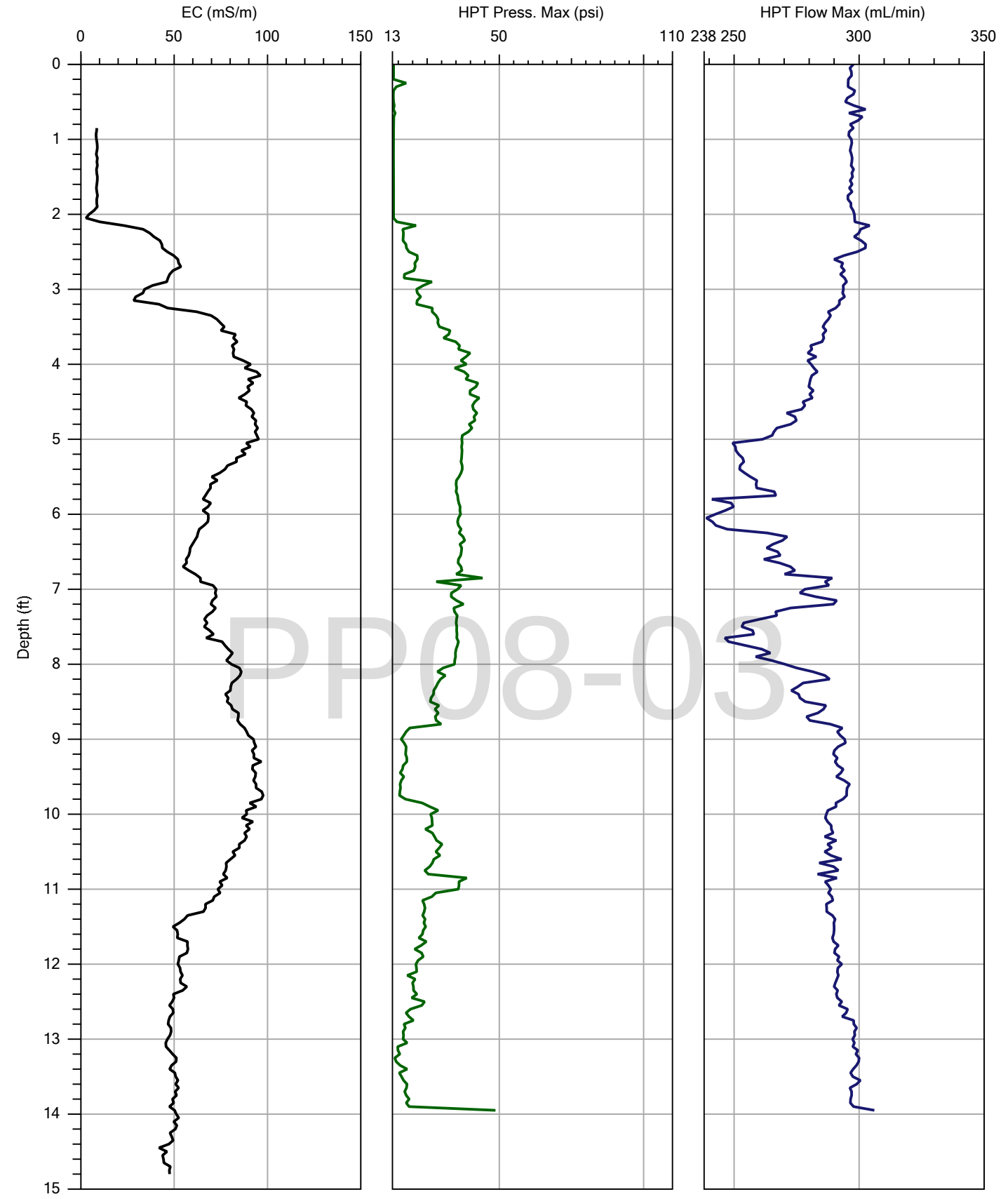

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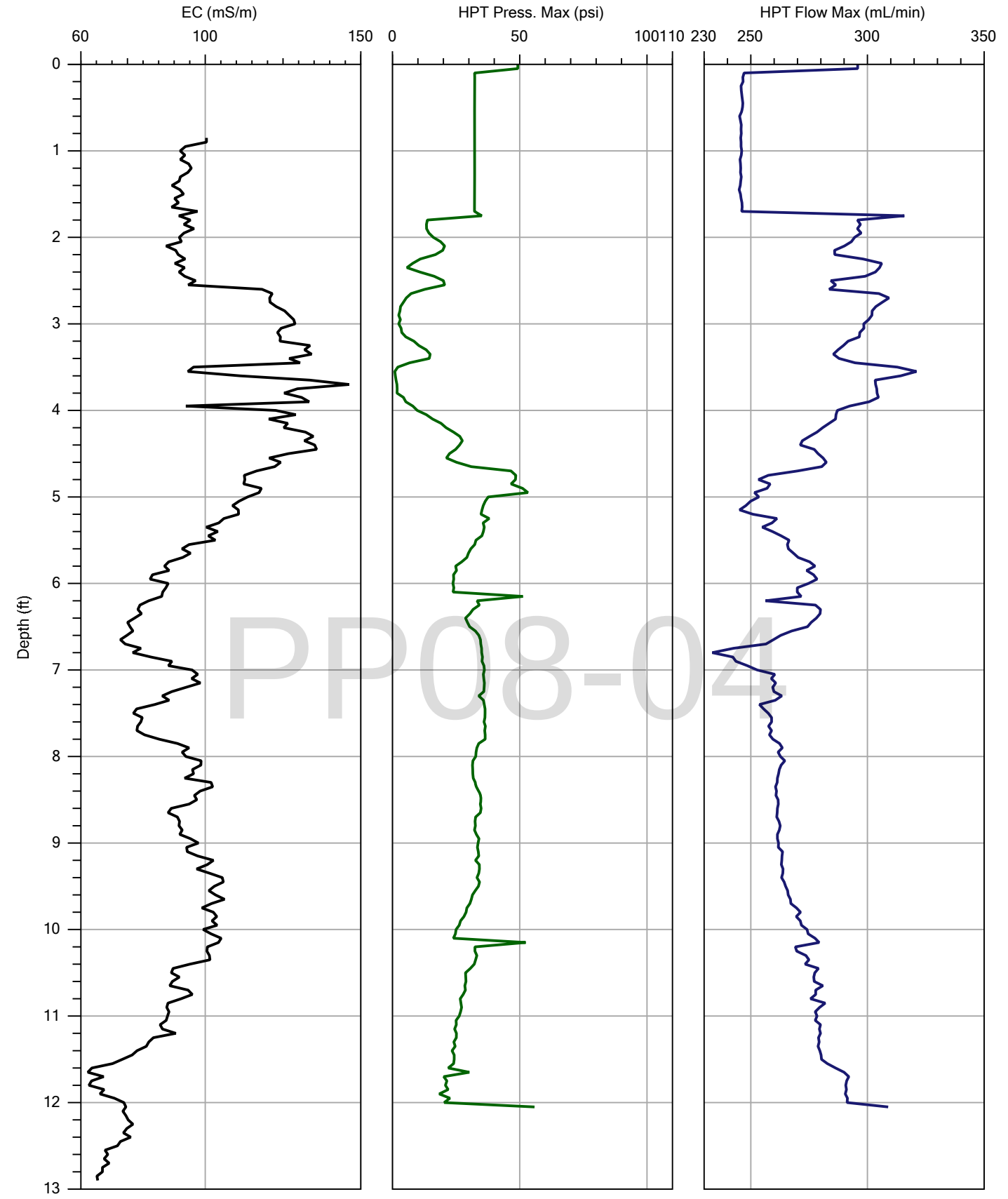

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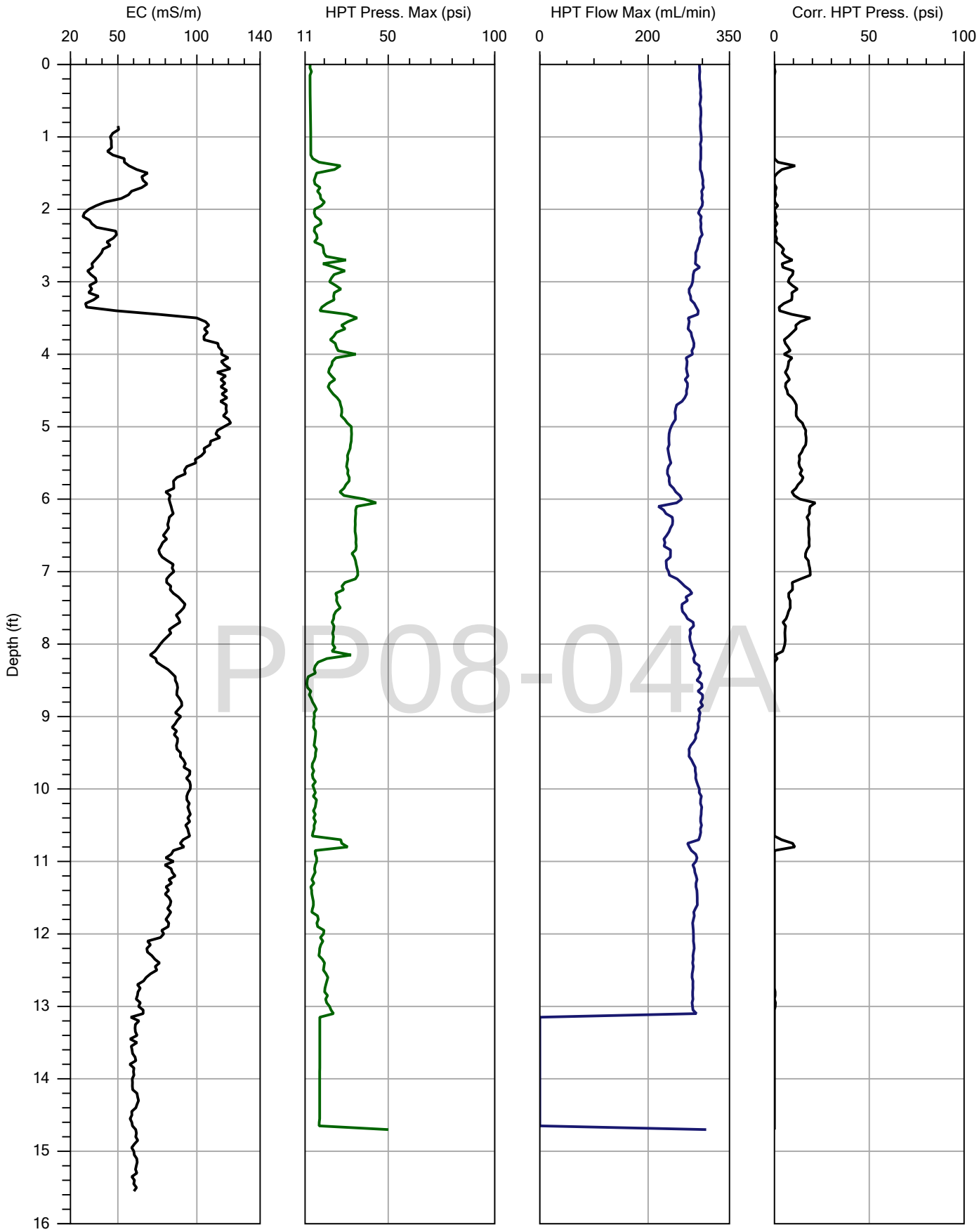
Company: ZEBRA		Operator: Will M	Date: 4/29/2014
Project ID: Site-08		Client: EA Engineering	Location:



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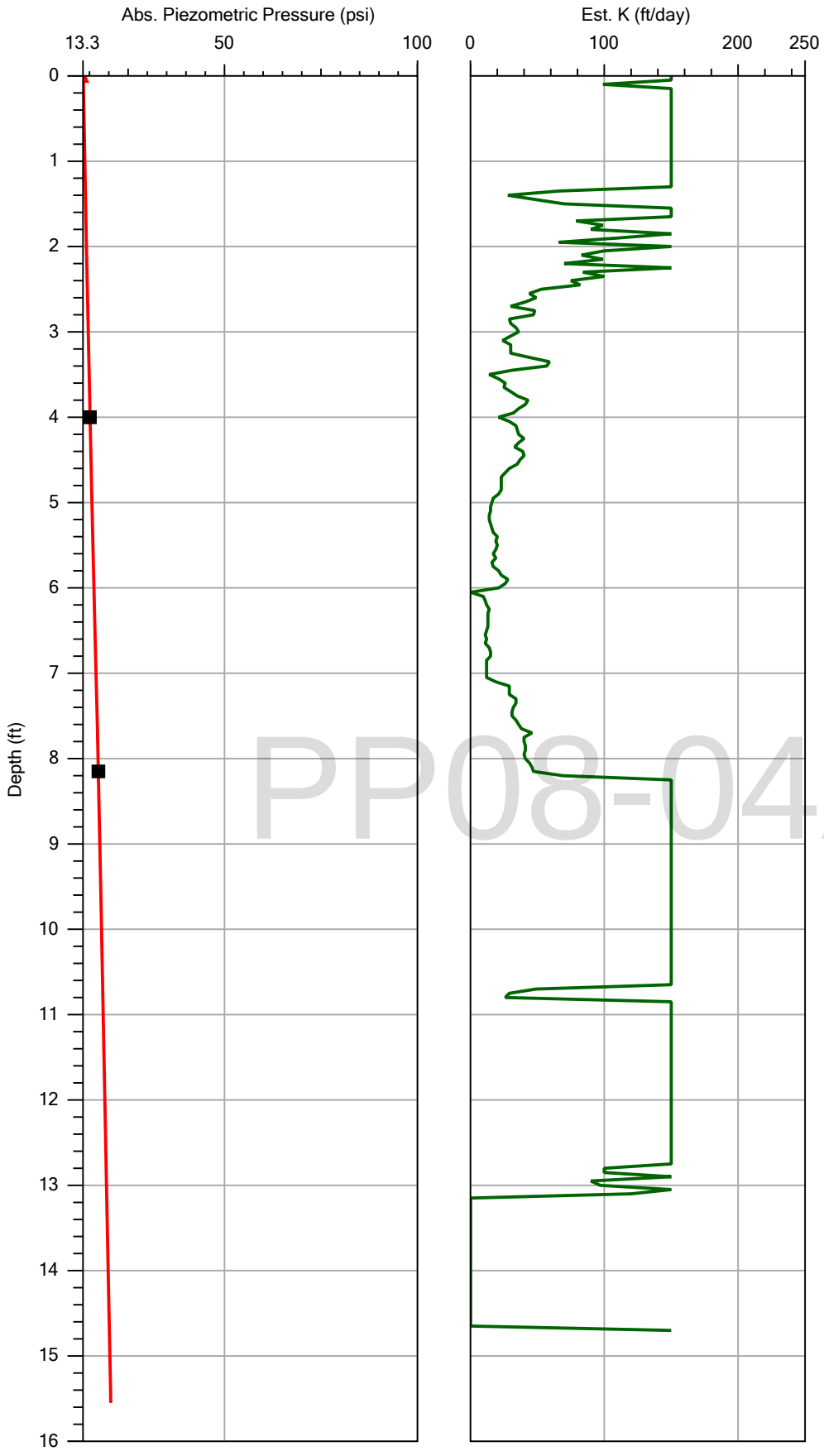
Project ID: PP		Client: EA Engineering	Location:



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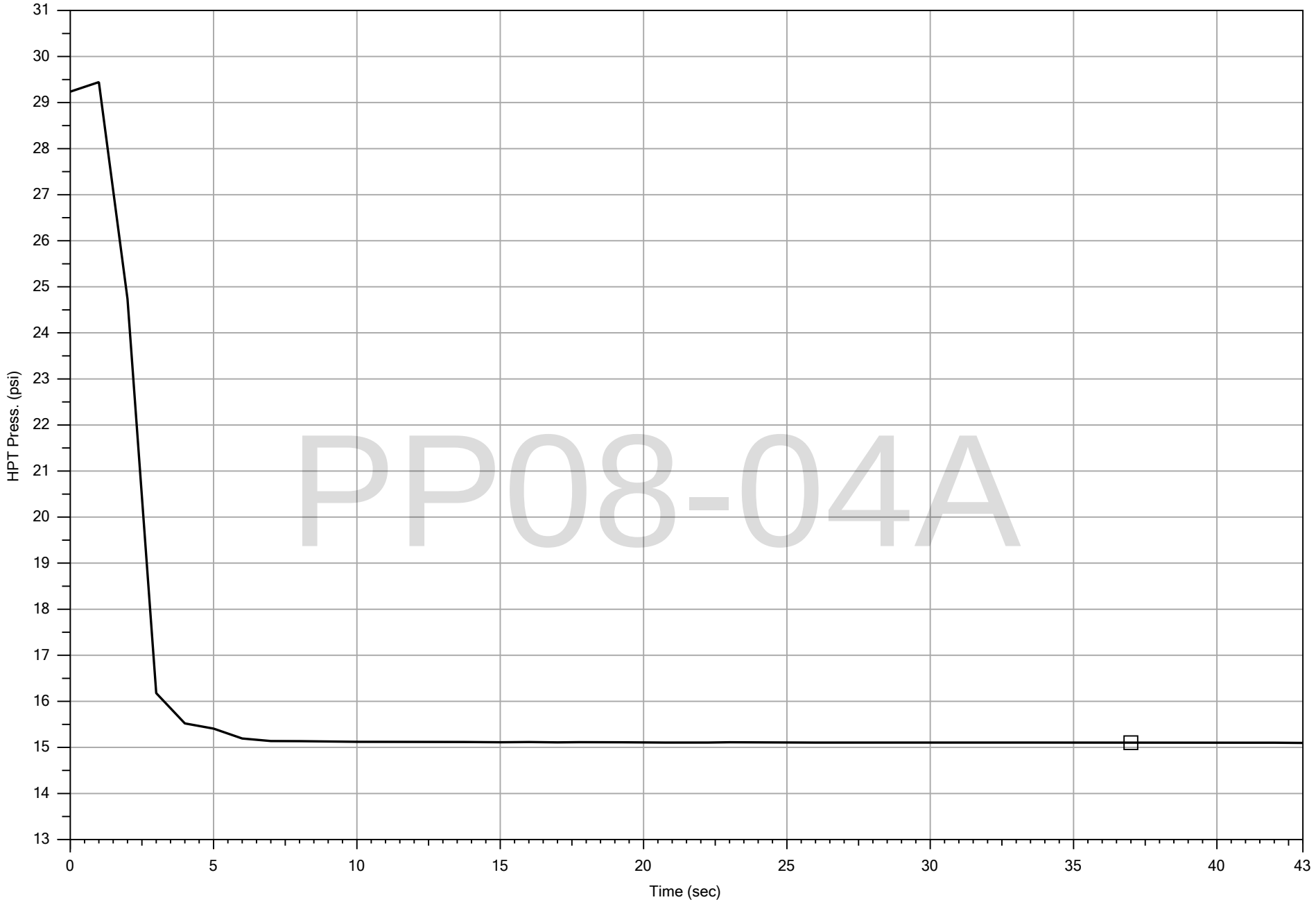
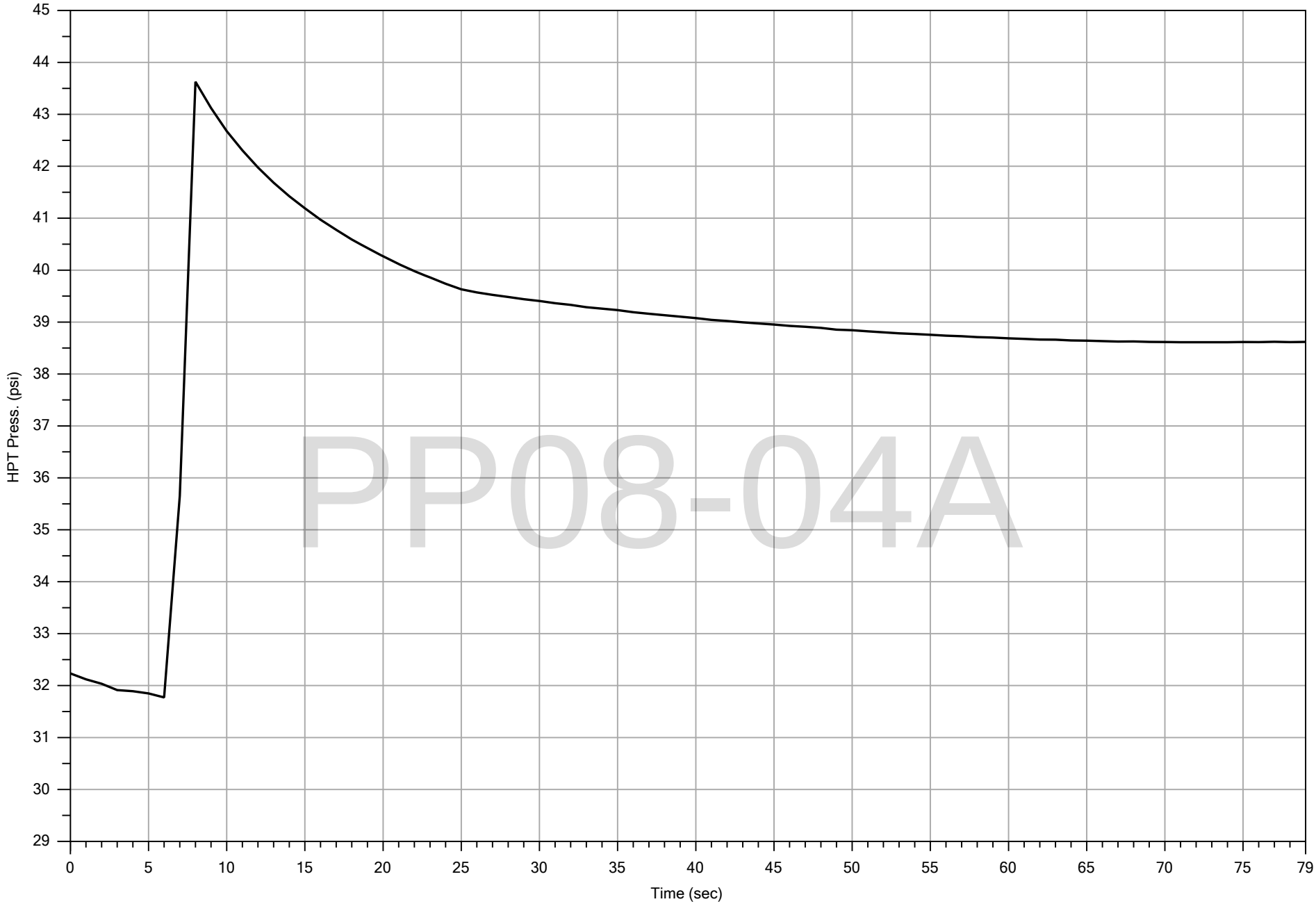


HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA	Operator: Will M	Location:	Sensor: HPT Press.
Project ID: PP	Client: EA Engineering	Depth: 4.00 ft	Test: 1
File: PP8-04A.TIM			Date: 4/30/2014



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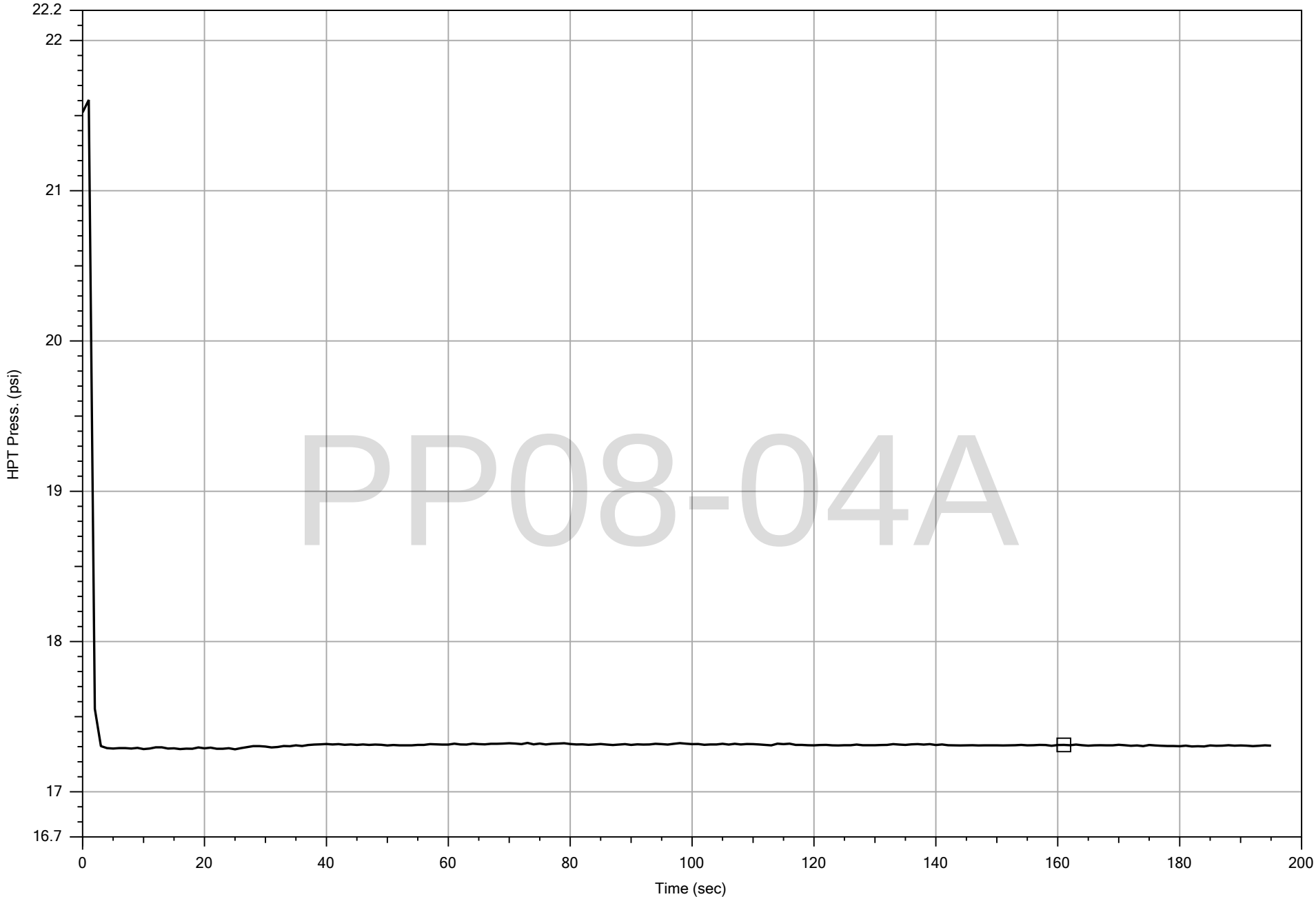

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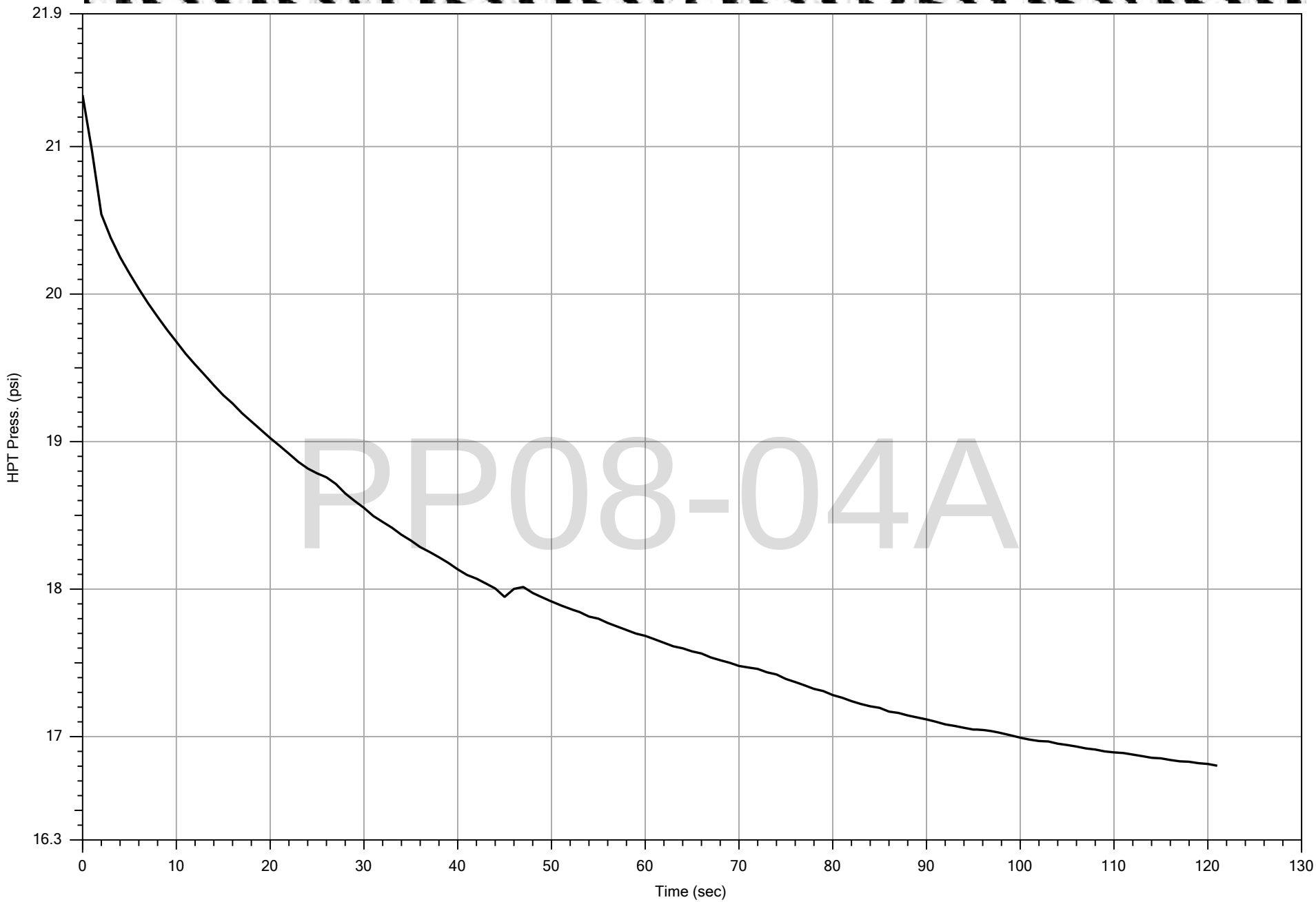
Project ID: PP	Client: EA Engineering	Location:	Sensor: HPT Press.
		Depth: 8.15 ft	Test: 1

ABSOLUTE STATIC PRESSURE

Company: ZEBRA	Operator: Will M
Project ID: PP	Client: EA Engineering

■ PP8-04A.HPT 4/30/2014



HPT DISSIPATION (SINGLE CASE)

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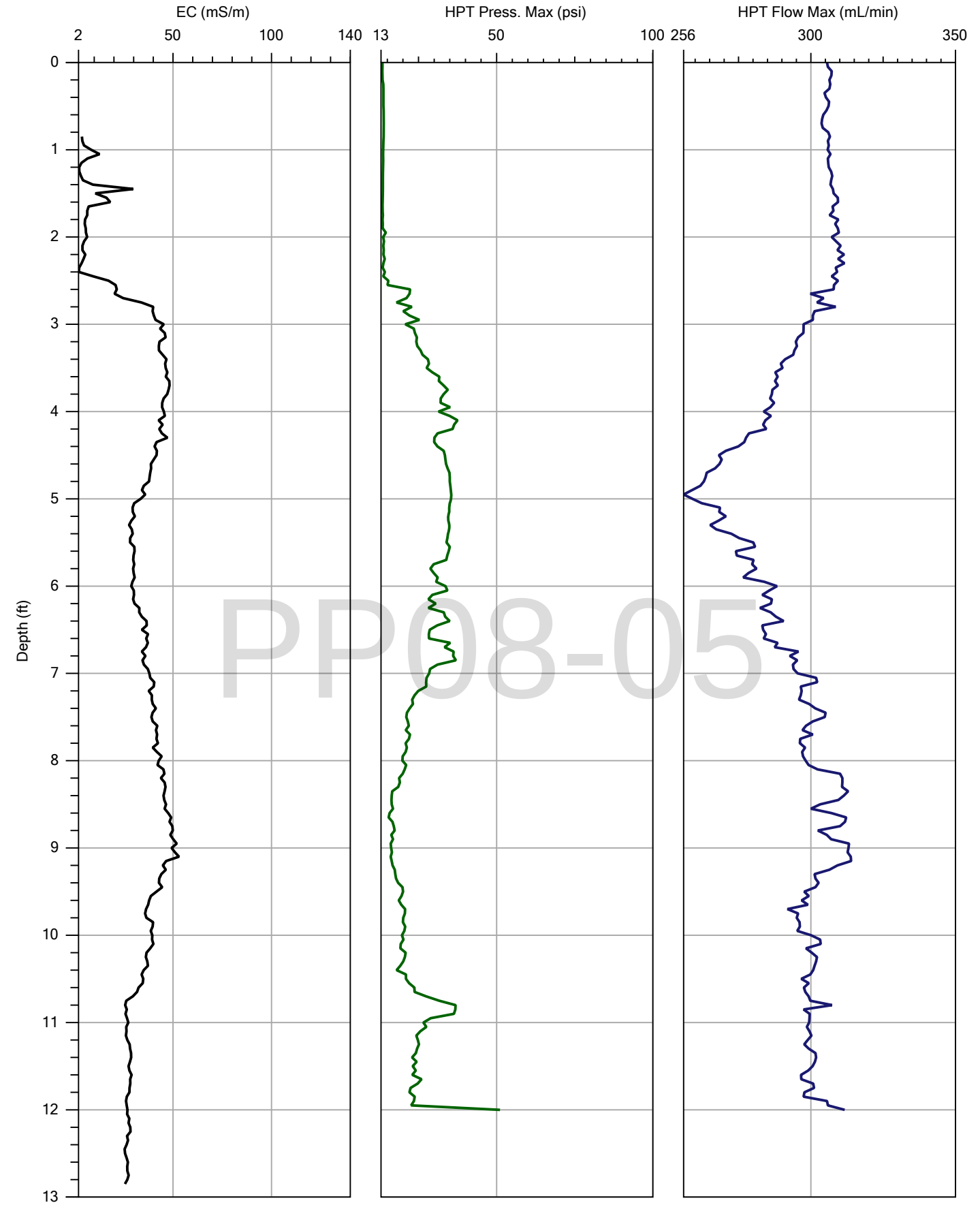

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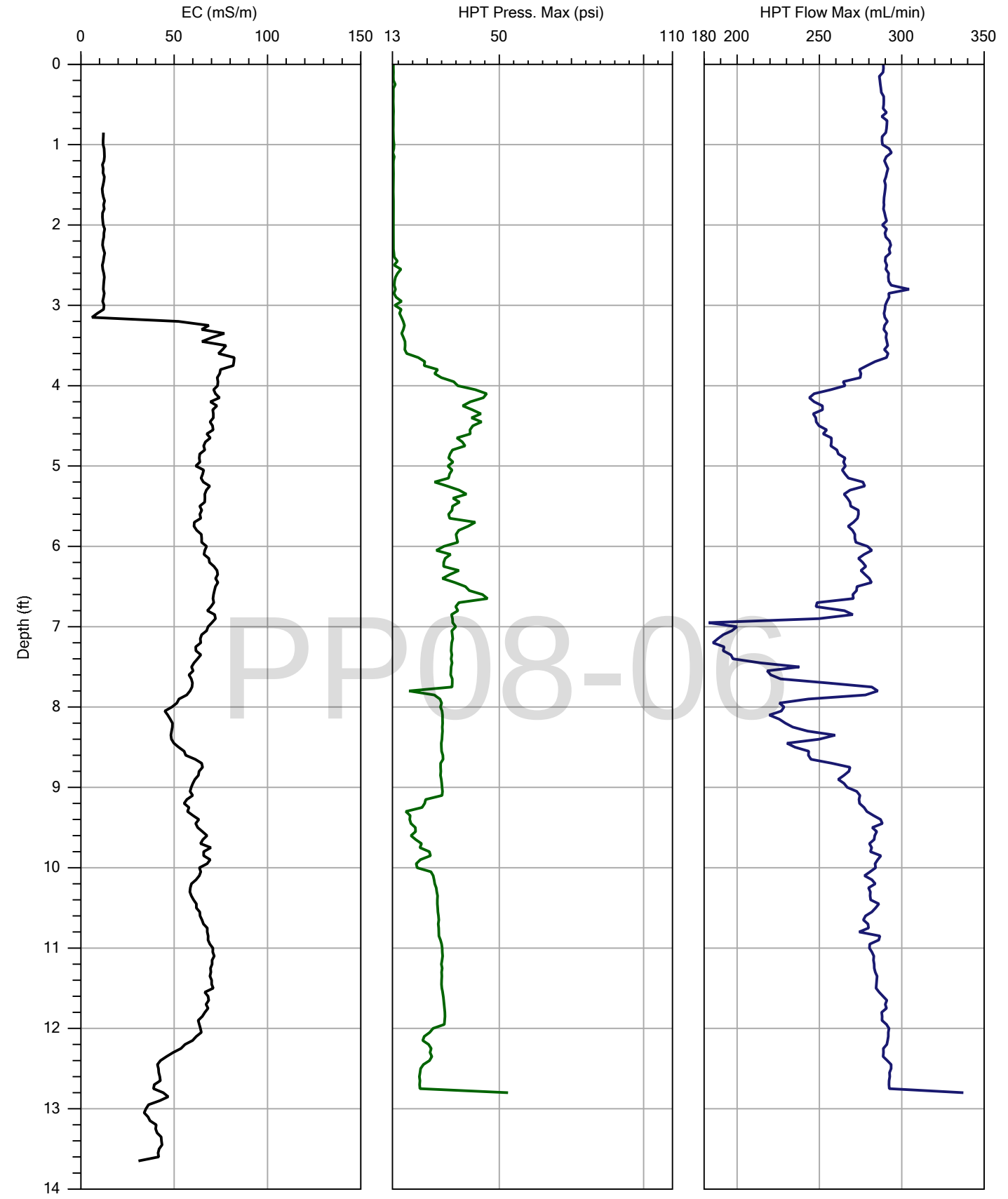
Company: ZEBRA	Operator: Will M		Date: 4/30/2014
Project ID: PP	Client: EA Engineering		Location:



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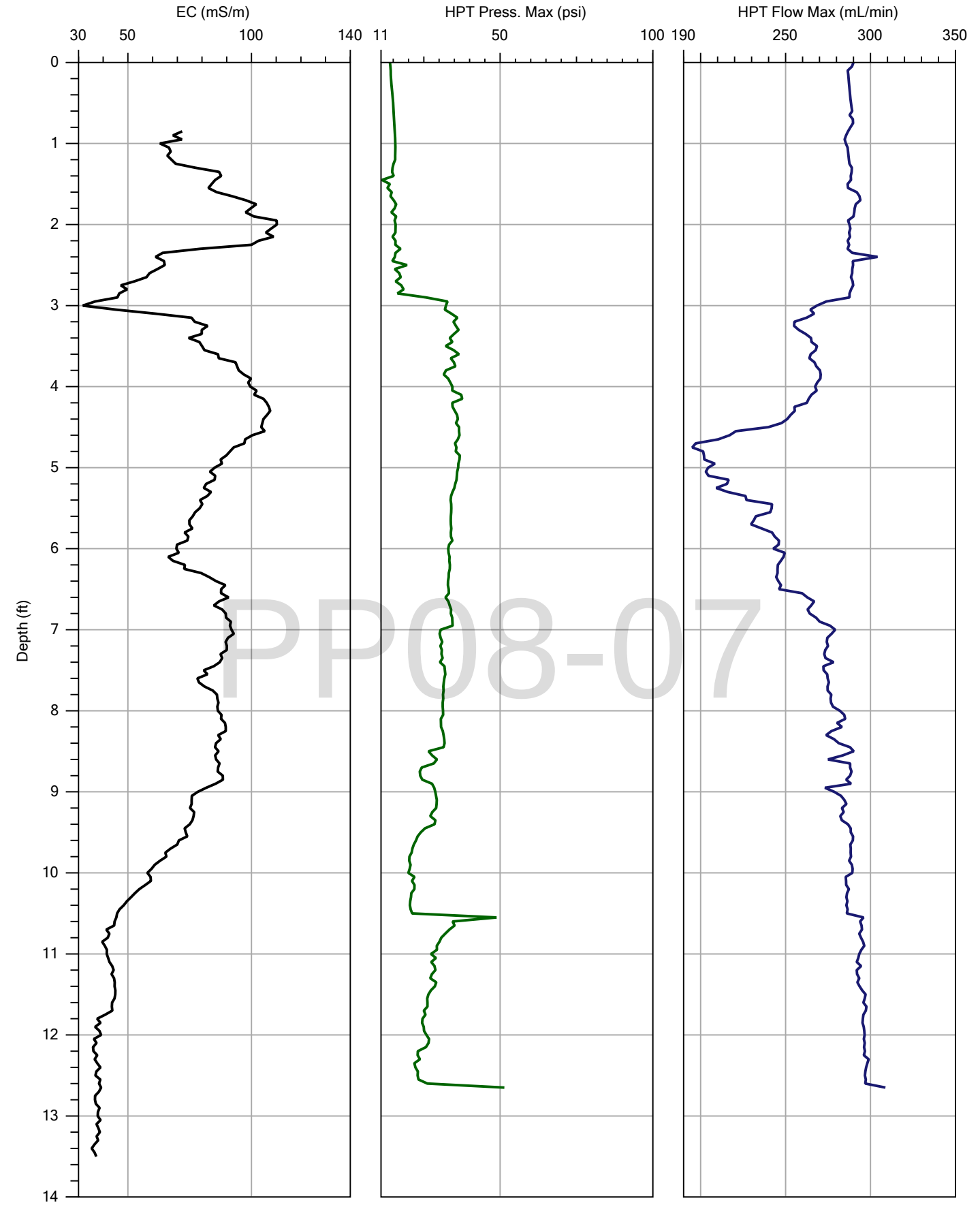
Company: ZEBRA		Operator: Will M	Date: 4/29/2014
Project ID: Site-08		Client: EA Engineering	Location:



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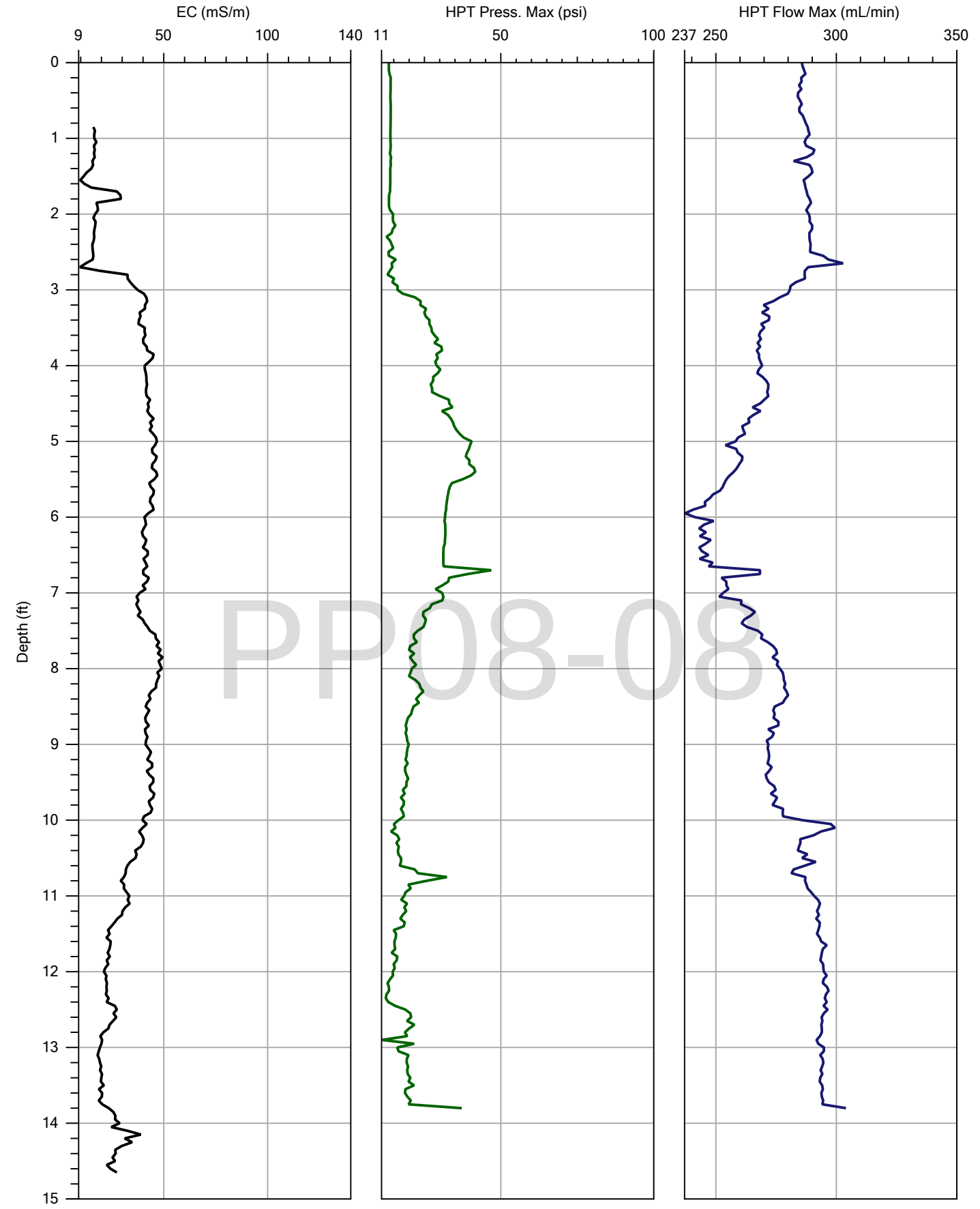
Project ID: PP	Client: EA Engineering		Location:



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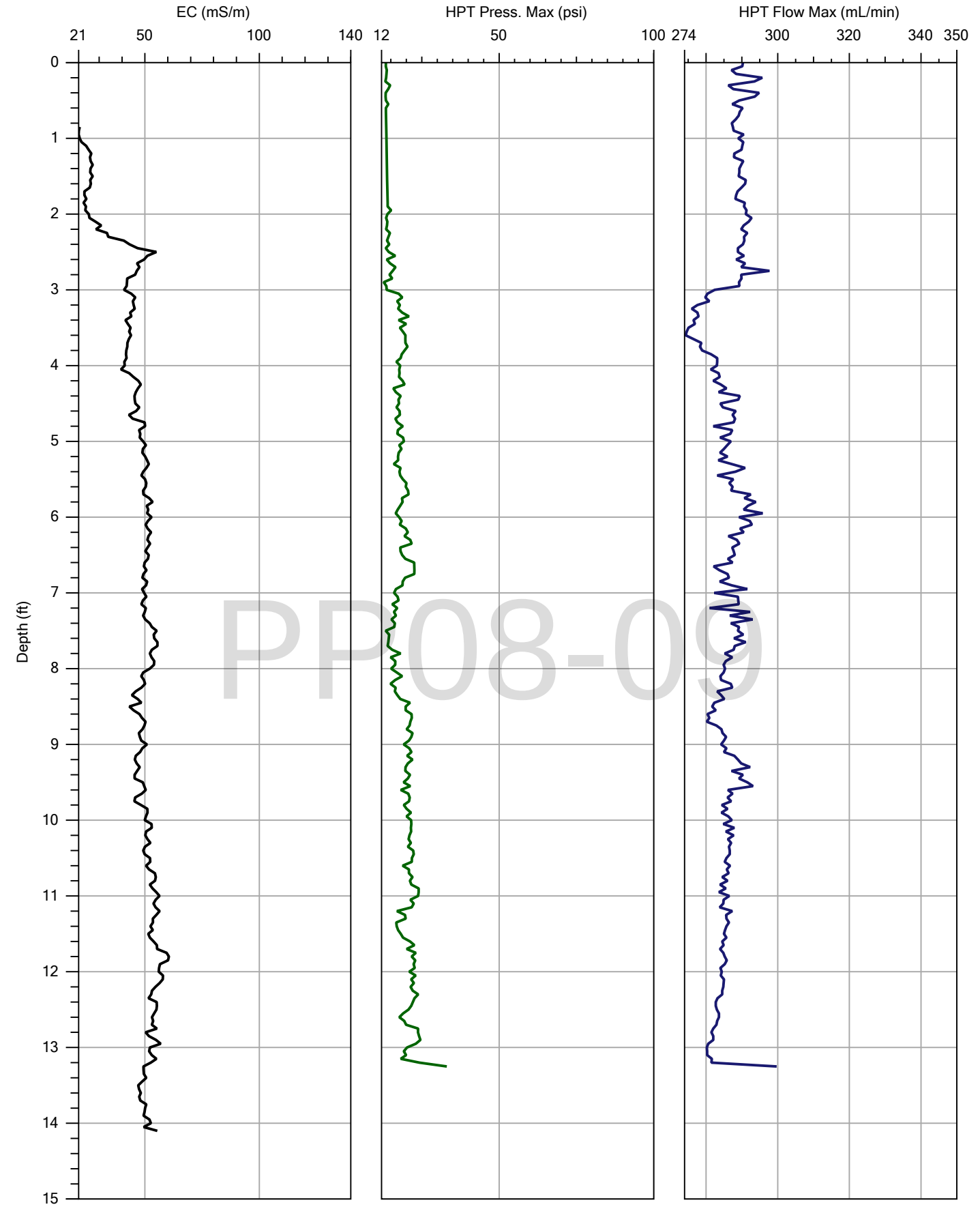
Company: ZEBRA	Operator: Will M		Date: 4/30/2014
Project ID: PP	Client: EA Engineering		Location:



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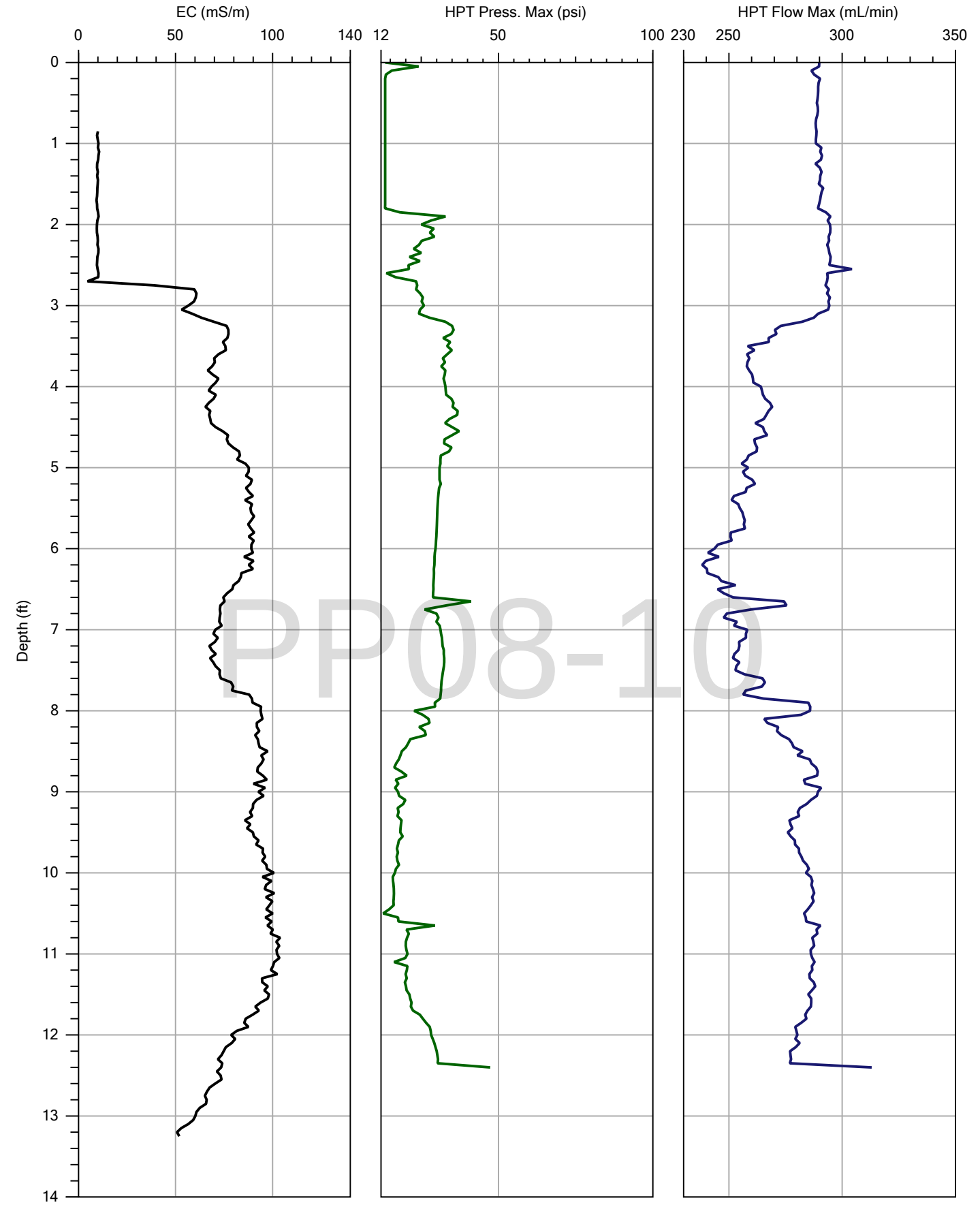

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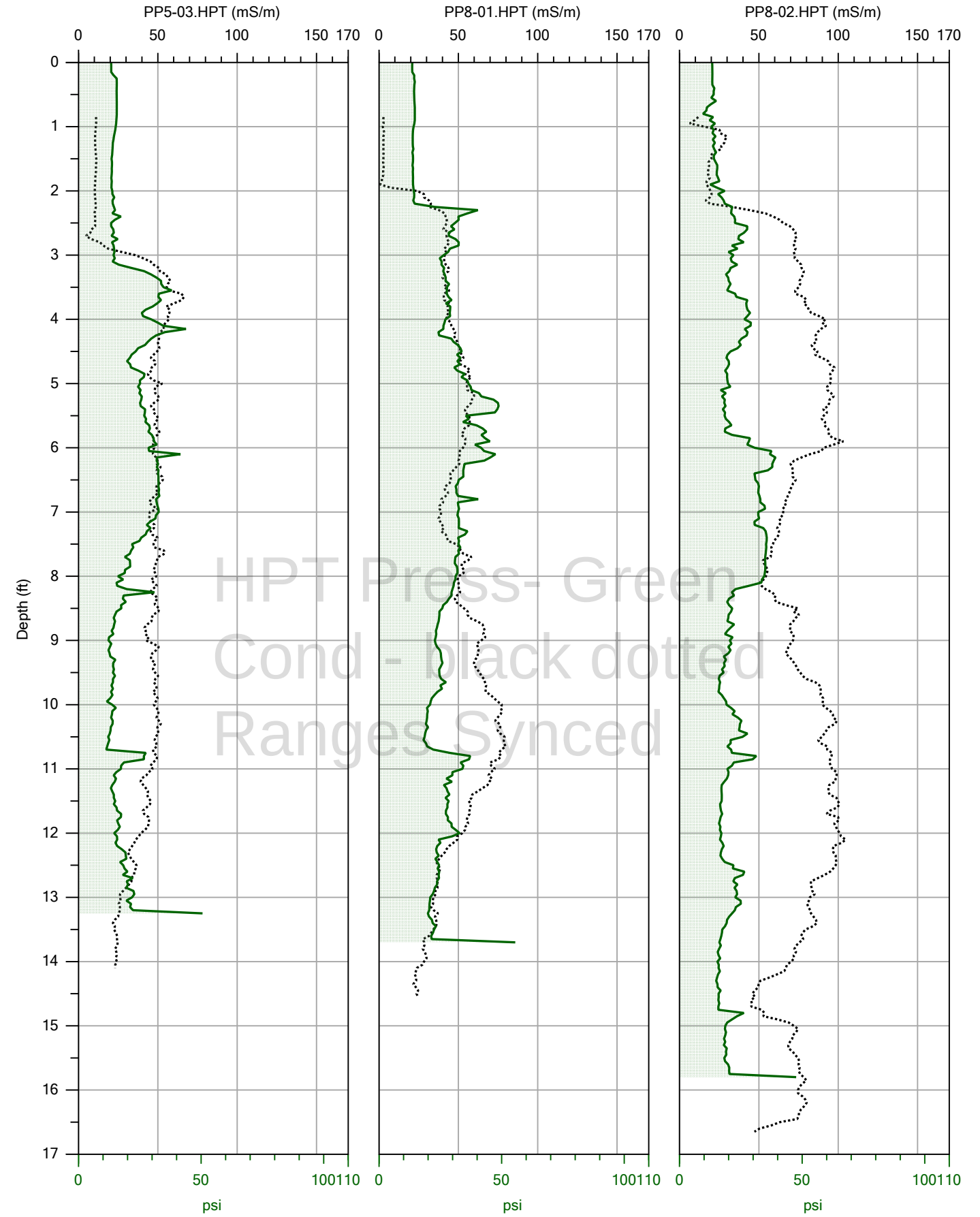
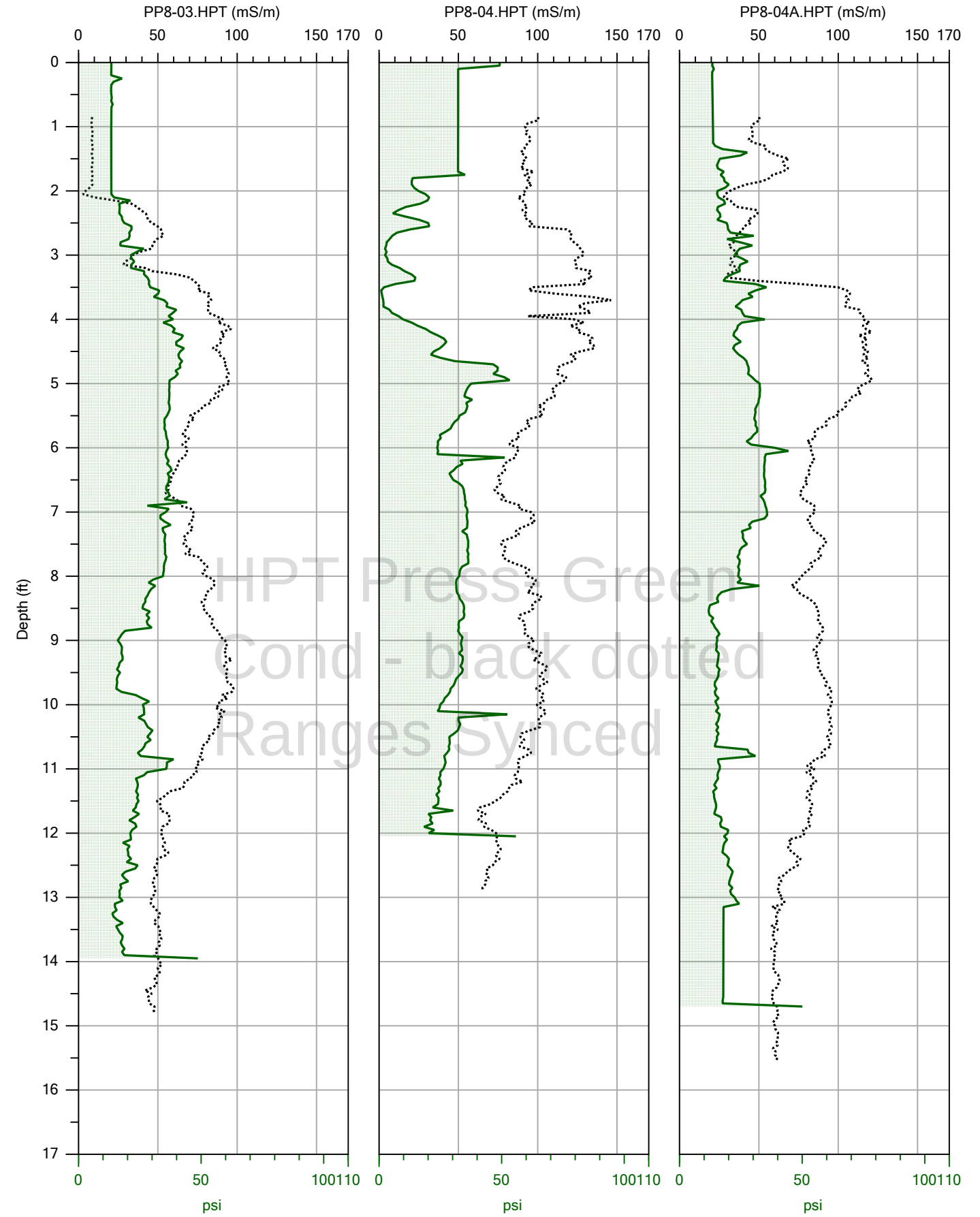
Project ID: PP		Client: EA Engineering	Location:



EC / HPT Press. Max

Company: ZEBRA	Operator: Will M
Project ID: PP	Client: EA Engineering

PP5-03.HPT	4/30/2014
PP8-01.HPT	4/29/2014
PP8-02.HPT	4/29/2014



EC / HPT Press. Max

Company: ZEBRA	Operator: Will M
Project ID: PP	Client: EA Engineering

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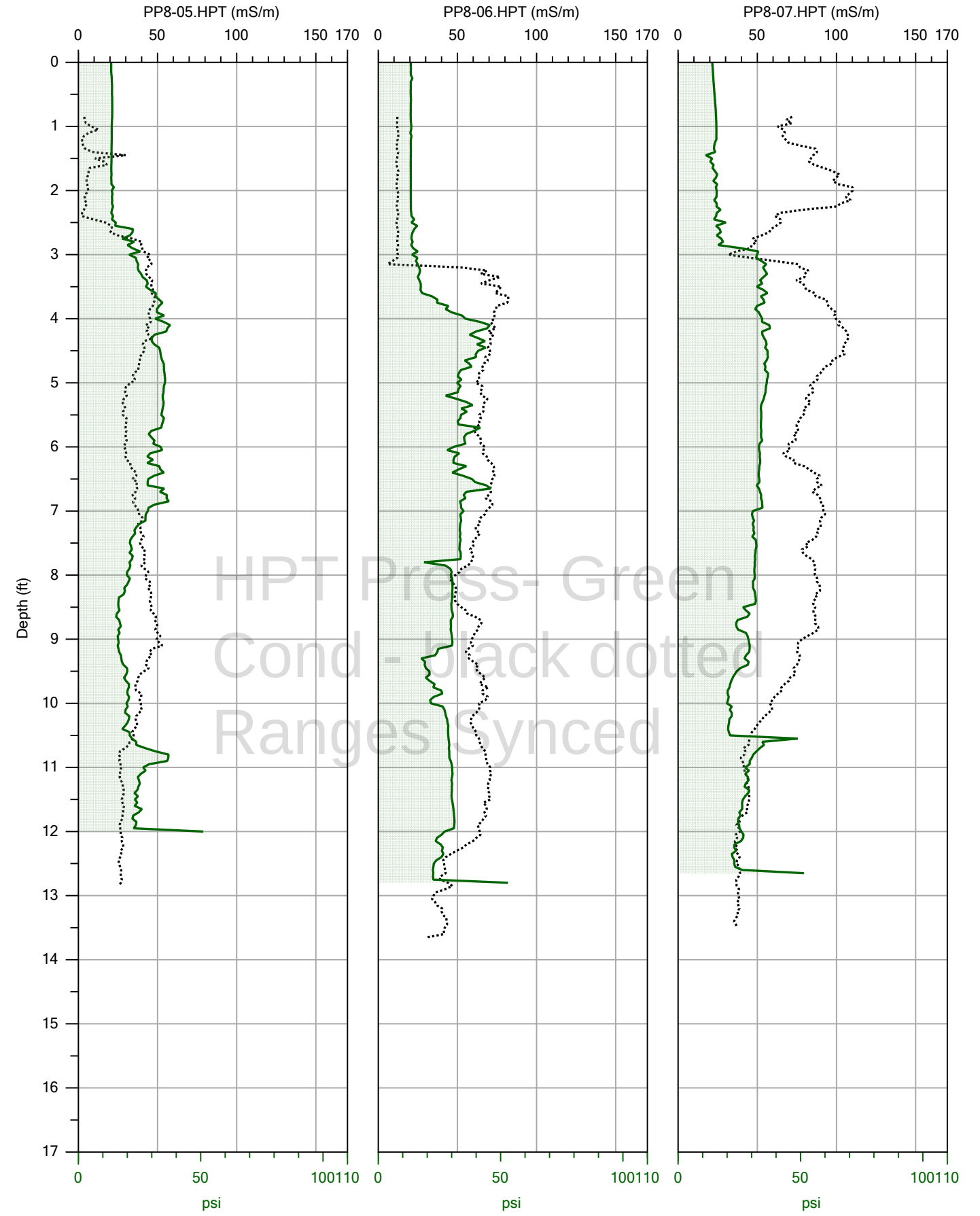
PP8-04.HPT	4/29/2014
PP8-04A.HPT	4/30/2014



EC / HPT Press. Max

Company: ZEBRA	Operator: Will M
Project ID: PP	Client: EA Engineering

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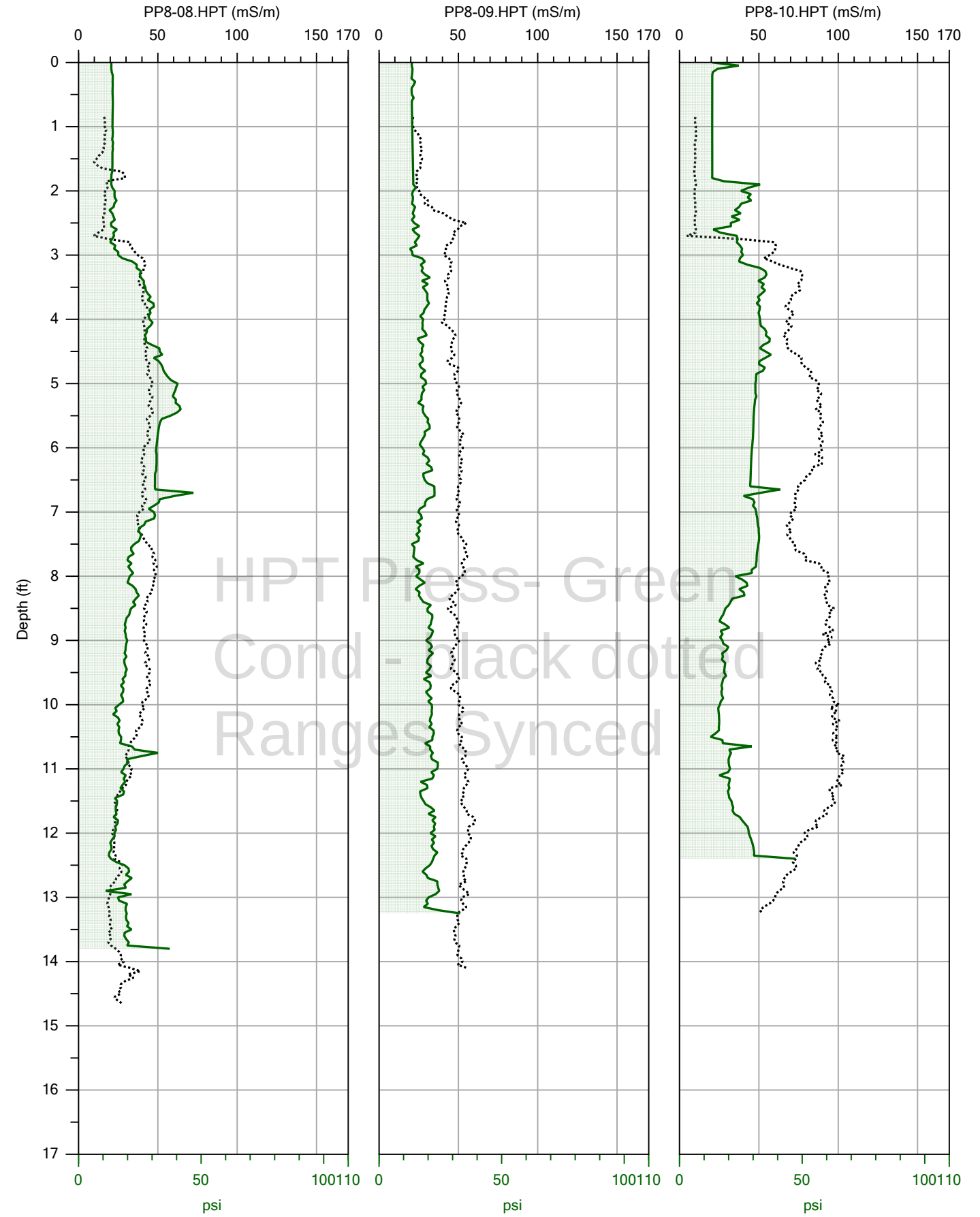
PP8-07.HPT	4/30/2014



EC / HPT Press. Max

Company: ZEBRA	Operator: Will M
Project ID: PP	Client: EA Engineering

PP8-08.HPT	4/30/2014
PP8-09.HPT	4/30/2014
PP8-10.HPT	4/30/2014

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Appendix G-2

Soil Boring Logs

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FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:	1136653.13, 1051345.38
Surface Elevation:	597.90
Casing Below Surface:	597.48
Reference Elevation:	NAVD 88
Reference Description:	NAD 83 Datum

Job. No. 6265401	Client: AFCEC / NFARS				Location: NFARS, Niagara Falls, NY
Drilling Method: Drive and Wash, Rotary					Soil Boring Number: CH8-01
Sampling Method: NQ wireline					Sheet 1 of 2
					Drilling
Water Lev.	7ft bgs				Start: 4/24/2014
Time	10:00				Finish: 4/24/2014
Date	24-Apr-14				

Penetration Rate (Feet / Drvn/Ft. / Recvrd)	Well Diagram	Run	Depth (in Feet)	RQD / Log	Surface Conditions: Paved (asphalt) Weather: Rain showers, cloudy, wind 14 mph Temperature: 36F
			0		See log for H.S.A / Split-spoon sampling for soil descriptions from 4/8/2014
			1		Drive and wash to set 6" diameter steel casing (temporary)
			2		
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
					Dolostone (Previous split spoon refusal @ 15.1' bgs)
			15		From 15.1-17.1 ft bgs Roller bit rock socket, set 4" diameter steel casing; grouted on 4/9/14 to 17.1 ft bgs
			16		
					Cored through grout plug
20 min/ 5 ft	5/3.87	R1	17	77% (Good)	Gray-brown Dolostone; closely-fractured, with occasional tabulate coral fossils, dissolution pits/vugs, hard.
					Horizontal Fracture @ 17.6 ft, 17.7 ft
			18		Subvertical Fracture (45 deg) @ 18-18.2 ft bgs; Horizontal Fracture @ 18.1 ft, 18.4 ft
					Sphalerite and calcite/dolomite crystals in vugs @ ~18.7-18.9 ft
			19		Horizontal Fracture @ 19.2 ft, 19.57 ft, 19.97 ft
			20		Calcite crystals in vug @ 20.4 & 20.8 ft bgs, tabulate coral fossils

Logged by: Lynette Mokry Date: 4/24/14

Drilling Contractor: SJB Drillings Driller: Brian & Dan Delude

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates: 1136653.13, 1051345.38
Surface Elevation: 597.90
Casing Below Surface: 597.48
Reference Elevation: NAVD 88
Reference Description: NAD 83 Datum

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: Drive and Wash, Rotary		Soil Boring Number: CH8-01
Sampling Method: NQ wireline		Sheet 2 of 2

					Drilling Start	Drilling Finish
Water Lev.	7ft bgs				4/24/2014	4/24/2014
Time	10:00					
Date	24-Apr-14					

Min/Ft	Feet Cored/Ft. Recvrd	Well Diagram	Run	Depth in Feet	RQD Log	Surface Conditions: Paved (asphalt) / Weather: Sunny, wind 5-10 mph NNE / Temperature: 36F, warming to 55F
20 min/ 5 ft	5.0/3.87		R1	20	77% (Good)	
				21		Lost ~ 50 gal H2O Run 1
				22		Vug with sphalerite and calcite crystal at 22.3 ft
20 min/ 5'	5.0/4.95		R2	23	87% (Good)	Gray-brown Dolostone, closely to mod. closely fractured, with occasional styolites, fossils, vugs. / Horizontal Fracture at 22.6 ft. Styolites @ 23.3 ft & 24.1 ft
				24		
				25		Gypsum seam (~0.05 'thick' below fracture), 25.7 ft
				26		Horizontal Fracture @ 26.1, 26.8 ft (S.A.A. with vugs, tabulate coral fossils, styolites)
				27		Lost ~ 50 gal H2O Run 2 / Horizontal Fracture at 27.42 ft (vug), 27.7 ft
10 min/1.8'	1.8/1.5		R3	28	83% (Good)	Subvertical Fracture (45 degree) at 28.2 ft; Pocket (~0.16 ft dia.) with calcite crystals, styolites
				29		Horizontal Fracture at 28.6 ft, styolite (with galena) / Horizontal Fracture at 29.4 ft; Lost ~75 gal H2O Run 3
15 min/3.5'	3.61/2.99		R4	30	85% (Good)	Core blockage - started new run / Horizontal Fracture at 30.2 ft, 30.3 ft
				31		Horizontal Fracture at 31.06 ft (vugs, sm, this section)
				32		Horizontal Fracture at 31.59 ft - fossils (tabulate coral, vug) / Lost ~ 25 gal H2O Run 4
						End of boring @ 32.7 ft bgs - completed as flush mount on 4/25/14
				33		
				34		
				35		
				36		
				37		
				28		
				39		
				40		

Logged by: Lynette Mokry Date: 4/24/14

Drilling Contractor: SJB Services Driller: Brian & Dan Delude

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: Geoprobe		Soil Boring Number: SB8-04
Sampling Method: 4-ft macrocores		Sheet 1 of 1

					Drilling	
Water Lev.	6.65 ft bgs				Start	Finish
Time	13:45				4/30/2014	4/30/2014

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet		USCS Log	
							Surface Conditions: Paved Asphalt
							Weather: Rain in A.M.
							Temperature: 50 F (A.M.) - 56 F (P.M.)
			24.1	0		GM	0.0 - 2.0': Asphalt and subbase (silty clay and fine gravel) (GM).
			0	1			
			13.3	2		CL	2.0 - 7.5': Reddish brown CLAY; trace fine to very fine Gravel; trace yellow mottling; low plasticity; very tight and moist (CL).
			0	3			
			8.1	4			
			-	5			
			15.9	6			
			8.6	7		GM	7.5 - 8.0': Gray coarse SAND and fine GRAVEL, trace medium to coarse Gravel, trace Silt; loose and non-cohesive (GM).
			7.4	8		CL	8.0 - 11.5': Reddish brown CLAY; trace Gravel, trace Sand; low plasticity increasing to high plasticity at base; tight (CL).
				9			
				10			
			8.1	11			11.5 - 12.0': Reddish brown CLAY, trace coarse Gravel; high plasticity (CL).
				12			12.0 - 13.0': Reddish brown CLAY, trace Silt, trace Gravel; high plasticity; tight and cohesive (CL).
			7.6	13			13.0 - 14.0': Reddish brown CLAY, some very fine Sand grading to very fine flowing Sand and Silt at base; cohesive; loose and wet at base (CL).
				14			End of Boring at 14.0-ft bgs
				15			
				16			
							Collect samples for TCL VOC, metals/mercury, %solids, and TOC analysis:
				17			SB8-04-7-8 at 1100
							SB8-04-8-10 at 1030 (MS/MSD)
				18			SB8-04-12-14 at 1130 (includes grain size analysis)
				19			
				20			

Logged by: Amanda Kohn Date: 4/30/14

Drilling Contractor: Zebra Environmental Driller: Will McAllister and Phillip Orsi

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: Geoprobe		Soil Boring Number: SB8-08
Sampling Method: 4-ft macrocores		Sheet 1 of 1

					Drilling	
Water Lev.	6.37 ft bgs				Start	Finish
Time	14:05				4/30/2014	4/30/2014

Blow Counts (140-lb) Feet / Drvn/Ft. / Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet	USCS Log	Surface Conditions: Paved Asphalt Weather: Rain in A.M. Temperature: 50 F (A.M.) - 56 F (P.M.)
		0.0	0		0.0 - 1.0' : Grass and organics
		-	1	OL	1.0 - 4.0': Reddish brown CLAY; trace yellow mottling; low plasticity; moist to dry (OL).
		-	2		
		-	3		
		-	4	CL	4.0 - 8.0': Reddish brown CLAY, trace fine Gravel (single stones); trace red and yellow mottling; dry (CL).
		-	5		
		-	6		
		-	7		
		-	8		8.0 - 12.0': Reddish brown CLAY, trace fine Gravel (single stones); trace red and yellow mottling; moist (CL).
		-	9		
		-	10		
		-	11		
		-	12	GC	12.0 - 13.0' Gray fine to coarse GRAVEL (weathered bedrock) and CLAY; trace to little coarse Sand; loose and wet (GC).
		-	13		Refusal at 13.0-ft bgs
			14		
			15		
			16		
					Collect samples for TCL VOC, metals/mercury, %solids, and TOC analysis:
			17		SB8-08-10-12 (includes grain size analysis)
					Duplicate SB8-FD-140430 collected at SB8-08-10-12
			18		
			19		
			20		

Logged by: Amanda Kohn Date: 4/30/14

Drilling Contractor: Zebra Environmental Driller: Will McAllister and Phillip Orsi

Appendix G-3

Groundwater Purge Forms

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EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH8-01	**EA Personnel:** AK/RP	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good/New	**Weather:** Sunny / ~80F
Sounding Method: Solinst WLM	**Gauge Date:** 6/10/2014	**Measurement Ref:** TOC
	Gauge Time: 10:00:00	
Stick Up/Down (ft): Down ~0.4 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 4" casing, open hole ~3"

Purge Date: 10-Jun-14	**Purge Time:** 1040
Purge Method: Low Flow	**Field Technician:** AK/RP

Well Volume

A. Well Depth (ft): 32.22	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down ~ 0.4 ft
B. Depth to Water (ft): 8.61	**E. Well Volume (gal) (C*D):** 8.665	**Pump Type:** Grundfos
C. Liquid Depth (ft) (A-B): 23.61	**F. Three Well Volumes (gal) (E3):** 25.995	**Pump Intake Depth:** ~ 124 ft (center open hole)

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
1049	7.50	2.18	192	7.67	19.81	-99	8.61	0.20	0
1052	7.59	2.48	178	7.60	15.01	-105	8.62	0.20	0.6
1055	7.57	2.52	212	10.67	14.86	-107	8.61	0.20	1.2
1058	7.52	2.51	70.2	0.73	17.38	-107	8.61	0.20	1.8
1101	7.53	2.48	70.4	0.00	16.66	-106	8.61	0.20	2.4
1104	7.51	2.47	67.2	0.00	15.93	-106	8.61	0.20	3
1107	7.48	2.50	65	0.00	15.61	-107	8.61	0.20	3.3
1110	7.48	2.62	24.3	0.00	13.86	-107	8.61	0.20	3.9
1113	7.48	2.63	18.5	0.00	13.44	-108	8.61	0.20	4.5
1116	7.47	2.64	18.6	0.00	13.37	-108	8.61	0.20	5.1
1119	7.45	2.64	16.8	0.00	13.36	-108	8.61	0.20	5.7
1122	7.45	2.64	15.6	0.00	13.3	-108	8.61	0.20	6.3
1125	7.45	2.64	15.4	0.00	13.33	-109	8.61	0.20	6.9

Total Quantity of Water Removed (gal):	1.82	**Sampling Time:**	1130
Samplers:	Amanda Kohn	**Split Sample With:**	CH8-FD-140610, MS/MSD
Sampling Date:	6/10/2014	**Sample Type:**	GW (VOCs)

COMMENTS AND OBSERVATIONS: Fractures / open hole - Grundfos pump gets stuck ~30 ftr bgs (do not lower to bottom!)

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: MW8-10D	**EA Personnel:** H. Williams	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Partly sunny / ~75F
Sounding Method: Solinst WLM	**Gauge Date:** 6/10/2014 **Gauge Time:** 11:45:00	**Measurement Ref:** TOC
Stick Up/Down (ft): up, ~ 2.5 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 2"

Purge Date: 10-Jun-14	**Purge Time:** 1148
Purge Method: Low Flow	**Field Technician:** H. Williams

Well Volume

A. Well Depth (ft): 24.75	**D. Well Volume (ft):** 0.163	**Depth/Height of Top of PVC:** up, ~ 2.5 ft
B. Depth to Water (ft): 10.65	**E. Well Volume (gal) (C*D):** 2.2983	**Pump Type:** peristaltic pump
C. Liquid Depth (ft) (A-B): 14.1	**F. Three Well Volumes (gal) (E3):** 6.8949	**Pump Intake Depth:** 24 ft.

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
1152	7.60	2.28	27.9	0.57	16.65	69	10.68	0.30	0
1155	7.45	2.30	41.6	0.00	16.15	57	10.68	0.30	0.9
1158	7.36	2.32	40.6	0.00	15.94	46	10.68	0.30	1.8
1201	7.33	2.33	35.3	0.00	15.48	41	10.67	0.30	2.7
1204	7.31	2.34	31.8	0.00	15.54	35	10.67	0.30	3.6
1207	7.29	2.34	25.0	0.00	15.39	31	10.67	0.30	4.5
1210	7.28	2.34	20.9	0.00	15.37	25	10.67	0.30	5.4
1213	7.27	2.36	16.9	0.00	15.41	20	10.66	0.30	6.3
1216	7.27	2.39	16.2	0.00	15.26	19	10.66	0.30	7.2
1219	7.27	2.40	15.6	0.00	15.10	18	10.66	0.30	8.1

Total Quantity of Water Removed (gal):	2.14	**Sampling Time:**	1225
Samplers:	H. Williams	**Split Sample With:**	DUP
Sampling Date:	6/10/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: Collected duplicate sample: MW8-FD-140610

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: MW8-1	**EA Personnel:** H. Williams	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good - PVC slightly cracked	**Weather:** Overcast, hazy / ~70F
Sounding Method: Solinst WLM	**Gauge Date:** 6/10/2014 **Gauge Time:** 9:55:00	**Measurement Ref:** TOC
Stick Up/Down (ft): flush, ~0.1 ft btoc	**PID Headspace Reading:** NA	**Well Diameter (in):** 2"

Purge Date: 10-Jun-14	**Purge Time:** 958
Purge Method: Low Flow	**Field Technician:** H. Williams

Well Volume

A. Well Depth (ft): 13.75	**D. Well Volume (ft):** 0.163	**Depth/Height of Top of PVC:** flush, ~0.1 ft btoc
B. Depth to Water (ft): 8.41	**E. Well Volume (gal) (C*D):** 0.87042	**Pump Type:** peristaltic pump
C. Liquid Depth (ft) (A-B): 5.34	**F. Three Well Volumes (gal) (E3):** 2.61126	**Pump Intake Depth:** 13 ft

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
1001	7.31	1.69	25.0	0.00	20.99	-113	8.41	0.30	0
1004	7.25	1.74	18.6	0.00	20.48	-131	8.41	0.30	0.9
1007	7.22	1.77	11.3	0.00	19.95	-144	8.41	0.30	1.8
1010	7.21	2.05	24.2	0.00	14.99	-154	8.41	0.30	2.7
1013	7.21	2.06	10.4	0.00	14.53	-160	8.41	0.30	3.6
1016	7.2	2.05	3.2	0.00	14.52	-166	8.41	0.30	4.5
1019	7.19	2.04	2.4	0.00	14.45	-169	8.41	0.30	5.4
1022	7.18	2.05	5.2	0.00	14.44	-174	8.41	0.30	6.3
1025	7.18	2.03	3.6	0.00	14.44	-178	8.41	0.30	7.2

Total Quantity of Water Removed (gal):	1.90	**Sampling Time:**	1030
Samplers:	H. Williams	**Split Sample With:**	MS/MSD
Sampling Date:	6/10/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS:

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Appendix H

Site 5 - Logs

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Appendix H-1

HPT Logs

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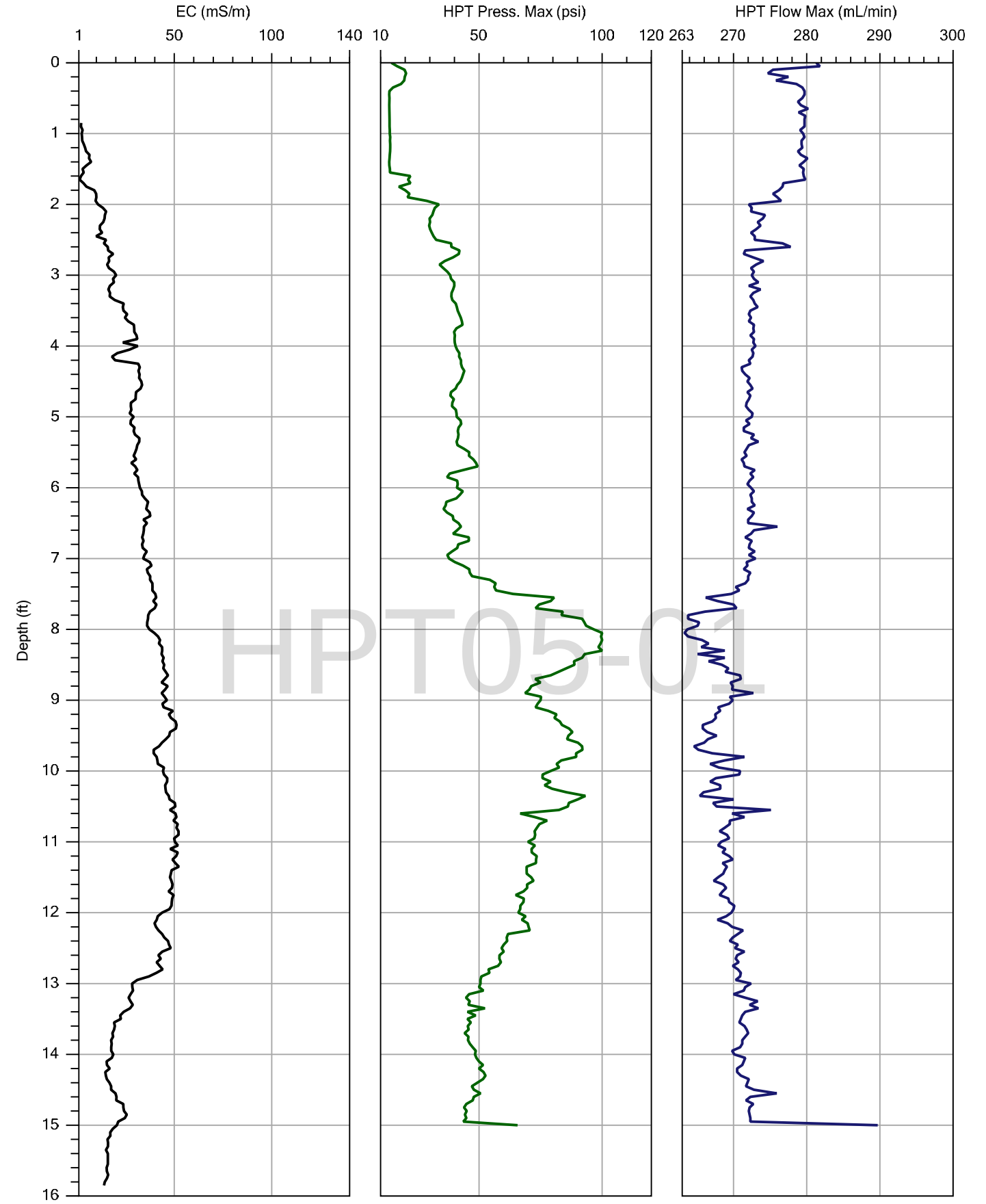

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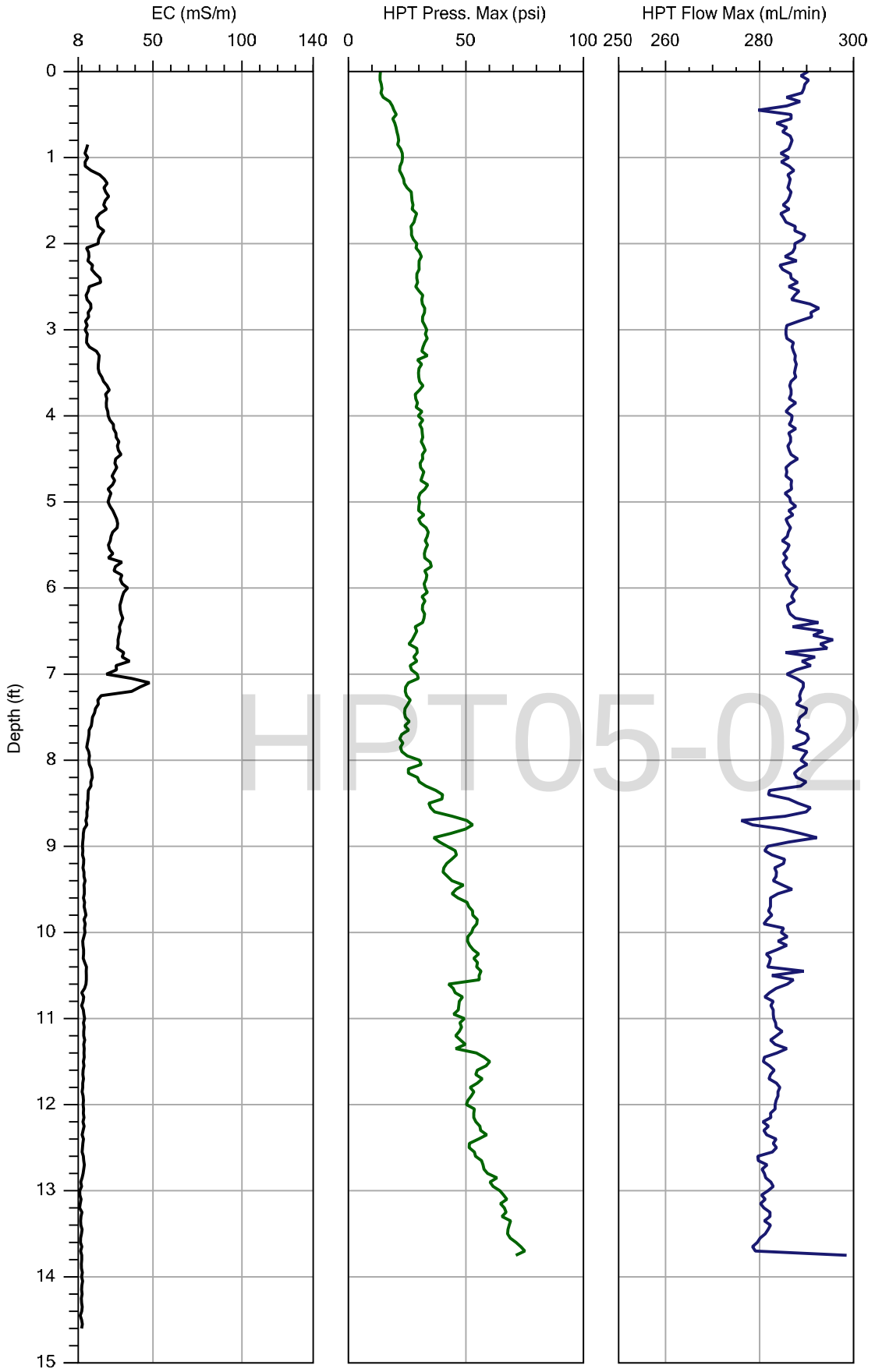

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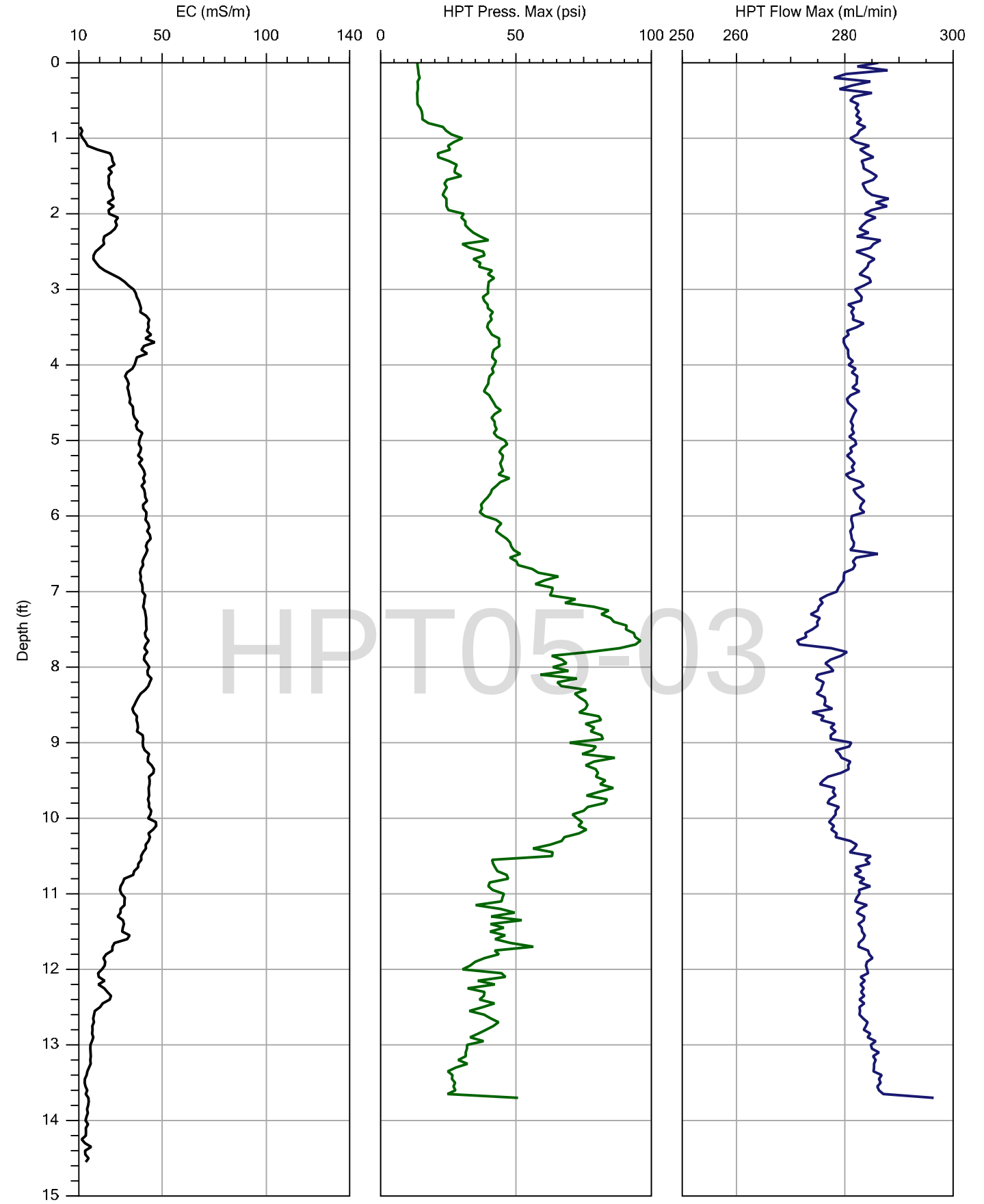

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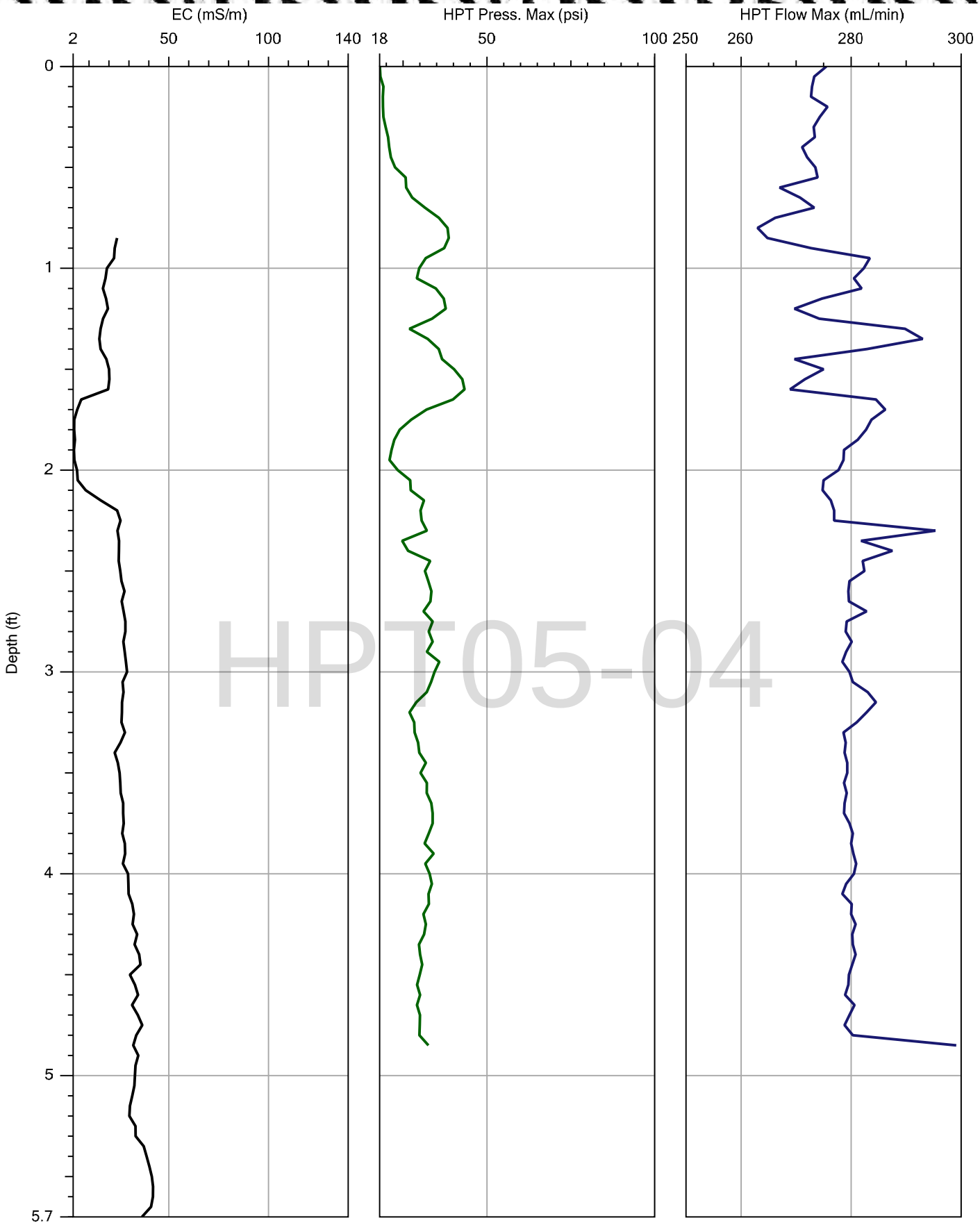

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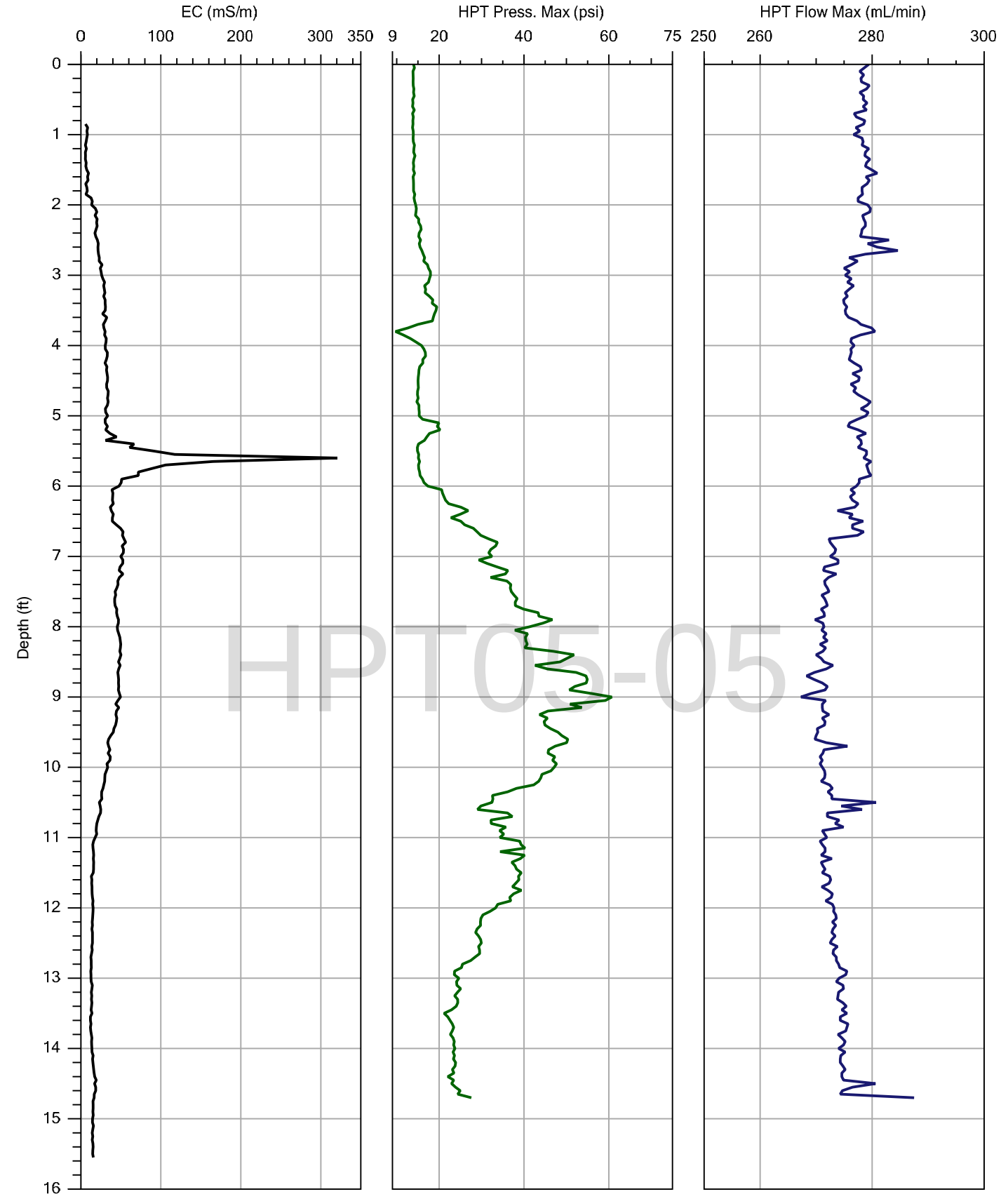

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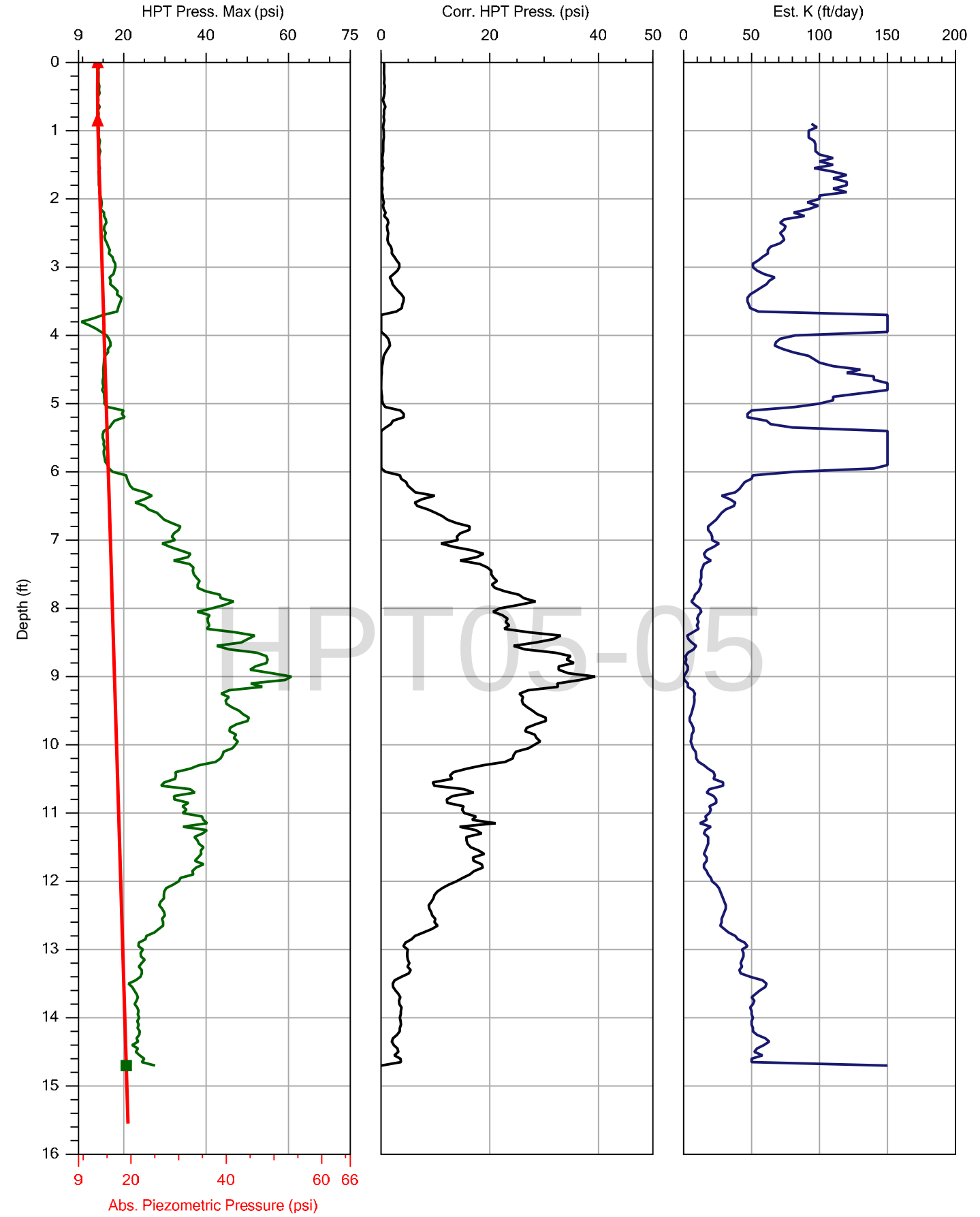

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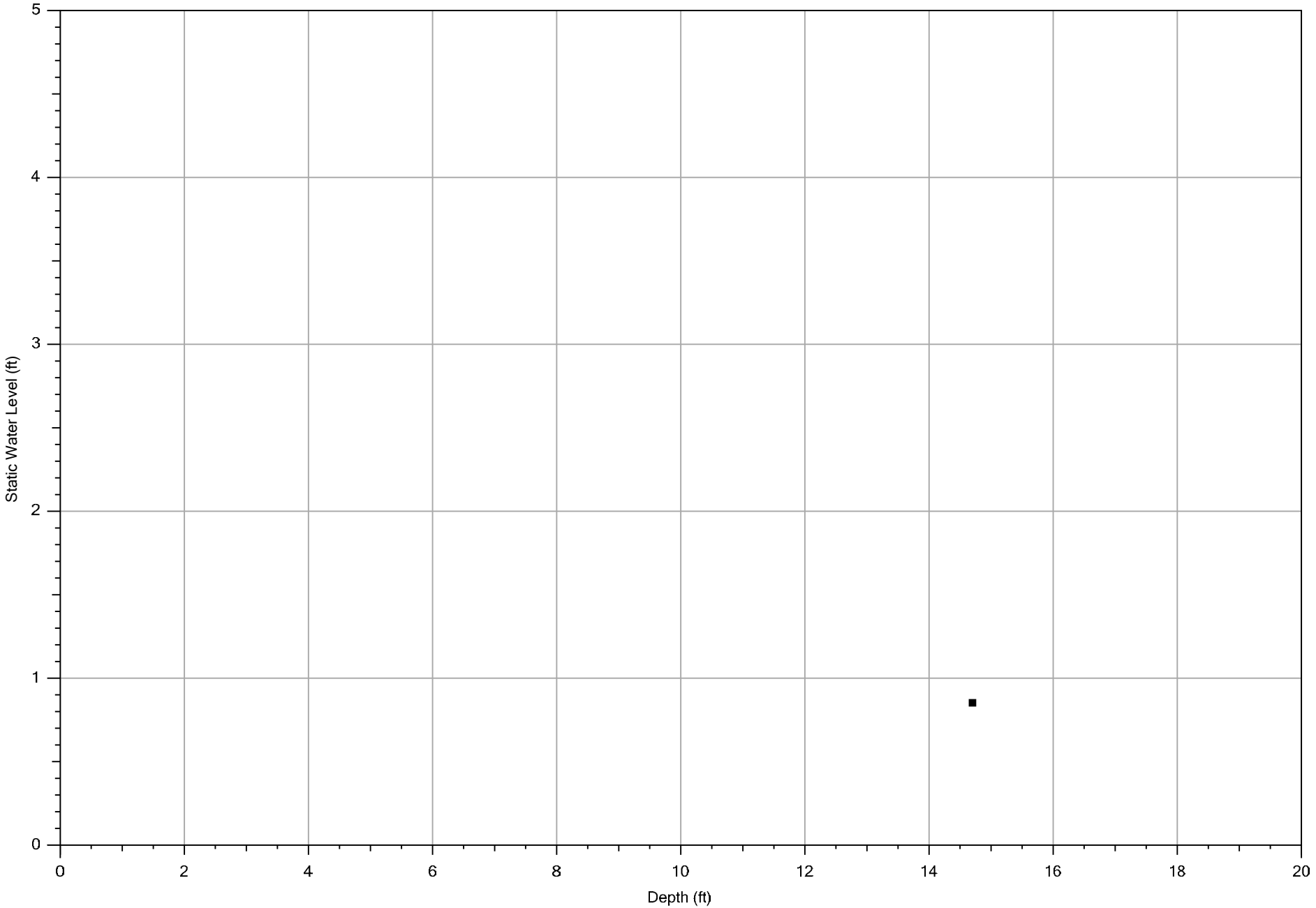
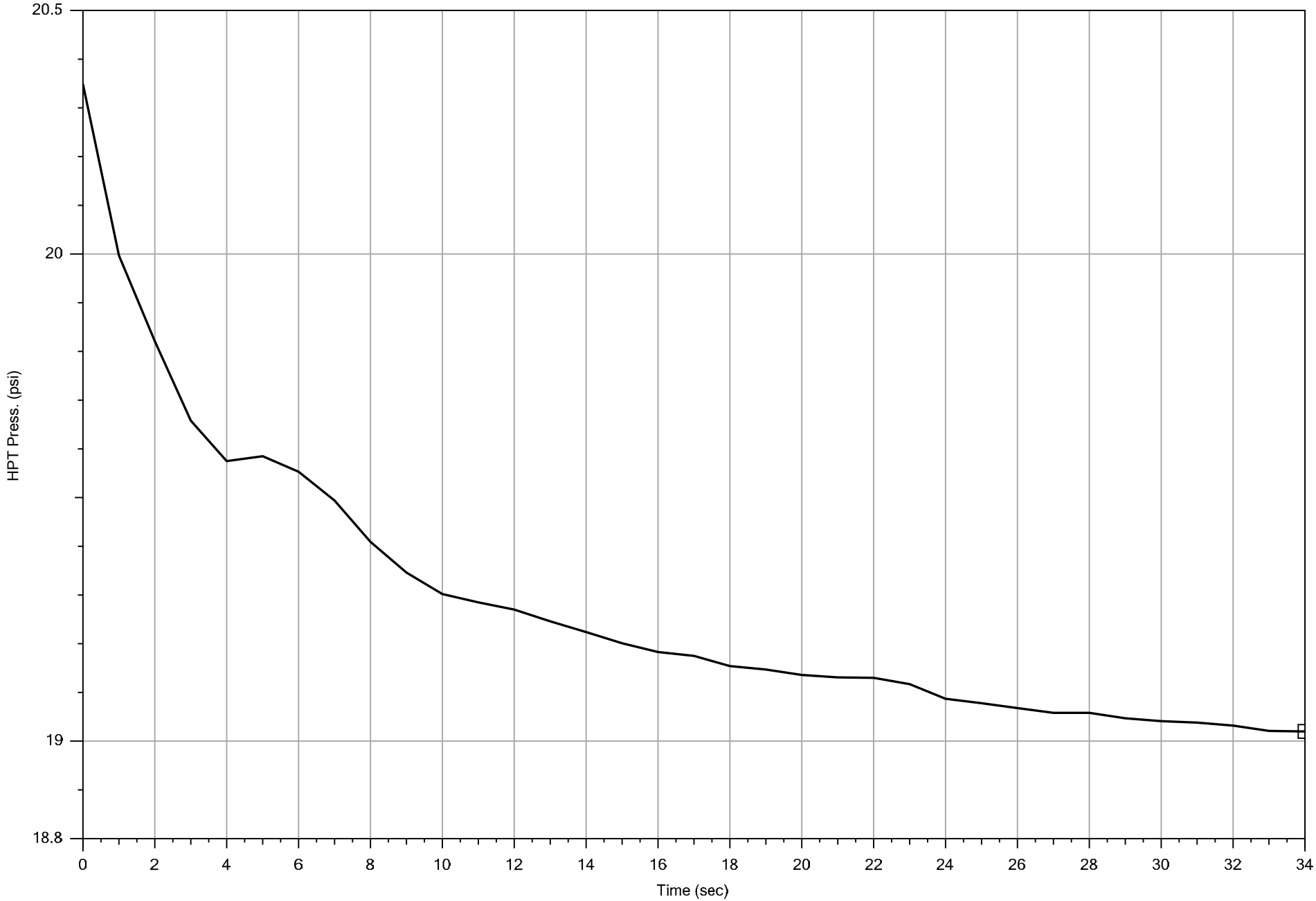


STATIC WATER LEVEL

Company: ZEBRA Environmental	Operator: Zach
Project ID: EA - 6265401	Client: EA

■ HPT05-05.HPT 4/3/2014



HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA Environmental	Operator: Zach	File: HPT05-05.TIM	Date: 4/3/2014
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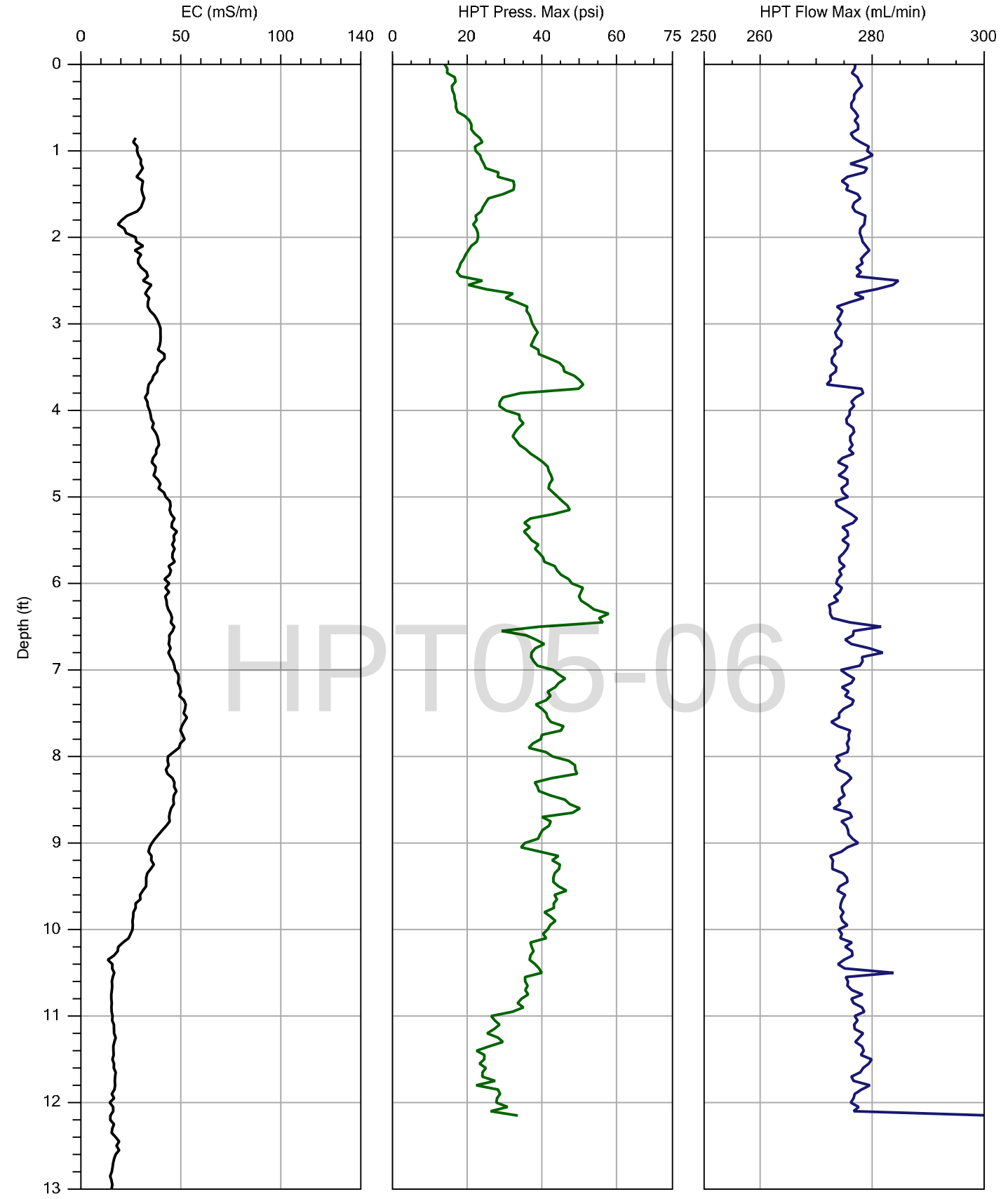

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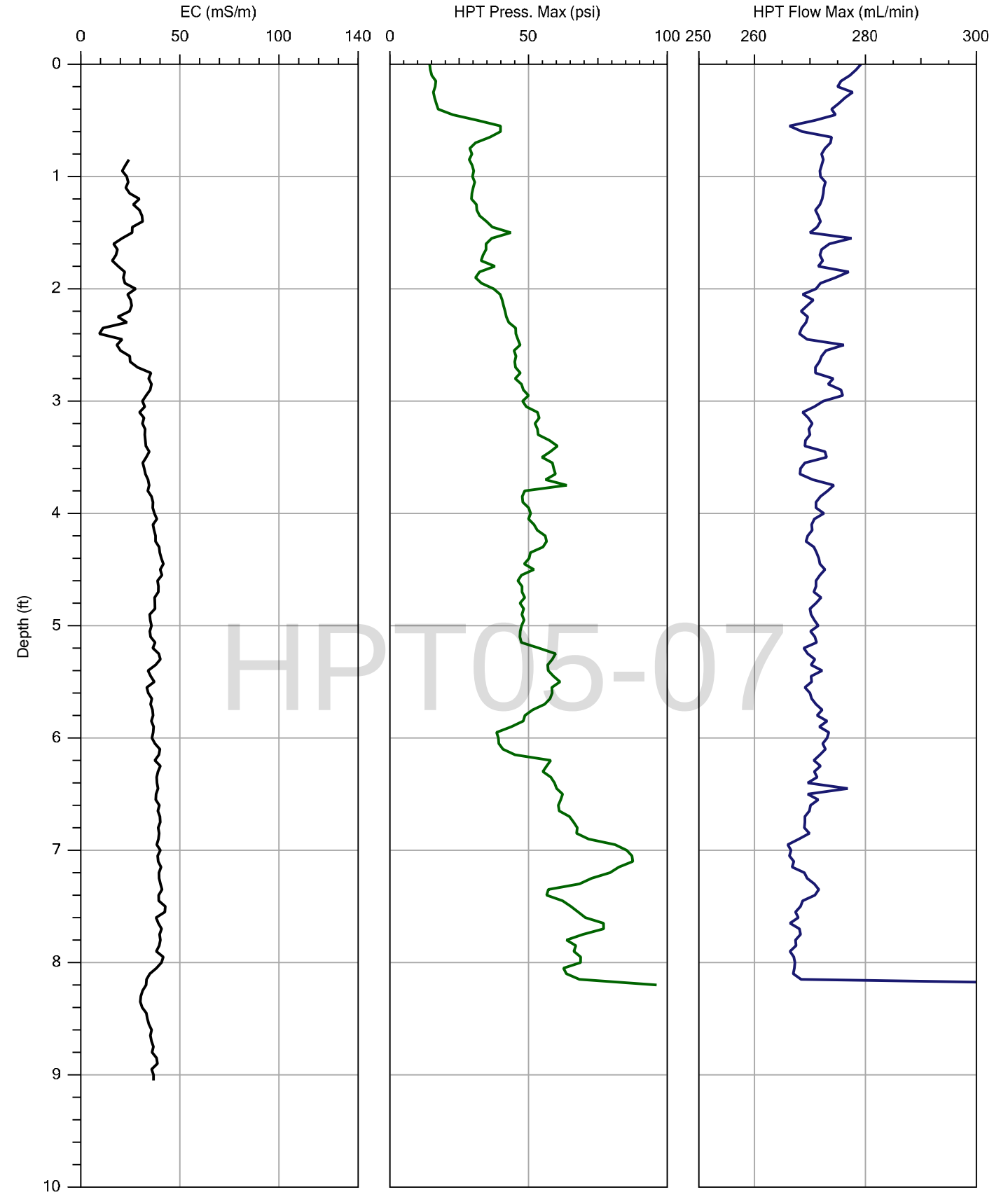

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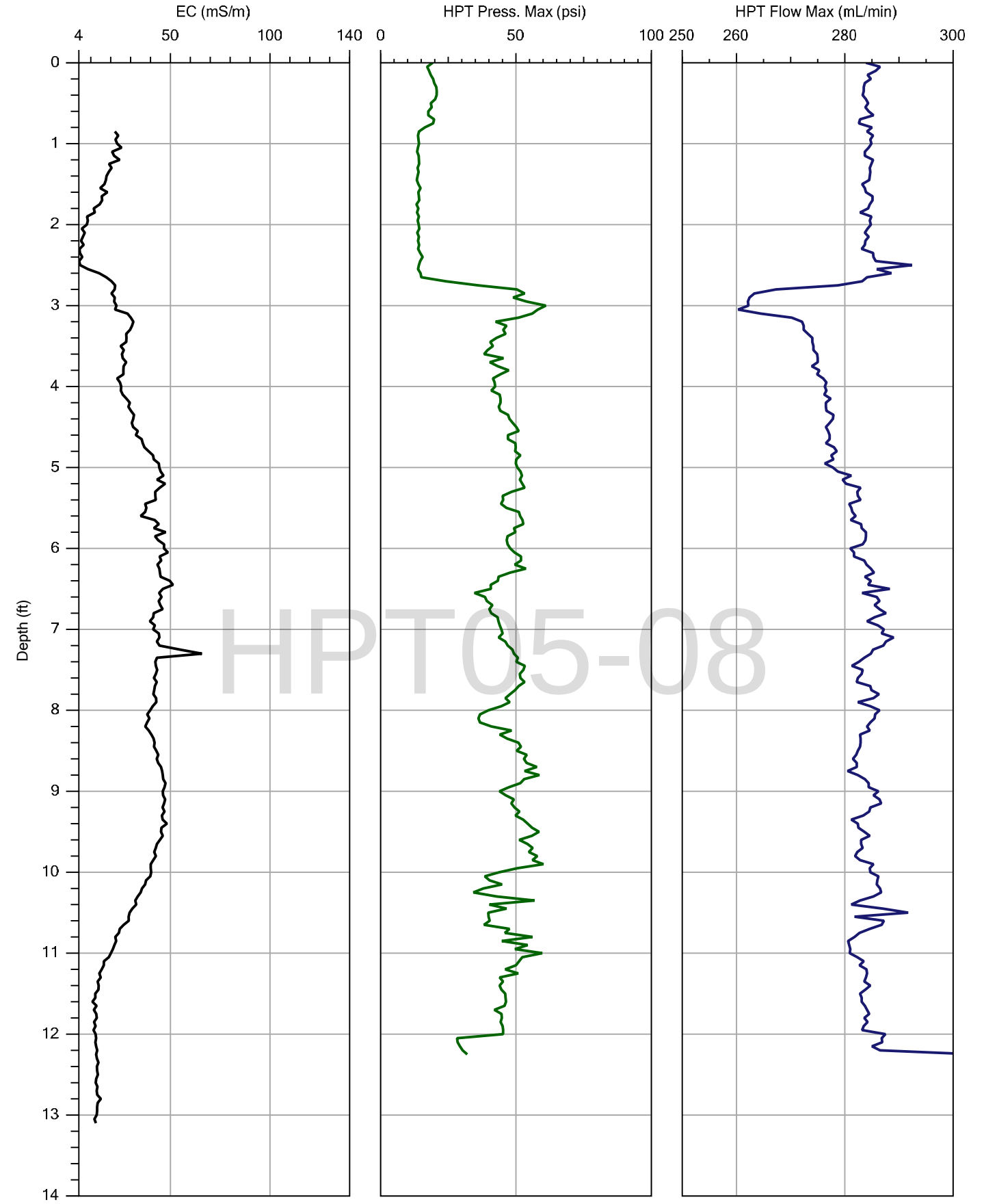

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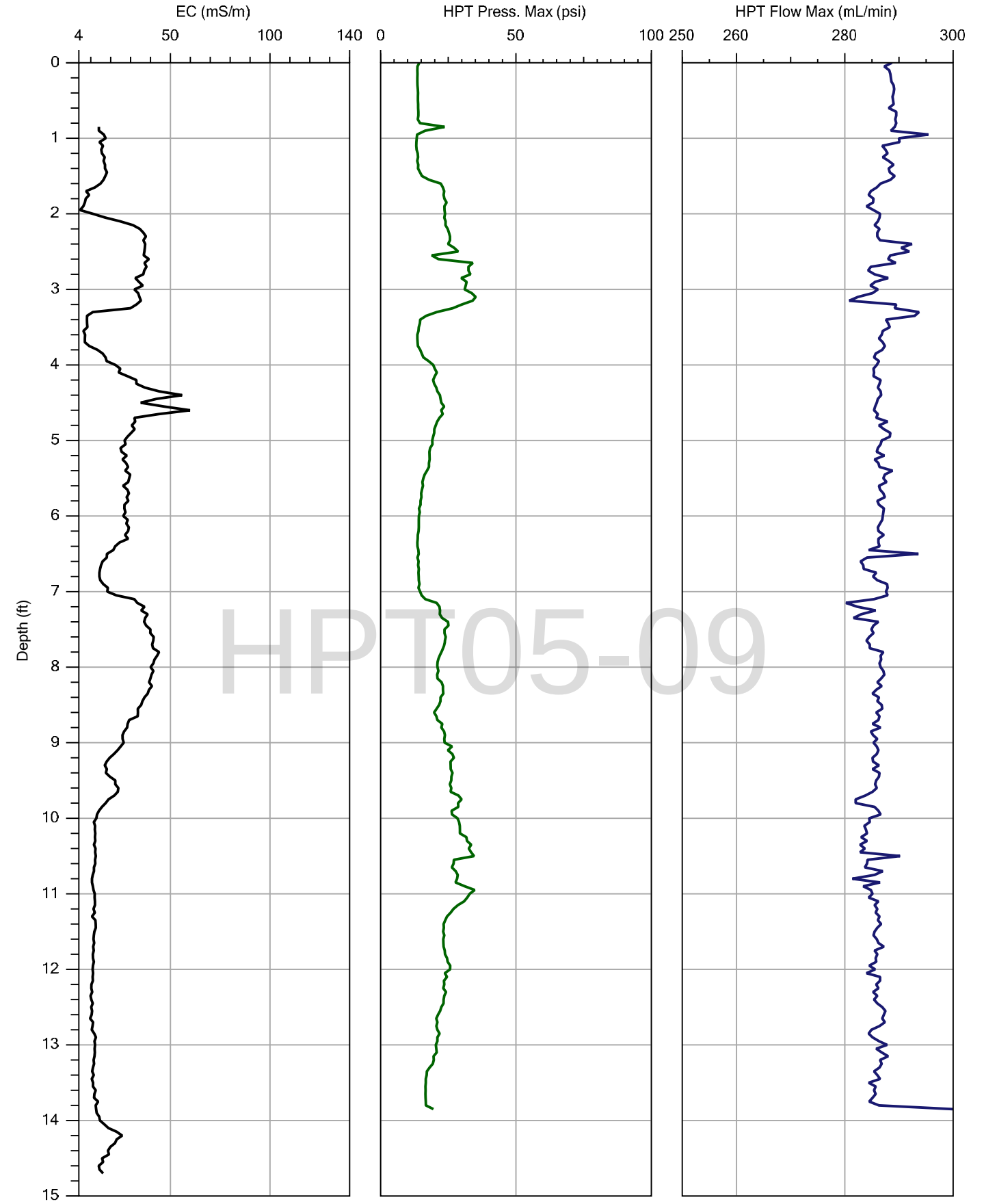

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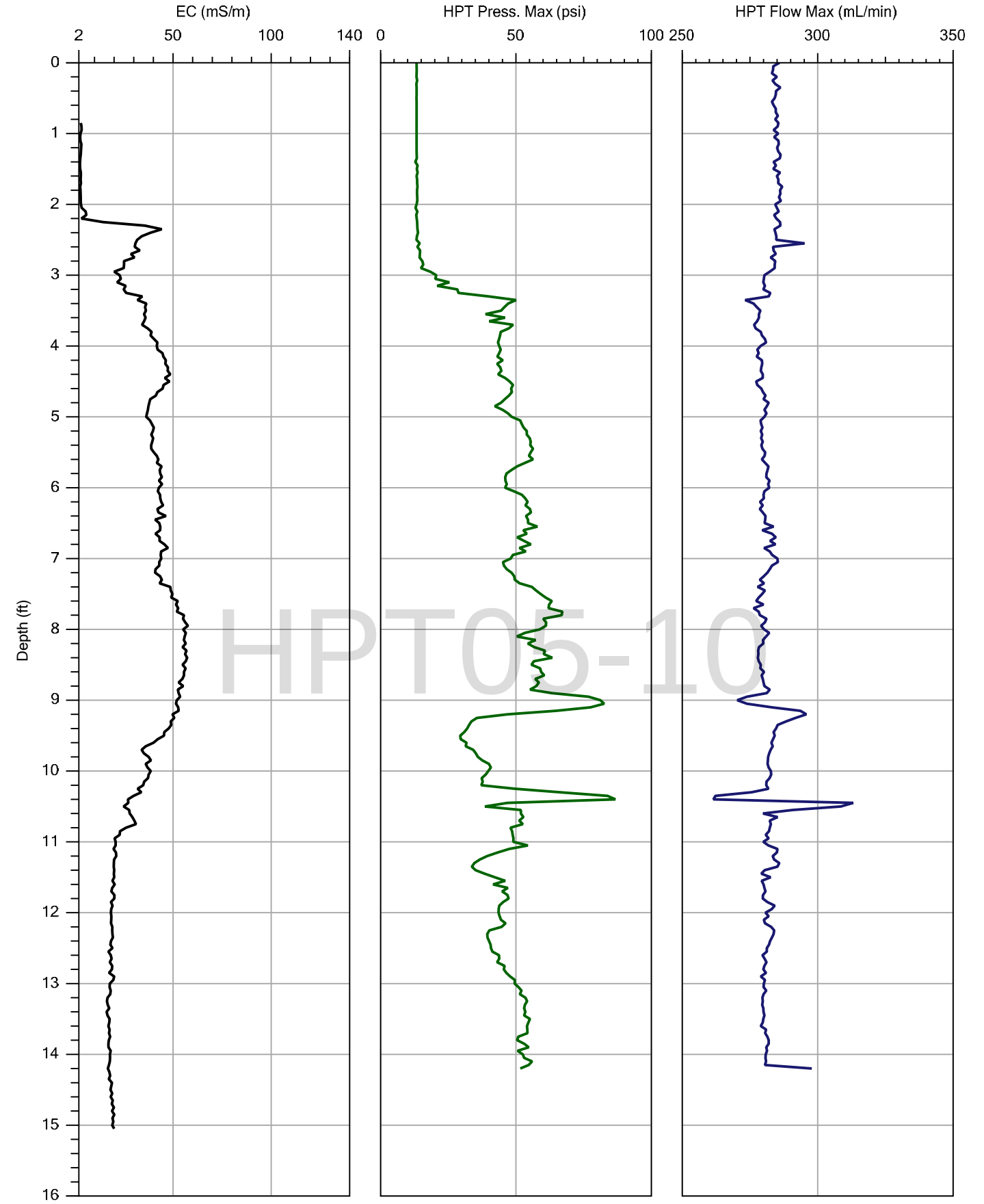

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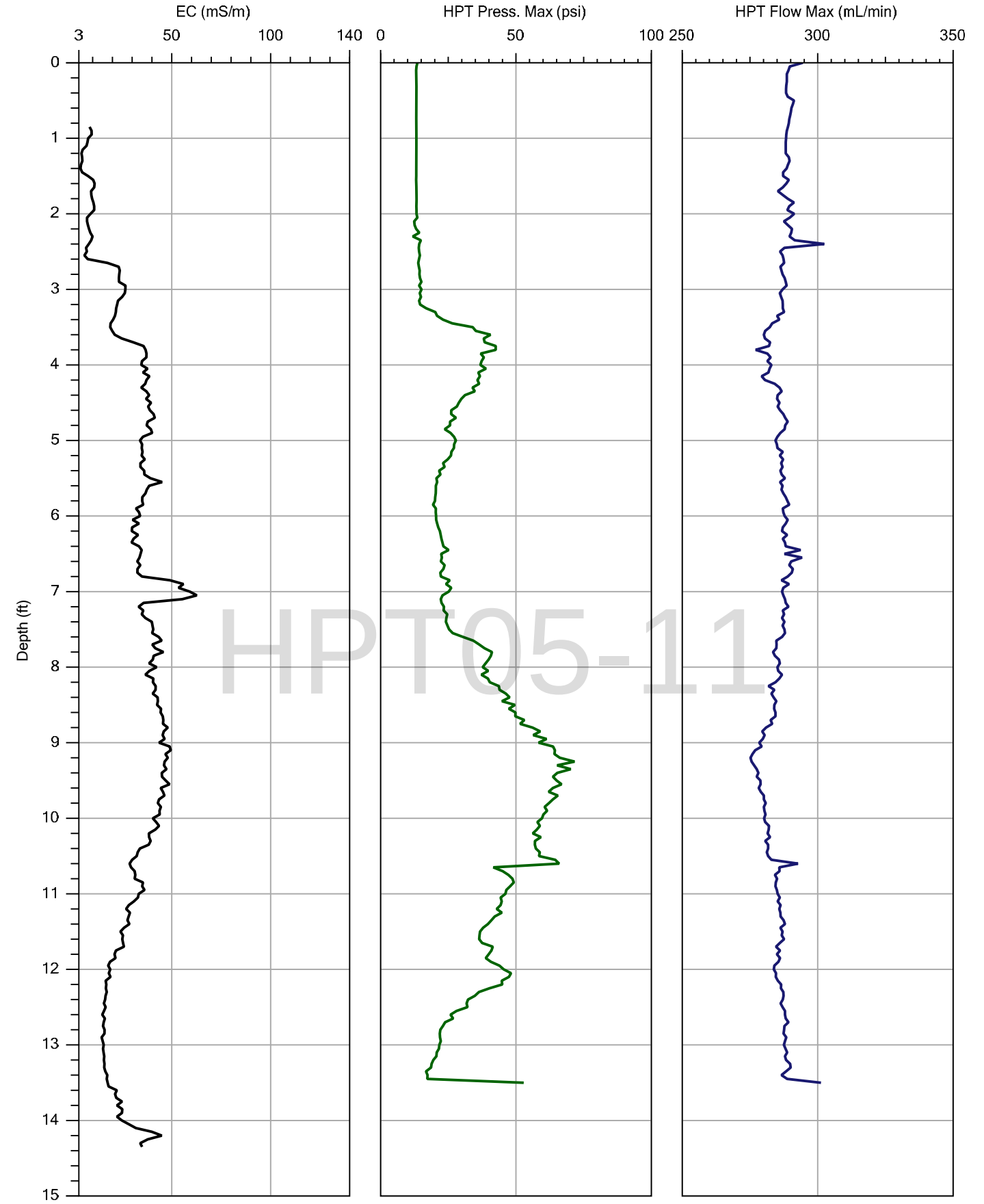

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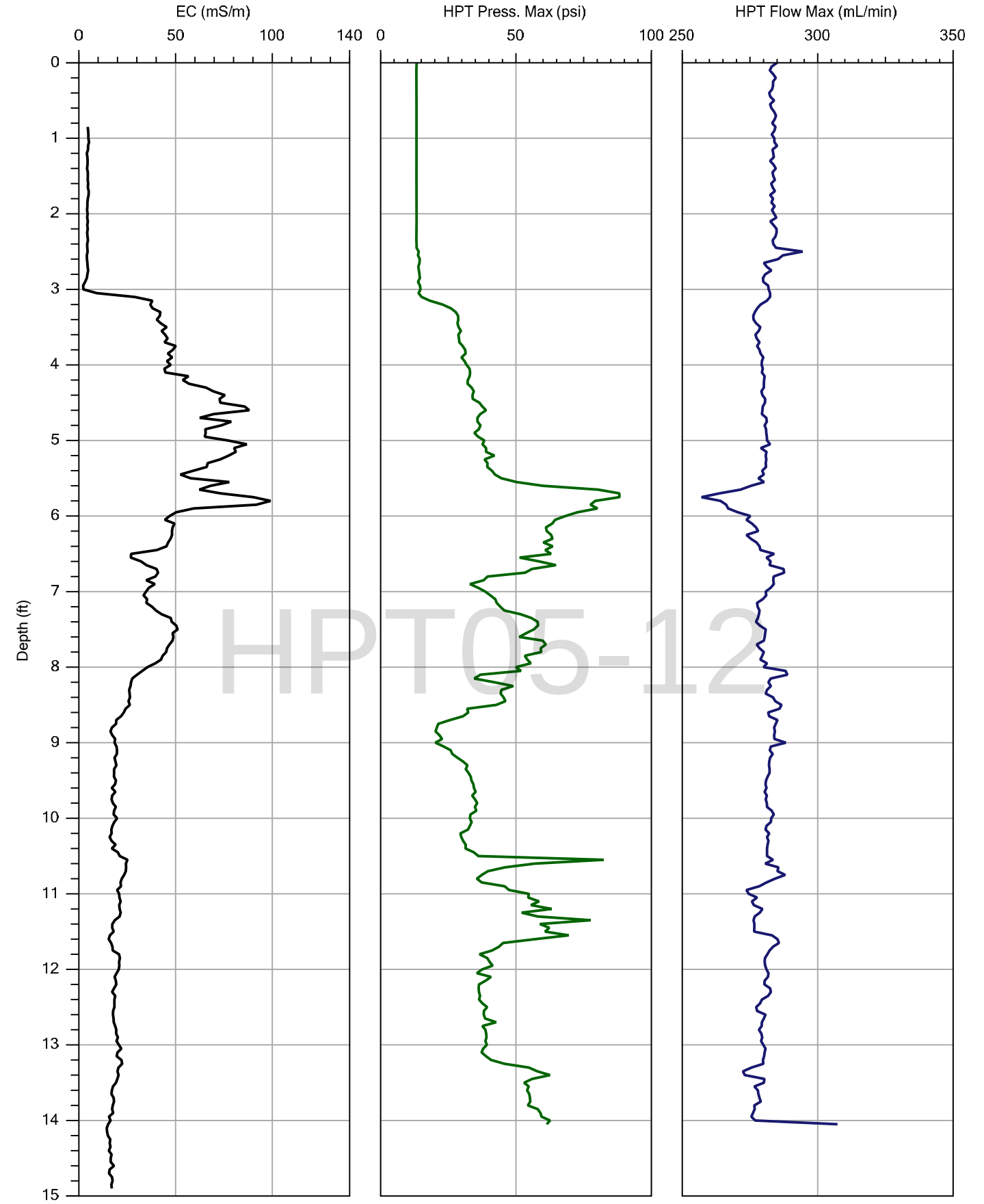

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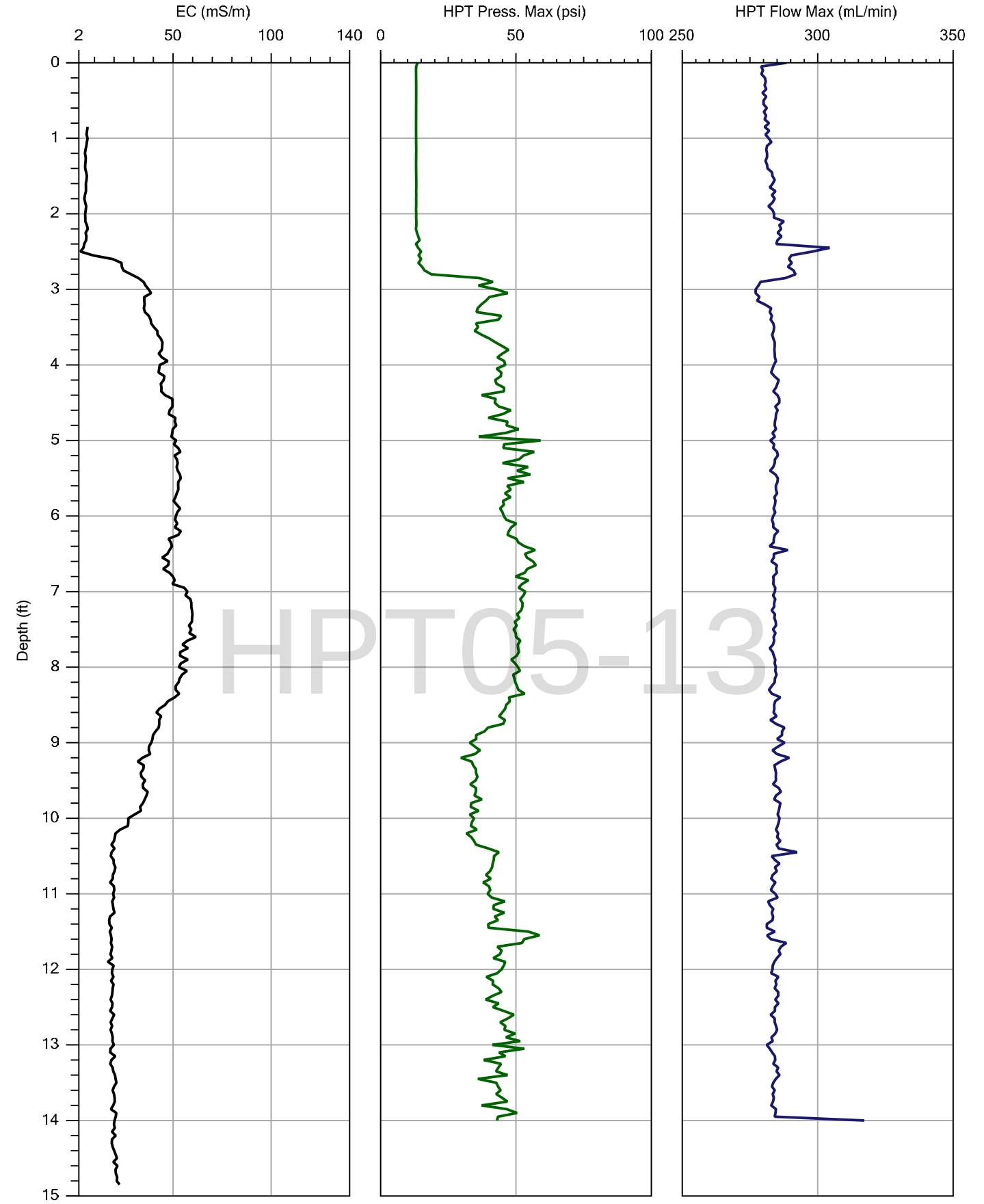

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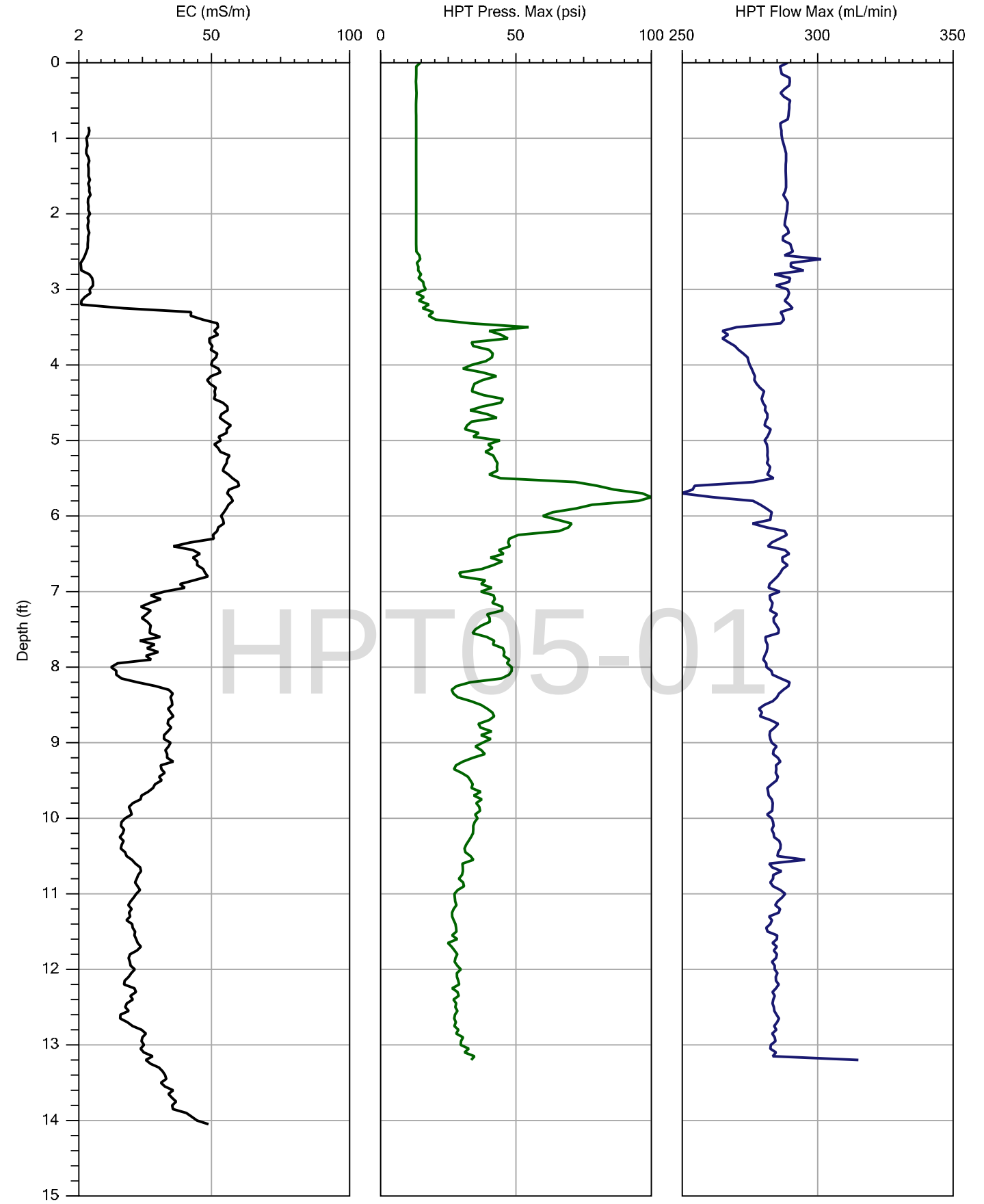

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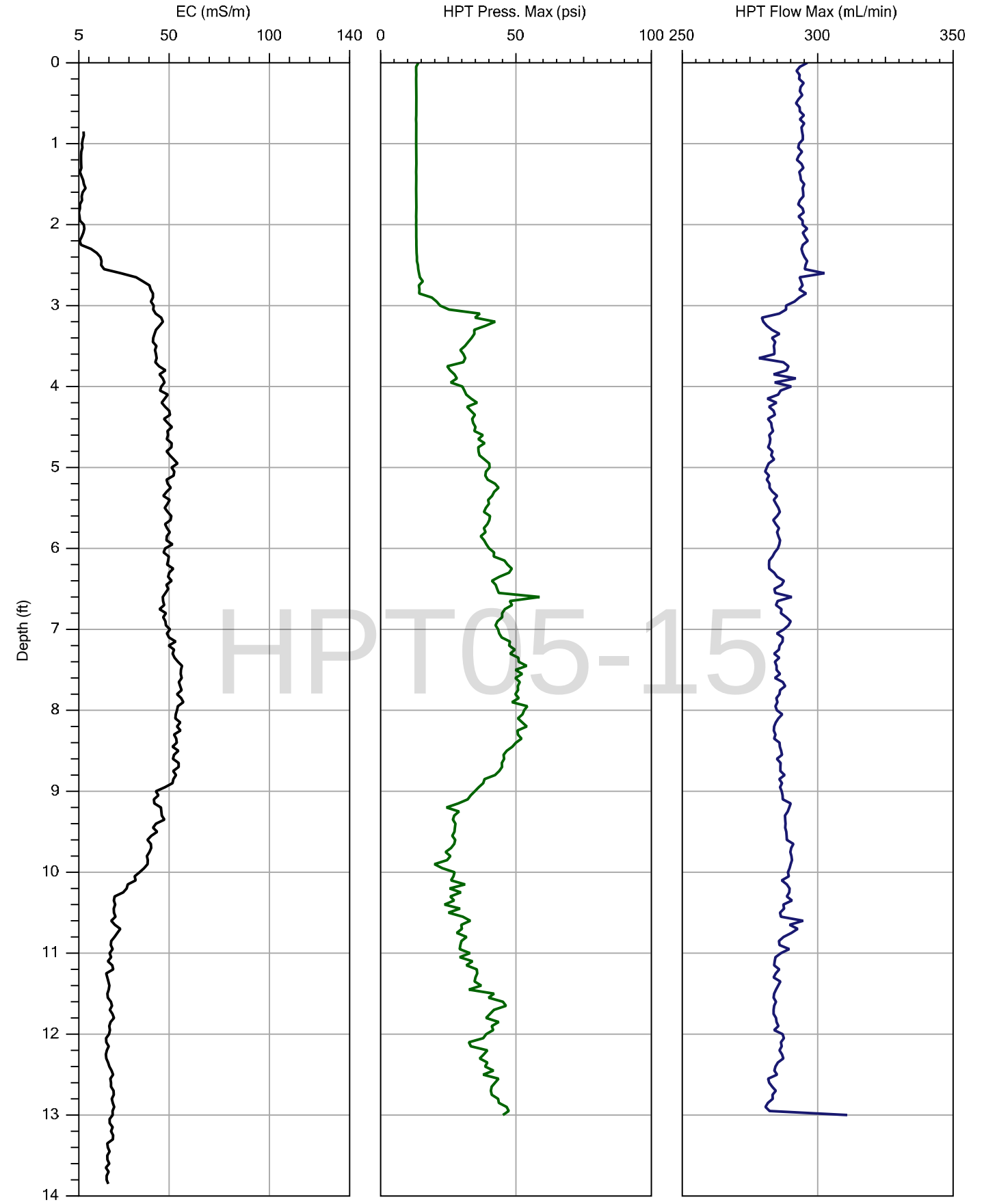

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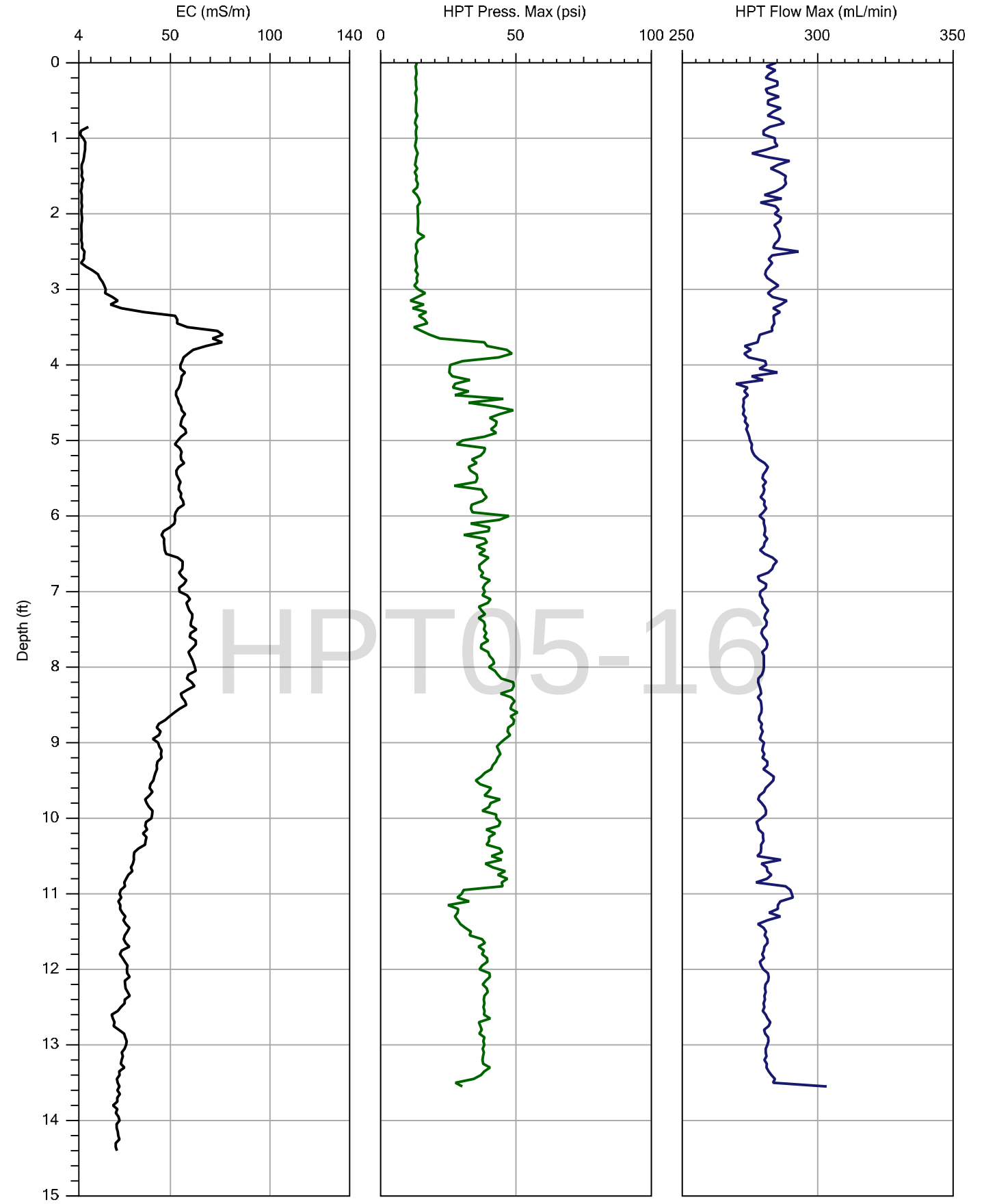

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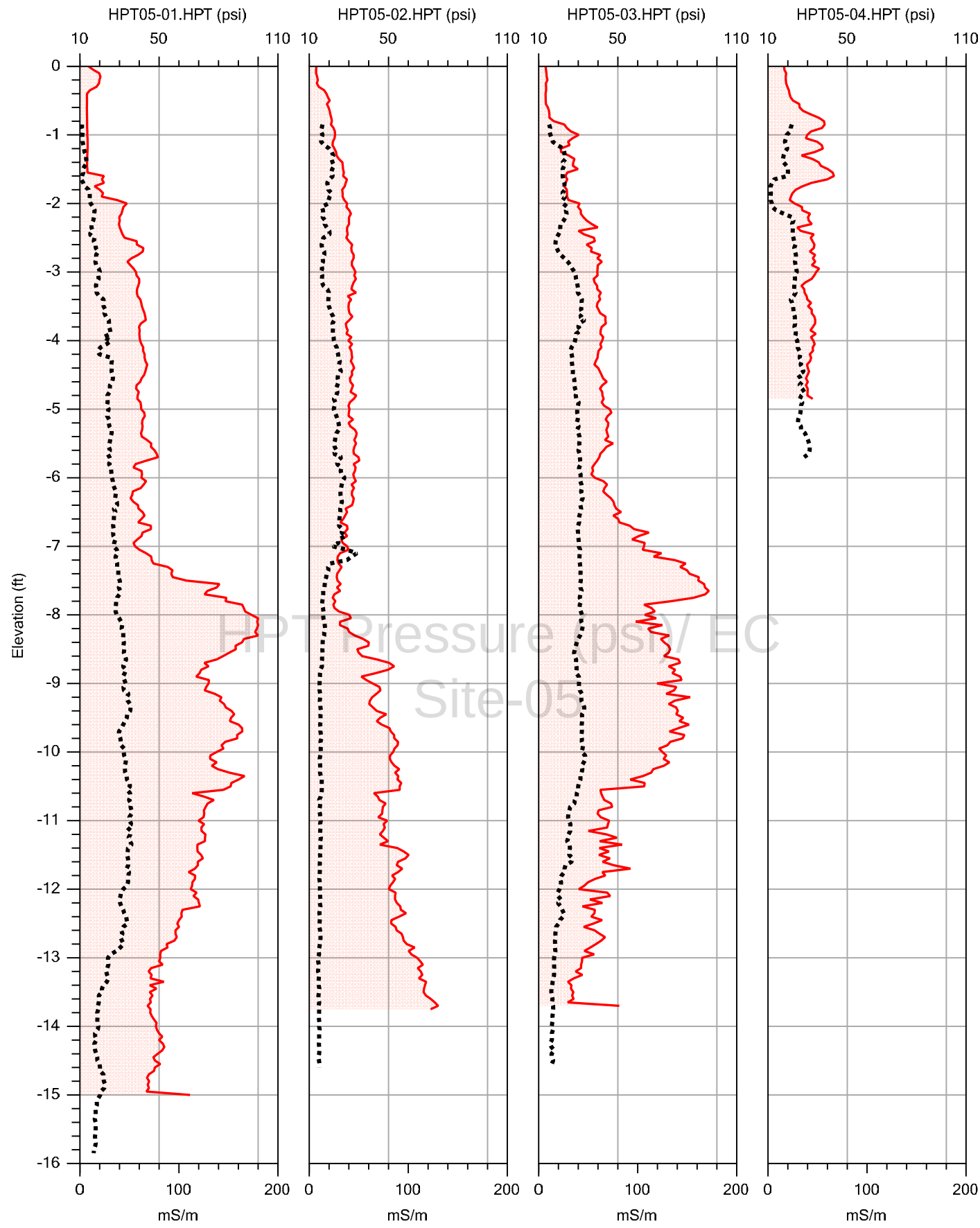

HPT Press. Max / EC

Company: ZEBRA	Operator: ZACH
Project ID:	Client: EA

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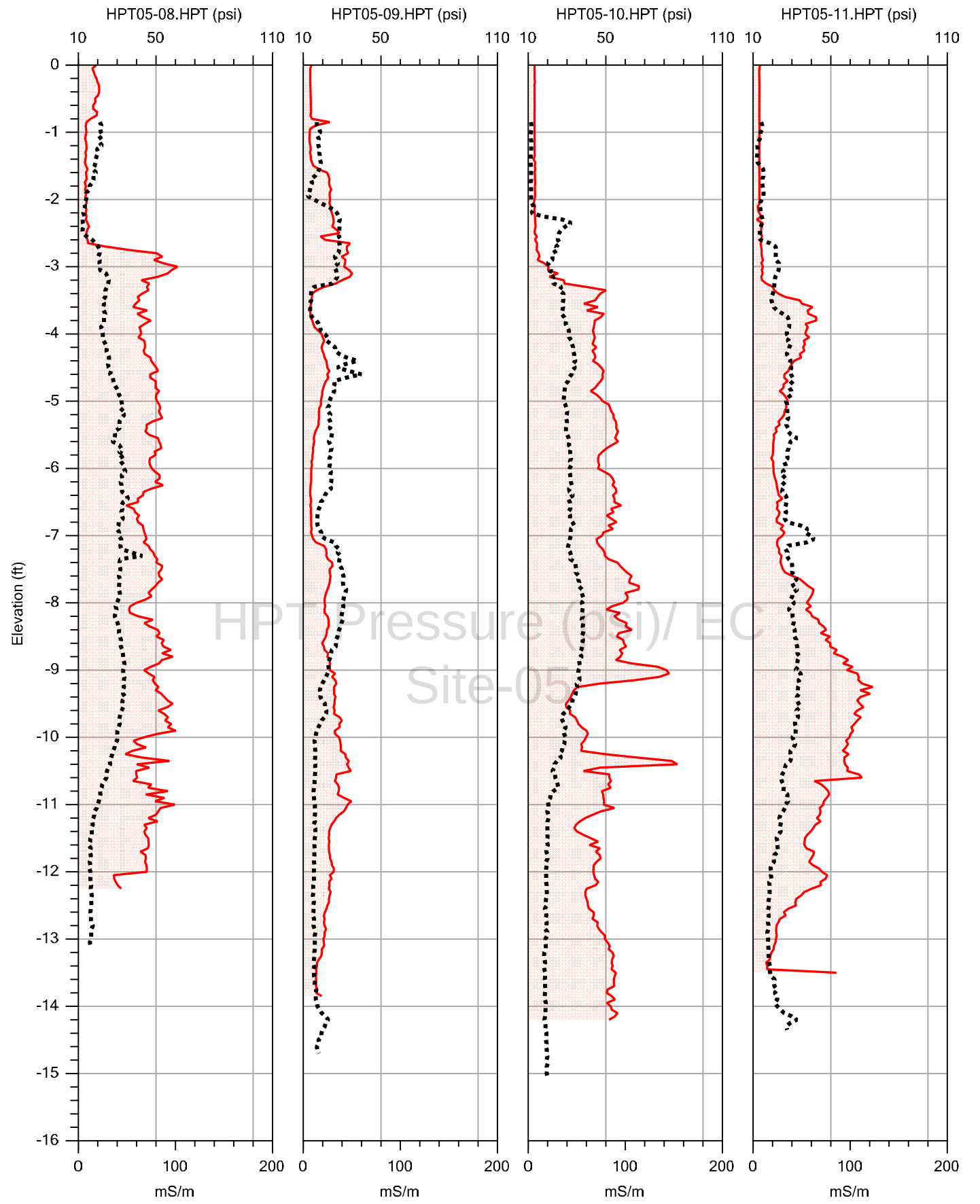
HPT05-02.HPT	4/4/2014
HPT05-03.HPT	4/4/2014
HPT05-04.HPT	4/4/2014



ZEBRA

HPT Press. Max / EC

Company: ZEBRA	Operator: ZACH
Project ID:	Client: EA

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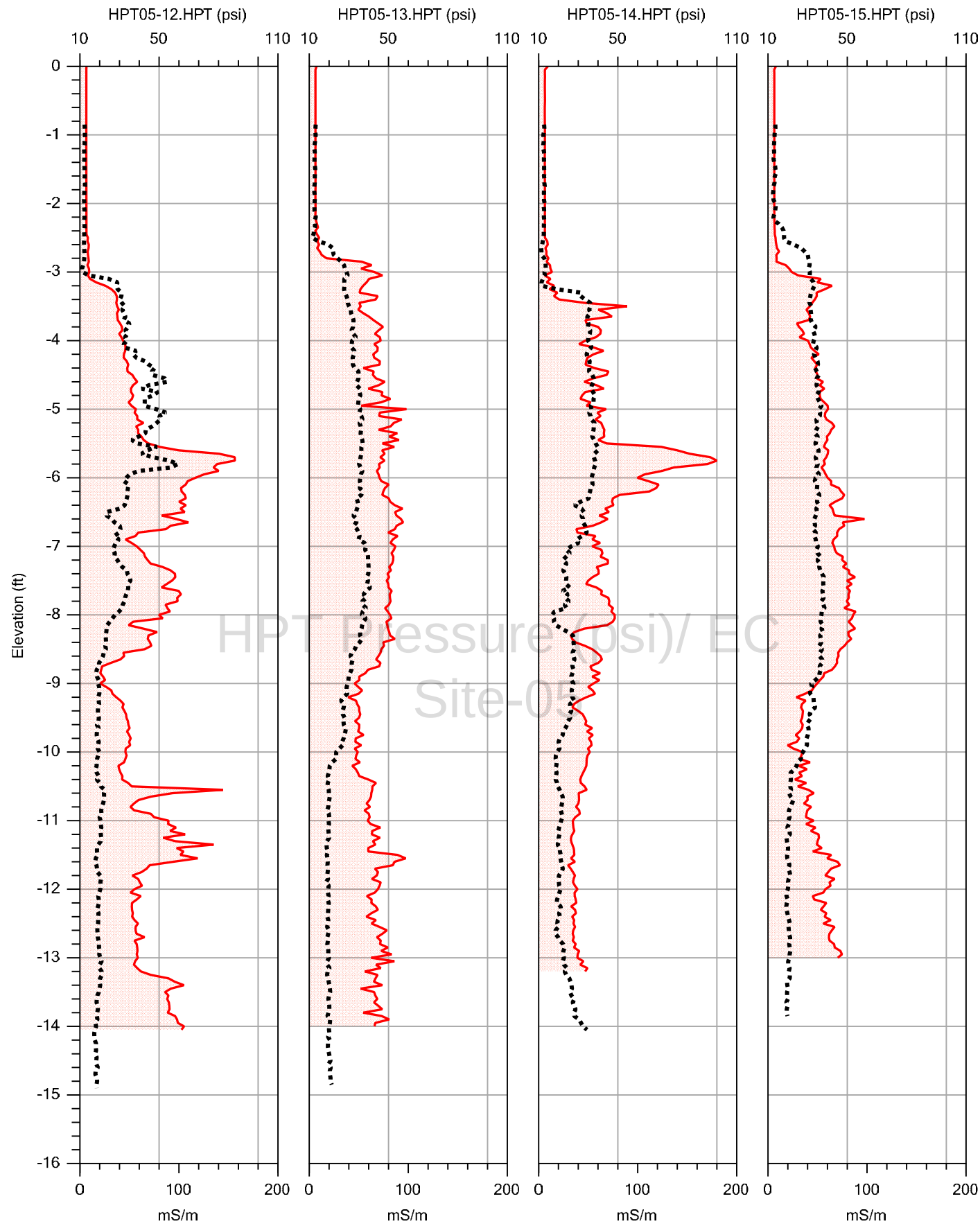
HPT05-09.HPT	4/4/2014
HPT05-10.HPT	4/4/2014
HPT05-11.HPT	4/4/2014

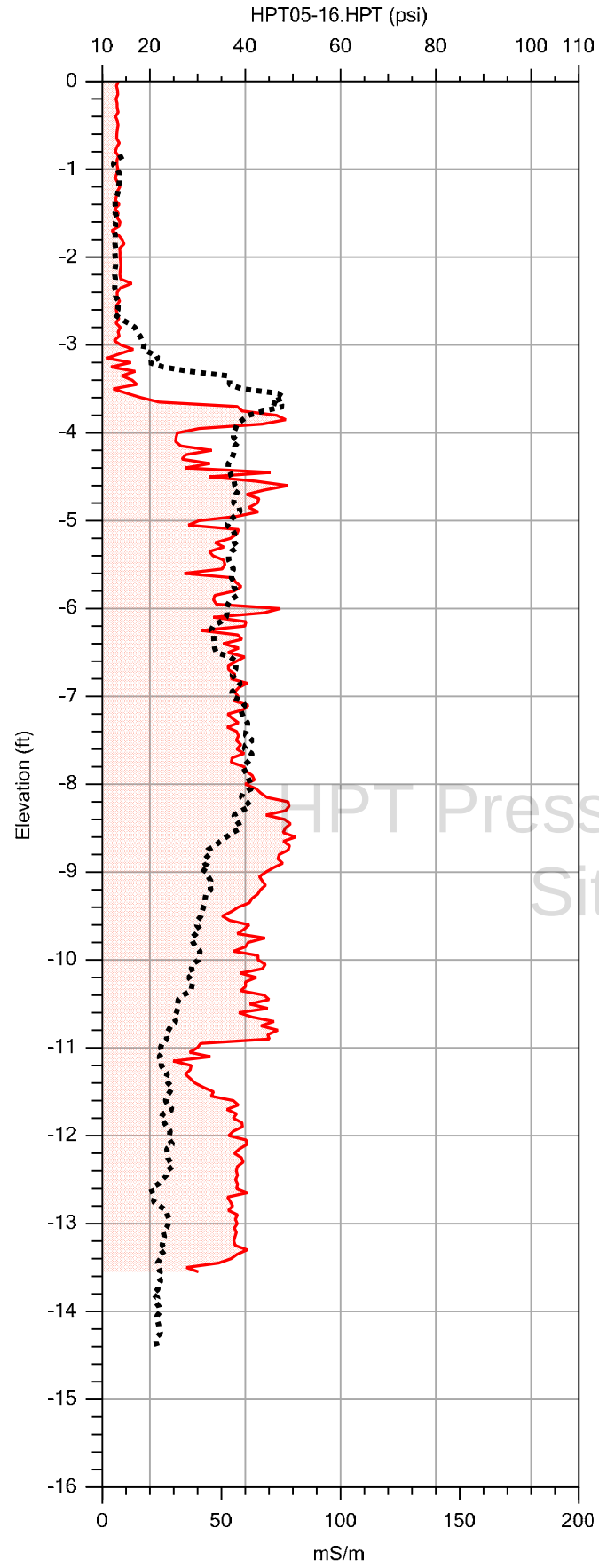


ZEBRA

HPT Press. Max / EC

Company: ZEBRA	Operator: ZACH
Project ID:	Client: EA

HPT05-12.HPT	4/4/2014
HPT05-13.HPT	4/4/2014
HPT05-14.HPT	4/4/2014
HPT05-15.HPT	4/4/2014



HPT Press. Max / EC		
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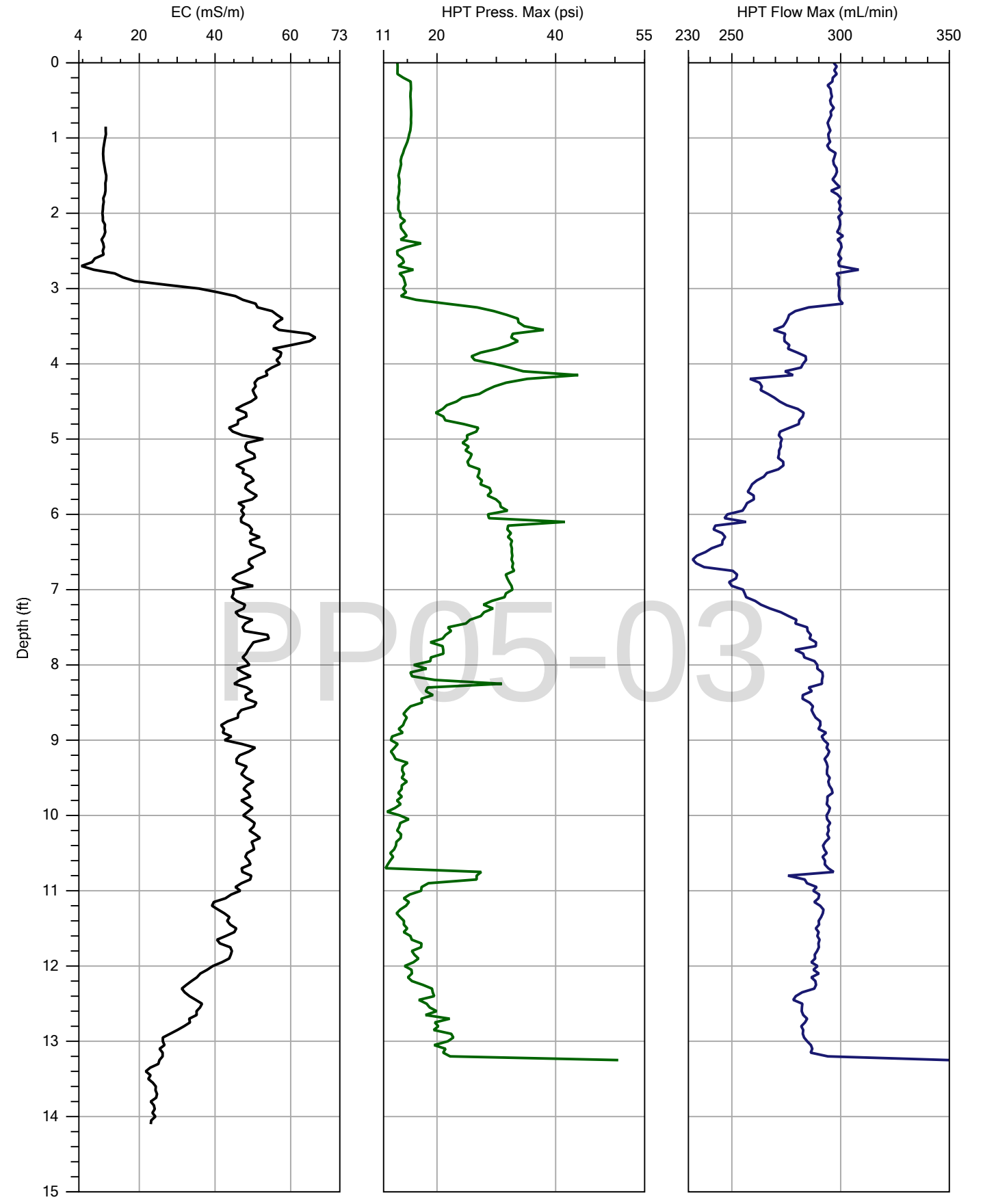
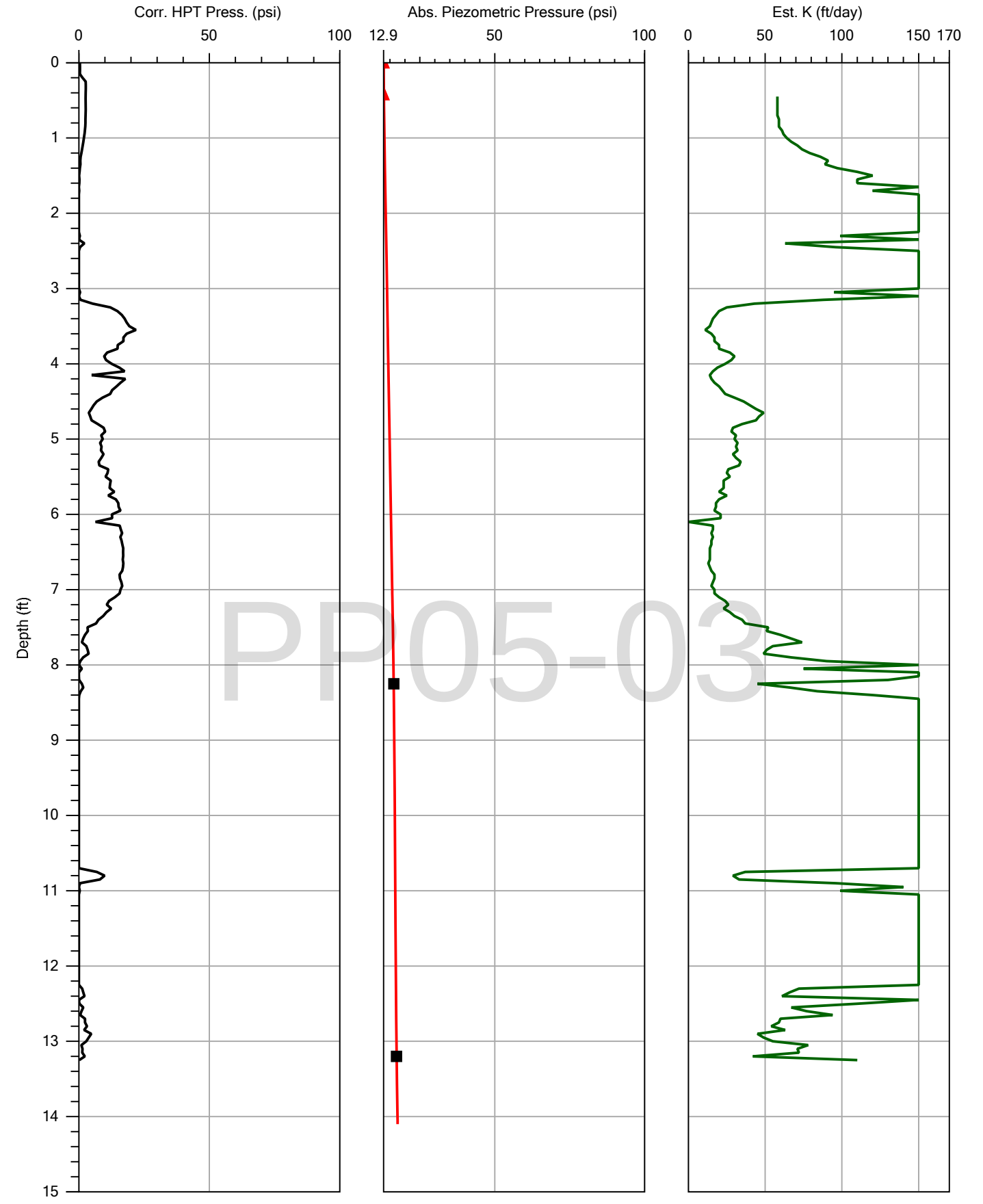
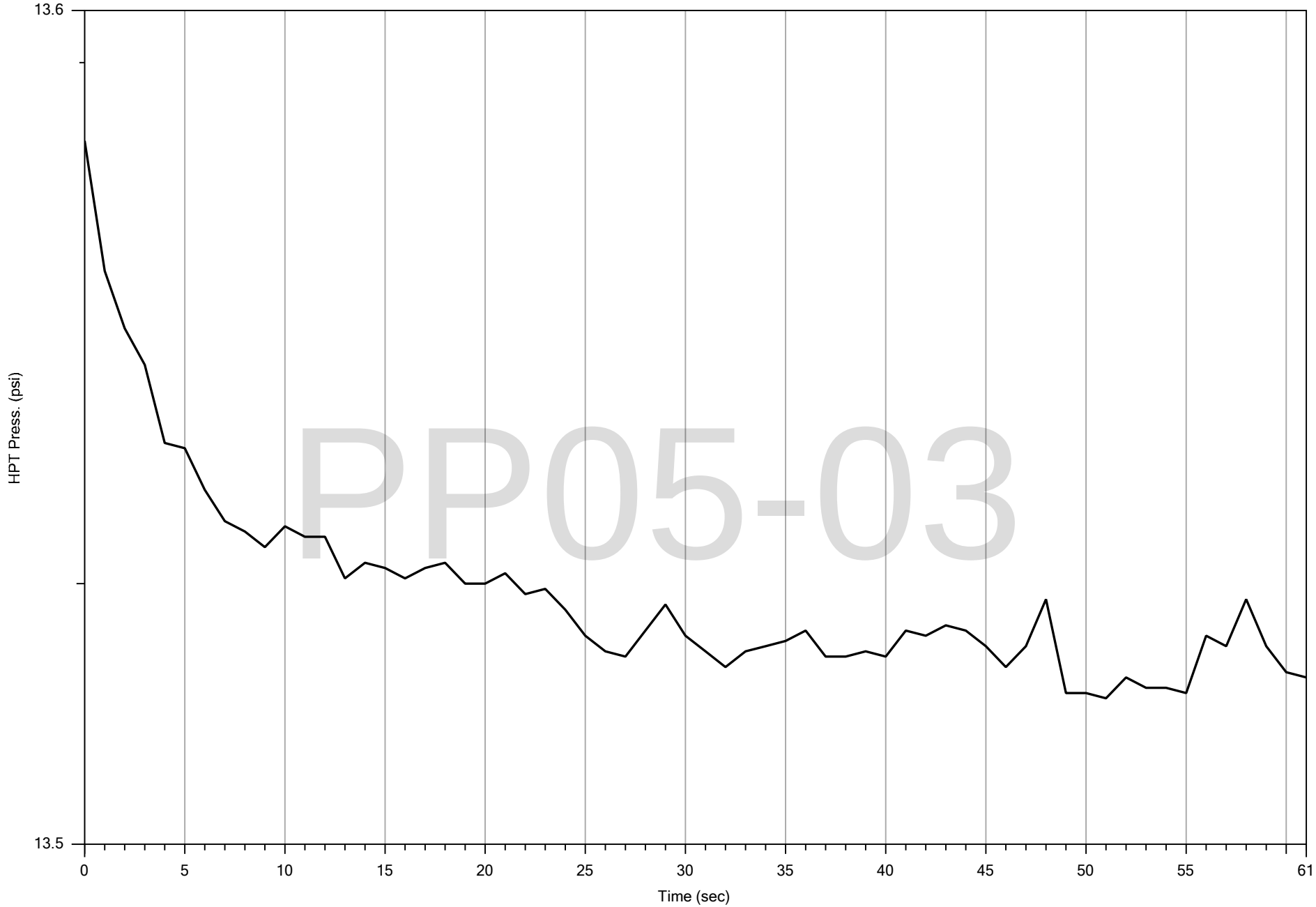
Company: ZEBRA	Operator: ZACH	Date: 4/4/2014
Project ID:	Client: EA	Location:



			File: PP5-03.HPT
Company: ZEBRA	Operator: Will M		Date: 4/30/2014
Project ID:	Client: EA Engineering		Location:

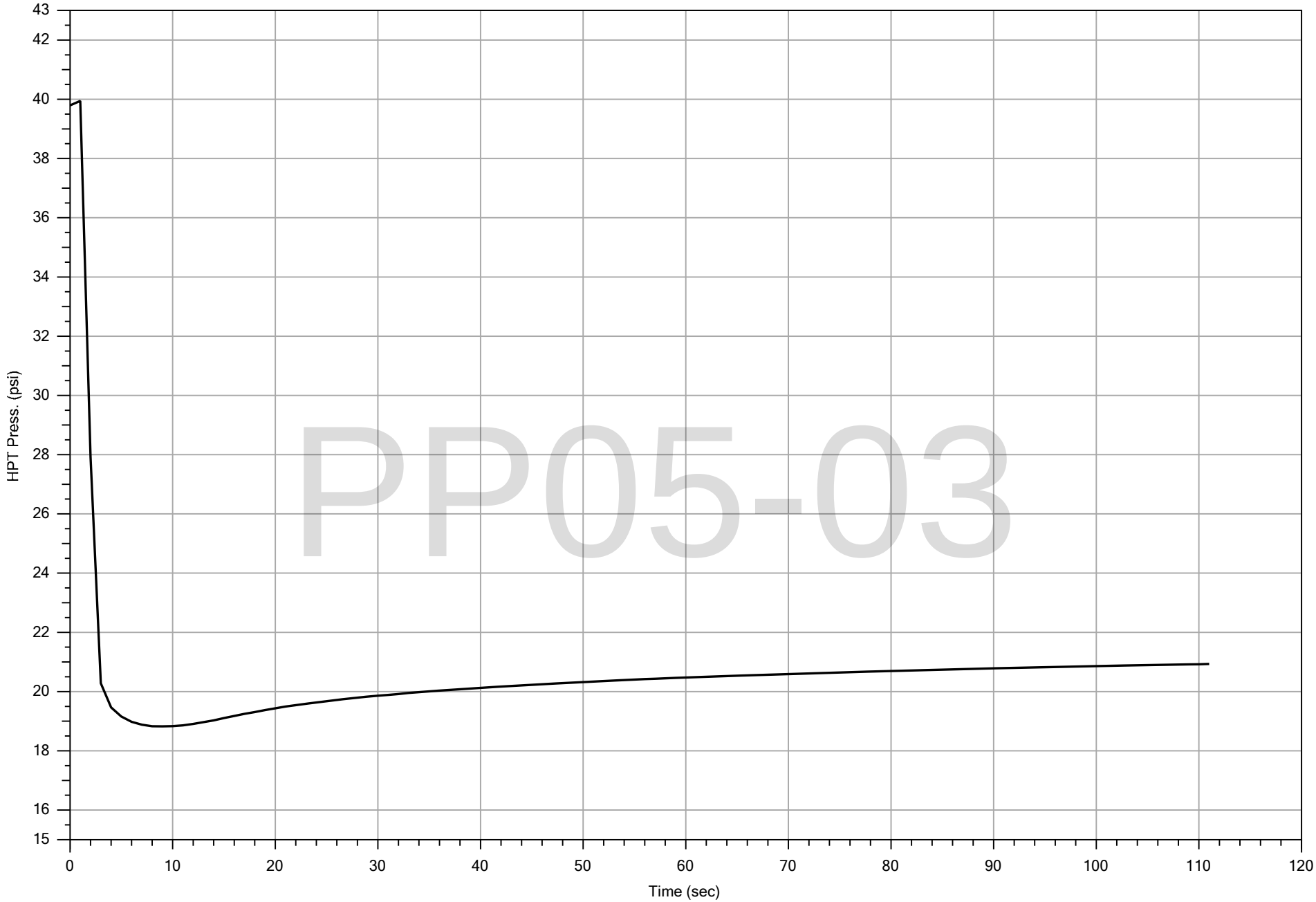


			File: PP5-03.HPT
Company: ZEBRA	Operator: Will M		Date: 4/30/2014
Project ID:	Client: EA Engineering		Location:



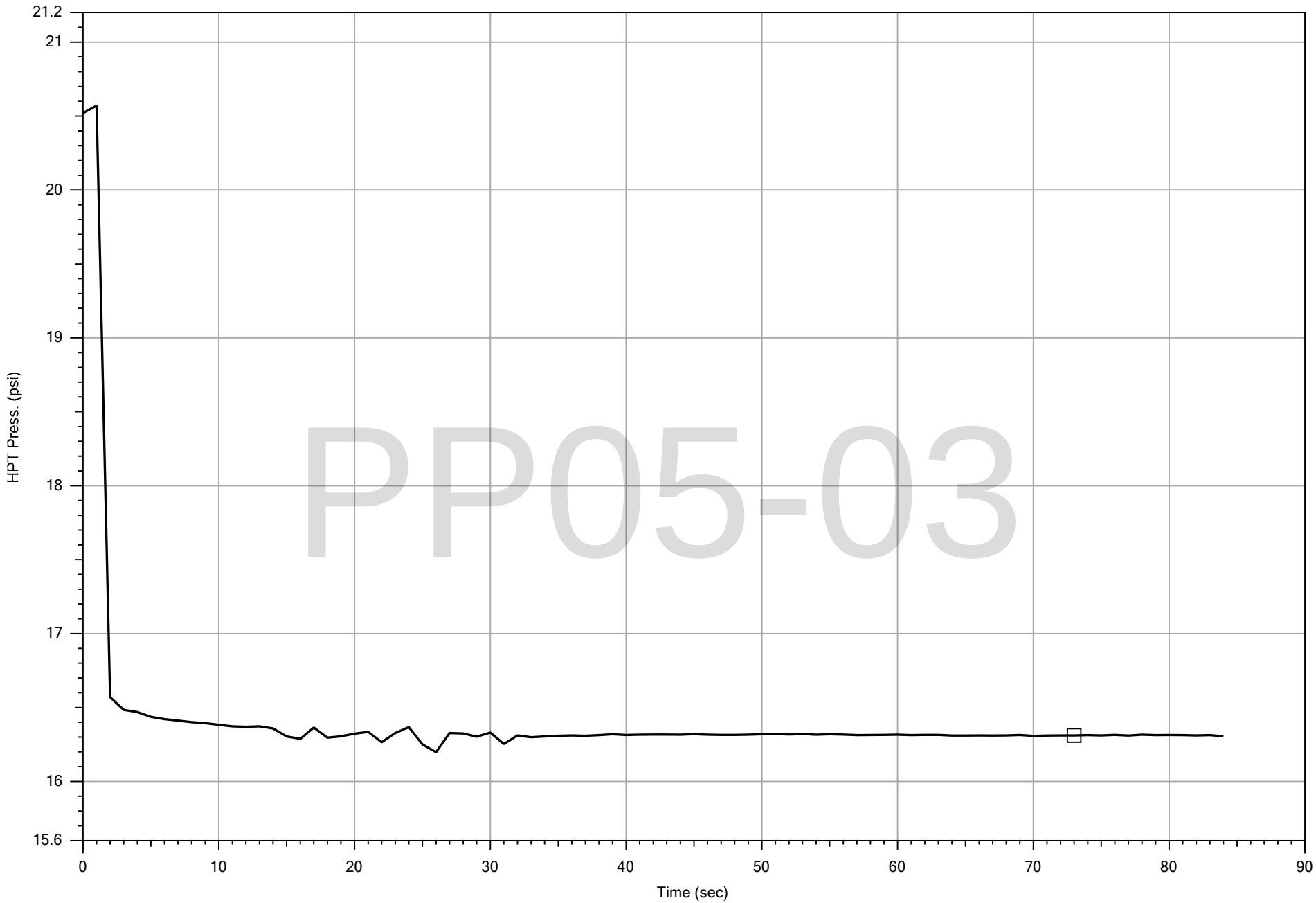
HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA	Operator: Will M	File: PP5-03.TIM	Date: 4/30/2014
Project ID:	Client: EA Engineering	Location: Depth: 4.15 ft	Sensor: HPT Press. Test: 1



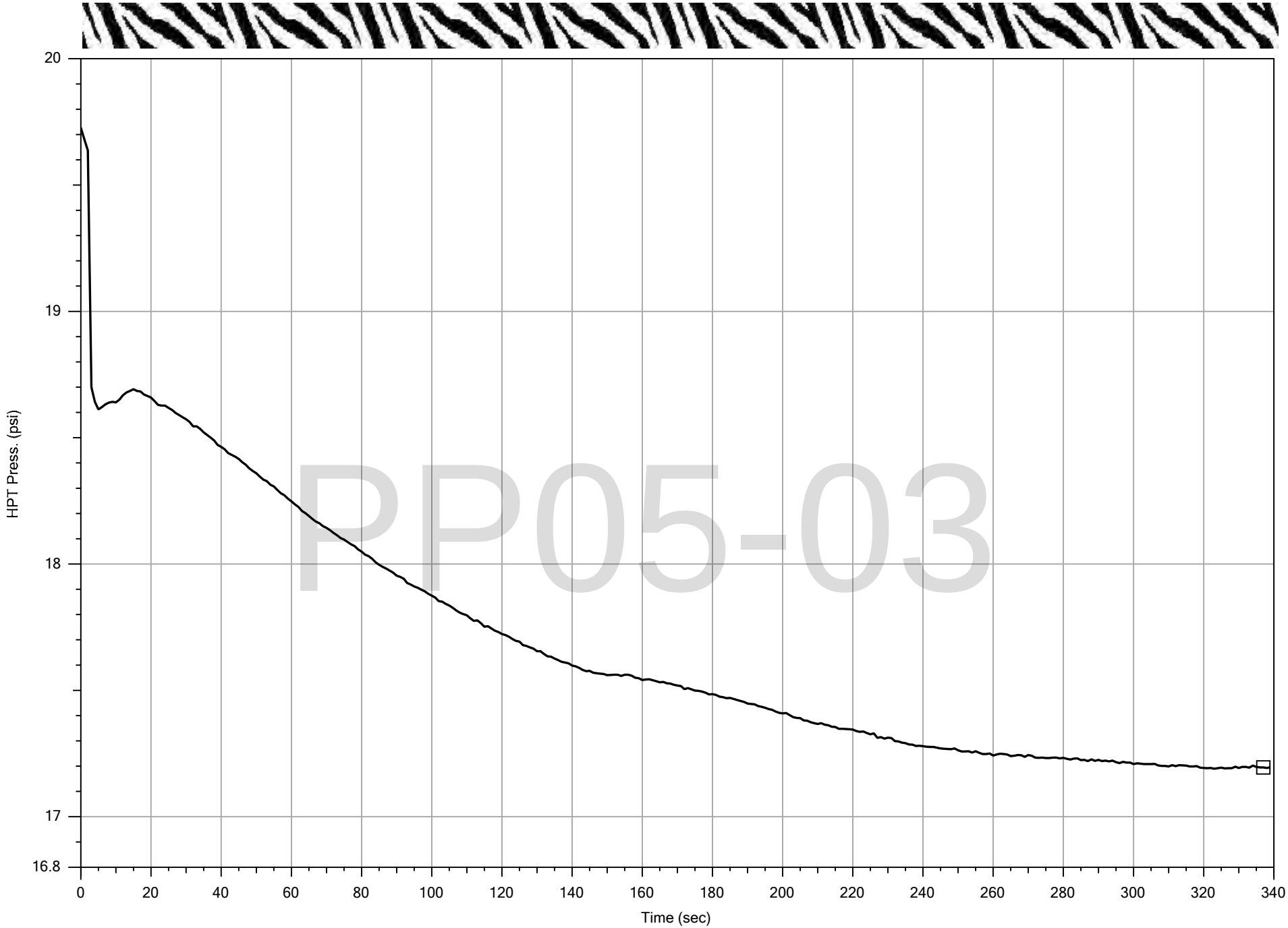
HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA	Operator: Will M	Location:	Sensor: HPT Press.
Project ID:	Client: EA Engineering	Depth: 6.10 ft	Test: 1
		File: PP5-03.TIM	Date: 4/30/2014



HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA	Operator: Will M	File: PP5-03.TIM	Date: 4/30/2014
Project ID:	Client: EA Engineering	Location: Depth: 8.25 ft	Sensor: HPT Press. Test: 1



HPT DISSIPATION (SINGLE CASE)

Company: ZEBRA	Operator: Will M	File: PP5-03.TIM	Date: 4/30/2014
Project ID:	Client: EA Engineering	Location: Depth: 13.20 ft	Sensor: HPT Press. Test: 1

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Appendix H-2

Soil Boring Logs

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FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:	1135933.82, 1050939.07
Surface Elevation:	597.20
Casing Below Surface:	597.11
Reference Elevation:	NAVD 88
Reference Description:	NAD 83 Datum

Job. No. 6265401	Client: AFCEC / NFARS				Location: NFARS, Niagara Falls, NY
	Project: PDI				
Drilling Method: Drive & Wash, Rotary					Soil Boring Number: CH5-01
Sampling Method: NQ Wireline					Sheet 1 of 2
					Drilling
Water Lev.	9 ft bgs				Start: 4/14/2014
Time					Finish: 4/22/2014
Date	22-Apr-12				

Penetration Rate	Feet Drvn/Ft. Recvrd	Boring Diagram	Run	Depth in Feet	RQD	
				0		Surface Conditions: Grassy
						Weather: Cloudy and win 15-20 mps, NW.
						Temperature: mid 50s F
				0		Drive and wash (no sampling) to set temporary 6" diameter steel casing
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				10		
				11		
				12		
				13		
				14		
				15		
				16		DOLOSTONE Bedrock at 16 ft
				17		Rock socket to 17.5 ft, 4" diameter steel casing grouted in on 4/14/14
20 min / 5 ft	5.0' / 4.35'		R1		87% (Good)	(RUN 1 - 17.5 - 22.5') Gray-brown fine Dolostone, closely-fractured, weathered, fossils, dissolution pits
				18		Horizontal Fracture at 18.05 ft
						Broken Zone / Horizontal Fracture 18.4-18.5 ft
				19		More frequent coral fossils w/ pitted dissolution, through end of run
				20		Horizontal Fracture @ 20.95 ft and 2 Vertical Fractures

Logged by: Lynette Mokry Date: 4/22/14

Drilling Contractor: SJB Drilling Driller: Brian and Dan Delude

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:	1135933.82, 1050939.07
Surface Elevation:	597.20
Casing Below Surface:	597.11
Reference Elevation:	NAVD 88
Reference Description:	NAD 83 Datum

Job. No. 6265401	Client: AFCEC / NFARS Project: PDI				Location: NFARS, Niagara Falls, NY
Drilling Method: Drive & Wash, Rotary					Soil Boring Number: CH5-01
Sampling Method: NQ Wireline					Sheet 2 of 2
					Drilling
Water Lev.	9 ft bgs				Start: 4/14/2014
Time					Finish: 4/22/2014
Date	22-Apr-12				

Penetration Rate	Feet Drvn/Ft. Recvrd	Boring Diagram	Run	Depth in Feet	RQD	
						Surface Conditions: Grassy
						Weather: Cloudy and win 15-20 mps, NW.
						Temperature: mid 50s F
20 min / 5 ft	5 ft / 4.35 ft		R1	21	87% (Good)	Gray-brown fine Dolostone with fossils, hard; Horizontal Fracture @ 20.95 ft w/ 2 Vertical Fractures
						Horizontal Fracture @ 21.4 ft and 21.9 ft
				22		
20 min / 5 ft	5 ft / 4.2 ft		R2		84% (Good)	(RUN 2 - 22.5 - 27.5')
				23		Gray-brown fine Dolostone, with fossils, and pits/vugs to 24.9'
						Horizontal Fracture @ 23.5 ft
				24		Horizontal Fracture @ 24.1 ft
						Sub-Horizontal Fracture (30 degrees) @ 24.9 ft
				25		Horizontal Fracture @ 25.1 ft, 25.15 ft, 25.40 ft (Dolostone with few fossils from 24.9 - 26.0 ft)
				26		More fossils from 26.0 - 27.4 ft; Horizontal Fracture @ 26.10 ft
				27		Broken Zone from 27.4 - 27.5 ft; Sub-Horizontal Fracture (30 degrees) @ 25.75 ft
						Lost ~ 25 gal of H2O in Run 2
20 min / 5 ft	5 ft / 2 ft		R3	28	40 % (Poor)	(RUN 3 - 27.5 - 32.5')
						Gray-brown Dolostone with vugs and styolites; from 27.5 - 27.7 ft vug ~0.17 ft in diameter
				29		Broken Zone from 27.7 - 28.7 ft, Sub-Horizontal Fracture (30 degrees), styolites @ 28.7 ft
						Horizontal Fracture @ 28.8 ft and 29.4 ft
				30		
				31		Lost ~ 100 gal H2O in Run 3
				32		End of Boring at 32.5 ft bgs
				33		Completed flush mount on 4/25/14

Logged by: Lynette Mokry Date: 4/22/14

Drilling Contractor: SJB Drilling Driller: Brian and Dan Delude

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: Geoprobe		Soil Boring Number: SB5-05 (1st Run)
Sampling Method: 4-ft macrocores		Sheet 1 of 2

					Drilling	
Water Lev.					Start	Finish
Time					4/4/2014	4/4/2014

Blow Counts (140-lb) Feet / Drvn/Ft. / Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet		USCS Log	
						Surface Conditions: Paved Asphalt
						Weather: Cloudy/Overcast in A.M.; Drizzle/Rain Showers in P.M.
						Temperature: 40 F (A.M.) - 50 F (P.M.)
		0	0		OL	0 - 2' : Brown clayey SILT; trace coarse Sand; trace asphalt; organic material present; low plasticity; loose and moist (OL).
		0	1			
		0	2		CL	2 - 4': Brown silty CLAY; slightly mottled; high plasticity; moist (CL).
		0	3			
		-	4		CL/GC	4 - 6': Reddish-brown CLAY; trace fine to medium Sand and Gravel; high plasticity; tight and mosit (CL/GC).
		-	5			
		-	6			
		-	7			Refusal at 7.0-ft bgs
		-	8			
			9			No samples collected.
			10			
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

Logged by: Hillary Williams Date: 4/4/2014

Drilling Contractor: Zebra Environmental Driller: Phillip Orsi

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: Geoprobe		Soil Boring Number: SB5-05 (2nd Run)
Sampling Method: 4-ft macrocores		Sheet 2 of 2

			Drilling	
Water Lev.		3.13 ft below TOC (~4.31 ft bgs)	Start	Finish
Time		8 April 2014 at 0955	4/4/2014	4/4/2014

Blow Counts (140-lb) Feet / Drvn/Ft. / Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet	USCS Log	Description
			0		Surface Conditions: Paved Asphalt
					Weather: Cloudy/Overcast in A.M.; Drizzle/Rain Showers in P.M.
			1	OL	Temperature: 40 F (A.M.) - 50 F (P.M.)
					0 - 2': Brown clayey SILT; large rocks at 1-1.5 ft bgs (OL).
			2		
					2 - 4': Brown silty CLAY; slightly mottled; high plasticity; moist (CL).
			3		
			4		4 - 8': Reddish brown CLAY; trace fine to medium Sand; high plasticity; moist (CL).
			5		
			6	CL	
			7		
			8		8 - 10': Reddish brown CLAY; some Gravel; trace fine to medium Sand; high plasticity; very wet (CL).
			9		
			10		10 - 11': Reddish brown CLAY; trace fine to medium Sand; high plasticity; moist (CL).
			11	SC	11 - 12': Reddish-brown SAND (SC).
			12		End of Boring at 12.0-ft bgs
			13		
					Collect samples for TCL VOC, metals/mercury, %solids, and TOC analysis:
			14		SB5-05-8-10 at 1545
					SB5-05-10-12 at 1550
			15		MS/MSD collected at SB5-05-10-12
			16		
			17		
			18		
			19		
			20		

Logged by: Hillary Williams Date: 4/4/2014

Drilling Contractor: SJB Services Driller: Phillip Orsi

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:
Surface Elevation:
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: Geoprobe		Soil Boring Number: SB5-03
Sampling Method: 4-ft macrocores		Sheet 1 of 1
		Drilling
Water Lev.	5.31 ft below TOC (~4.31 ft bgs)	Start: 4/4/2014 / Finish: 4/4/2014
Time	8 April 2014 at 0944	

Blow Counts (140-lb)	Feet Drvn/Ft. Recvrd	Well Diagram	PID (ppm) H.S	Depth in Feet		USCS Log	
							Surface Conditions: Paved Asphalt
							Weather: Cloudy/Overcast in A.M.; Drizzle/Rain Showers in P.M.
							Temperature: 40 F (A.M.) - 50 F (P.M.)
			0	0		OL	0 - 2' : Brown, clayey SILT with fill material (asphalt), trace coarse sand; low plasticity; organic matter present; loose and moist (OL).
			0	1			
			0	2		CL	2 - 4': Brown silty CLAY; slightly mottled; high plasticity; moist (CL).
			0	3			
			-	4			4 - 12': Reddish-brown CLAY, trace fine to medium Sand; high plasticity; very tight and moist (CL).
			-	5			
			-	6			
			-	7			
			-	8			
				9			
				10			
				11			
				12			End of Boring at 12.0-ft bgs
				13			
							Collect samples for TCL VOC, metals/mercury, %solids, and TOC analysis:
				14			SB5-03-8-10 at 1500
							SB5-03-10-12 at 1515
				15			Field duplicate collected from SB5-03-10-12
				16			
				17			
				18			
				19			
				20			

Logged by: Hillary Williams Date: 4/4/14

Drilling Contractor: Zebra Environmental Driller: Phillip Orsi

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates: 1135904.17, 1050979.66
Surface Elevation: 597.60
Casing Below Surface: 597.41
Reference Elevation: NAVD 88
Reference Description: NAD 83 Datum

Job. No.	Client:	AFCEC / NFARS	Location:
6265401	Project:	PDI	NFARS, Niagara Falls, NY
Drilling Method: Drive & Wash, Rotary			Soil Boring Number: CH5-04
Sampling Method: NQ Wireline			Sheet 1 of 2
			Drilling
Water Lev.	8.96 bgs		Start: 4/14/2014 / Finish: 4/23/2014
Time	1300		
Date			

Penetration Rate	Feet Drvn/Ft. Recvrd	Boring Diagram	Run	Depth in Feet	RQD	
						Surface Conditions: Grassy
						Weather: Rainshowers, cloudy, wind (14 mph NW)
						Temperature: 36 F
				0		Drive and wash (no sampling) to set temporary 6" diameter steel casing
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				10		
				11		
				12		
				13		
				14		
				15		
				16		
				17		Bedrock at 17.6 ft bgs (Dolostone)
						Roller-bit rock socekt, cored grout plug 4 " steel casing grouted 4/16/14
				18		
				19		(RUN 1 - 19.6 - 24.6 ft)
18 min / 5 ft	5 ft/ 3.85 ft		R1		77% (Good)	Horizontal Fracture at 19.78 ft (Iron staining, CaCO3), 19.91ft, 20.05 ft
				20		Broken zone, vuggy; 10.19, 20.37, vertical fracture @ 20.52 ft w/ iron staining
						Gray-brown dolostone, closely fractured

Logged by: Lynette Mokry Date: 4/23/14

Drilling Contractor: SJB Drilling Driller: Brian and Dan Delude

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates: 1135904.17, 1050979.66
Surface Elevation: 597.60
Casing Below Surface: 597.41
Reference Elevation: NAVD 88
Reference Description: NAD 83 Datum

Job. No.	Client:	AFCEC / NFARS	Location:
6265401	Project:	PDI	NFARS, Niagara Falls, NY
Drilling Method: Drive & Wash, Rotary			Soil Boring Number: CH5-04
Sampling Method: NQ Wireline			Sheet 2 of 2
			Drilling

					Start	Finish
Water Lev.	8.96 bgs					
Time	1300				4/14/2014	4/23/2014
Date						

Penetration Rate (Feet / Drvn/Ft. / Recvrd)	Boring Diagram	Run	Depth in Feet	RQD	Surface Conditions: Grassy Weather: Rainshowers, cloudy, wind (14 mph NW) Temperature: 36 F
18 min / 5 ft; 5 ft/ 3.85ft		R1	21	77 % (Good)	Vertical fracture w/ iron staining, healed @ 20.52 ft
					Horizontal fracutre at 21.77 ft; occasional small pits (fine gravel size)
			22		Vug @ 22.22-22.32 ft (fossils and styolites
					Horizontal fracutre at 22.42 ft (sphalerite, styolites, fossils)
			23		MB @ 23.07; Horizontal Fracture @23.23 ft (fossils, pits)
					Vug and fossils
			24		Slight water loss during Run 1 ~10 gal
20 min / 5 ft; 5 ft/ 3.45 ft		R2		69% (Fair)	(RUN 2 - 24.0 - 29.5)
			25		Broken Zone; Vertical Fracture @ 27.97, 28.5 ft; Horizontal Fracture @24.75 ft,
			26		Subhorizontal (~45 degrees) Fracture @ 26.35 ft (Fossils, pits, vugs, this sect.)
					Horizontal Fracture @26.7, 27.1, 27.25 ft (Fluorite crystals in Vug)
			27		Horizontal Fracture @ 27.75 (Fossils, dissolution pits), 27.97, 28.87 ft
			28		
			29		Lost ~20 gal H2O during Run 2
15 min / 5 ft		R3		67% (Fair)	(RUN 3 - 29.5 - 34.0)
			30		Horizontal Fracture @ 30.15 (Styolites); 30.4 (subhorizontal); 30.51
					Broken Zone (sub horizontal fracture ~30 deg) @ 30.6 ft (styolites)
			31		
			32		Horizontal Fracture @ 33.2, 33.3, 33.48, 34.08, 34.6 ft (fossils, pits) sphalerite, broken zone at end
			33		
			34		Lost ~100 gal H2O in Run 3
					End of boring at 34.6 ft bgs
			35		(Note: hole measured to 34 ft bgs after drilling completion and rock floor)
					Completed as flush mount on 4/25/14
			36		

Logged by: Lynette Mokry Date: 4/23/14

Drilling Contractor: SJB Drilling Driller: Brian and Dan Delude

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:	1135911.79, 1050932.26
Surface Elevation:	597.70
Casing Below Surface:	597.18
Reference Elevation:	NAVD 88
Reference Description:	NAD 83 Datum

Job. No. 6265401	Client: AFCEC / NFARS				Location: NFARS, Niagara Falls, NY	
	Project: PDI					
Drilling Method: Drive & Wash, Rotary					Soil Boring Number: CH5-03	
Sampling Method: NQ Wireline					Sheet 1 of 2	
					Drilling	
Water Lev.	9 ft bgs				Start	Finish
Time					4/14/2014	4/23/2014
Date	22-Apr-12					

Penetration Rate	Feet Drvn/Ft. Recvrd	Boring Diagram	Run	Depth in Feet	RQD	
				0		Surface Conditions: Grassy Weather: Rainshowers, cloudy, wind (14 mph NW) Temperature: 36 F Drive and wash (no sampling) to set temporary 6" diameter steel casing
				1		
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				10		
				11		
				12		
				13		
				14		
				15		
				16		DOLOSTONE Bedrock at 16.5 ft
						Temporary casing 6" diameter to 16.5 ft on 4/15/14
				17		
				18		Roller bit rock socket to 18.5 ft bgs, 4" casing grouted 4/15/14 to 18.5 ft - Core through grout plug
30 min / 5 ft	5.0' / 4.15'		R1	19	51% (Poor)	(RUN 1 - 18.5 - 23.5) Dolostone, gray-brown, closely fractured with occasional styolites, fossils, and dissolution pits Horizontal fracture @ 18.85, 19.35, 19.55, 19.95, 20.30, 20.55, 20.90, 21.7, 22.1, 22.2, 22.55, 22.65 ft
				20		Vertical fracture from 18.5-18.95 ft, 19.35-19.95 ft, 20.5-20.9 ft; Broken zones 21.3-21.7 and 22.65-23.5 ft Fossil zones with pits 19.95 ft

Logged by: Lynette Mokry Date: 4/23/14

Drilling Contractor: SJB Drilling Driller: Brian and Dan Delude

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates: 1135911.79, 1050932.26
Surface Elevation: 597.70
Casing Below Surface: 597.18
Reference Elevation: NAVD 88
Reference Description: NAD 83 Datum

Job. No.	Client:	AFCEC / NFARS	Location:
6265401	Project:	PDI	NFARS, Niagara Falls, NY
Drilling Method: Drive & Wash, Rotary			Soil Boring Number: CH5-03
Sampling Method: NQ Wireline			Sheet 2 of 2
			Drilling

					Start	Finish
Water Lev.	9 ft bgs					
Time					4/14/2014	4/23/2014
Date	22-Apr-12					

Surface Conditions: Grassy
Weather: Rainshowers, cloudy, wind (14 mph NW)
Temperature: 36 F

Penetration Rate (Feet Drvn/Ft. Recvrd)	Boring Diagram	Run	Depth in Feet	RQD	
30 min / 5 ft		R1	21	51% (Poor)	Horizontal Fracture @ 18.85', 19.35', 19.55', 20.30', 20.55', 20.90', 21.7', 22.1', 22.2', 22.55' 22.65'
					Vertical Fracture from 18.5 - 18.95', 19.35 - 19.95'; Broken Zone from 21.3 - 21.7' and 22.65 - 23.5'
			22		Fossil zones with pits from 19.95 - 21.3'
					Lost ~50 gal H2O in Run 1
			23		(RUN @ - 23.5 - 28.5 ft)
20 min / 5 ft		R2		84% (Good)	styolite, closely to mod closely fractured
			24		Horizontal Fracture @23.55', 23.9', 24.35', 25.25', 25.95', 26.0', 26.3', 27.3', 27.5', 27.6';
					Subvertical Fracture @ 27.3 - 27.5'; Broken Zone till end of run
			25		
			26		
			27		
					Lost ~ 50 gal H2O in Run 2
			28		
20 min / 5 min		R3			(RUN 3 - 28.5 - 33.5)
			29		Same as above, few fossils, frequent styolites
					Horizontal Fracture @29.0', 29.7'
			30		Several Horizontal Fractures 0.05-0.2' from 29.7-30.37' then Broken Zone to ~30.8 ft
					Horizontal Fracture @ 31.0', 32.1', 32.9', 33.3'
			31		Vertical Fracture 31-32'; vug w/ fluorite and calcite
					Coreblock @ 32', continued run.
			32		Lost ~ 100 gal of H20 in Run 3
			33		End of Boring at 33.5 ft bgs
					Completed as flush mount on 4/25/14
			34		
			35		
			36		
			37		
			38		
			39		
			40		
			41		

Logged by: Lynette Mokry Date: 4/23/14

Drilling Contractor: SJB Drilling Driller: Brian and Dan Delude

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:	1135936.79, 1050980.95
Surface Elevation:	597.10
Casing Below Surface:	596.97
Reference Elevation:	NAVD 88
Reference Description:	NAD 83 Datum

Job. No. 6265401	Client: AFCEC / NFARS				Location: NFARS, Niagara Falls, NY	
Drilling Method: Drive and Wash, Rotary					Soil Boring Number: CH5-02	
Sampling Method: NQ wireline					Sheet 1 of 2	
					Drilling	
Water Lev.	9.5 ft bgs				Start	Finish
Time					4/17/2014	4/24/2014
Date	21-Apr-14					

Penetration Rate (Feet / Drvn/Ft. / Recvrd)	Well Diagram	Run	Depth (in Feet)	RQD	Log	
						Surface Conditions: Grassy
						Weather: Sunn & breezy (5-10 mph)
						Temperature: 60F
			0			
			1			Drive and wash to set 6" diameter steel casing (temporary)
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			
			16			
						6" temporary casing to 16.3 ft bgs
			17			
			18			4" steel casing @ 18.3 ft bgs grouted in roller bit rock socket; Gray-brown Dolostone, closely fractured
9 min/ 11'	5/4.85	R1		92% (Excellent)		Run 1 18.3-23.5 ft
			19			Vertical Fracture @ 18.3-18.5 ft; Horizontal Fracture @ 18.5-18.55 ft and @ 18.8-19.25 ft
						19.05 ft vug ~1" diameter drusy crystals
			20			
						at 22.35' slight vertical healed fracture line 19.1-20' (styolites)

Logged by: Lynette Mokry Date: 4/21/14

Drilling Contractor: SJB Drillings Driller: Brian & Dan Delude

FIELD BORING LOG FORM

EA Engineering, P.C.
EA Science and Technology

LOG OF SOIL BORING

Coordinates:	1135936.79, 1050980.95
Surface Elevation:	597.10
Casing Below Surface:	596.97
Reference Elevation:	NAVD 88
Reference Description:	NAD 83 Datum

Job. No.	Client:	Location:
6265401	AFCEC / NFARS	NFARS, Niagara Falls, NY
Drilling Method: Drive and Wash, Rotary		Soil Boring Number: CH5-02
Sampling Method: NQ wireline		Sheet 2 of 2

					Drilling	
Water Lev.	9.5 ft bgs				Start	Finish
Time					4/17/2014	4/24/2014
Date	21-Apr-14					

Min/Ft	Feet / Cored/Ft. / Recvrd	Well Diagram	Run	Depth (in Feet)	RQD / Log	Surface Conditions: Grassy / Weather: Sunn & breezy (5-10 mph) / Temperature: 60F
27 min/ 5'	5/4.85		R1	20	92 % (Excellent)	Occasional drusy zones, vug @22.35 ft (~1" diameter);
						From 21.3 - 21.7 ft more frequent small vugs/pits (elongated)
				21		
				22		Horizontal Fracture at 22.45 ft, similar to above with styolites
						@22.65 ft, 60 degree Subvertical Fracture
15 min/ 4'	5/3.69		R2	23	87% (Good)	Run 2 - 23.3-28.3'
						At 23.9 ft drusy zone with small pits; Subhorizontal Fracture (~10 degrees)
				24		
				25		Vertical Fracture @ 25.2 - 25.36 ft (rough), pits this section
						Broken zone following Subvertical Fracture (~45 degrees) @ 25.9 ft
				26		Subhorizontal Fracture (~10 degrees) @ 26.31 ft
						Horizontal Fracture at 26.52 ft, pits
				27		Styolites @ 27.04, 27.14 ft
						Subvertical Fracture (~45 degrees) @ 27.71 - cavity
				28		Horizontal Fracture @28.16 ft
18 min/ 2.5'	2.5/0.8		R3		83% (Good)	Run 3 - 28.3 - 30.8 ft; core blockage: lost ~150 gal H2O; Horizontal Fracture @28.35 ft,
				29		Subvertical Fracture (~45 deg) @28.55; Horizontal Fracture @ 28.9 ft, 29.0 ft, 29.1 ft,
						Broken Zone/Horizonal Fracture (0.1 - 0.2 ft) to 29.3 ft; Horizontal fracture @29.3 & 29.85 ft
6 min/4.5'	2.5/2.2		R4	30	85% (Good)	Infilled vug w/ dolomite/calcite @ 29.55 ft; Horizontal fracture @ 30.12 & 30.35 ft
						Run 4 (30.8 - 33.3)
				31		Horizontal fracture @ 31.1 ft
				32		Subvertical Fracture (~45 deg), fossils @32.1 ft; Horizontal Fracture @ 32.4 ft (pitted around fractures)
				33		EOB @ 33.3ft, water @ 9.5 ft - completed as flush mount on 4/25/14
				34		
				35		
				36		
				37		
				28		
				39		
				40		

Logged by: Lynette Mokry Date: 4/21/2014

Drilling Contractor: SJB Services Driller: Brian & Dan Delude

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Appendix H-3

Groundwater Purge Forms

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EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: RW5-1	**EA Personnel:** H. Williams	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Overcast / ~75 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/10/2014 **Gauge Time:** 13:45:00	**Measurement Ref:** TOC
Stick Up/Down (ft): Down, -0.5 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 2"

Purge Date: 10-Jun-14	**Purge Time:** 1350
Purge Method: Low Flow	**Field Technician:** H. Williams

Well Volume

A. Well Depth (ft): 14.65	**D. Well Volume (ft):** 0.163	**Depth/Height of Top of PVC:** Down, -0.5 ft
B. Depth to Water (ft): 7.65	**E. Well Volume (gal) (C*D):** 1.141	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 7.00	**F. Three Well Volumes (gal) (E3):** 3.423	**Pump Intake Depth:** 14.0 ft btoc

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
1356	7.65	1.14	3.3	2.09	14.3	-27	8.35	0.30	0
1359	7.36	1.08	16	0.00	14.51	-46	8.54	0.30	0.9
1402	7.29	1.09	0	0.00	13.94	-55	8.75	0.30	1.8
1405	7.27	1.09	0	0.00	13.81	-60	8.90	0.30	2.7
1408	7.25	1.07	0.8	0.00	14.45	68	9.12	0.30	3.6
1411	7.24	1.06	0.6	0.00	14.69	-72	9.30	0.30	4.5
1414	7.23	1.06	0	0.00	14.67	-73	9.45	0.30	5.4
1417	7.23	1.06	0	0.00	14.56	-72	9.62	0.30	6.3
1420	7.23	1.06	0.1	0.00	14.48	-71	9.75	0.30	7.2

Total Quantity of Water Removed (gal):	1.90	**Sampling Time:**	1425
Samplers:	H. Williams	**Split Sample With:**	MS/MSD
Sampling Date:	6/10/2014	**Sample Type:**	GW Grab

COMMENTS AND OBSERVATIONS: None.

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: MW5-5D	**EA Personnel:** AK/RP	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Sunny / ~80F
Sounding Method: Solinst WLM	**Gauge Date:** 6/10/2014 **Gauge Time:** 13:40:00	**Measurement Ref:** TOC
Stick Up/Down (ft): Down, 0.5 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 2"

Purge Date: 10-Jun-14	**Purge Time:** 1349
Purge Method: Low Flow	**Field Technician:** AK/RP

Well Volume

A. Well Depth (ft): 27.28	**D. Well Volume (ft):** 0.163	**Depth/Height of Top of PVC:** Down, 0.5 ft
B. Depth to Water (ft): 10.05	**E. Well Volume (gal) (C*D):** 2.808	**Pump Type:** Grundfos
C. Liquid Depth (ft) (A-B): 17.23	**F. Three Well Volumes (gal) (E3):** 8.425	**Pump Intake Depth:** Center of screen

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (Lpm)	Volume (liters)
1352	7.15	1.74	17.1	9.55	12.92	-218	11.51	0.30	0.9
1355	7.21	1.76	20.8	1.89	13.97	-265	10.9	0.30	1.8
1358	7.38	1.78	12.1	0.00	14.2	-290	10.84	0.30	2.7
1401	7.25	1.77	9.7	0.00	14.21	-302	10.85	0.30	3.6
1404	7.14	1.75	21.1	0.00	14.37	-311	10.73	0.30	4.5
1407	7.03	1.75	22.7	0.00	14.46	-320	10.71	0.30	5.4
1410	6.96	1.74	7.5	0.00	14.5	-325	10.7	0.30	6.3
1413	6.91	1.74	2.2	0.00	14.6	-329	10.69	0.30	7.2
1416	6.89	1.72	15.5	0.00	15.13	-334	10.68	0.30	8.1
1419	6.87	1.7	16.1	0.00	15.27	-337	10.68	0.30	9
1422	6.86	1.69	1.7	0.00	15.29	-340	10.68	0.30	9.9
1425	6.86	1.77	1.6	0.00	13.85	-342	10.66	0.30	10.8
1428	6.87	1.77	1.5	0.00	13.76	-345	10.65	0.30	11.7
1431	6.86	1.77	1.5	0.00	13.73	-347	10.65	0.30	12.6

Total Quantity of Water Removed (gal):	3.33	**Sampling Time:**	1435
Samplers:	AK	**Split Sample With:**	DUP MW-FD-140610
Sampling Date:	6/10/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: Sulfur odor, black water at start of purge, clear/grey tint
MW5-FD-140610 collected

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-01-Upper	**EA Personnel:** A. Kohn / R. Peterson	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good - new	**Weather:** Overcast / ~70 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/12/2014 **Gauge Time:** 9:28:00	**Measurement Ref:** TOC
Stick Up/Down (ft): Down, ~0.2 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 4"

Purge Date: 12-Jun-14	**Purge Time:** 0933 (high flow)
Purge Method: High flow	**Field Technician:** HW/RP

Well Volume

A. Well Depth (ft): 32.45 ft; packer interval 17.5-22 ft	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down, ~0.2 ft
B. Depth to Water (ft): 10.16	**E. Well Volume (gal) (C*D):** 4.35	**Pump Type:** Peristaltic / Whaler Pump
C. Liquid Depth (ft) (A-B): 11.84 (packer top at 22 ft)	**F. Three Well Volumes (gal) (E3):** 13.05	**Pump Intake Depth:** 21.00

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (°C)	ORP (mV)	DTW (ft btoc)	Rate (GPM)	Volume (gallons)
Purged using peristaltic (0.2 GPM) and whaler pump (1.5 GPM)									
938	N/A	N/A	N/A	N/A	N/A	N/A	14.64	1.70	8.5
941	N/A	N/A	N/A	N/A	N/A	N/A	20.45	1.70	13.6
Well purged dry at 0942, let well recover									
947	N/A	N/A	N/A	N/A	N/A	N/A	19.96	N/A	N/A
950	N/A	N/A	N/A	N/A	N/A	N/A	19.34	N/A	N/A
953	N/A	N/A	N/A	N/A	N/A	N/A	18.91	N/A	N/A
0955 collect VOC sample									

Total Quantity of Water Removed (gal):	13.60	**Sampling Time:**	955
Samplers:	AK/RP	**Split Sample With:**	N/A
Sampling Date:	6/12/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: black tint to water

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-01-Middle	**EA Personnel:** H. Williams / R. Peterson	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good - new	**Weather:** Overcast / ~70 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/13/2014	**Measurement Ref:** TOC
	Gauge Time: 9:30:00	
Stick Up/Down (ft): Down, ~0.2 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 4"

Purge Date: 13-Jun-14	**Purge Time:** 0935 (high flow) 0958 (low flow)
Purge Method: High & low flow	**Field Technician:** HW/RP

Well Volume

A. Well Depth (ft): 32.45 ft; packer interval 23-26 ft	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down, ~0.2 ft
B. Depth to Water (ft): 10.16	**E. Well Volume (gal) (C*D):** 1.101	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 3' interval (23-26 ft interval, straddle packer)	**F. Three Well Volumes (gal) (E3):** 3.303	**Pump Intake Depth:** 24 ft bgs

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (°C)	ORP (mV)	DTW (ft btoc)	Rate (GPM /LPM)	Volume (Gal / liters)
938	7.13	1.9	161	0.00	13.99	-272	10.07	0.16 GPM	0.5 Gal
941	6.98	1.92	84.3	0.00	13.04	-313	10.07	0.16 GPM	1 Gal
944	6.93	1.91	57.6	0.00	12.93	-326	10.07	0.16 GPM	1.4 Gal
947	6.91	1.9	42.8	0.00	12.98	-333	10.07	0.16 GPM	1.9 Gal
950	6.87	1.9	36.6	0.00	13.06	-339	10.07	0.16 GPM	2.4 Gal
953	6.89	1.89	28.3	0.00	13.05	-340	10.05	0.16 GPM	2.9 Gal
956	6.88	1.89	24.3	0.00	13.13	-341	10.05	0.16 GPM	3.4 Gal
Start low-flow purge at 0958									
959	6.88	1.87	15.8	0.00	13.6	-341	10.05	0.3 LPM	0.9 liters
1002	6.88	1.88	15.6	0.00	14.75	-339	10.05	0.3 LPM	1.8 liters
1005	6.88	1.9	19.7	0.00	15.32	-337	10.05	0.3 LPM	2.7 liters

Total Quantity of Water Removed (gal):	3.4 Gal high flow, 0.7 Gal low flow	**Sampling Time:**	1010
Samplers:	HW/RP	**Split Sample With:**	N/A
Sampling Date:	6/13/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: black / gray tint to water

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-01 (Lower)	**EA Personnel:** AK	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Overcast / ~70F
Sounding Method: Solinst WLM	**Gauge Date:** 6/12/2014 **Gauge Time:** 10:15:00	**Measurement Ref:** TOC
Stick Up/Down (ft): Down, 0.2 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 3"

Purge Date: 12-Jun-14	**Purge Time:** 1018
Purge Method: High flow 3 well volumes, low flow stabilized sampling	**Field Technician:** AK

Well Volume

A. Well Depth (ft): 32.45 ft; packer interval 27-32.45 ft	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down, 0.2 ft
B. Depth to Water (ft): 10.57 (10.51 w/ packer)	**E. Well Volume (gal) (C*D):** 2.0185	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 5.5 (packer bottom at 27 ft)	**F. Three Well Volumes (gal) (E3):** 6.0555	**Pump Intake Depth:** 28 ft

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (GPM /LPM)	Volume (Gal / liters)
1028	7.20	1.87	0	0.00	14.11	272	10.54	0.2 GPM	3 gal
1038	7.19	1.87	802	0.00	14.00	-286	10.53	0.2 GPM	4.5 gal
1048	7.21	1.92	446	0.00	13.28	-286	10.53	0.2 GPM	6 gal
Start low-flow purge at 1048									
1051	7.21	1.95	398	0.00	14.1	-286	10.53	0.3 LPM	0.9 liters
1054	7.39	1.91	344	0.00	14.95	-257	10.53	0.3 LPM	1.8 liters
1057	7.26	1.93	335	0.00	14.97	-279	10.53	0.3 LPM	2.7 liters
1100	7.22	1.95	331	0.00	15.17	-280	10.53	0.3 LPM	3.6 liters
1103	7.2	1.94	283	0.00	15.24	-281	10.53	0.3 LPM	4.5 liters
1106	7.2	1.94	232	0.00	15.32	-280	10.53	0.3 LPM	5.4 liters
1109	7.2	1.95	231	0.00	15.33	-279	10.53	0.3 LPM	6.3 liters
1112	7.2	1.92	230	0.00	15.39	-278	10.53	0.3 LPM	7.2 liters
1115	7.19	1.94	220	0.00	15.32	-279	10.53	0.3 LPM	8 liters
1118	7.19	1.94	218	0.00	15.34	-281	10.53	0.3 LPM	8.9 liters
1121	7.19	1.93	210	0.00	15.38	-209	10.53	0.3 LPM	9 liters
1124	7.19	1.93	209	0.00	15.31	-281	10.53	0.3 LPM	9.9 liters
1127	7.18	1.93	204	0.00	15.22	-282	10.53	0.30 LPM	10.8 liters

Total Quantity of Water Removed (gal):	6 gal high flow, 2.9 gal low flow	**Sampling Time:**	1130
Samplers:	AK	**Split Sample With:**	N/A
Sampling Date:	6/12/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: Could not gauge DTW in packed interval - WLM would not fit in pvc. Started low flow at 1048
Cleaned horiba at 1054

EA Engineering, P.C.
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GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-02 (Upper)	**EA Personnel:** RP / AK	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Overcast / ~70F
Sounding Method: Solinst WLM	**Gauge Date:** 6/12/2014	**Measurement Ref:** TOC
	Gauge Time: 8:00:00	
Stick Up/Down (ft): Down	**PID Headspace Reading:** NA	**Well Diameter (in):** 4" to 3"

Purge Date: 12-Jun-14	**Purge Time:** 8:29:00 AM
Purge Method: High flow 3 well volumes, low flow stabilization/sampling	**Field Technician:** AK/RP

Well Volume

A. Well Depth (ft): 32.96 ft; packer interval 18.3-22 ft	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down
B. Depth to Water (ft): 10.35	**E. Well Volume (gal) (C*D):** 5.3	**Pump Type:** Peristaltic Pump / whaler pump
C. Liquid Depth (ft) (A-B): 11.65 (top of packer at 22 ft)	**F. Three Well Volumes (gal) (E3):** 15.8	**Pump Intake Depth:** 18.5 ft

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (GPM /LPM)	Volume (Gal / liters)
832	N/A	N/A	N/A	N/A	N/A	N/A	12.90	0.2 GPM	1.3 Gal
Start whaler pump at 0832									
835	N/A	N/A	N/A	N/A	N/A	N/A	16.9	1.5 GPM	5.8 Gal
purged below base of whaler pump at 0836									
838	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2 GPM	7.3 Gal
841	N/A	N/A	N/A	N/A	N/A	N/A	18.95	0.2 GPM	7.9 Gal
843	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2 GPM	8.5 Gal
Purged dry at 0843, let well recover									
848	N/A	N/A	N/A	N/A	N/A	N/A	18.71	N/A	N/A
853	N/A	N/A	N/A	N/A	N/A	N/A	18.5	N/A	N/A
901	N/A	N/A	N/A	N/A	N/A	N/A	18.3	N/A	N/A
collected sample at 0902									

Total Quantity of Water Removed (gal):	8.5 Gal high flow	**Sampling Time:**	902
Samplers:	AK/RP	**Split Sample With:**	N/A
Sampling Date:	6/12/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: 0836 purged below rock socket w/ whaler pump, recover (rate .2 gpm); Purged dry at 0843

Well slowly recovering (<0.2 ft over 5 min)

Grabbed sample - fresh water flowing into well. Gray tint / sulfur odor

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-02-Middle	**EA Personnel:** H. Williams / R. Peterson	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Overcast / ~68 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/13/2014 **Gauge Time:** 8:40:00	**Measurement Ref:** TOC
Stick Up/Down (ft): Down, -0.2 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 4"

Purge Date: 13-Jun-14	**Purge Time:** 0842 (high flow) 0904 (low flow)
Purge Method: High flow for 3 gal & low flow after until stabilization	**Field Technician:** HW/RP

Well Volume

A. Well Depth (ft): 32.96ft; packer interval 23-26 ft	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down, -0.2ft
B. Depth to Water (ft): 10	**E. Well Volume (gal) (C*D):** 1.101	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 3' interval (23-26 ft interval, straddle packer)	**F. Three Well Volumes (gal) (E3):** 3.303	**Pump Intake Depth:** 24 ft bgs

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (°C)	ORP (mV)	DTW (ft btoc)	Rate (GPM /LPM)	Volume (Gal / liters)
845	7.02	1.79	60.8	0.00	13.98	-283	10.00	0.15 GPM	0.9 Gal
848	7.00	1.79	45.8	0.00	12.80	-311	10.00	0.15 GPM	1.35 Gal
851	7.01	1.78	37.9	0.00	12.54	-315	10.00	0.15 GPM	1.8 Gal
854	7.05	1.78	23.7	0.00	12.52	-317	10.00	0.15 GPM	2.25 Gal
857	7.07	1.78	19.8	0.00	12.55	-318	10.00	0.15 GPM	2.7 Gal
900	7.08	1.79	17.8	0.00	12.7	-319	10.00	0.15 GPM	3.15 Gal
903	7.1	1.8	14.7	0.00	12.72	-320	9.98	0.15 GPM	3.6 Gal
Start low-flow purge at 0904									
906	7.12	1.79	8.7	0.00	13.28	-322	9.98	0.3 LPM	0.9
909	7.11	1.79	6.5	0.00	14.35	-322	9.98	0.3 LPM	1.8
912	7.11	1.8	7.1	0.00	14.88	-322	9.98	0.3 LPM	2.7

Total Quantity of Water Removed (gal): 3.6 Gal high flow, 0.7 gal low flow
Samplers: HW/RP
Sampling Date: 6/13/2014
Sampling Time: 915
Split Sample With: N/A
Sample Type: GW grab

COMMENTS AND OBSERVATIONS: black / grey tint to the water

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-02 (Lower)	**EA Personnel:** AK/RP	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Sunny / ~80 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/11/2014 **Gauge Time:** 15:15:00	**Measurement Ref:** TOC
Stick Up/Down (ft): Down, ~0.3 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 3"

Purge Date: 11-Jun-14	**Purge Time:** 1520
Purge Method: High flow 3 well volumes, low flow stabilization/sampling	**Field Technician:** H. Williams / R. Peterson

Well Volume

A. Well Depth (ft): 32.96 ft; packer interval 27 - 32.5	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down, ~0.3 ft
B. Depth to Water (ft): 9.8	**E. Well Volume (gal) (C*D):** 2.1	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 5.5 ft (base of packer at 27 ft)	**F. Three Well Volumes (gal) (E3):** 6.3	**Pump Intake Depth:** 28

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (°C)	ORP (mV)	DTW (ft btoc)	Rate (GPM /LPM)	Volume (Gal / liters)
1525	7.34	1.17	49.3	0.00	18.03	-245	9.92	0.16 GPM	0.8 GAL
1530	7.21	1.86	8.8	0.00	13.87	-275	9.98	0.16 GPM	1.6 GAL
1535	7.22	1.86	3.8	0.00	13.66	-271	10.01	0.16 GPM	2.4 GAL
1540	7.23	1.85	2.4	0.00	13.61	-269	10.03	0.16 GPM	3.2 .GAL
1545	7.23	1.85	3.4	0.00	13.56	-266	10.05	0.16 GPM	4 GAL
1550	7.24	1.88	3.1	0.00	13.33	-265	10.08	0.16 GPM	4.8 GAL
1555	7.24	1.89	3.1	0.00	13.33	-265	10.08	0.16 GPM	5.6 GAL
1558	7.24	1.86	5.1	0.00	13.25	-264	10.08	0.16 GPM	6.4 GAL
Start low-flow purge at 1558									
1401	7.22	1.89	5.5	0.00	14.26	-265	10.08	0.3 LPM	0.9 L
1404	7.22	1.88	2.8	0.00	14.57	-269	10.09	0.3 LPM	1.8 L
1407	7.23	1.87	2.9	0.00	14.56	-272	10.09	0.3 LPM	2.7 L
1410	7.23	1.88	2.7	0.00	14.59	-273	10.09	0.3 LPM	3.6 L

Total Quantity of Water Removed (gal):	6.4 gal high flow, 0.95 gal low flow	**Sampling Time:**	1610
Samplers:	AK/RP	**Split Sample With:**	DUP CH5-FD-140611
Sampling Date:	6/11/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: Started low flow at 1558

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-03-Upper	**EA Personnel:** A. Kohn / R. Peterson	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good - new	**Weather:** Overcast / ~75F
Sounding Method: Solinst WLM	**Gauge Date:** 6/12/2014	**Measurement Ref:** TOC
	Gauge Time: 0:55:00	
Stick Up/Down (ft): Down, ~0.2 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 4"

Purge Date: 12-Jun-14	**Purge Time:** 1300 (high flow)
Purge Method: High flow	**Field Technician:** HW/RP

Well Volume

A. Well Depth (ft): 32.74 ft; packer interval 16.5-22 ft	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down, ~0.2 ft
B. Depth to Water (ft): 9.97	**E. Well Volume (gal) (C*D):** 4.35	**Pump Type:** Peristaltic / Whaler Pump
C. Liquid Depth (ft) (A-B): 11.84 (packer top at 22 ft)	**F. Three Well Volumes (gal) (E3):** 13.05	**Pump Intake Depth:** 21

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (°C)	ORP (mV)	DTW (ft btoc)	Rate (GPM)	Volume (gallons)
Purged using peristaltic (0.2 GPM) and whaler pump (1.5 GPM)									
1303	N/A	N/A	N/A	N/A	N/A	N/A	14.03	1.70	5.1
1305	N/A	N/A	N/A	N/A	N/A	N/A	17.20	1.70	8.5
Well purged dry at 1305, let well recover									
1310	N/A	N/A	N/A	N/A	N/A	N/A	13.17	N/A	N/A
1314	N/A	N/A	N/A	N/A	N/A	N/A	11.20	N/A	N/A
1322	N/A	N/A	N/A	N/A	N/A	N/A	10.50	N/A	N/A
1324 collect VOC sample									

Total Quantity of Water Removed (gal):	8.5 gal high flow	**Sampling Time:**	1324
Samplers:	AK/RP	**Split Sample With:**	N/A
Sampling Date:	6/12/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: black tint to water

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-03-Middle	**EA Personnel:** H. Williams / R. Peterson	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Overcast, Wind / ~70 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/13/2014 **Gauge Time:**	**Measurement Ref:** TOC
Stick Up/Down (ft): Down, ~0.6 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 4"

Purge Date: 13-Jun-14	**Purge Time:** 1028 (high flow) 1047 (low flow)
Purge Method: High flow 3 well volumes, low flow stabilization/sampling	**Field Technician:** HW/RP

Well Volume

A. Well Depth (ft): 32.74 ft; packer interval 22-25 ft	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down, ~0.6 ft
B. Depth to Water (ft): 10.22	**E. Well Volume (gal) (C*D):** 1.101	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 3' interval (22-25 ft interval, straddle packer)	**F. Three Well Volumes (gal) (E3):** 3.303	**Pump Intake Depth:** 23 ft bgs

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (°C)	ORP (mV)	DTW (ft btoc)	Rate (GPM /LPM)	Volume (Gal / liters)
1032	7.52	1.12	126	0.00	13.86	-258	10.20	0.18 Gal	0.7 Gal
1035	7.43	1.15	87.6	0.00	13.04	-284	10.20	0.18 Gal	1.24 Gal
1038	7.38	1.15	75.5	0.00	12.88	-293	10.20	0.18 Gal	1.8 Gal
1041	7.34	1.15	56.9	0.00	12.81	-299	10.20	0.18 Gal	2.3 Gal
1044	7.31	1.15	53.5	0.00	12.86	-301	10.20	0.18 Gal	2.9 Gal
1047	7.28	1.15	47.8	0.00	12.89	-308	10.20	0.18 Gal	3.4 Gal
Start low-flow purge at 1047									
1050	7.25	1.13	34.5	0.00	14.63	-309	10.20	0.3 LPM	0.9 liters
1053	7.25	1.18	34	0.00	15.57	-311	10.20	0.3 LPM	1.8 liters
1056	7.24	1.2	31.2	0.00	16.03	-311	10.20	0.3 LPM	2.7 liters

Total Quantity of Water Removed (gal):	3.4 gal high flow, 0.7 gal low flow	**Sampling Time:**	1100
Samplers:	HW/RP	**Split Sample With:**	N/A
Sampling Date:	6/13/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: Black / Gray tint to the water

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-03 (Lower)	**EA Personnel:** RP / AK	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Overcast / ~75F
Sounding Method: Solinst WLM	**Gauge Date:** 6/12/2014 **Gauge Time:** 11:45:00	**Measurement Ref:** TOC
Stick Up/Down (ft): Down ~0.3 ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 3" in rock, 4" overburden casing

Purge Date: 12-Jun-14	**Purge Time:** 11:52
Purge Method: High flow 3 well volumes, low flow stabilization/sampling	**Field Technician:** AK/RP

Well Volume

A. Well Depth (ft): 32.74 ft ft; packer interval 27-32.74 ft	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down ~0.3 ft
B. Depth to Water (ft): 10.52	**E. Well Volume (gal) (C*D):** 2.38	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 6.5 base of packer at 27 ft)	**F. Three Well Volumes (gal) (E3):** 7.16	**Pump Intake Depth:** 28 ft

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (°C)	ORP (mV)	DTW (ft btoc)	Rate (GPM /LPM)	Volume (Gal / liters)
1202	7.25	1.11	78	0.54	12.14	-270	9.95	0.2 GPM	2 gal
1212	6.29	1.80	12.6	0.00	12.08	-259	10.5	0.2 GPM	4 gal
1222	7.26	1.81	9.7	0.00	11.99	-259	9.95	0.2 GPM	6 gal
1230	7.24	1.81	12	0.00	12.02	-260	9.95	0.2 GPM	8 gal
Start low-flow purge at 1230									
1233	7.23	1.81	7	0.00	12.83	-259	9.96	0.3 LPM	0.9 liters
1236	7.22	1.76	8	0.00	13.17	-262	9.96	0.3 LPM	1.8 liters
1239	7.22	1.76	8.5	0.00	13.34	-264	9.96	0.3 LPM	2.7 liters
1242	7.22	1.76	8.5	0.00	13.35	-265	9.96	0.3 LPM	3.6 liters

Total Quantity of Water Removed (gal):	8 gal high flow, 0.95 gal low flow	**Sampling Time:**	1242
Samplers:	AK/RP	**Split Sample With:**	N/A
Sampling Date:	6/12/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: Low flow @ 1230

EA Engineering, P.C.
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GROUNDWATER SAMPLING PURGE FORM

Well I.D.:	**EA Personnel:**	**Client:**
CH5-04 (Upper)	AK/RP	NFARS
Location:	**Well Condition:**	**Weather:**
Niagara Falls, NY	Good	Sunny / ~70 F; humid / light rain
Sounding Method:	**Gauge Date:** 6/11/2014	**Measurement Ref:**
Solinst WLM	**Gauge Time:** 11:28:00	TOC
Stick Up/Down (ft):	**PID Headspace Reading:**	**Well Diameter (in):**
Down	NA	3"

Purge Date:	**Purge Time:**
11-Jun-14	1129
Purge Method:	**Field Technician:**
Low flow	AK/RP

Well Volume

A. Well Depth (ft):	**D. Well Volume (ft):**	**Depth/Height of Top of PVC:**
33.79; packer interval 17.6-21 ft	0.367	Down
B. Depth to Water (ft):	**E. Well Volume (gal) (C*D):**	**Pump Type:**
9.1	4.36	Peristaltic Pump
C. Liquid Depth (ft) (A-B):	**F. Three Well Volumes (gal) (E3):**	**Pump Intake Depth:**
11.9 (top of packer at 21 ft)	13.1	20

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (^{o}C)	ORP (mV)	DTW (ft btoc)	Rate (GPM /LPM)	Volume (Gal / liters)
1135	7.30	1.46	17.6	0.47	18.31	-185	9.26	0.15 GPM	0.9 Gallons
1140	7.33	1.49	3.4	0.52	16.47	-165	9.46	0.15 GPM	1.65 Gallons
1145	7.21	1.5	7.6	0.00	13.66	-196	9.81	0.15 GPM	2.4 Gallons
1150	7.19	1.52	4.4	0.00	13.32	-204	10	0.15 GPM	3.15 Gallons
1155	7.17	1.53	3.1	0.00	13.18	-206	10.07	0.15 GPM	3.9 Gallons
1200	7.16	1.54	3.5	0.00	13.25	-209	10.1	0.15 GPM	4.65 Gallons
1205	7.16	1.56	4.6	0.00	13.35	-212	10.1	0.15 GPM	5.4 Gallons
1210	7.15	1.55	3.2	0.00	13.21	-216	10.1	0.15 GPM	6.15 Gallons
1215	7.15	1.54	3.1	0.00	13.23	-217	10.1	0.15 GPM	6.9 Gallons
1220	7.14	1.55	2.9	0.00	13.28	-217	10.1	0.15 GPM	7.65 Gallons
1225	7.14	1.55	2.6	0.00	13.21	-218	10.1	0.15 GPM	8.4 Gallons
1230	7.15	1.55	2.5	0.00	13.17	-221	10.1	0.15 GPM	9.15 Gallons
1233	7.15	1.56	5.6	0.00	13.08	-222	9.9	0.15 GPM	9.9 Gallons
Installed whaler pump, increased flow to 2.5 GPM									
1235	7.17	1.46	22.9	0.00	13.16	-202	14.24	2.5 GPM	14.9 Gallons
Start low-flow purge for parameter stabilization at 1235									
1238	7.19	1.52	0	0.00	13.15	-219	12.05	0.3 LPM	0.9 liters
1241	7.17	1.54	0	0.00	13.18	-225	11.21	0.3 LPM	1.8 liters
1244	7.16	1.54	583	0.00	13.05	-228	10.6	0.3 LPM	2.7 liters
1247	7.16	1.6	456	0.00	12.49	-228	10.3	0.3 LPM	3.6 liters
1250	7.15	1.59	370	0.00	12.49	-229	10.16	0.3 LPM	4.5 liters
1253	7.15	1.6	285	0.00	12.54	-232	10.06	0.3 LPM	5.4 liters
1256	7.15	1.6	269	0.00	12.57	-231	10	0.3 LPM	6.3 liters
1259	7.19	1.54	238	0.00	14.27	-177	9.96	0.3 LPM	7.2 liters
1302	7.15	1.54	196	0.00	14.18	-217	9.95	0.3 LPM	8.1 liters
1305	7.15	1.53	188	0.00	14.21	-223	9.95	0.3 LPM	9 liters
1308	7.15	1.53	156	0.00	14.11	-226	9.95	0.3 LPM	9.9 liters
1311	7.15	1.52	159	0.00	14.11	-228	9.93	0.3 LPM	10.8 liters
1314	7.15	1.52	144	0.00	14.04	-228	9.93	0.3 LPM	11.7 liters
1317	7.15	1.52	121	0.00	14.11	-228	9.93	0.3 LPM	12.6 liters
1320	7.14	1.52	118	0.00	14.26	-227	9.92	0.3 LPM	13.5 liters
1323	7.15	1.52	85.5	0.00	14.15	-227	9.92	0.3 LPM	14.4 liters
1326	7.14	1.61	62.2	0.00	12.57	-223	9.91	0.3 LPM	15.3 liters
1329	7.14	1.6	49.9	0.00	12.48	-227	9.91	0.3 LPM	16.2 liters
1332	7.14	1.6	48.7	0.00	12.48	-228	9.92	0.3 LPM	17.1 liters
1335	7.14	1.6	47.5	0.00	12.44	-229	9.92	0.3 LPM	18 liters

Total Quantity of Water Removed (gal):	15 gal high flow, 4.8 low flow	**Sampling Time:**	1335
Samplers:	AK	**Split Sample With:**	MS/MSD
Sampling Date:	6/11/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS:

Evacuate 3 well volumes at high flow (highest setting on pump)
Drop rate to low flow for stabilization / sampling
At 1233 installed whaler pump, increased flow rate to 2.5 gpm
1235 start low flow purge

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-04-Middle	**EA Personnel:** H. Williams / R. Peterson	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good - new	**Weather:** Overcast / ~70 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/13/2014 **Gauge Time:** 7:50:00	**Measurement Ref:** TOC
Stick Up/Down (ft): Down, ~0.3ft	**PID Headspace Reading:** NA	**Well Diameter (in):** 4"

Purge Date: 13-Jun-14	**Purge Time:** 0750 (high flow) 0815 (low flow)
Purge Method: High flow for 3 gal & low flow after until stabilization	**Field Technician:** HW/RP

Well Volume

A. Well Depth (ft): 33.79 ft; packer interval 22-25 ft	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down, -0.2ft
B. Depth to Water (ft): 9.13	**E. Well Volume (gal) (C*D):** 1.101	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 3' interval (22-25 ft interval, straddle packer)	**F. Three Well Volumes (gal) (E3):** 3.303	**Pump Intake Depth:** 23 ft bgs

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (°C)	ORP (mV)	DTW (ft btoc)	Rate (GPM /LPM)	Volume (Gal / liters)
756	7.65	1.58	44.8	1.72	15.24	-121	9.00	0.15 GPM	0.9 Gal
759	7.37	1.60	52.9	0.00	12.85	-142	9.00	0.15 GPM	1.35 Gal
802	7.27	1.62	53.5	0.00	12.44	-146	9.00	0.15 GPM	1.8 Gal
805	7.23	1.62	54.3	0.00	12.3	-147	-	0.15 GPM	2.25 Gal
808	7.21	1.62	54.1	0.00	12.32	-150	9.00	0.15 GPM	2.7 Gal
811	7.2	1.62	51.7	0.00	12.23	-154	-	0.15 GPM	3.15 Gal
814	7.19	1.62	43.9	0.00	12.29	-158	-	0.15 GPM	3.6 Gal
Start low-flow purge at 0815									
817	7.18	1.61	37.5	0.00	12.65	-160	-	0.3 LPM	0.9
820	7.17	1.61	34.5	0.00	13.74	-166	-	0.3 LPM	1.8
823	7.17	1.62	34	0.00	14	-170	9.00	0.3 LPM	2.7

Total Quantity of Water Removed (gal):	3.6 Gal high flow, 0.7 gal low flow	**Sampling Time:**	825
Samplers:	HW/RP	**Split Sample With:**	N/A
Sampling Date:	6/13/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS:

EA Engineering, P.C.
EA Science and Technology

GROUNDWATER SAMPLING PURGE FORM

Well I.D.: CH5-04 (Lower)	**EA Personnel:** AK/RP	**Client:** NFARS
Location: Niagara Falls, NY	**Well Condition:** Good	**Weather:** Overcast / ~75 F
Sounding Method: Solinst WLM	**Gauge Date:** 6/11/2014	**Measurement Ref:** TOC
	Gauge Time: 13:56:00	
Stick Up/Down (ft): Down	**PID Headspace Reading:** NA	**Well Diameter (in):** 3"

Purge Date: 11-Jun-14	**Purge Time:** 1398
Purge Method: Low flow	**Field Technician:** AK/RP

Well Volume

A. Well Depth (ft): 33.79; packer interval 26-33.79 ft	**D. Well Volume (ft):** 0.367	**Depth/Height of Top of PVC:** Down
B. Depth to Water (ft): 10.3	**E. Well Volume (gal) (C*D):** 3.15	**Pump Type:** Peristaltic Pump
C. Liquid Depth (ft) (A-B): 8.6 (packer base set at 26 ft)	**F. Three Well Volumes (gal) (E3):** 9.45	**Pump Intake Depth:** 28 ft

Water Quality Parameters

Time (hrs)	pH (pH units)	Conductivity (mS/cm)	Turbidity (ntu)	DO (mg/L)	Temperature (°C)	ORP (mV)	DTW (ft btoc)	Rate (GPM /LPM)	Volume (Gal / liters)
1403	7.18	1.51	240	0.00	14.62	-198	9.45	0.2 GPM	1 gal
1408	7.16	1.51	195	0.00	14.32	-207	9.12	0.2 GPM	2 gal
1413	7.16	1.51	170	0.00	14.24	-213	9.09	0.2 GPM	3 gal
1418	7.17	1.61	137	0.00	13.06	-209	9.05	0.2 GPM	4 gal
1423	7.16	1.62	102	0.00	13.12	-216	9.05	0.2 GPM	5 gal
1428	7.16	1.62	80.5	0.00	12.89	-218	9.05	0.2 GPM	6 gal
1433	7.17	1.62	70.8	0.00	12.95	-219	9.05	0.2 GPM	7 gal
1438	7.17	1.62	69.1	0.00	13.05	-219	9.05	0.2 GPM	8 gal
1443	7.17	1.65	58.3	0.00	13.35	-219	9.05	0.2 GPM	9 gal
1445	7.17	1.65	54.2	0.00	13.28	-220	9.05	0.2 GPM	9.4 gal
1448	7.17	1.66	46.7	0.00	14.41	-223	9.05	0.3 LPM	0.9 liters
1451	17.15	1.67	47.1	0.00	15.25	-223	9.05	0.3 LPM	1.8 liters
1454	17.16	1.66	48.3	0.00	15.79	-221	9.05	0.3 LPM	2.7 liters
1457	17.16	1.66	47.4	0.00	15.71	-220	9.05	0.3 LPM	3.6 liters

Total Quantity of Water Removed (gal):	9.4 gal high flow, 0.95 gal low flow	**Sampling Time:**	1500
Samplers:	AK	**Split Sample With:**	N/A
Sampling Date:	6/11/2014	**Sample Type:**	GW grab

COMMENTS AND OBSERVATIONS: Could not gauge interval while sampling due to packer in well - Gauge water depth above packer

Started low flow at 1445