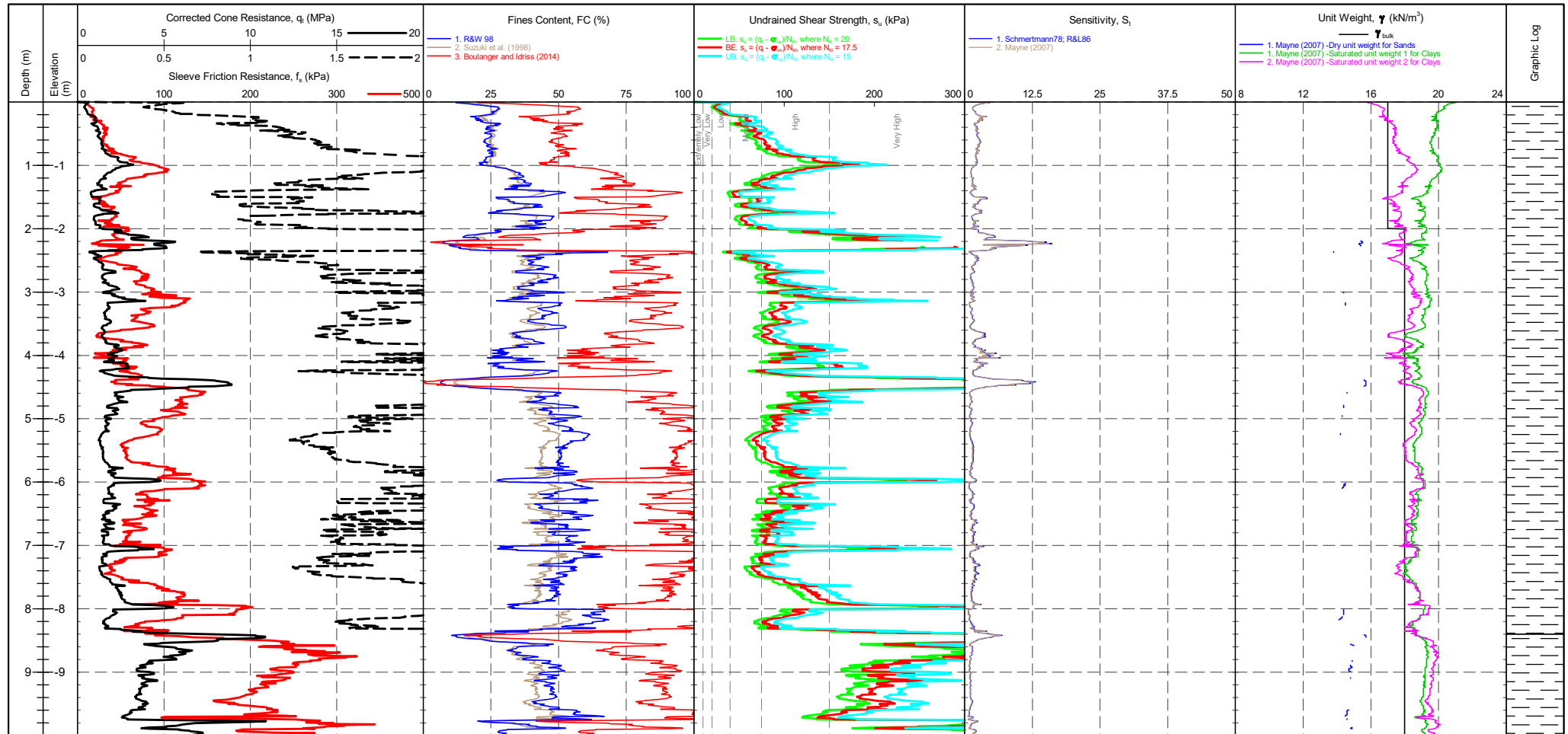


PointID

HYDCPT35

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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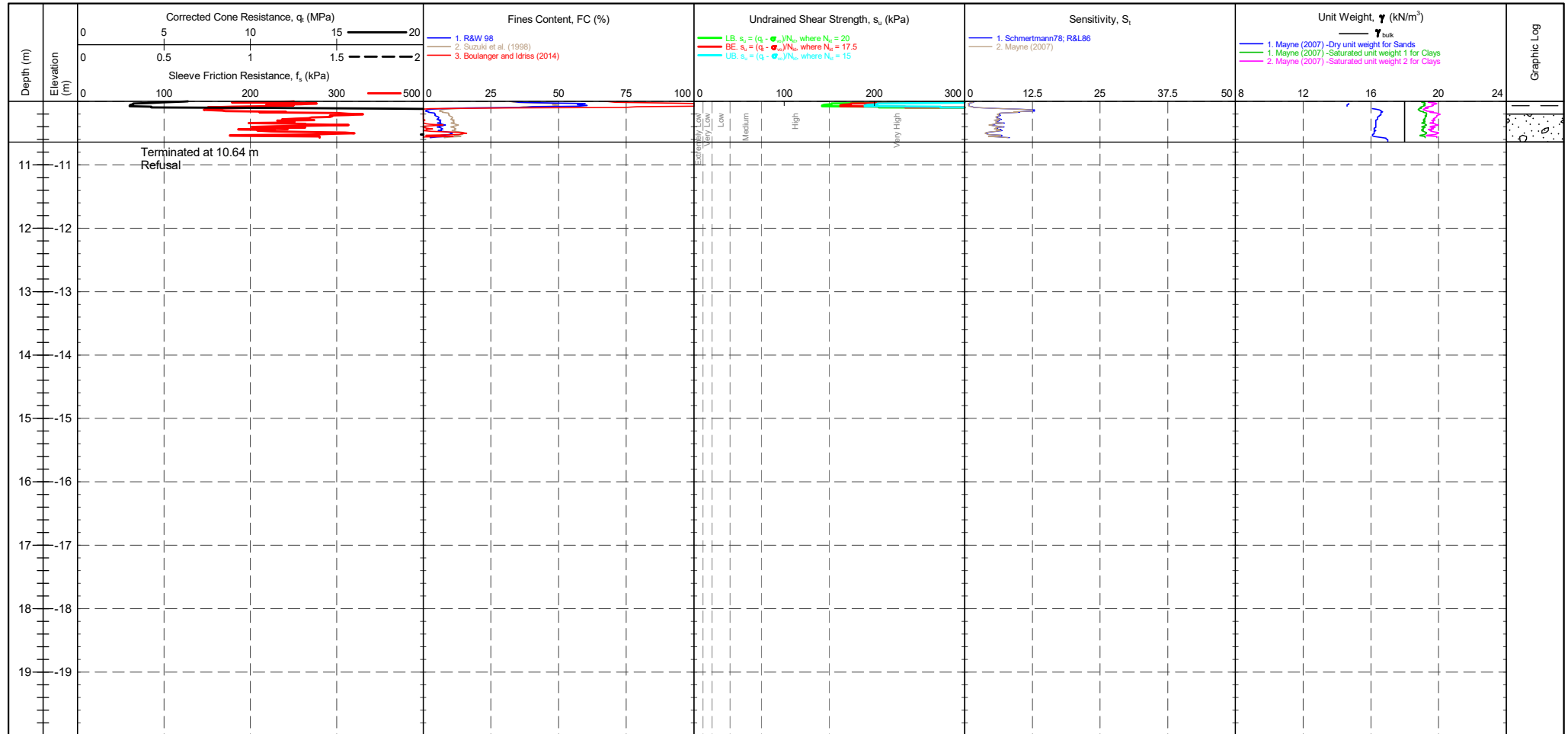


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 234 mV Sleeve: 261 mV Pore Pressure 2: 474 mV X-Y Inclinator: 2244 mV	CPTU ZERO VALUES Post: 234 mV Difference: 0 MPa 261 mV 0 kPa 544 mV 0.02 kPa 2460 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	▽ Groundwater Level ▮ Dissipation Test
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PointID

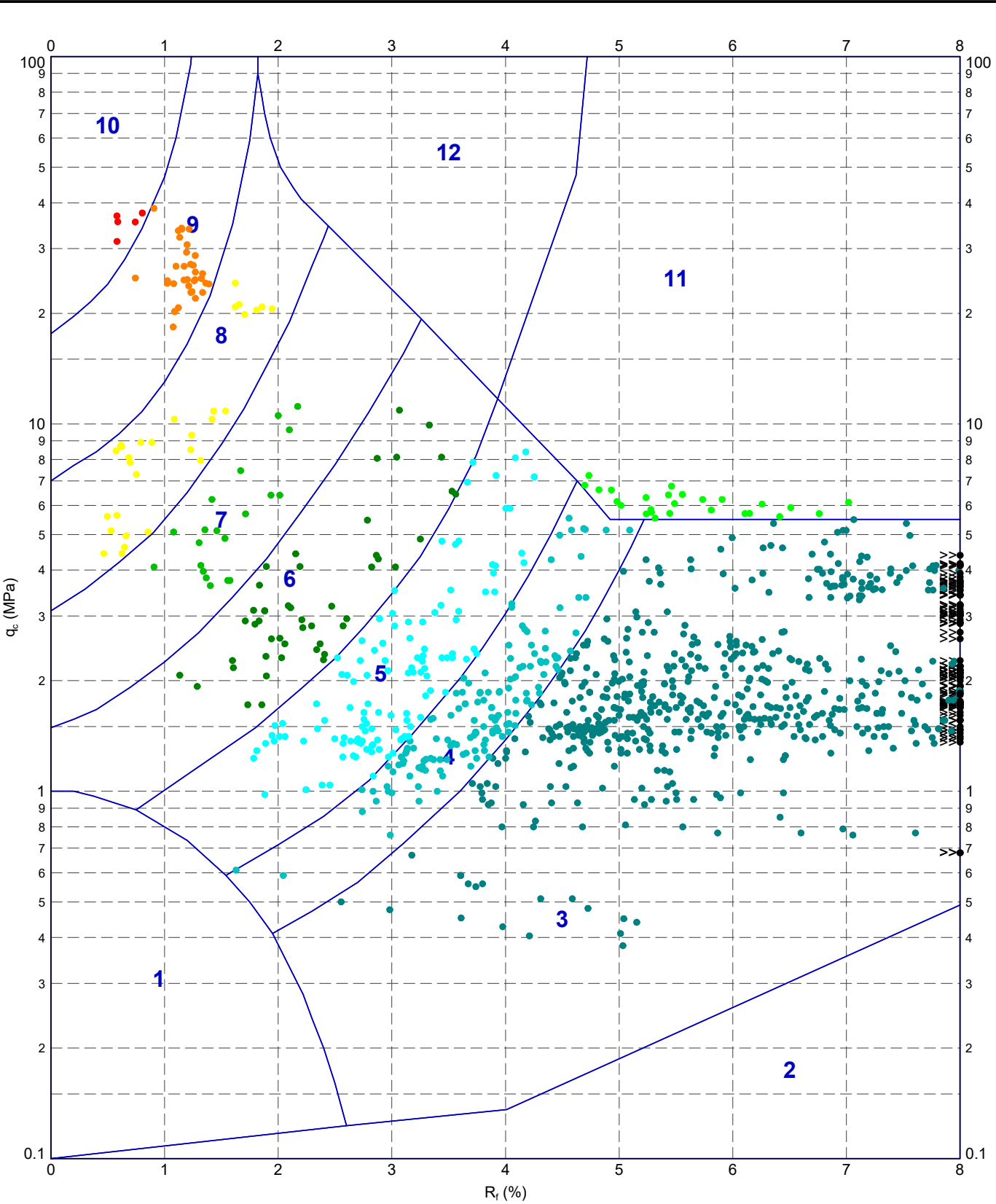
HYDCPT35

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr><th>Transducer</th><th>Pre</th><th>Post</th><th>Difference</th></tr> <tr><td>Tip</td><td>234 mV</td><td>234 mV</td><td>0 MPa</td></tr> <tr><td>Sleeve</td><td>261 mV</td><td>261 mV</td><td>0 kPa</td></tr> <tr><td>Pore Pressure 2</td><td>474 mV</td><td>544 mV</td><td>0.02 kPa</td></tr> <tr><td>X-Y Inclinator</td><td>2244 mV</td><td>2460 mV</td><td></td></tr> </table>	Transducer	Pre	Post	Difference	Tip	234 mV	234 mV	0 MPa	Sleeve	261 mV	261 mV	0 kPa	Pore Pressure 2	474 mV	544 mV	0.02 kPa	X-Y Inclinator	2244 mV	2460 mV		COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 <table border="1"> <tr><th>Term based on measurement</th><th>s_u (kPa)</th><th>Term based on measurement</th><th>s_u (kPa)</th></tr> <tr><td>Extremely low strength</td><td><10</td><td>Medium strength</td><td>40-75</td></tr> <tr><td>Very low strength</td><td>10-20</td><td>High strength</td><td>75-150</td></tr> <tr><td>Low strength</td><td>20-40</td><td>Very high strength</td><td>150-300</td></tr> <tr><td></td><td></td><td>Extremely high strength</td><td>>300</td></tr> </table>	Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)	Extremely low strength	<10	Medium strength	40-75	Very low strength	10-20	High strength	75-150	Low strength	20-40	Very high strength	150-300			Extremely high strength	>300	▽ Groundwater Level ▮ Dissipation Test
Transducer	Pre	Post	Difference																																									
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<drawingFile>> 09/06/2021 22:15:10.02.00.04. Dalgid Lab and In Situ Tool. In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10



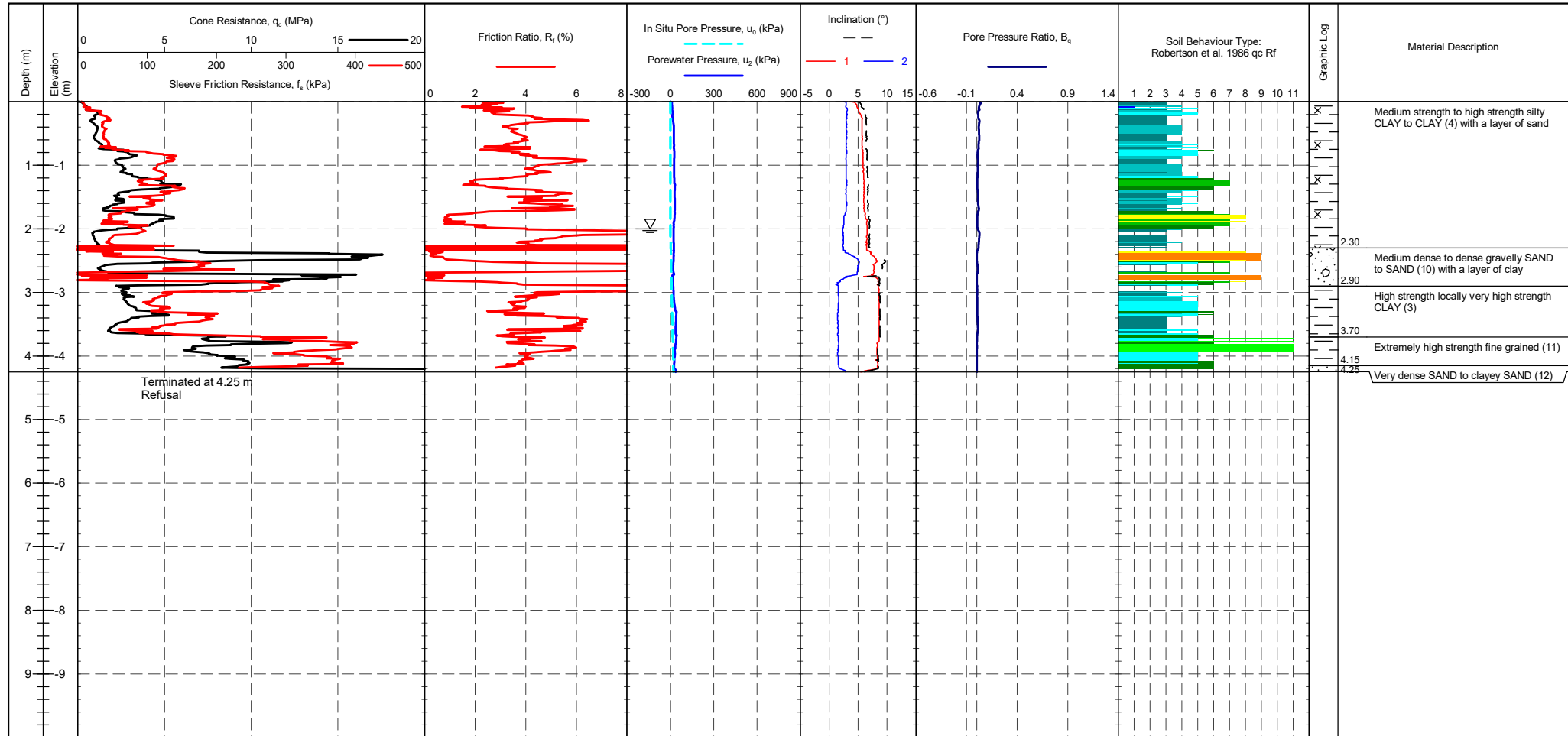
METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
- 7 - Silty SAND to sandy SILT
- 10 - Gravelly SAND to SAND
- 2 - Organic material
- 5 - Clayey SILT to silty CLAY
- 8 - SAND to silty SAND
- 11 - Very stiff fine grained
- 3 - CLAY
- 6 - Sandy SILT to clayey SILT
- 9 - SAND
- 12 - SAND to clayey SAND

	TITLE	DRAWN	DATE
	Hydrock Wingate, Bolton Wingates, Bolton	CHECKED	DATE
	Robertson et al. 1986 qc vs. Rf - HYDCPT35	SCALE	FIGURE No
		PROJECT No 1210298	A4

PointID	HYDCPT36
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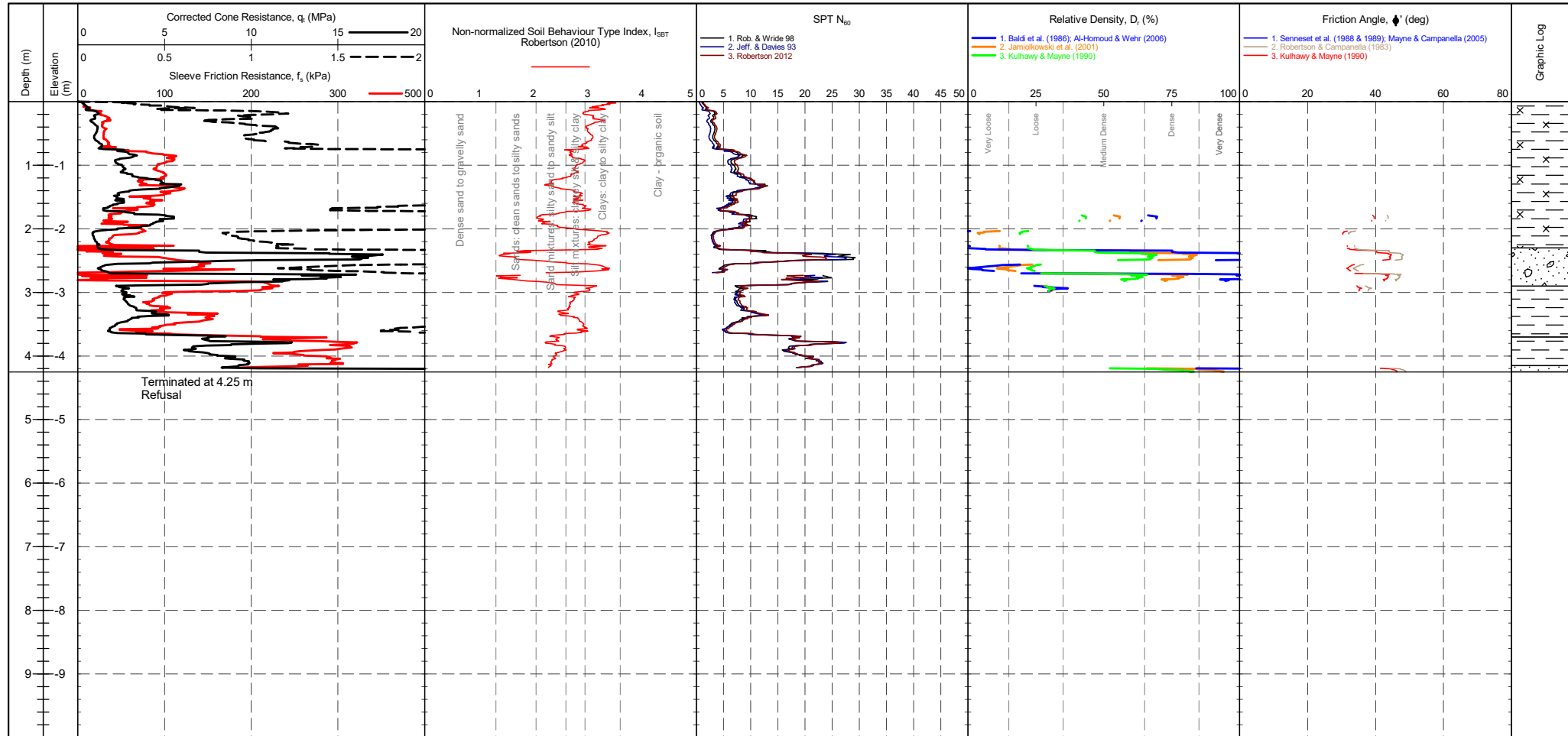
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on inclination.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 01/06/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICTION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre Post Difference Tip : 232 mV 230 mV -0.022 MPa Sleeve : 257 mV 253 mV -0.003 kPa Pore Pressure 2 : 449 mV 463 mV 0.004 kPa X-Y Inclinator : 2778 mV 2798 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID
HYDCPT36

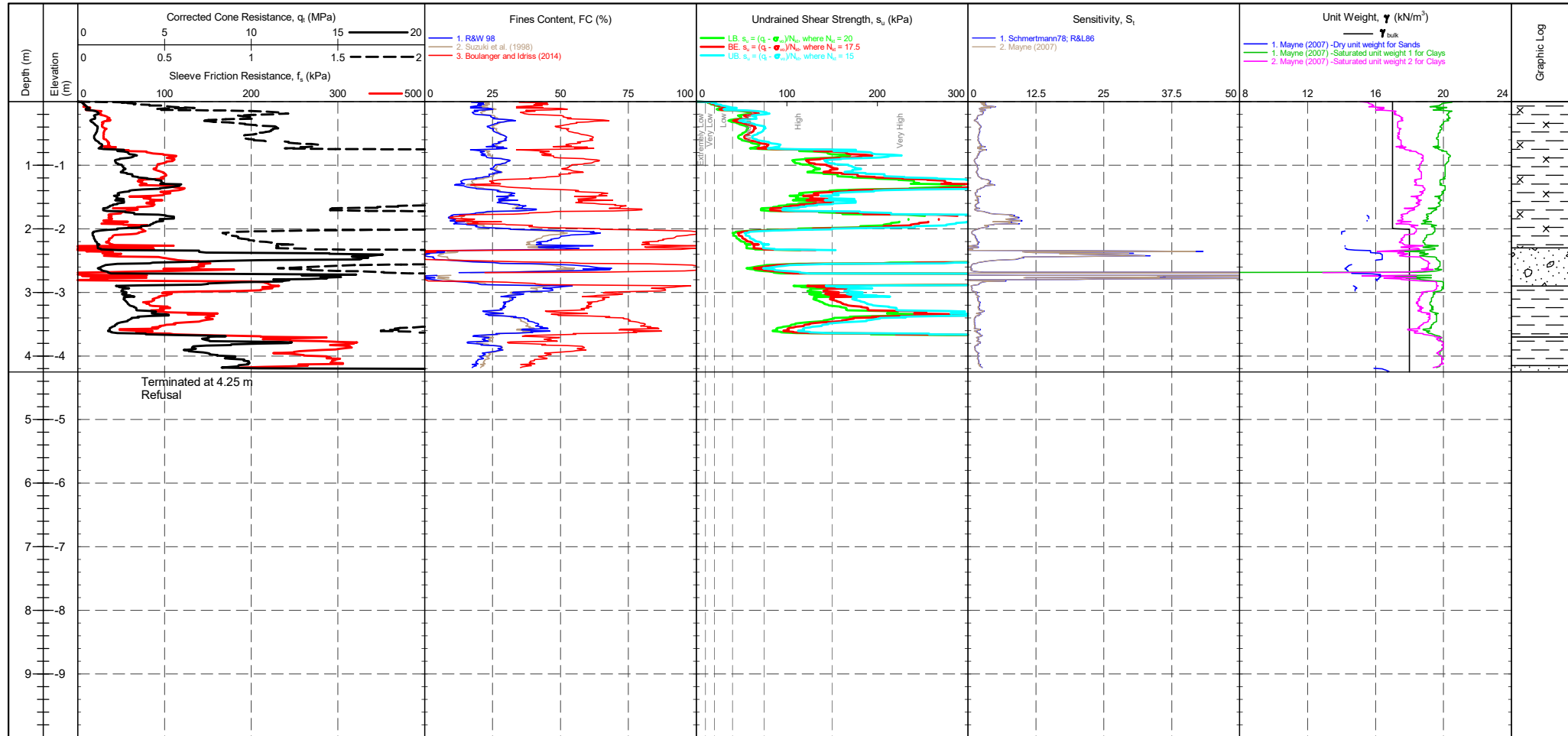
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on inclination.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 01/06/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Tip: 232 mV / 230 mV / -0.022 MPa Sleeve: 257 mV / 253 mV / -0.003 kPa Pore Pressure 2: 449 mV / 463 mV / 0.004 kPa X-Y Inclinator: 2778 mV / 2798 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)																																			
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Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65																																			
Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85																																			
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85																																			

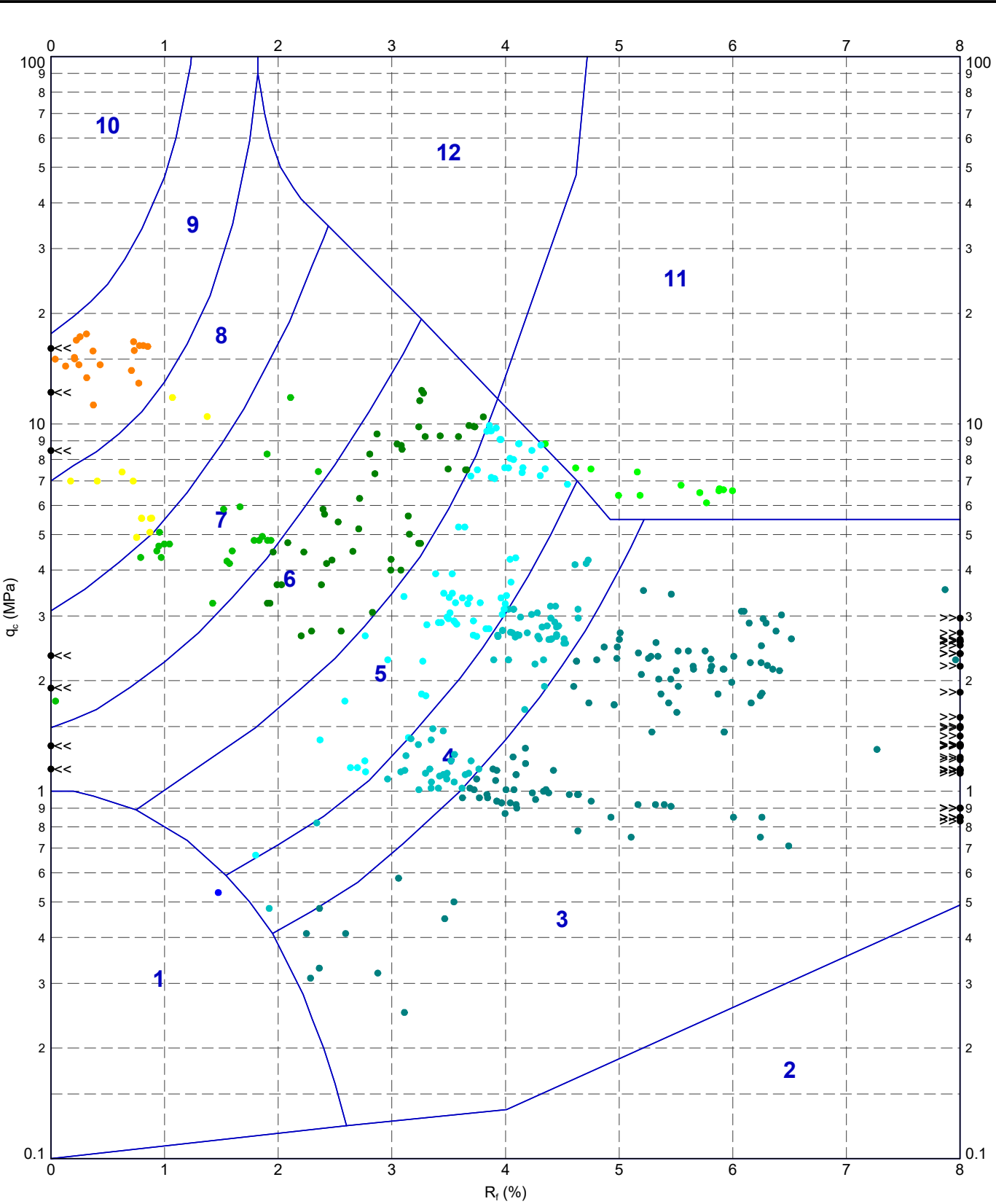
PointID
HYDCPT36

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on inclination.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 01/06/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 232 mV Sleeve: 257 mV Pore Pressure 2: 449 mV X-Y Inclinator: 2778 mV	CPTU ZERO VALUES Post: 230 mV Difference: -0.022 MPa 253 mV -0.003 kPa 463 mV 0.004 kPa 2798 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LUB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<drawingFile>> 09/06/2021 22:17 10.02.00.04 D:\git\Lab and In Situ Tool - DGD\Lab - In Situ SI 2.02.0\2017-07-10\Proj. In Situ SI 2.02.0\2017-07-10



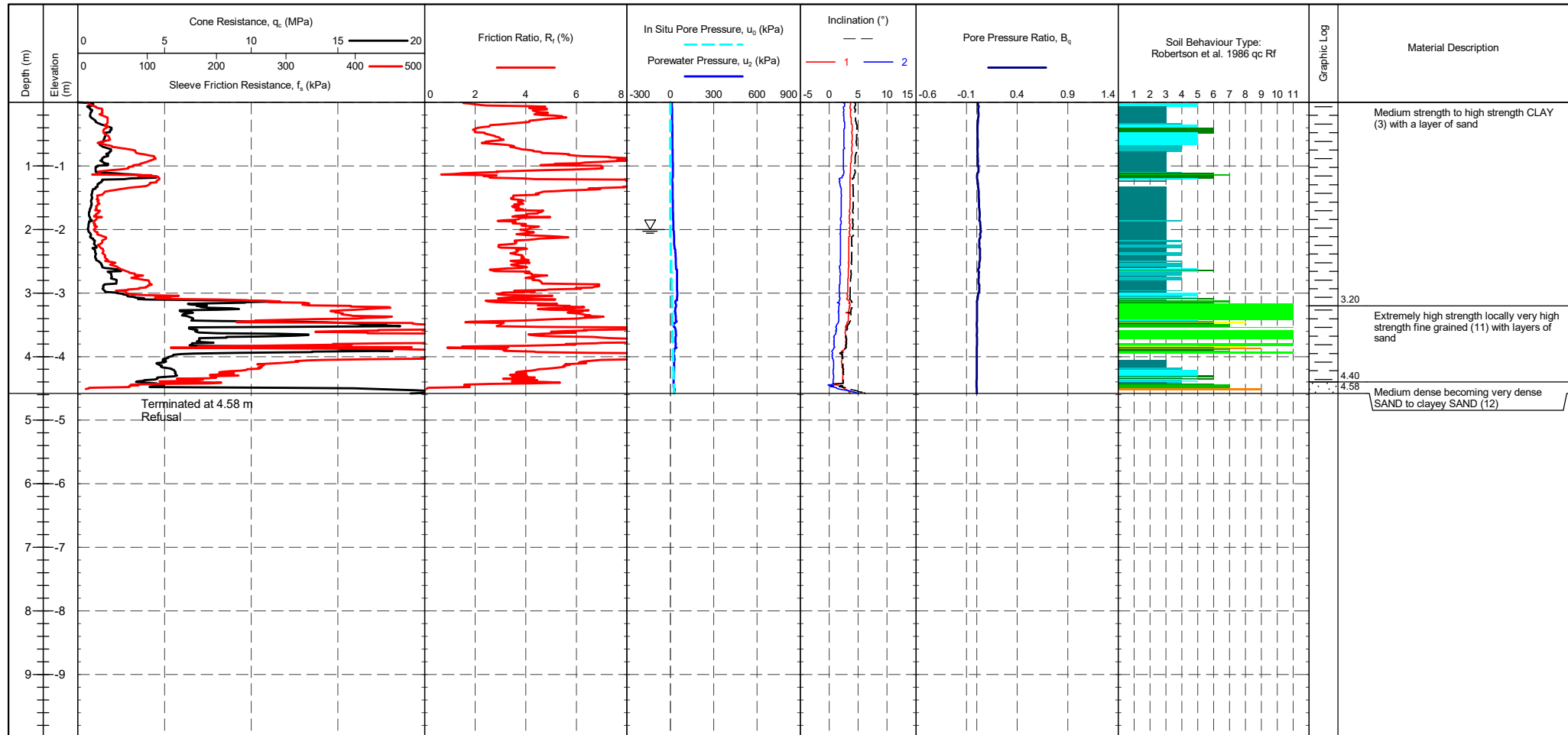
METHOD: Robertson et al. 1986 q_c R_f

1 - Sensitive fine grained material	4 - Silty CLAY to CLAY	7 - Silty SAND to sandy SILT	10 - Gravelly SAND to SAND
2 - Organic material	5 - Clayey SILT to silty CLAY	8 - SAND to silty SAND	11 - Very stiff fine grained
3 - CLAY	6 - Sandy SILT to clayey SILT	9 - SAND	12 - SAND to clayey SAND

	<p style="text-align: center;"> TITLE Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 q_c vs. R_f - HYDCPT36 </p>	DRAWN	DATE	09/06/2021	
		CHECKED	DATE	09/06/2021	
		SCALE	Not To Scale		A4
		PROJECT No	1210298		FIGURE No

PointID	HYDCPT37
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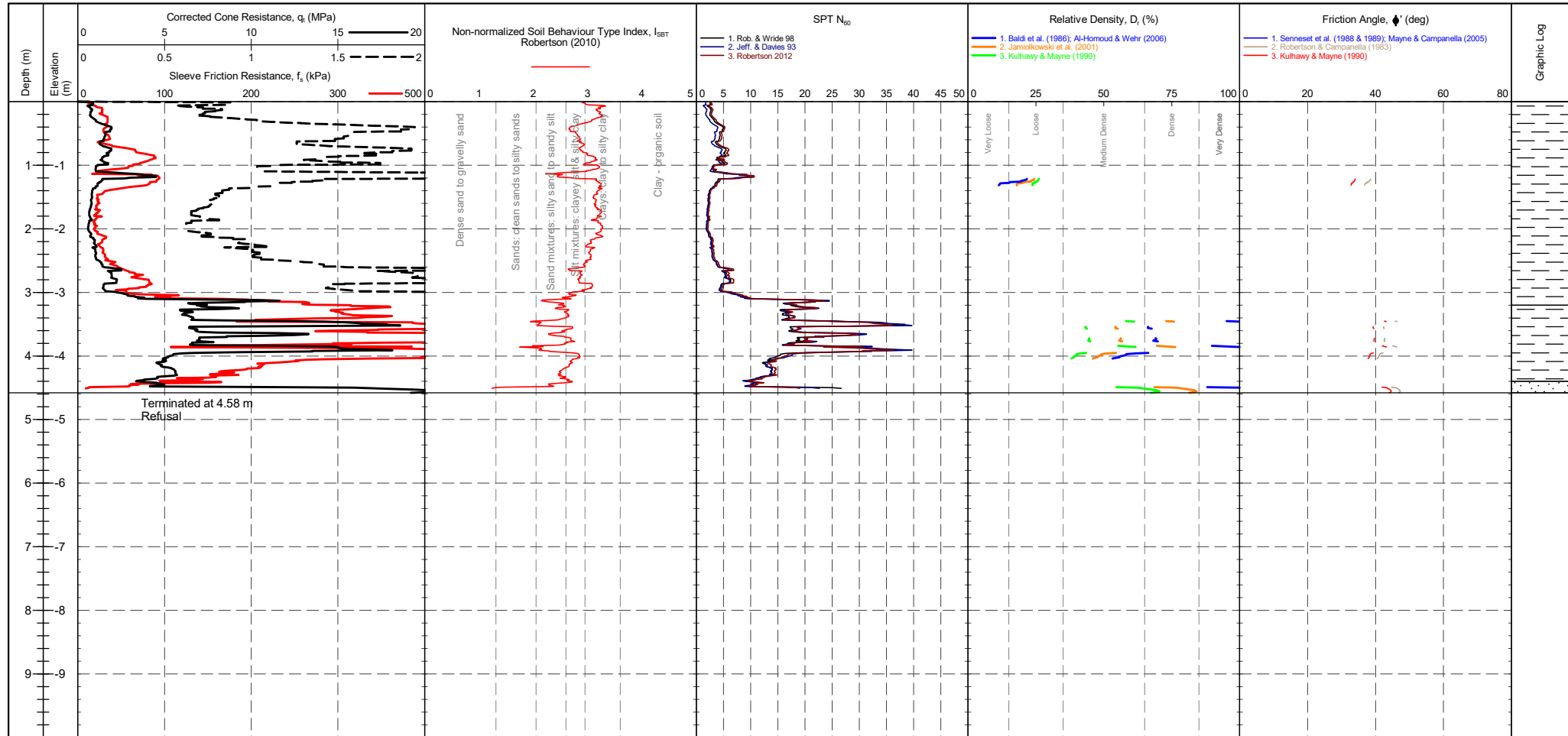
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on inclination.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 01/06/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICTION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre Post Difference Tip : 230 mV 230 mV 0 MPa Sleeve : 253 mV 253 mV 0 kPa Pore Pressure 2 : 462 mV 484 mV 0.006 kPa X-Y Inclinator : 2802 mV 2763 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT37
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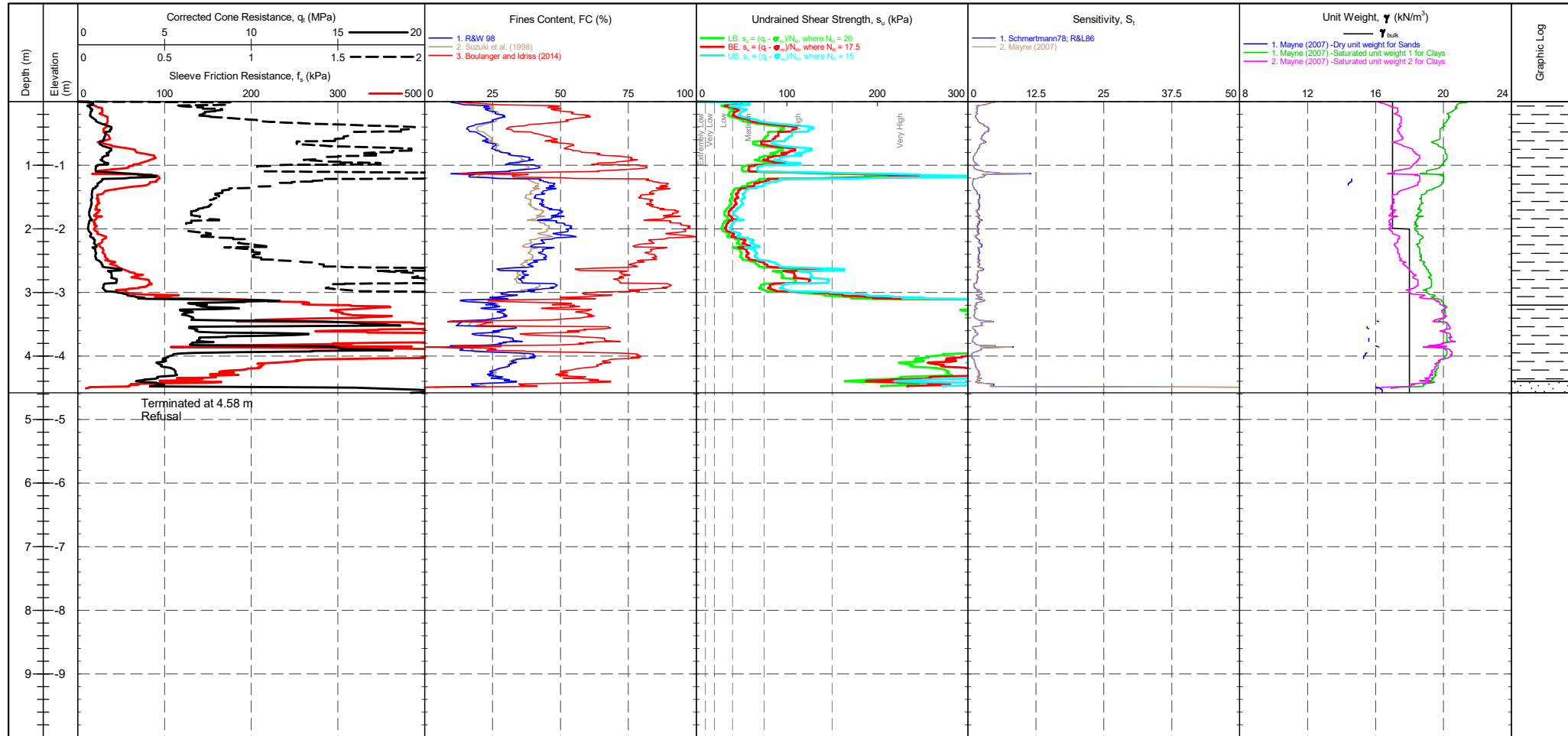
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on inclination.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 01/06/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 230 mV 230 mV 0 MPa Sleeve 253 mV 253 mV 0 kPa Pore Pressure 2 462 mV 484 mV 0.006 kPa X-Y Inclinator 2802 mV 2763 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)																																			
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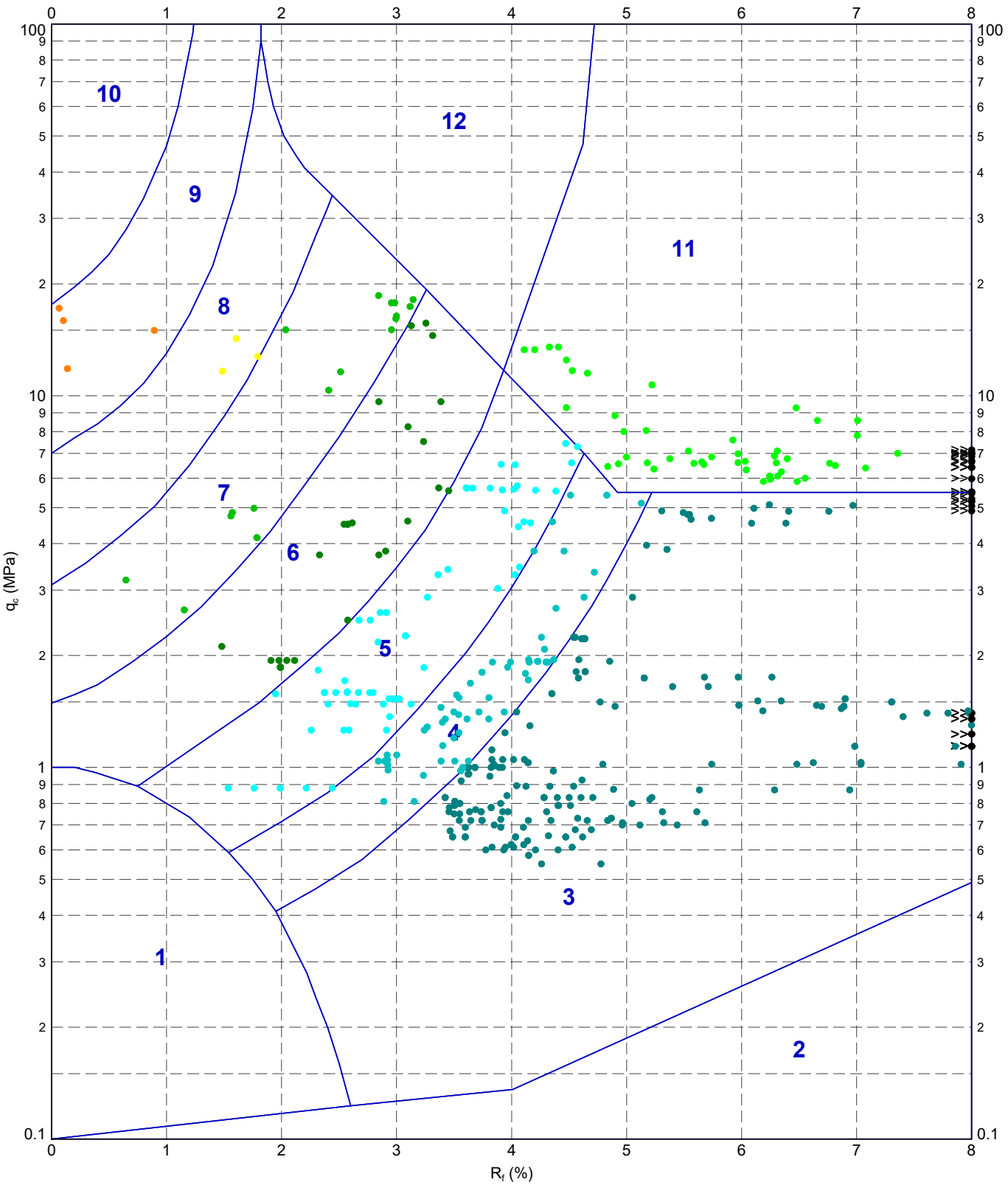
PointID
HYDCPT37

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on inclination.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 01/06/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 230 mV Sleeve: 253 mV Pore Pressure 2: 462 mV X-Y Inclinator: 2802 mV	CPTU ZERO VALUES Post: 230 mV Difference: 0 MPa 253 mV 0 kPa 484 mV 0.006 kPa 2763 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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210586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<DrawingFile>> 09/06/2021 22:19 10.02.00.04 Dajdel Lab and In Situ Tool - In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10

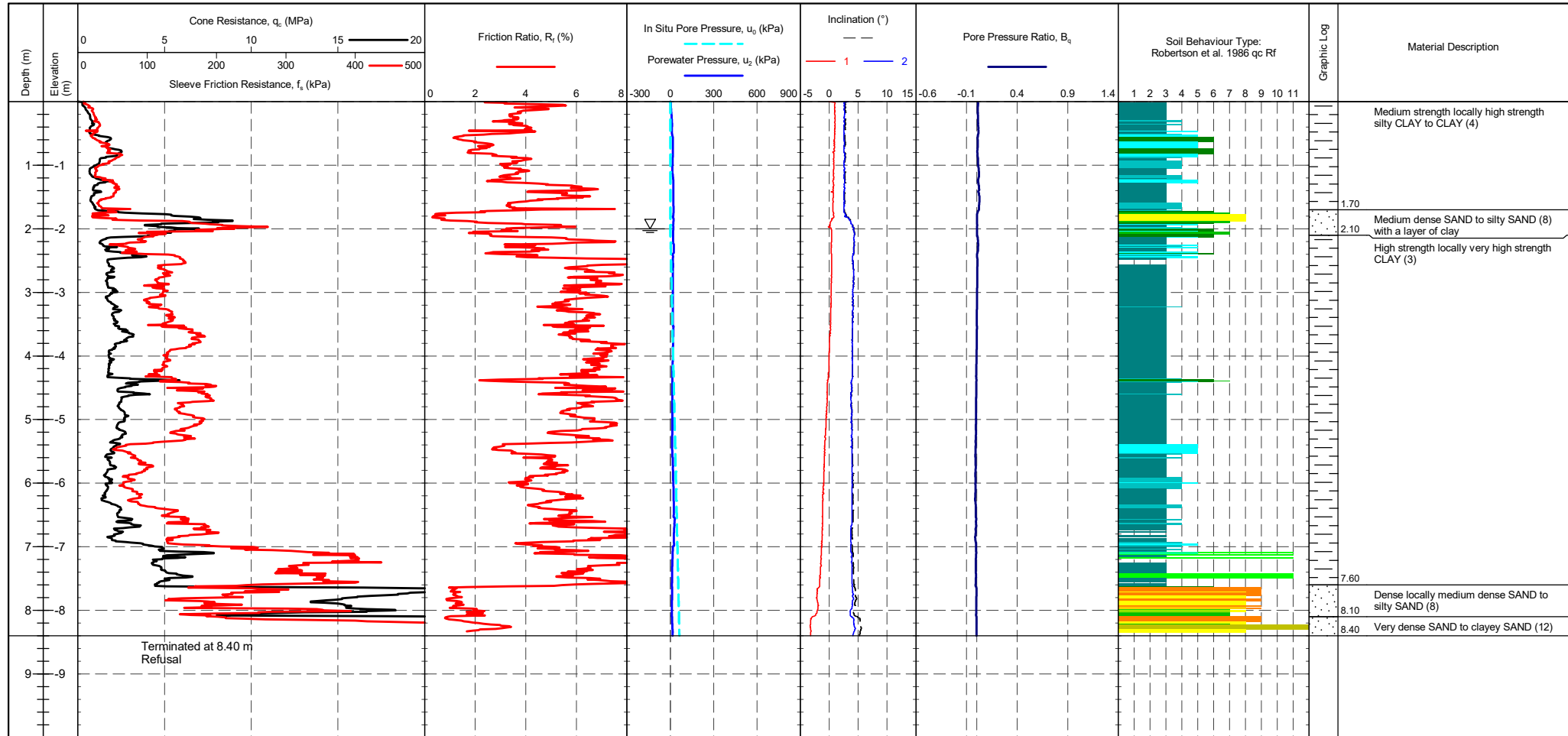


- METHOD: Robertson et al. 1986 q_c R_f**
- 1 - Sensitive fine grained material
 - 4 - Silty CLAY to CLAY
 - 7 - Silty SAND to sandy SILT
 - 10 - Gravelly SAND to SAND
 - 2 - Organic material
 - 5 - Clayey SILT to silty CLAY
 - 8 - SAND to silty SAND
 - 11 - Very stiff fine grained
 - 3 - CLAY
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 - 9 - SAND
 - 12 - SAND to clayey SAND

	TITLE	DRAWN	DATE	
	Hydrock Wingate, Bolton Wingates, Bolton	CHECKED	DATE	
	Robertson et al. 1986 q _c vs. R _f - HYDCPT37	SCALE	Not To Scale	A4
		PROJECT No	FIGURE No	
		1210298		

PointID	HYDCPT38
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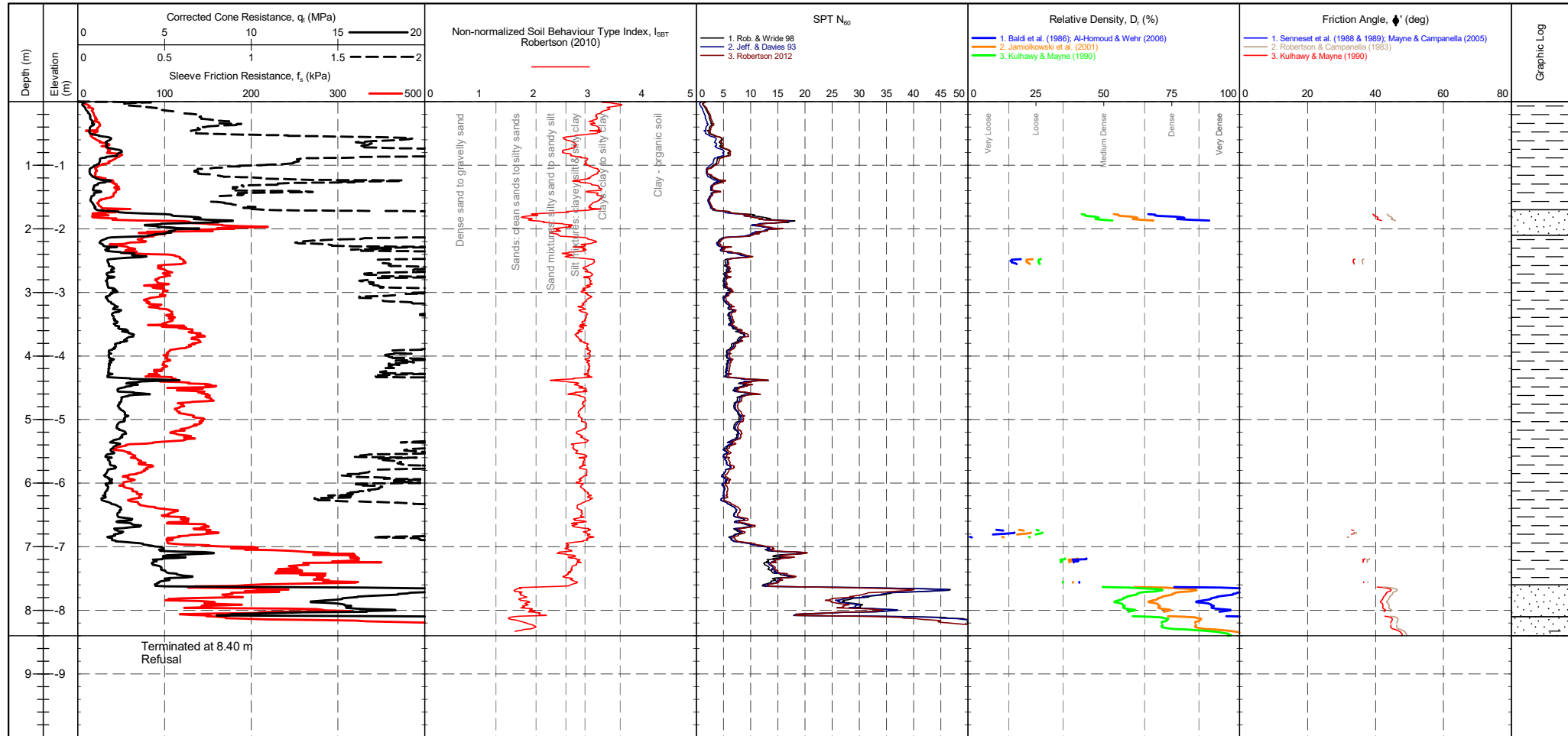
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Pre Post Difference Tip 233 mV 232 mV -0.011 MPa Sleeve 262 mV 262 mV 0 kPa Pore Pressure 2 468 mV 486 mV 0.005 kPa X-Y Inclinometer 2418 mV 2522 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT38
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CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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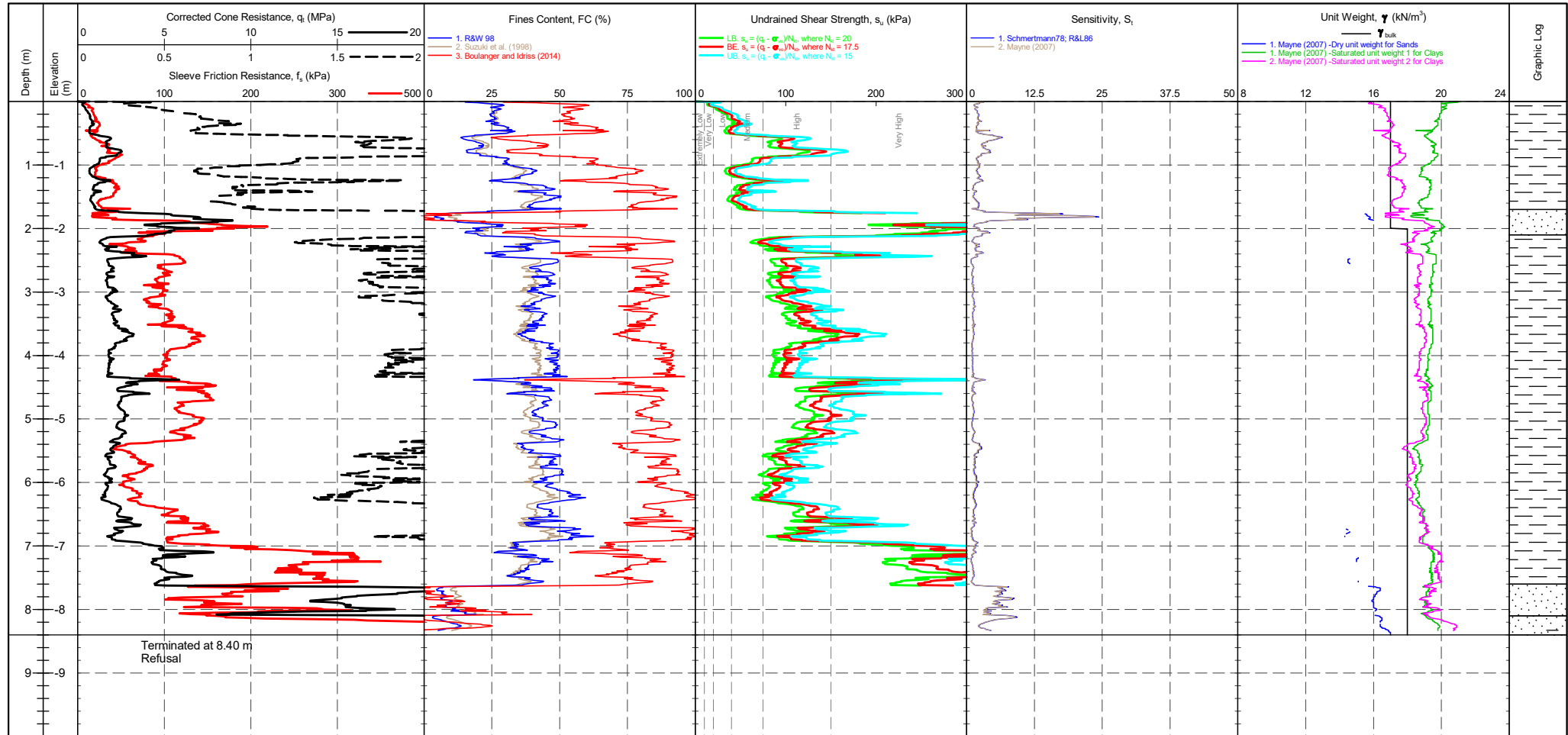


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 233 mV 232 mV -0.011 MPa Sleeve 262 mV 262 mV 0 kPa Pore Pressure 2 468 mV 486 mV 0.005 kPa X-Y Inclinator 2418 mV 2522 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)																																			
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PointID

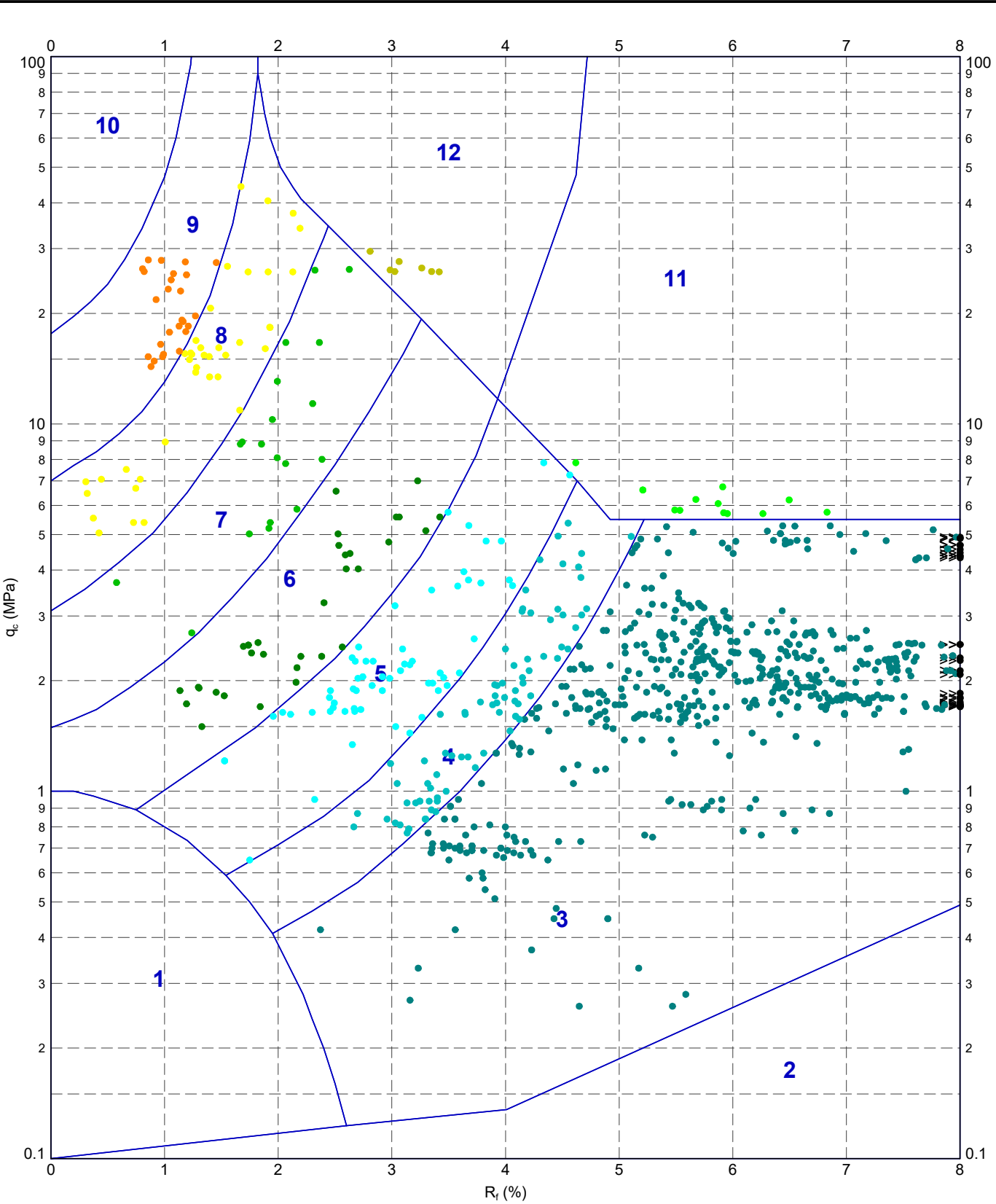
HYDCPT38

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 233 mV Sleeve: 262 mV Pore Pressure 2: 468 mV X-Y Inclinator: 2418 mV	CPTU ZERO VALUES Post: 232 mV Difference: -0.011 MPa 0 kPa 486 mV 2522 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<drawingFile>> 09/06/2021 22:22 10.02.00.04 Dalgid Lab and In Situ Tool - DGD Lib - In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10

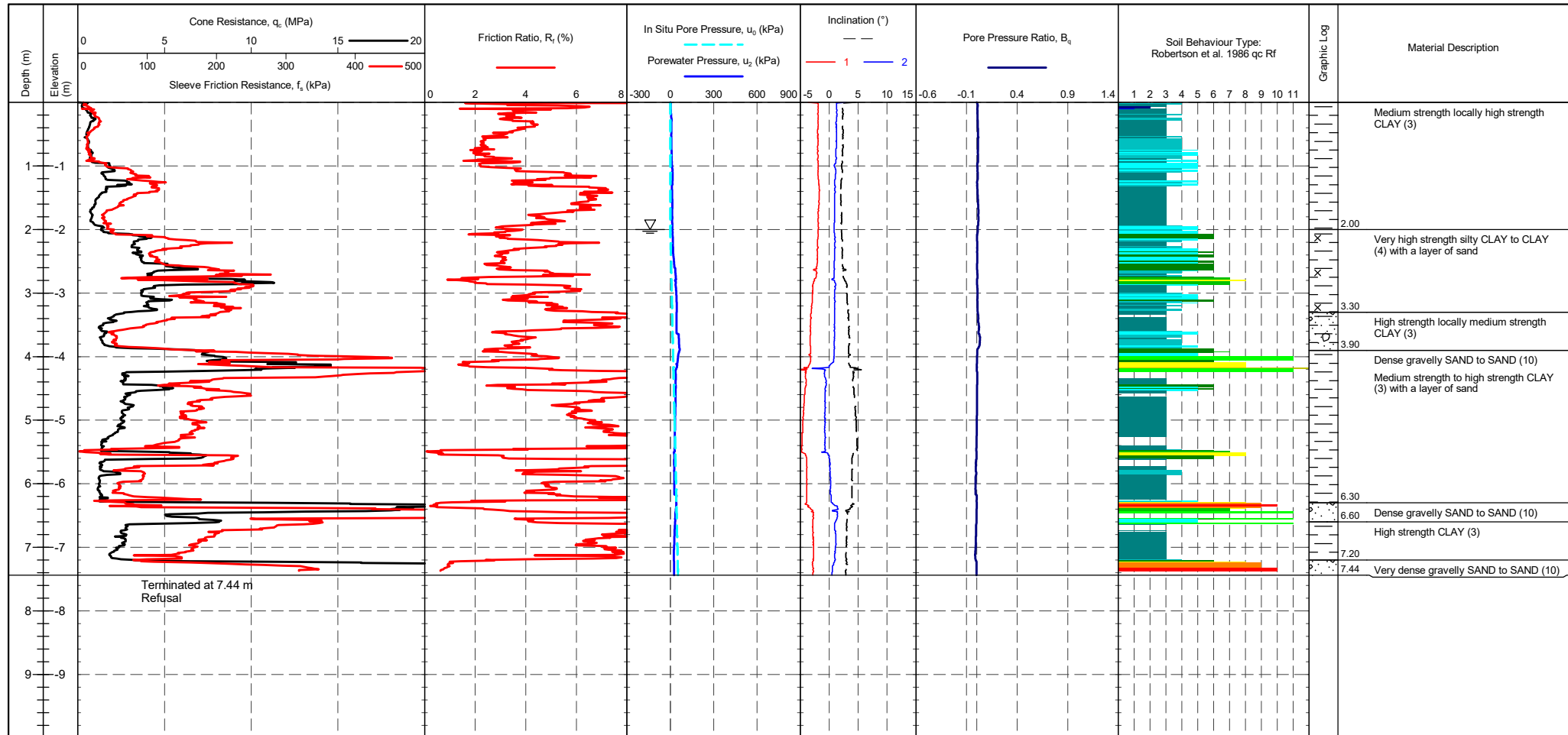


- METHOD: Robertson et al. 1986 q_c R_f**
- 1 - Sensitive fine grained material
 - 4 - Silty CLAY to CLAY
 - 7 - Silty SAND to sandy SILT
 - 10 - Gravelly SAND to SAND
 - 2 - Organic material
 - 5 - Clayey SILT to silty CLAY
 - 8 - SAND to silty SAND
 - 11 - Very stiff fine grained
 - 3 - CLAY
 - 6 - Sandy SILT to clayey SILT
 - 9 - SAND
 - 12 - SAND to clayey SAND

	TITLE Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 q _c vs. R _f - HYDCPT38	DRAWN _____	DATE 09/06/2021
		CHECKED _____	DATE 09/06/2021
		SCALE Not To Scale	A4
		PROJECT No 1210298	FIGURE No _____

PointID	HYDCPT39
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CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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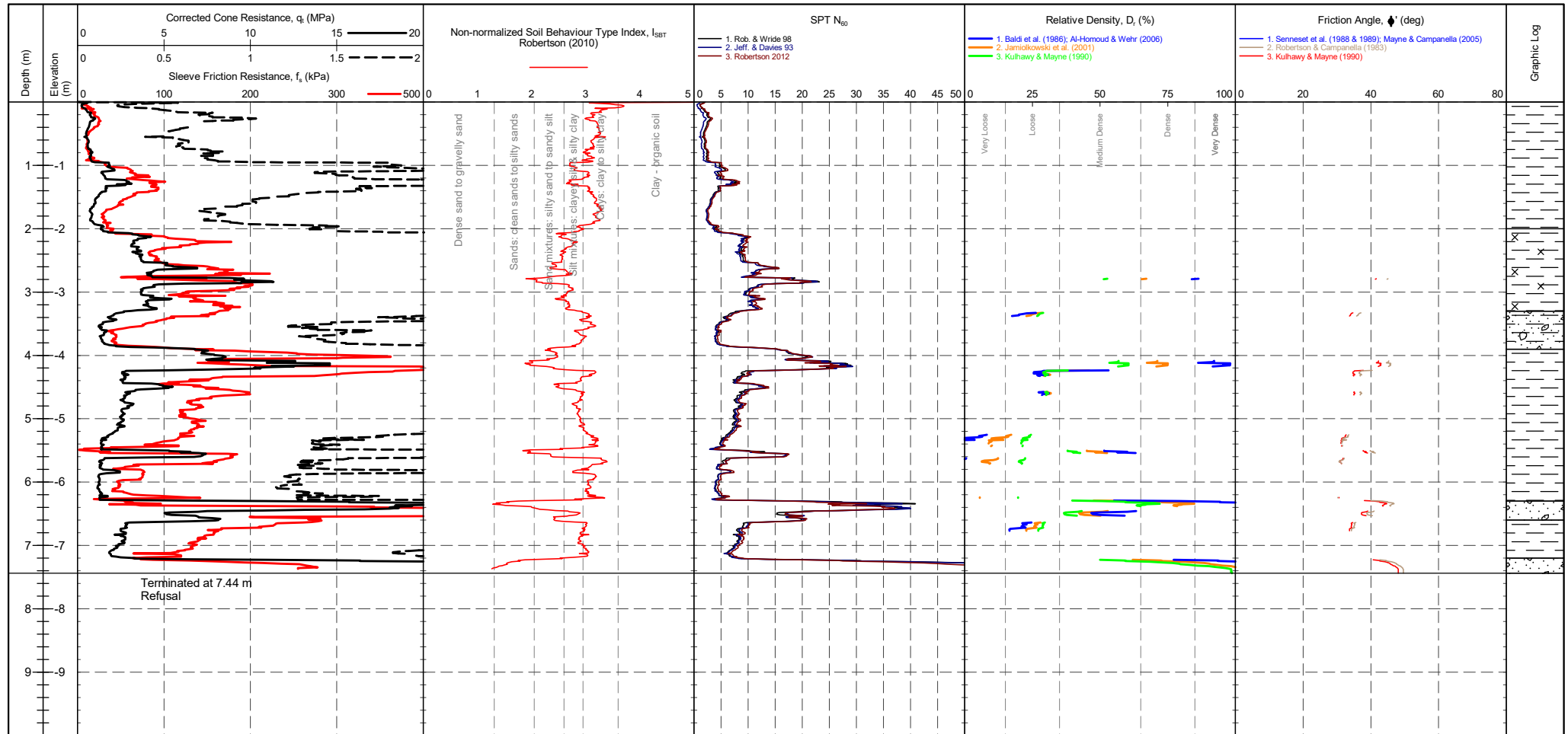


CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	Transducer Tip : 232 mV Sleeve : 261 mV Pore Pressure 2 : 491 mV X-Y Inclinometer : 2065 mV	CPTU ZERO VALUES Post : 231 mV Difference : -0.011 MPa Post : 258 mV Difference : -0.002 kPa Post : 599 mV Difference : 0.03 kPa Post : 2230 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID

HYDCPT39

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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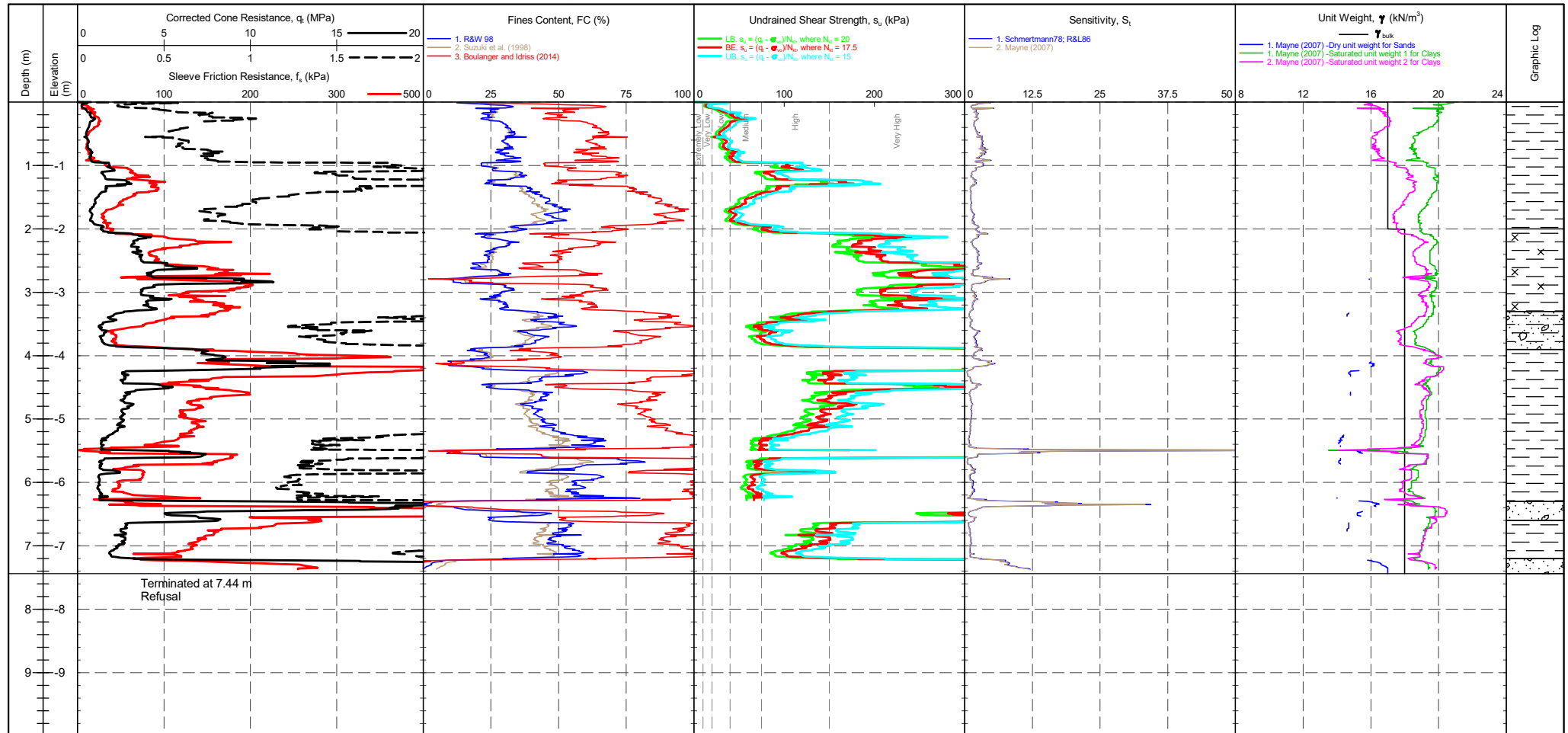


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 232 mV 231 mV -0.011 MPa Sleeve 261 mV 258 mV -0.002 kPa Pore Pressure 2 491 mV 599 mV 0.03 kPa X-Y Inclinator 2065 mV 2230 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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PointID

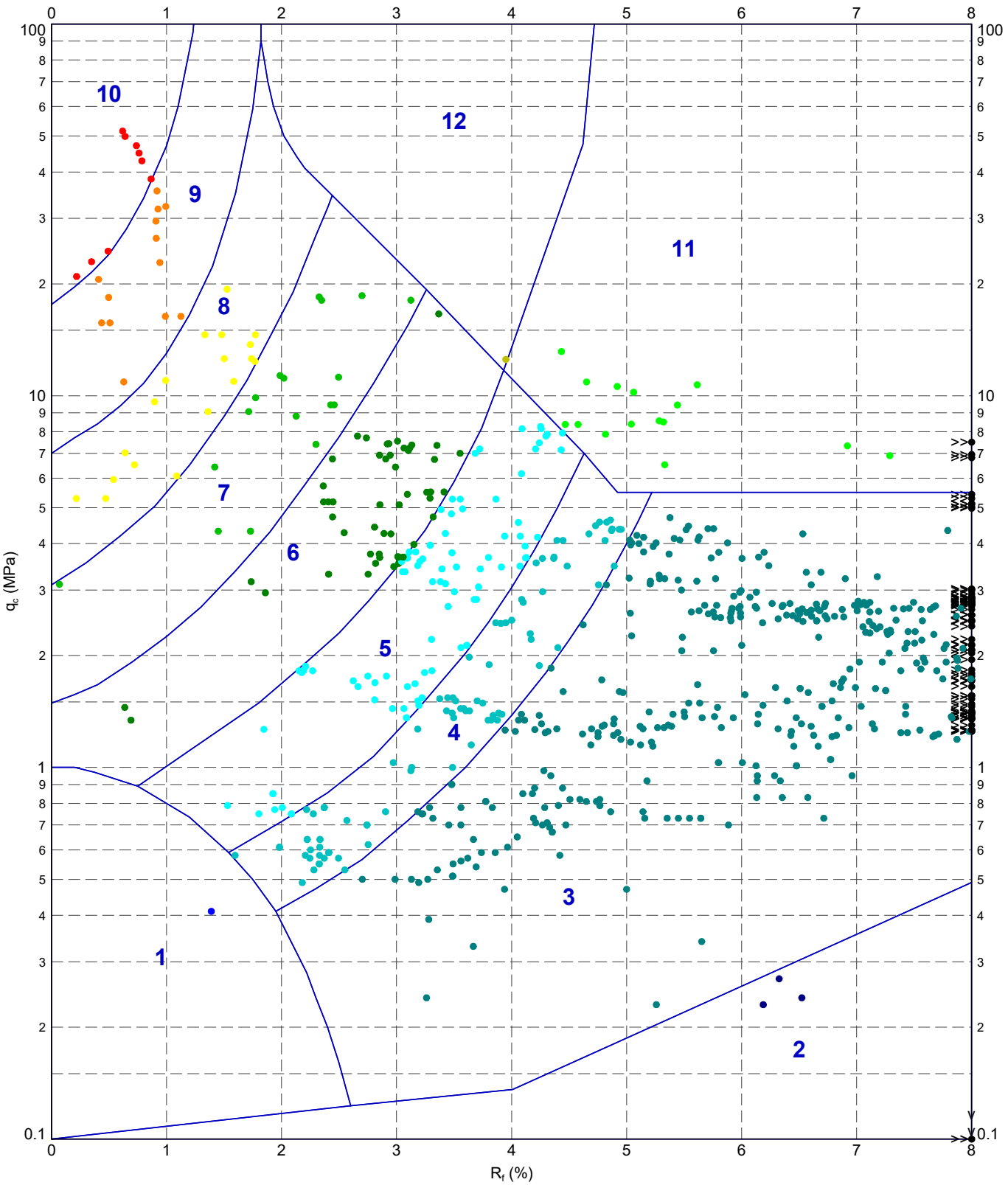
HYDCPT39

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 232 mV / 231 mV / -0.011 MPa Sleeve: 261 mV / 258 mV / -0.002 kPa Pore Pressure 2: 491 mV / 599 mV / 0.03 kPa X-Y Inclinator: 2065 mV / 2230 mV	CPTU ZERO VALUES Pre: 231 mV Post: 231 mV Difference: -0.011 MPa	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement s_u (kPa) Extremely low strength: <10 Very low strength: 10-20 Low strength: 20-40	Term based on measurement s_u (kPa) Medium strength: 40-75 High strength: 75-150 Very high strength: 150-300 Extremely high strength: >300	Groundwater Level Dissipation Test
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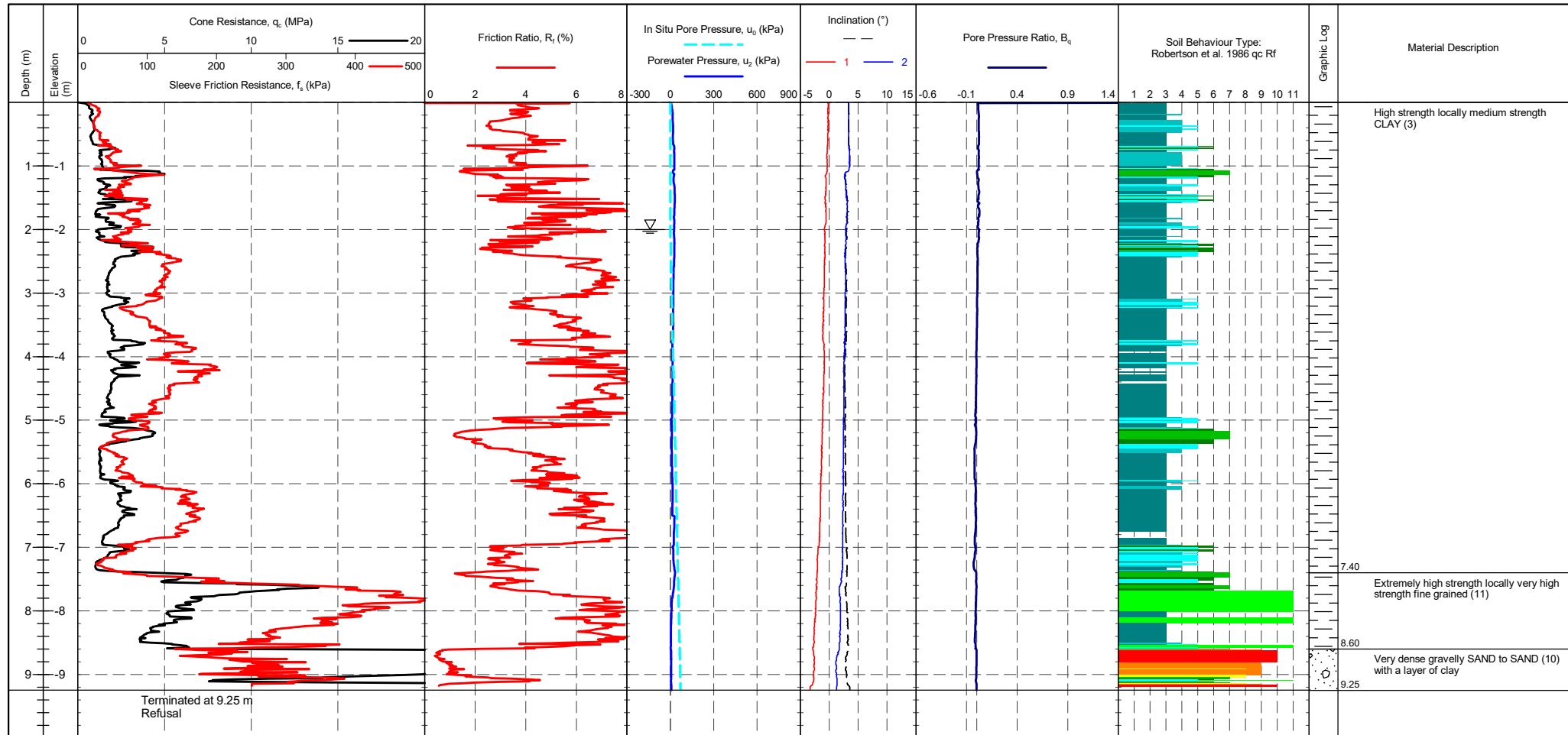
METHOD: Robertson et al. 1986 q_c R_f

1 - Sensitive fine grained material	4 - Silty CLAY to CLAY	7 - Silty SAND to sandy SILT	10 - Gravelly SAND to SAND
2 - Organic material	5 - Clayey SILT to silty CLAY	8 - SAND to silty SAND	11 - Very stiff fine grained
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	<p style="text-align: center;">Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 q_c vs. R_f - HYDCPT39</p>	DRAWN	DATE	09/06/2021	
		CHECKED	DATE	09/06/2021	
		SCALE	Not To Scale		A4
		PROJECT No	1210298		FIGURE No

PointID	HYDCPT40
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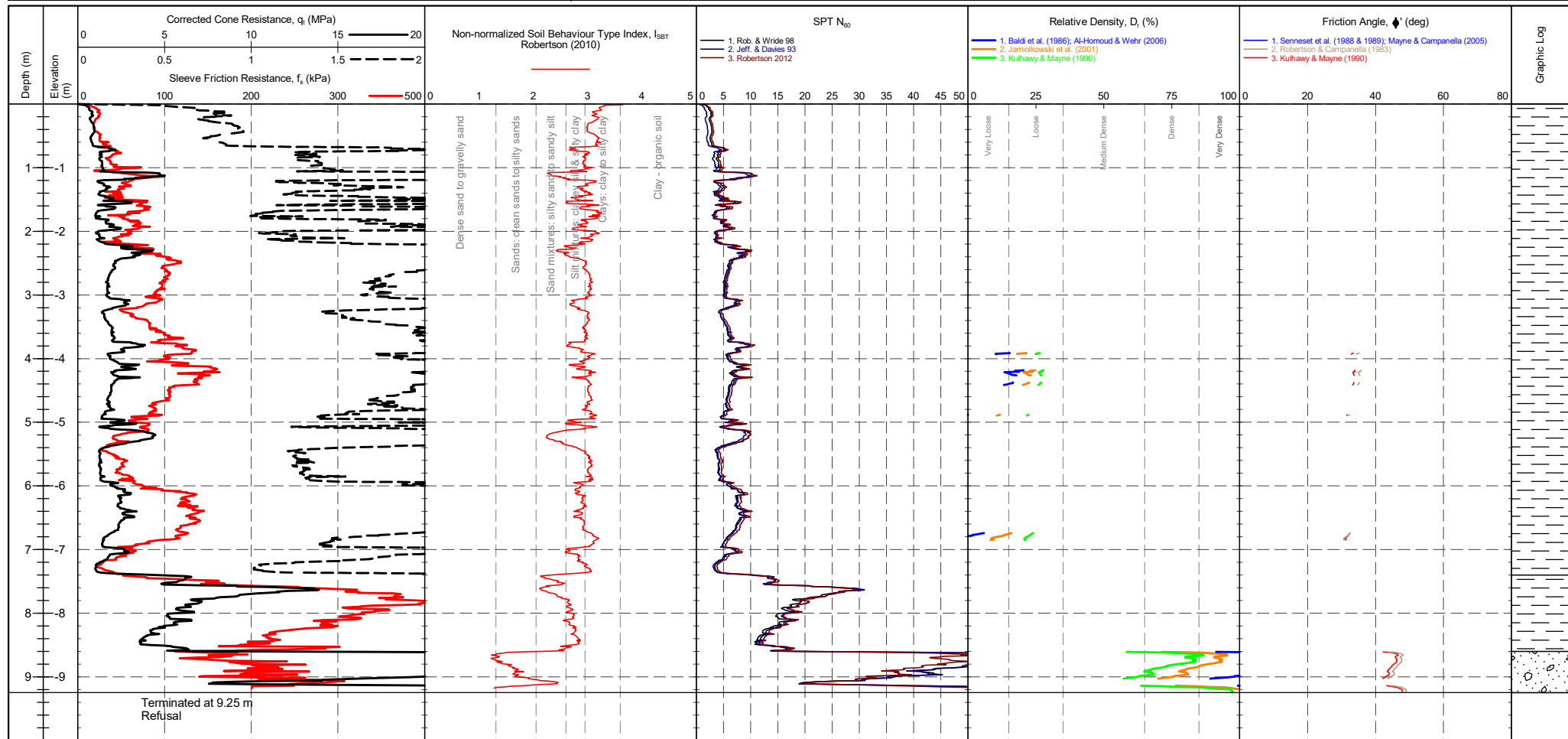
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Tip 235 mV 233 mV -0.022 MPa Sleeve 262 mV 262 mV 0 kPa Pore Pressure 2 505 mV 469 mV -0.01 kPa X-Y Inclinometer 2459 mV 2425 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID
HYDCPT40

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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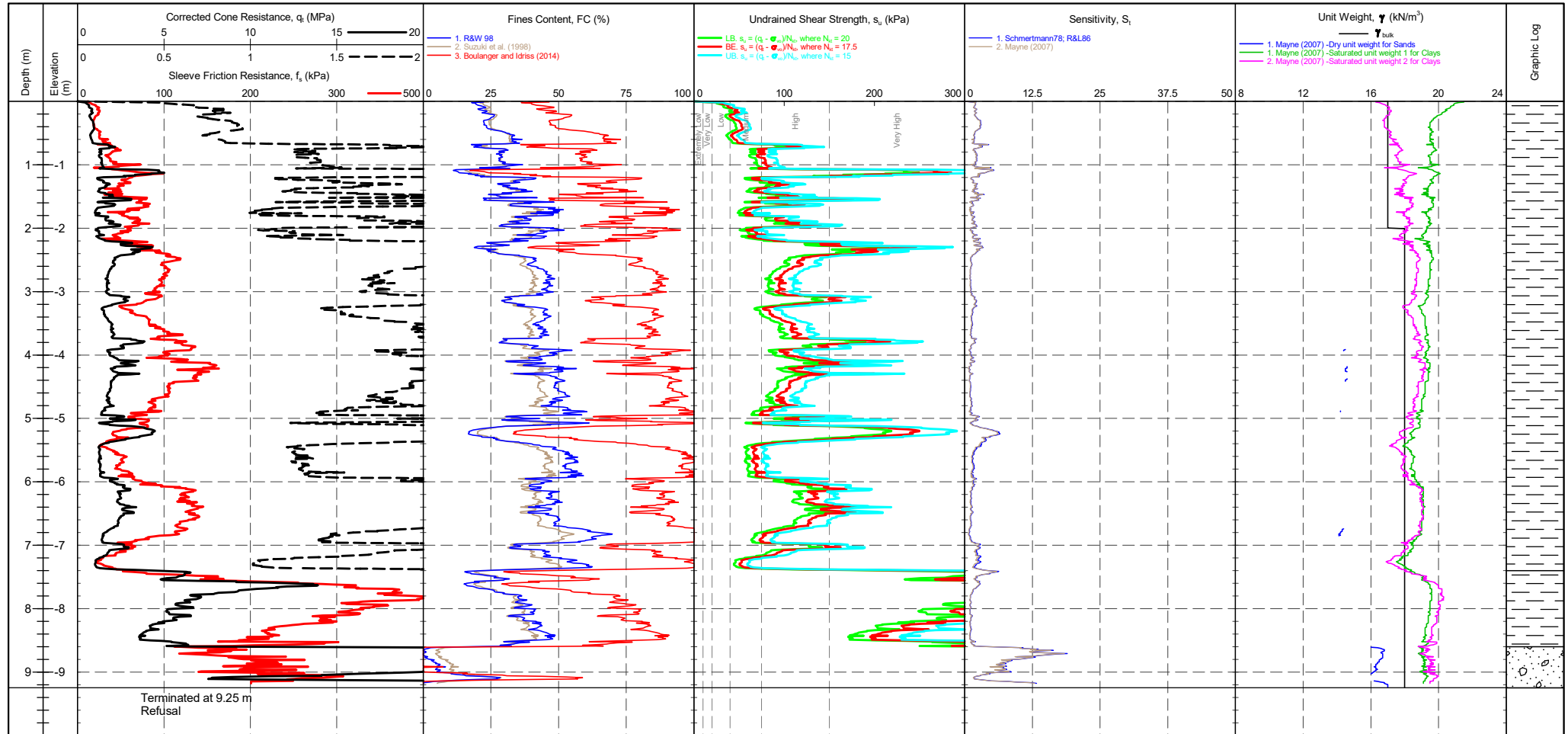


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 235 mV Sleeve : 262 mV Pore Pressure 2 : 505 mV X-Y Inclinator : 2459 mV	Post : 233 mV Difference : -0.022 MPa 0 kPa -0.01 kPa 2425 mV	CPTU ZERO VALUES Difference: -0.022 MPa 0 kPa -0.01 kPa	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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PointID

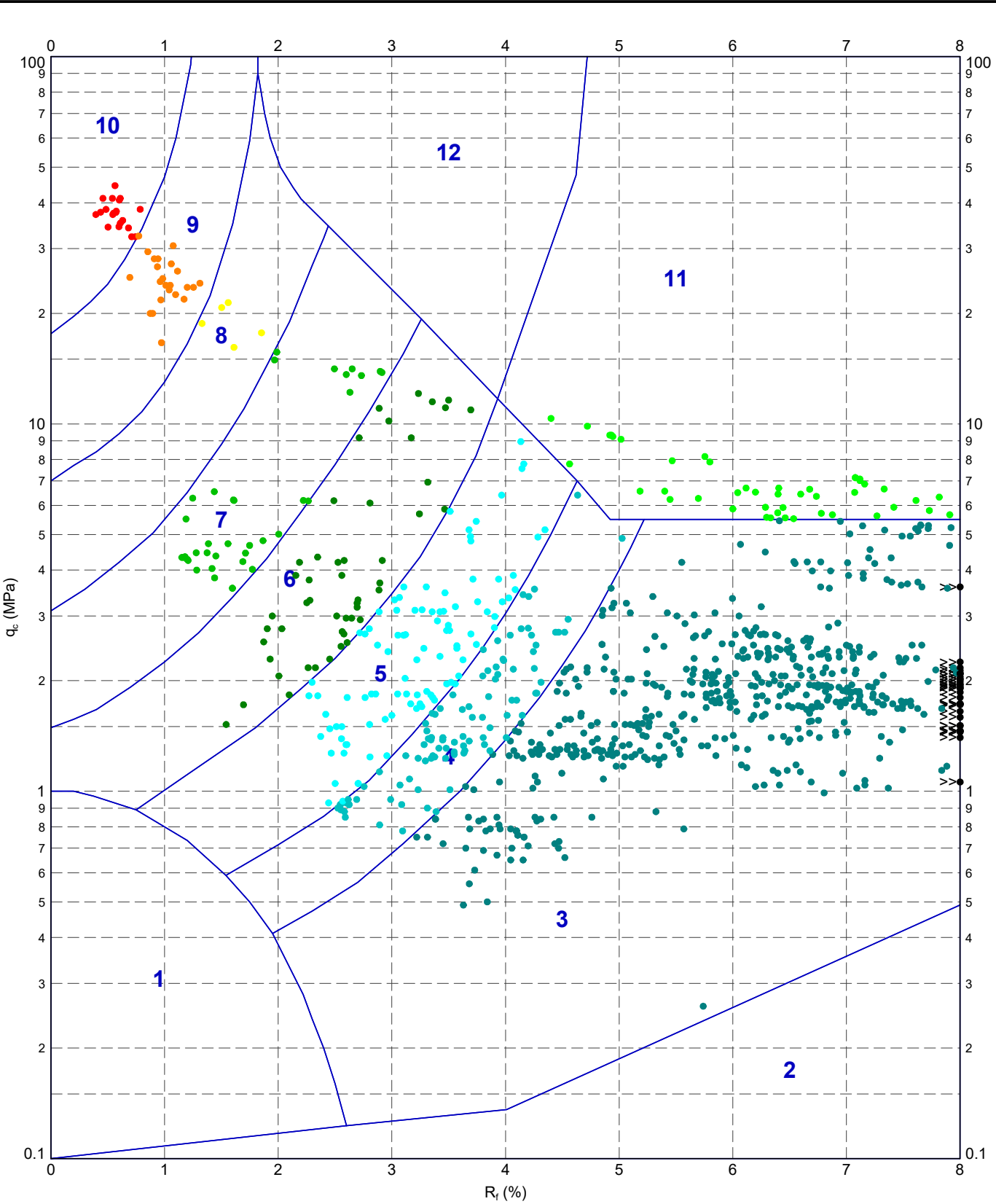
HYDCPT40

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 235 mV Sleeve : 262 mV Pore Pressure 2 : 505 mV X-Y Inclinator : 2459 mV	CPTU ZERO VALUES Post : 233 mV Difference : -0.022 MPa Post : 262 mV Difference : 0 kPa Post : 469 mV Difference : -0.01 kPa Post : 2425 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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210586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf MPF 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<DrawingFile>> 09/06/2021 22:28 10.02.00.04 Dalgid Lab and In Situ Tool - In Situ SI 2.02.0 2017-07-10 Proj: In Situ SI 2.02.0 2017-07-10



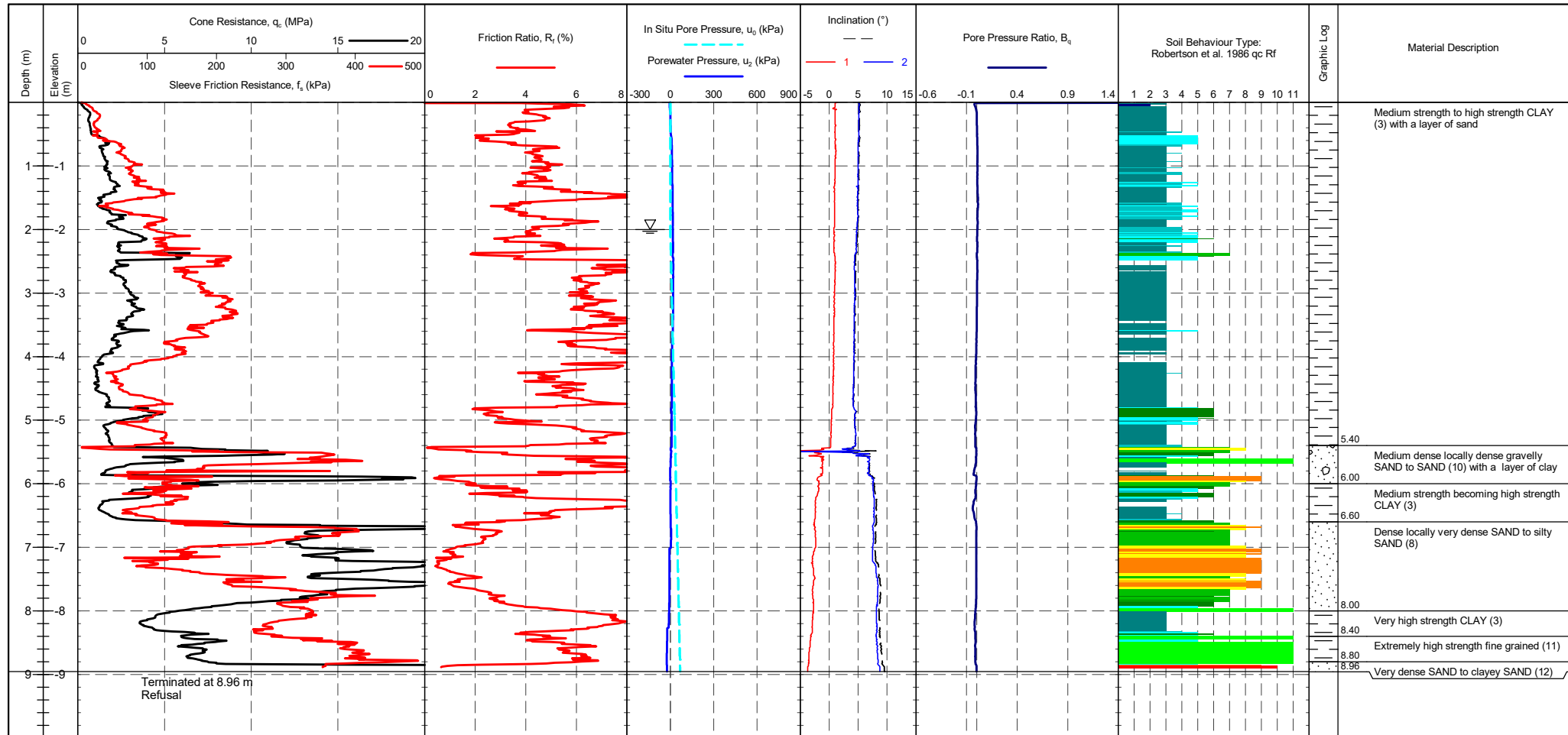
METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
- 7 - Silty SAND to sandy SILT
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	TITLE	DRAWN	DATE
	Hydrock Wingate, Bolton Wingates, Bolton	CHECKED	DATE
	Robertson et al. 1986 qc vs. R _f - HYDCPT40	SCALE	Not To Scale
	PROJECT No 1210298	SCALE	A4
		PROJECT No 1210298	FIGURE No

PointID	HYDCPT41
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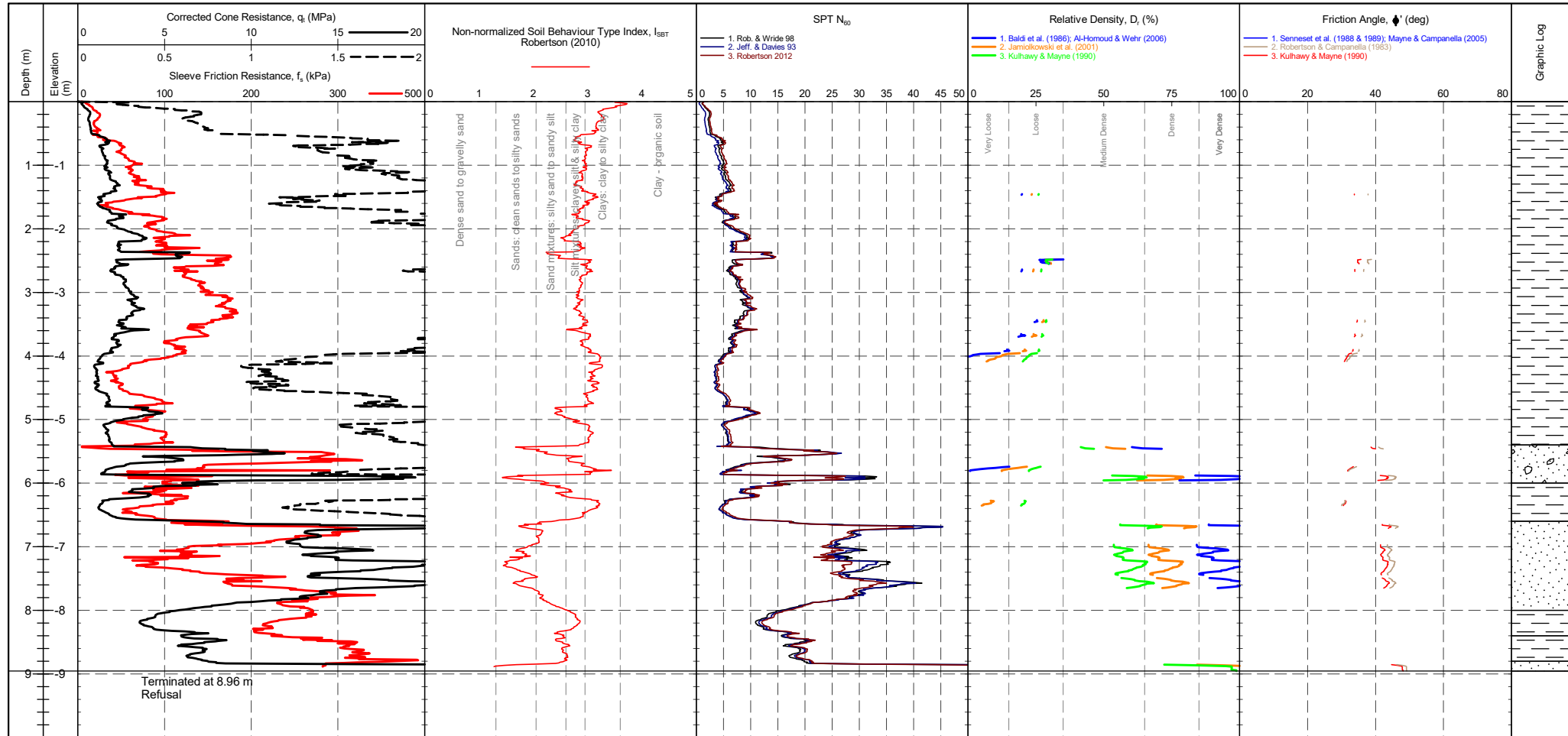
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Tip: Pre 234 mV, Post 233 mV, Difference -0.011 MPa Sleeve: Pre 260 mV, Post 260 mV, Difference 0 kPa Pore Pressure 2: Pre 577 mV, Post 540 mV, Difference -0.01 kPa X-Y Inclinometer: Pre 2526 mV, Post 2515 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT41
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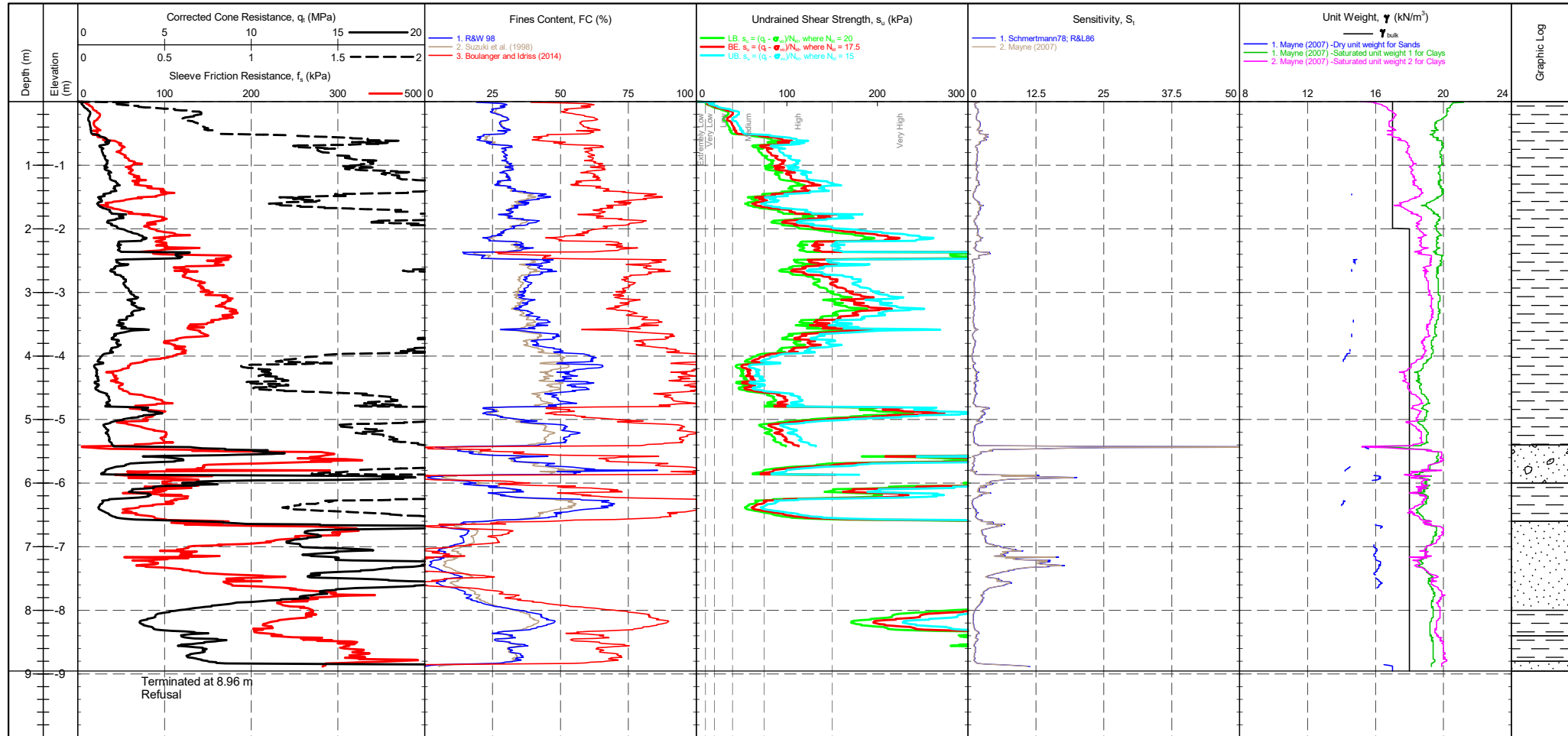
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 234 mV / 233 mV Sleeve : 260 mV / 260 mV Pore Pressure 2 : 577 mV / 540 mV X-Y Inclinator : 2526 mV / 2515 mV	CPTU ZERO VALUES Difference: -0.011 MPa 0 kPa -0.01 kPa	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density Dr (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)																																				
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15																																				
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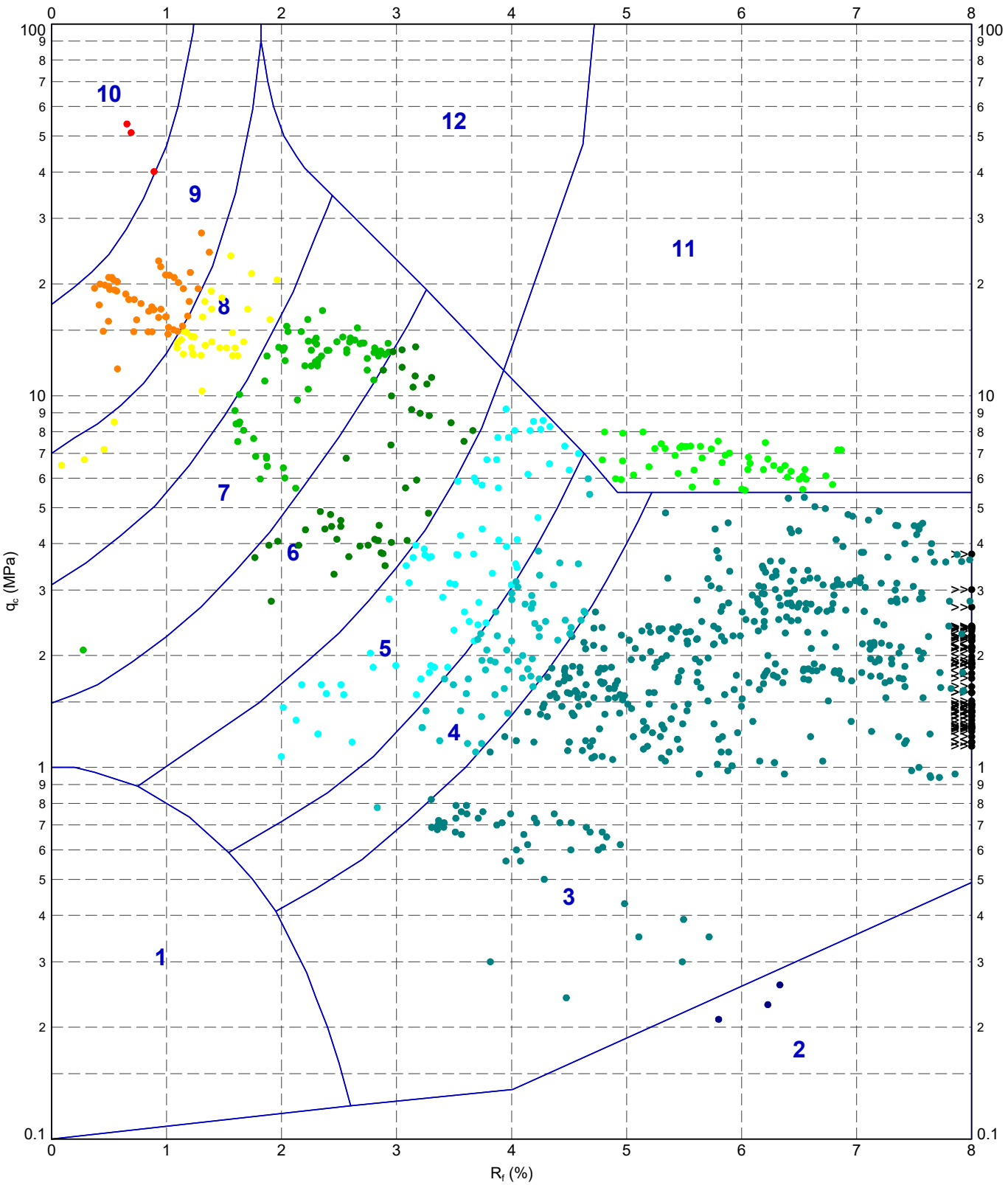
PointID	HYDCPT41
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CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 234 mV Sleeve : 260 mV Pore Pressure 2 : 577 mV X-Y Inclinator : 2526 mV	CPTU ZERO VALUES Pre : 233 mV Post : 260 mV Difference : -0.011 MPa 540 mV -0.01 kPa 2515 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 <table border="1"> <tr> <th>Term based on measurement</th> <th>su (kPa)</th> <th>Term based on measurement</th> <th>su (kPa)</th> </tr> <tr> <td>Extremely low strength</td> <td><10</td> <td>Medium strength</td> <td>40-75</td> </tr> <tr> <td>Very low strength</td> <td>10-20</td> <td>High strength</td> <td>75-150</td> </tr> <tr> <td>Low strength</td> <td>20-40</td> <td>Very high strength</td> <td>150-300</td> </tr> <tr> <td></td> <td></td> <td>Extremely high strength</td> <td>>300</td> </tr> </table>	Term based on measurement	su (kPa)	Term based on measurement	su (kPa)	Extremely low strength	<10	Medium strength	40-75	Very low strength	10-20	High strength	75-150	Low strength	20-40	Very high strength	150-300			Extremely high strength	>300	Groundwater Level Dissipation Test
Term based on measurement	su (kPa)	Term based on measurement	su (kPa)																						
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<DrawingFile>> 09/06/2021 22:31 10.02.00.04. Dalgid Lab and In Situ Tool. In Situ SI 2.02.0 2017-07-10.Pdf. In Situ SI 2.02.0 2017-07-10



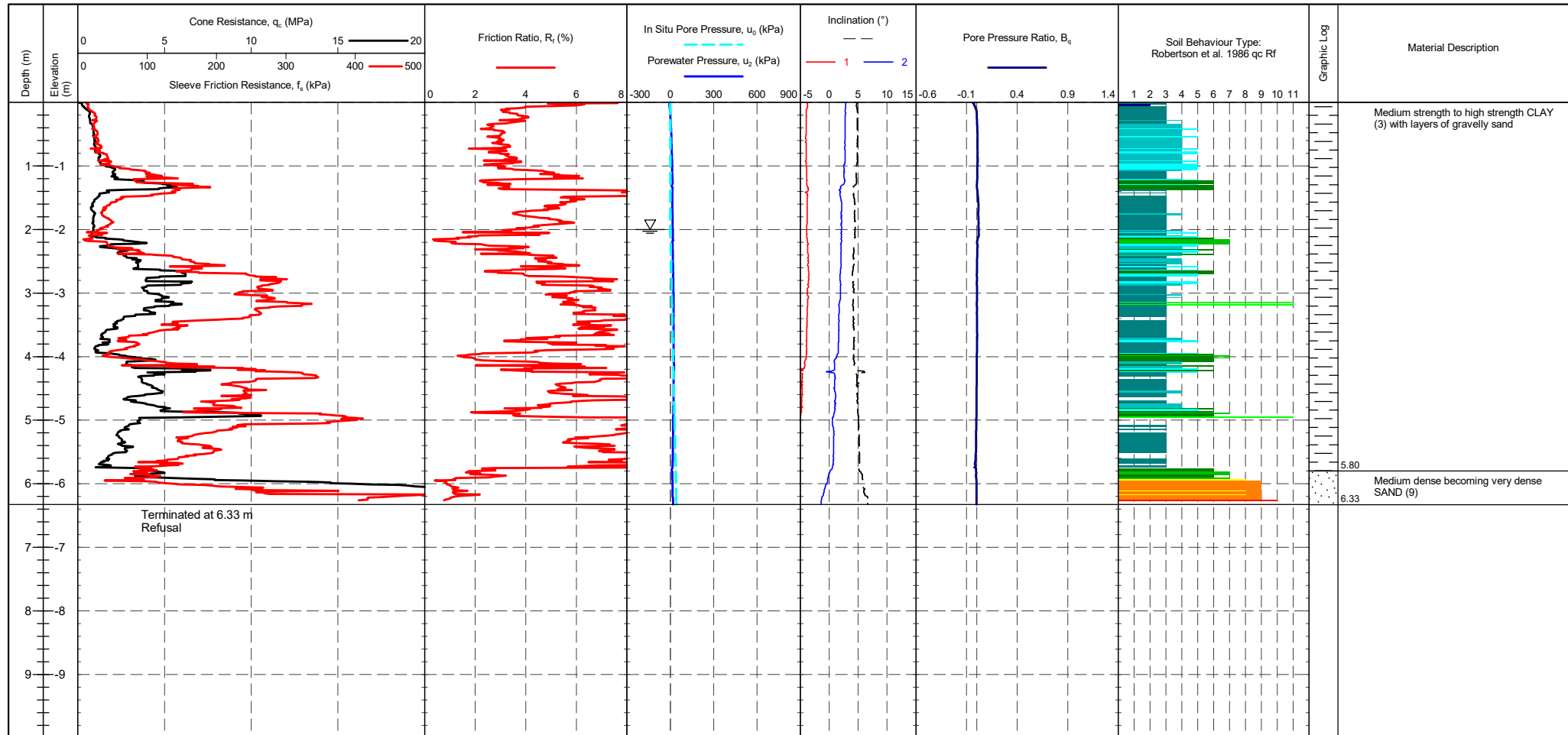
METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
- 7 - Silty SAND to sandy SILT
- 10 - Gravelly SAND to SAND
- 2 - Organic material
- 5 - Clayey SILT to silty CLAY
- 8 - SAND to silty SAND
- 11 - Very stiff fine grained
- 3 - CLAY
- 6 - Sandy SILT to clayey SILT
- 9 - SAND
- 12 - SAND to clayey SAND

	TITLE Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 qc vs. Rf - HYDCPT41	DRAWN _____	DATE 09/06/2021
		CHECKED _____	DATE 09/06/2021
		SCALE Not To Scale	A4
		PROJECT No 1210298	FIGURE No _____

PointID	HYDCPT42
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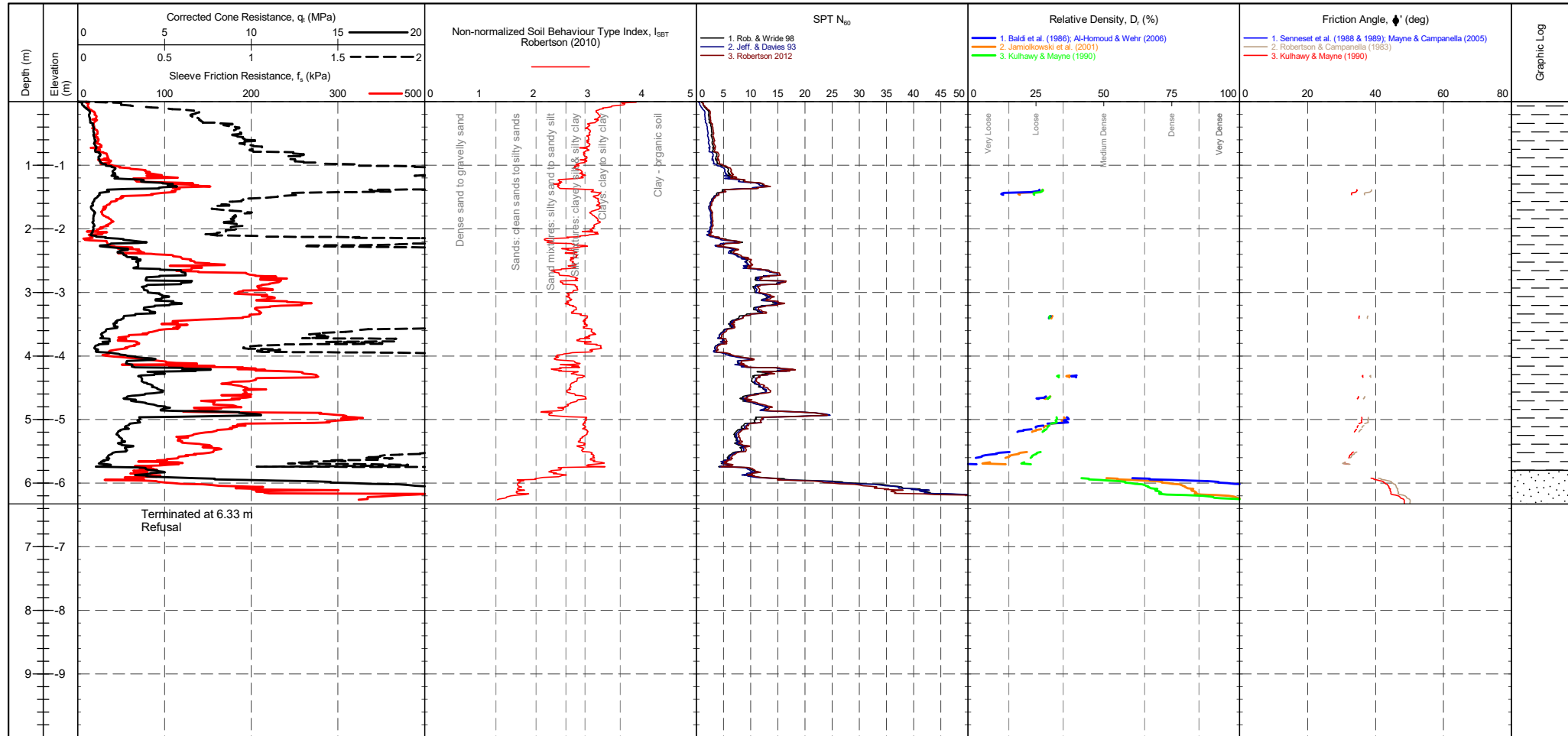
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre 234 mV, Post 232 mV, Difference -0.022 MPa Tip : 260 mV, 261 mV, 0.001 kPa Sleeve : 532 mV, 492 mV, -0.011 kPa Pore Pressure 2 : 2088 mV, 2063 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT42
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CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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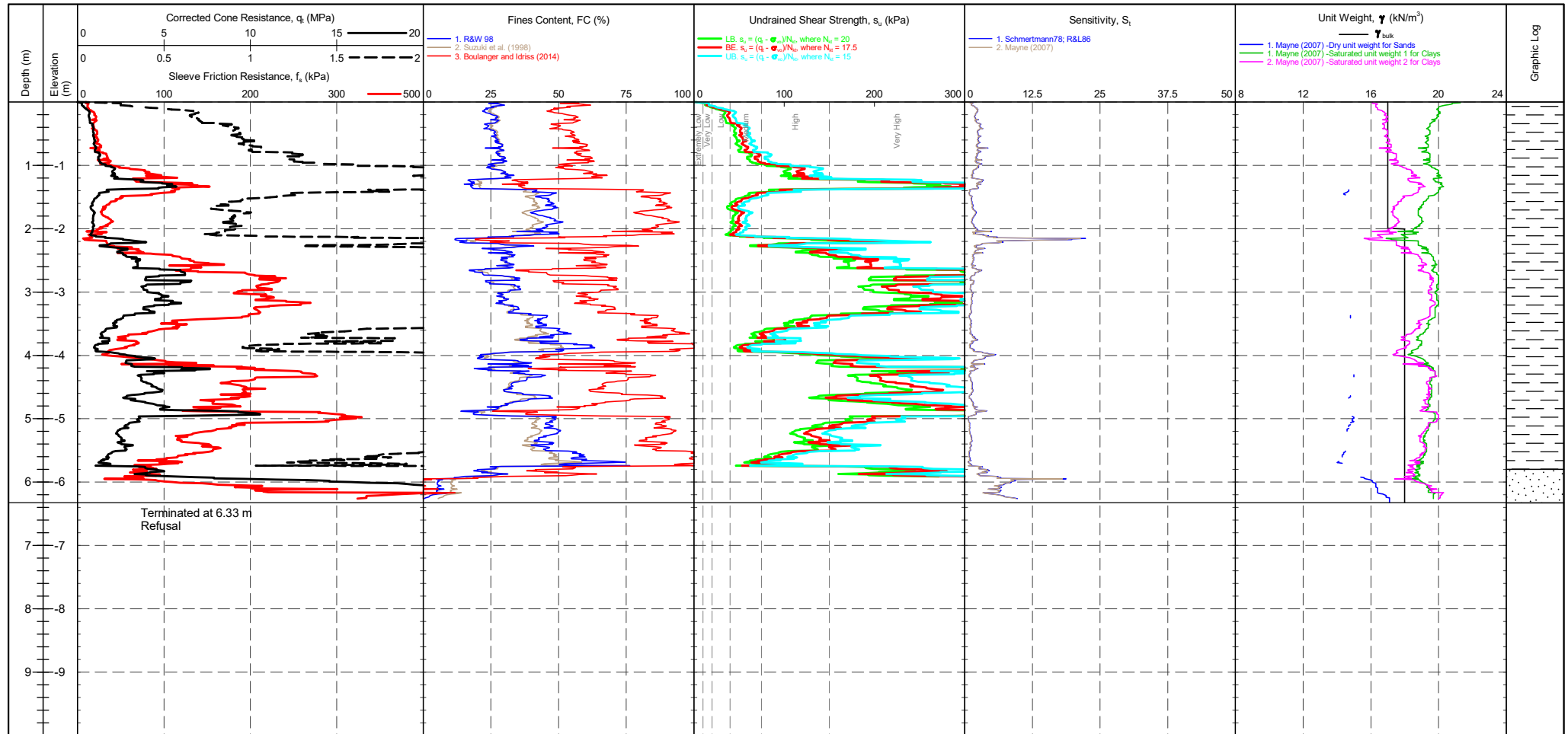


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 234 mV 232 mV -0.022 MPa Sleeve 260 mV 261 mV 0.001 kPa Pore Pressure 2 532 mV 492 mV -0.011 kPa X-Y Inclinator 2088 mV 2063 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)																																			
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Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85																																			

PointID

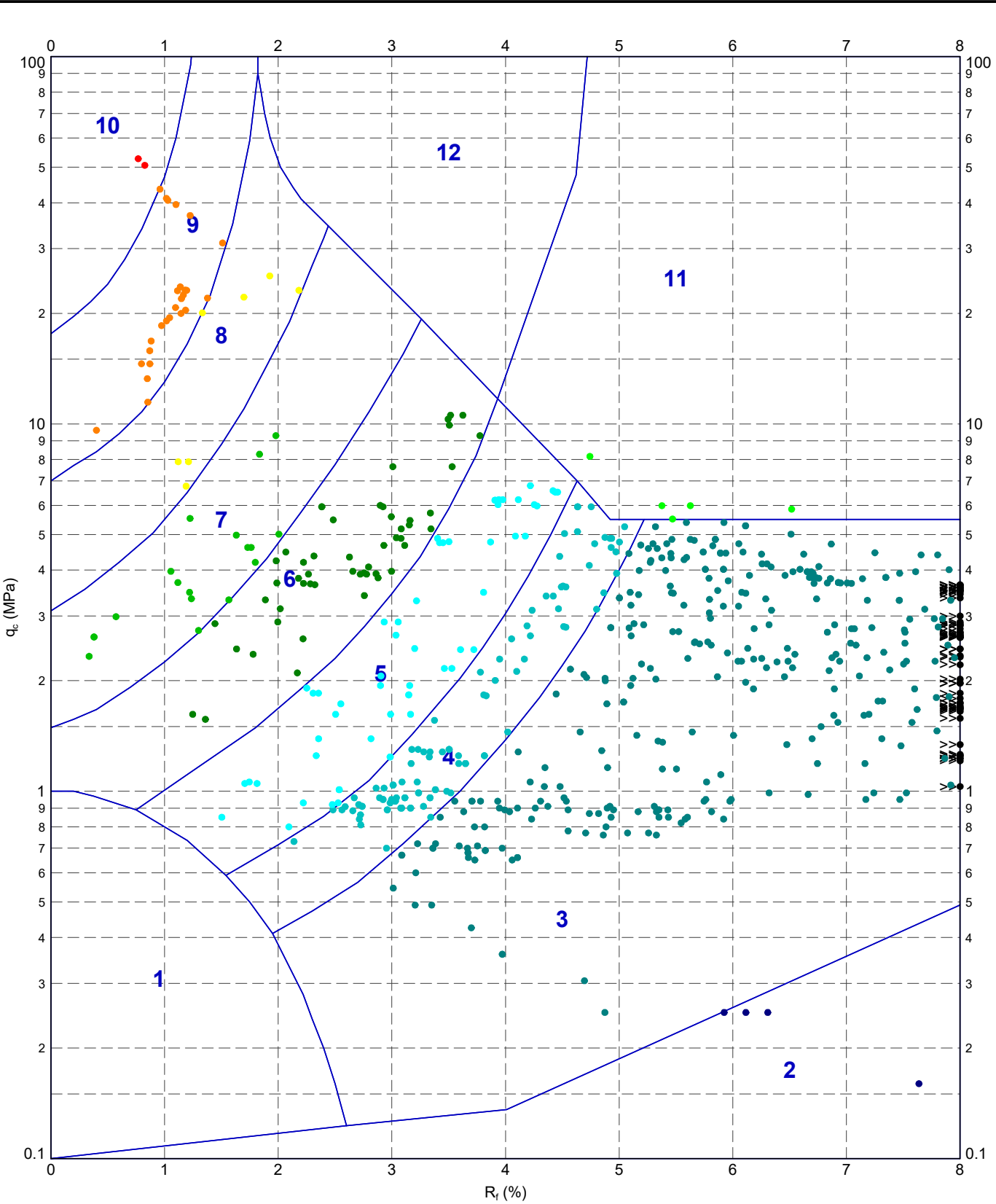
HYDCPT42

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 234 mV Sleeve: 260 mV Pore Pressure 2: 532 mV X-Y Inclinator: 2088 mV	CPTU ZERO VALUES Post: 232 mV Difference: -0.022 MPa 261 mV 0.001 kPa 492 mV -0.011 kPa 2063 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<DrawingFile>> 09/06/2021 22:33 10.02.00.04. Dalgid Lab and In Situ Tool. In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10



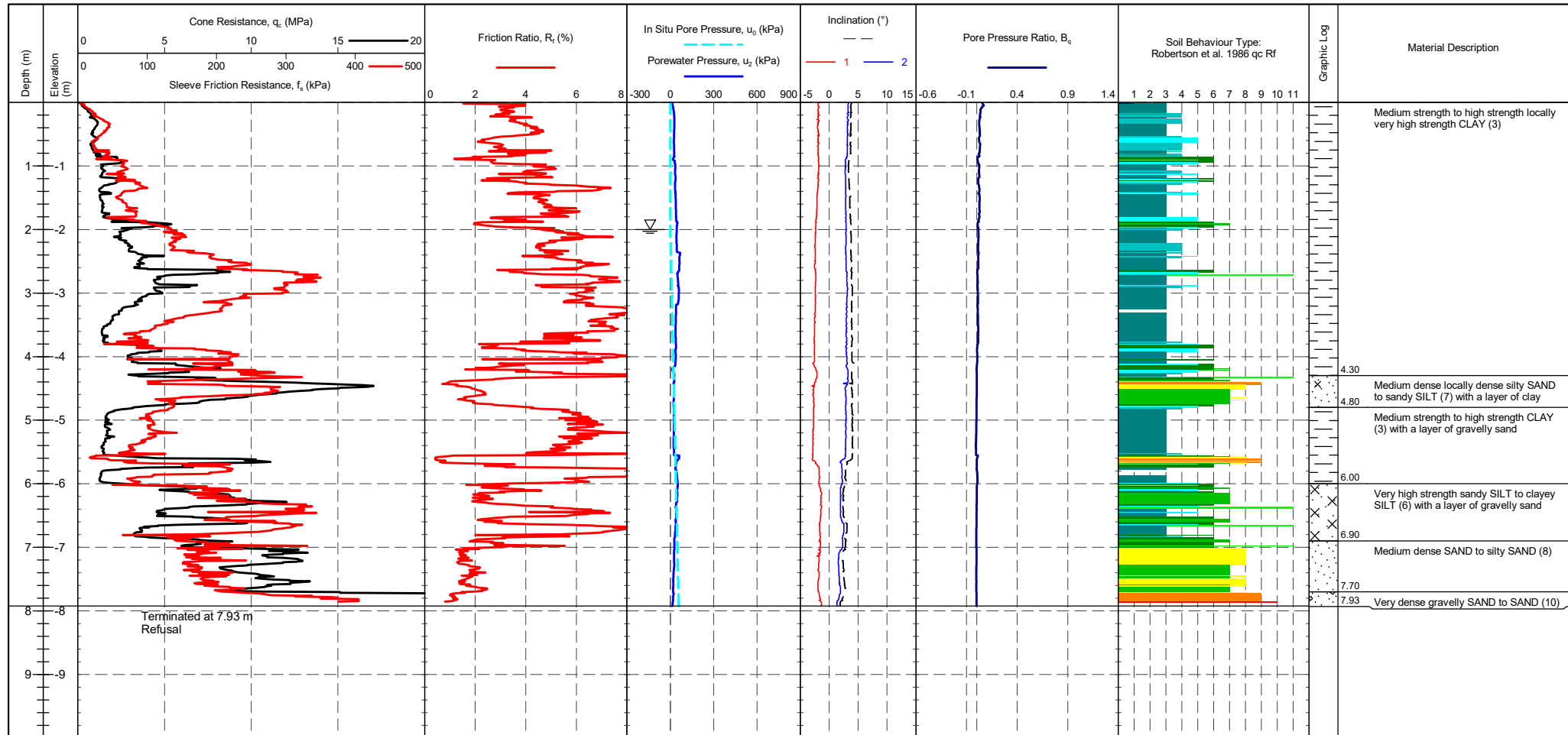
METHOD: Robertson et al. 1986 q_c R_f

1 - Sensitive fine grained material	4 - Silty CLAY to CLAY	7 - Silty SAND to sandy SILT	10 - Gravelly SAND to SAND
2 - Organic material	5 - Clayey SILT to silty CLAY	8 - SAND to silty SAND	11 - Very stiff fine grained
3 - CLAY	6 - Sandy SILT to clayey SILT	9 - SAND	12 - SAND to clayey SAND

	TITLE	DRAWN	DATE
	Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 q _c vs. R _f - HYDCPT42	CHECKED	DATE
		SCALE	FIGURE No
		PROJECT No	
		1210298	A4

PointID	HYDCPT43
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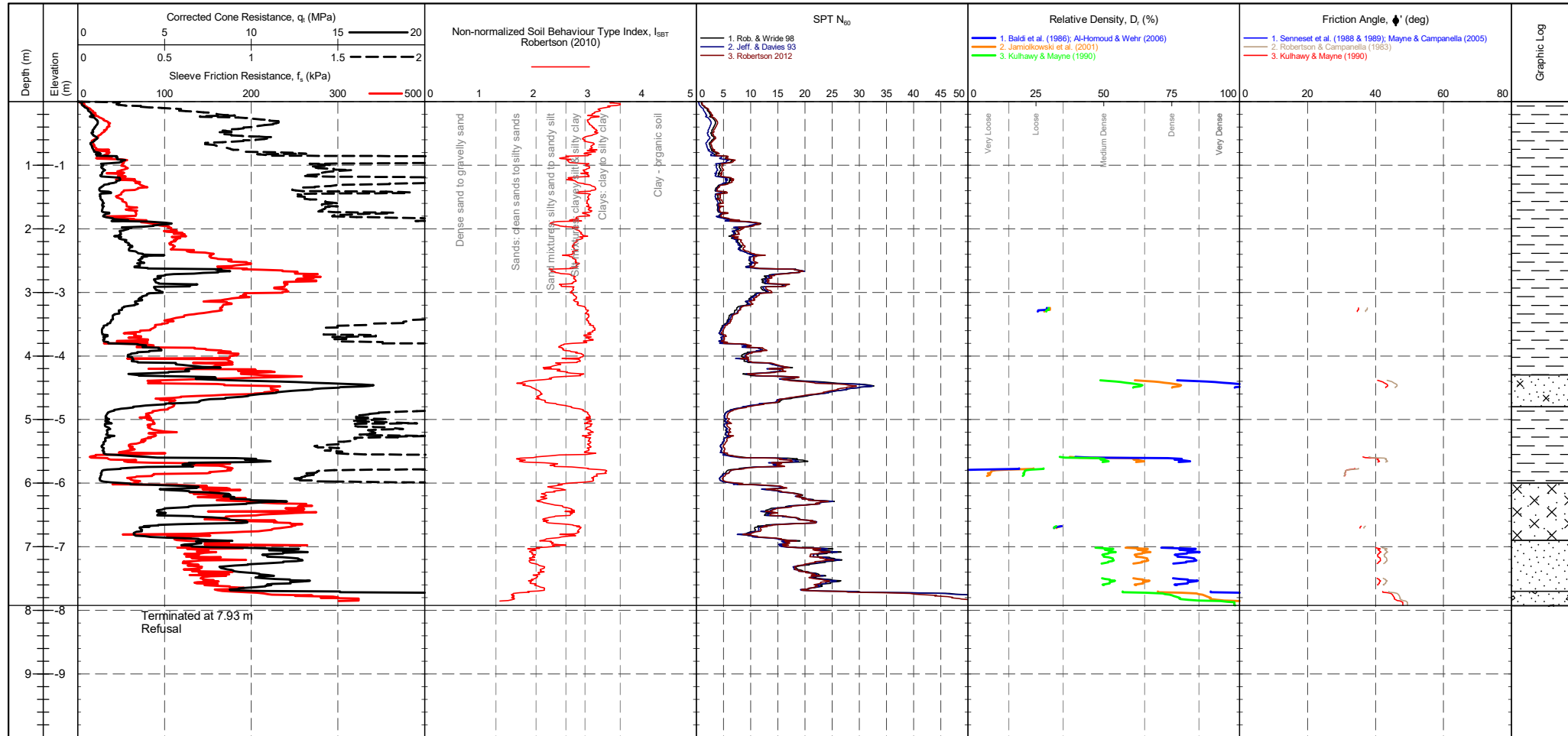
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 01/06/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre 233 mV, Post 228 mV, Difference -0.055 MPa Tip : 254 mV, 254 mV, 0 kPa Sleeve : 433 mV, 576 mV, 0.04 kPa Pore Pressure 2 : 2267 mV, 2219 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT43
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CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 01/06/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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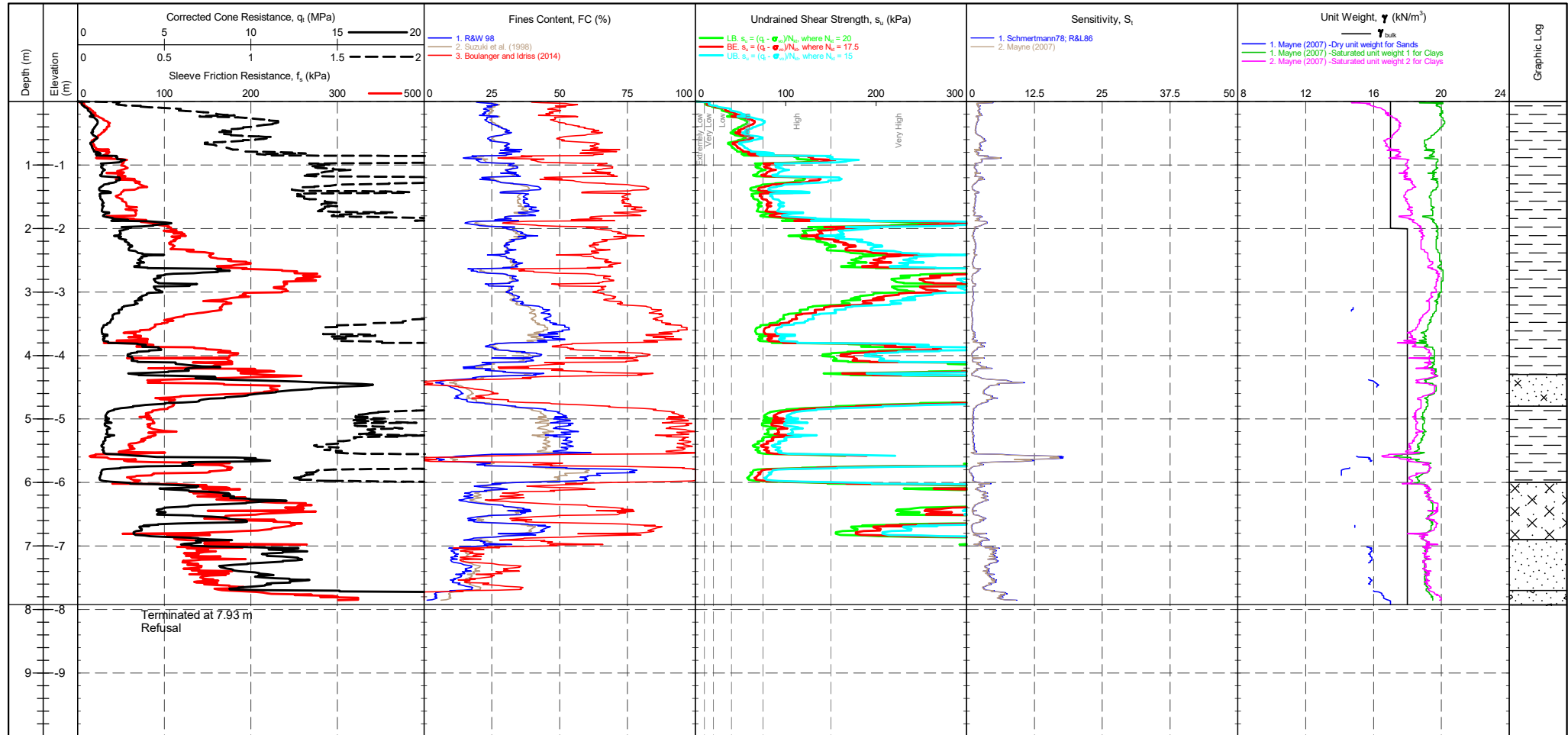


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 233 mV 228 mV Sleeve : 254 mV 254 mV Pore Pressure 2 : 433 mV 576 mV X-Y Inclinator : 2267 mV 2219 mV	CPTU ZERO VALUES Difference : -0.055 MPa 0 kPa 0.04 kPa	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	▽ Groundwater Level Dissipation Test
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PointID

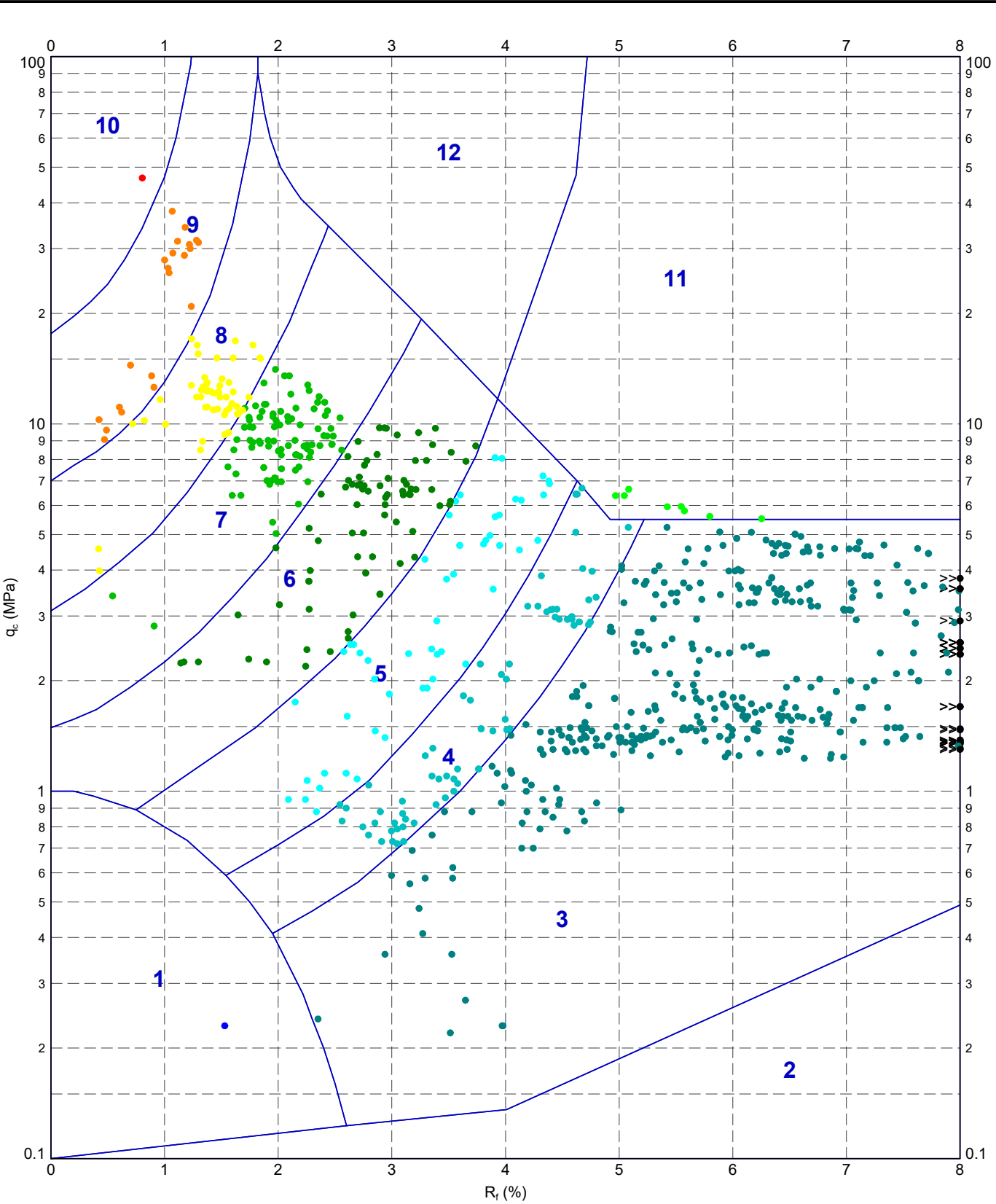
HYDCPT43

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 01/06/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 233 mV Sleeve: 254 mV Pore Pressure 2: 433 mV X-Y Inclinator: 2267 mV	CPTU ZERO VALUES Post: 228 mV Difference: -0.055 MPa 254 mV 0 kPa 576 mV 0.04 kPa 2219 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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210586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<drawingFile>> 09/06/2021 22:38 10.02.00.04 Dalgid Lab and In Situ Tool - In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10



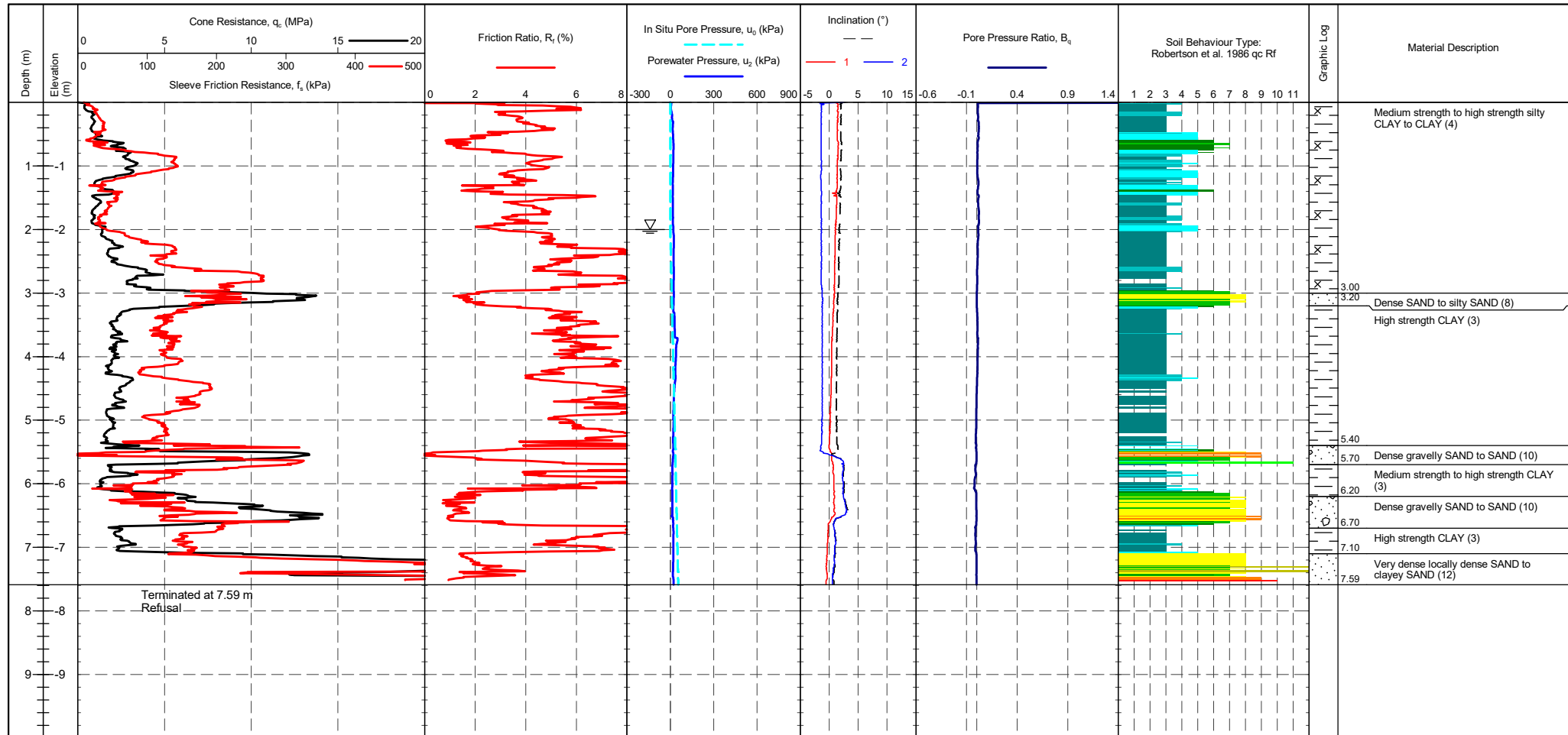
METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material	4 - Silty CLAY to CLAY	7 - Silty SAND to sandy SILT	10 - Gravelly SAND to SAND
2 - Organic material	5 - Clayey SILT to silty CLAY	8 - SAND to silty SAND	11 - Very stiff fine grained
3 - CLAY	6 - Sandy SILT to clayey SILT	9 - SAND	12 - SAND to clayey SAND

	TITLE	DRAWN	DATE
	Hydrock Wingate, Bolton Wingates, Bolton	CHECKED	DATE
	Robertson et al. 1986 qc vs. Rf - HYDCPT43	SCALE	Not To Scale
	PROJECT No 1210298	SCALE	A4
		PROJECT No 1210298	FIGURE No

PointID	HYDCPT44
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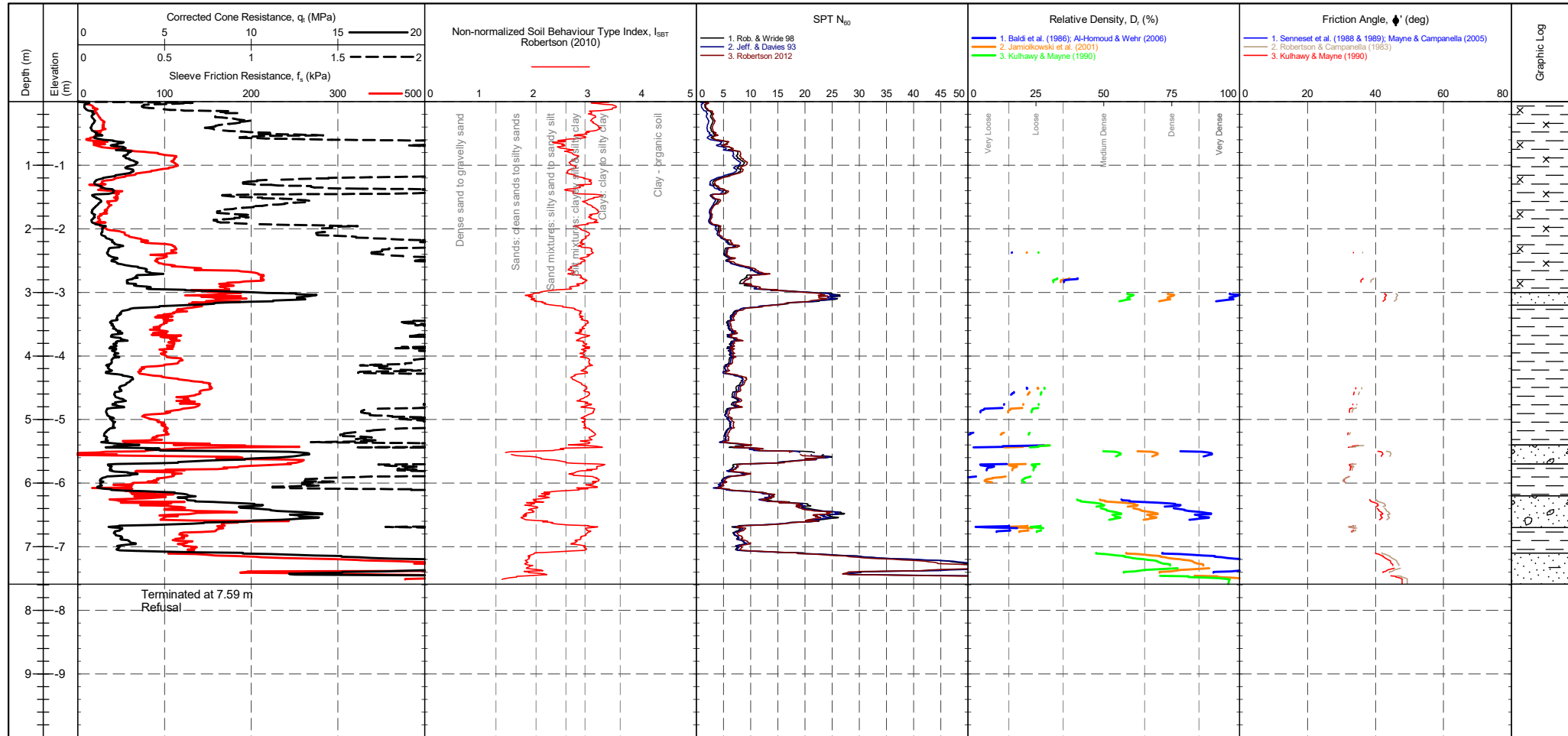
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Pre Post Difference Tip 233 mV 233 mV 0 MPa Sleeve 262 mV 260 mV -0.001 kPa Pore Pressure 2 483 mV 559 mV 0.021 kPa X-Y Inclinometer 2526 mV 2575 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT44
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CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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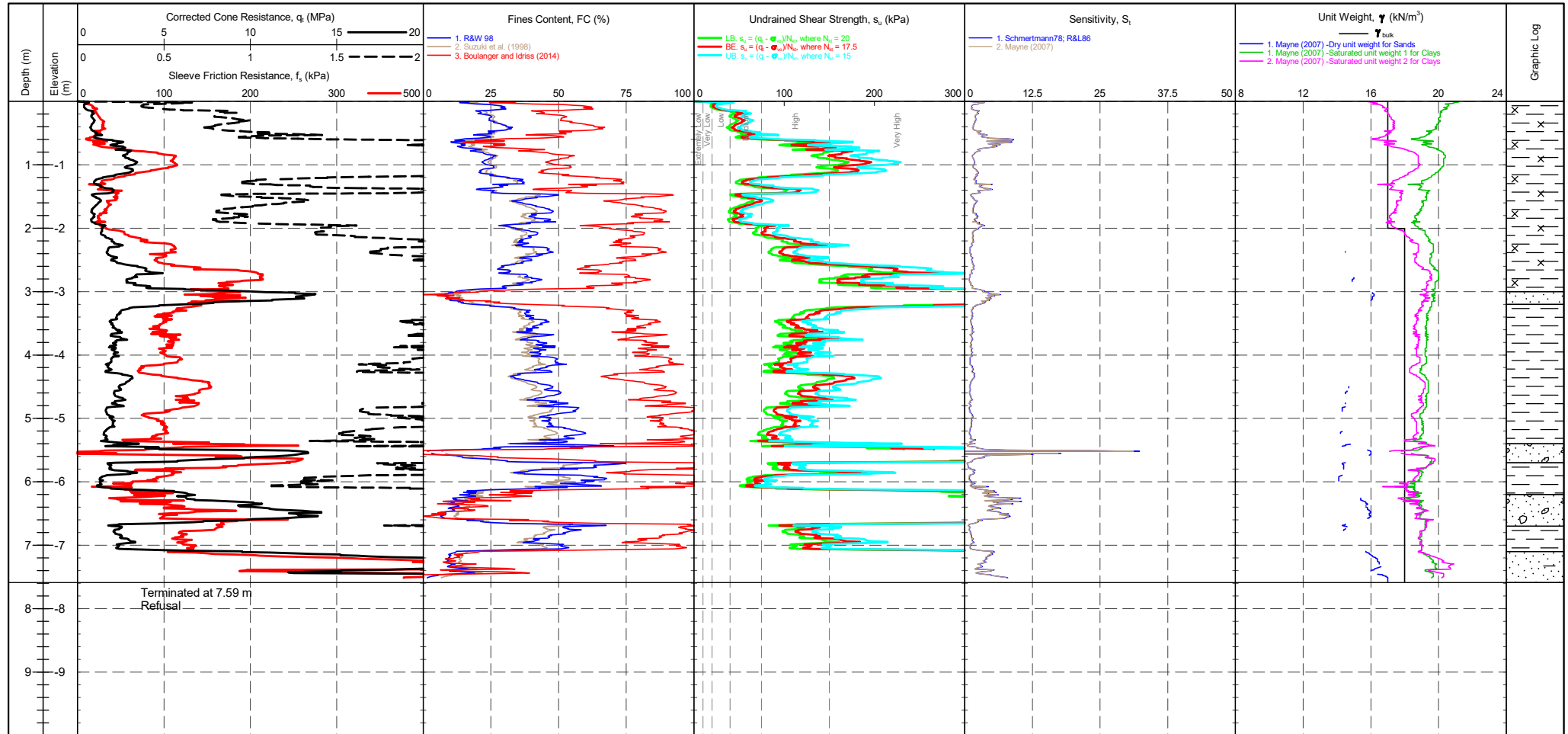


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 233 mV Sleeve : 262 mV Pore Pressure 2 : 483 mV X-Y Inclinator : 2526 mV	CPTU ZERO VALUES Pre : 233 mV Post : 260 mV Difference : -0.001 kPa 559 mV 2575 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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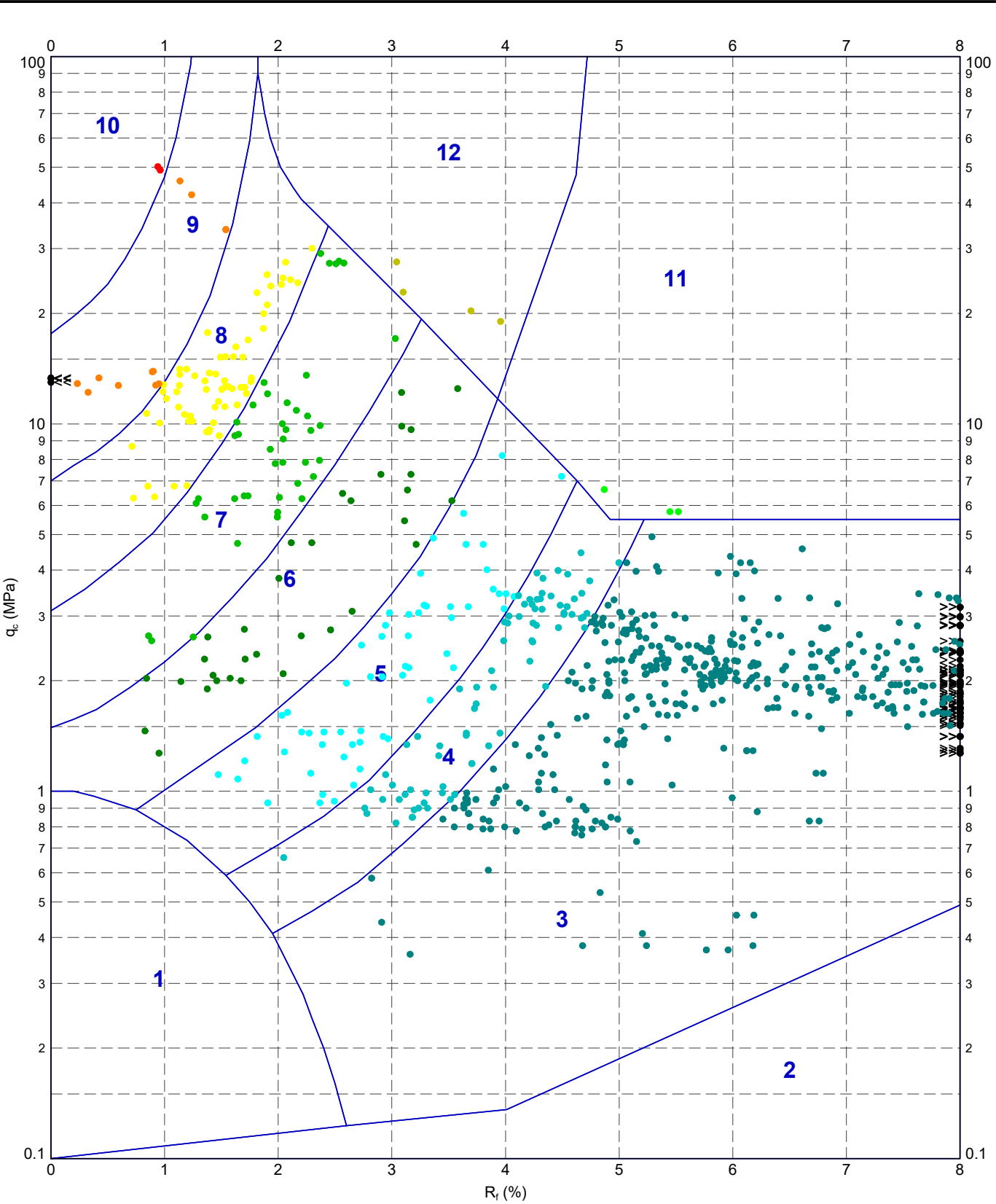
HYDCPT44

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 233 mV Sleeve: 262 mV Pore Pressure 2: 483 mV X-Y Inclinator: 2526 mV	CPTU ZERO VALUES Post: 233 mV Difference: 0 MPa -0.001 kPa 559 mV 0.021 kPa 2575 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<DrawingFile>> 09/06/2021 22:39 10.02.00.04. Dajal, Lab and In Situ Tool - In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10



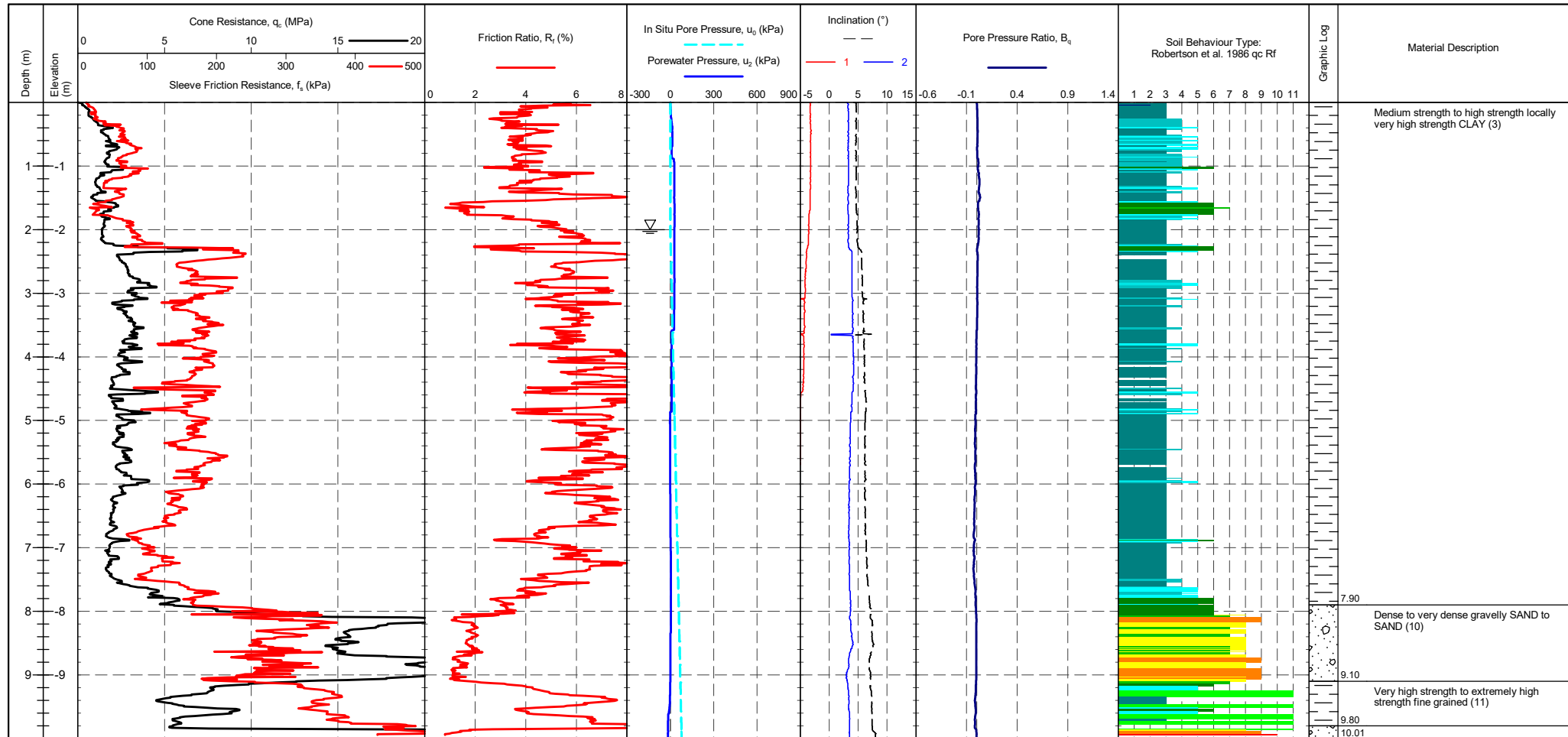
METHOD: Robertson et al. 1986 q_c R_f

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
- 7 - Silty SAND to sandy SILT
- 10 - Gravelly SAND to SAND
- 2 - Organic material
- 5 - Clayey SILT to silty CLAY
- 8 - SAND to silty SAND
- 11 - Very stiff fine grained
- 3 - CLAY
- 6 - Sandy SILT to clayey SILT
- 9 - SAND
- 12 - SAND to clayey SAND

	TITLE	DRAWN	DATE
	Hydrock Wingate, Bolton Wingates, Bolton		09/06/2021
	Robertson et al. 1986 q _c vs. R _f - HYDCPT44	CHECKED	DATE
			09/06/2021
		SCALE	FIGURE No
	Not To Scale	A4	
	PROJECT No	FIGURE No	
	1210298		

PointID	HYDCPT45
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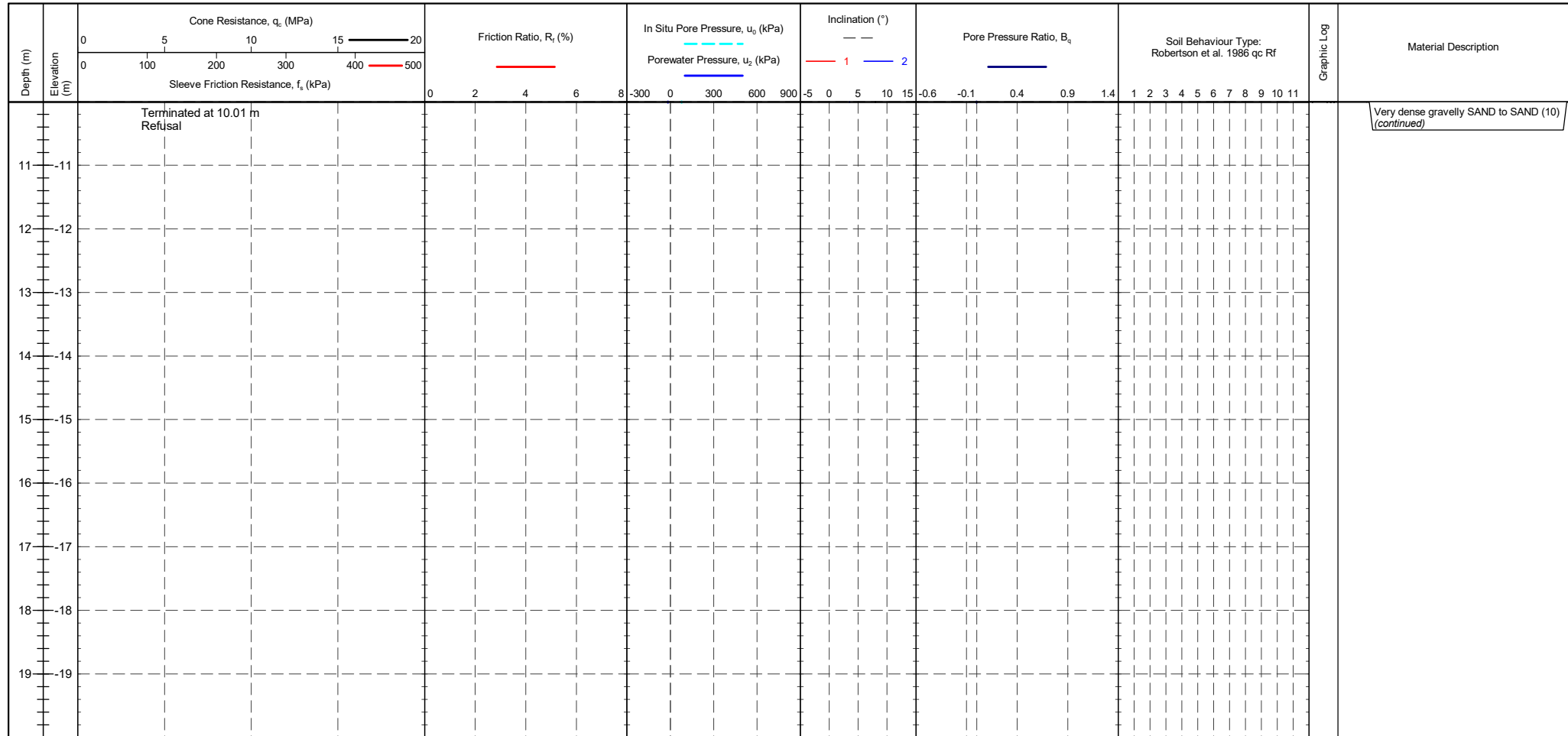
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre 234 mV, Post 233 mV, Difference -0.011 MPa Tip : 261 mV, 259 mV, -0.001 kPa Sleeve : 460 mV, 538 mV, 0.022 kPa Pore Pressure 2 : 2053 mV, 2086 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID
HYDCPT45

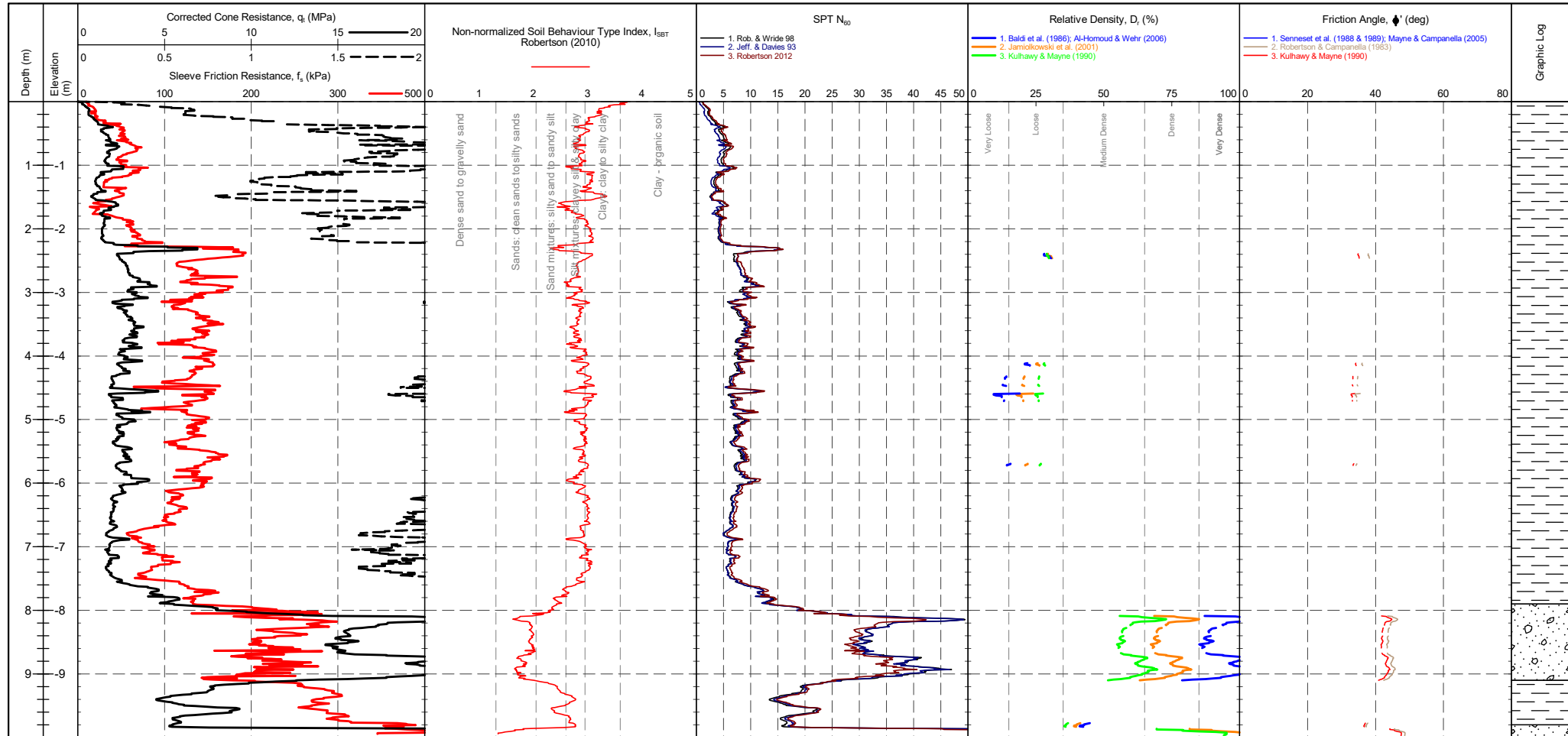
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Pre Post Difference Tip 234 mV 233 mV -0.011 MPa Sleeve 261 mV 259 mV -0.001 kPa Pore Pressure 2 460 mV 538 mV 0.022 kPa X-Y Inclinator 2053 mV 2086 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT45
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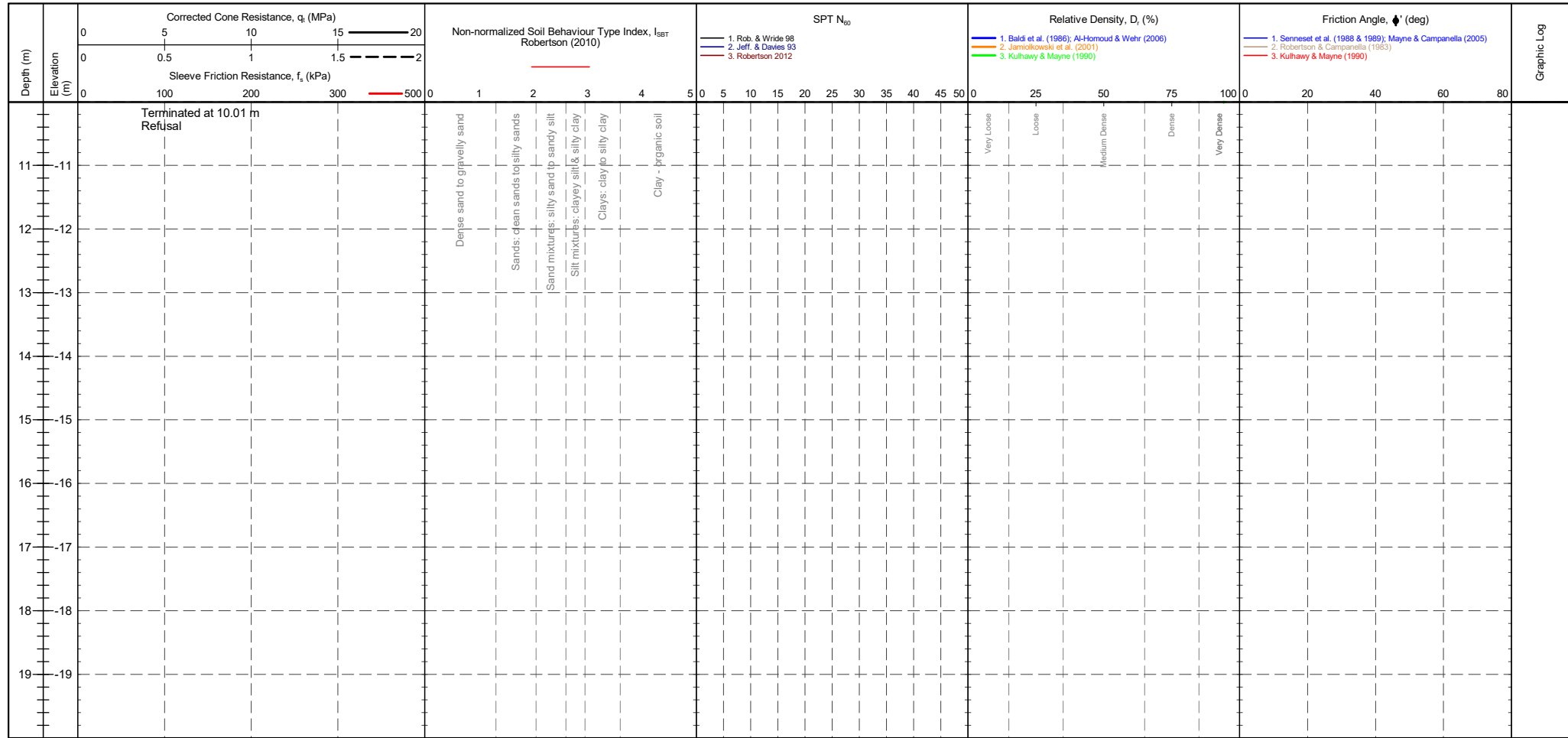
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 234 mV Sleeve: 261 mV Pore Pressure 2: 460 mV X-Y Inclinator: 2053 mV	CPTU ZERO VALUES Post: 233 mV Difference: -0.011 MPa -0.001 kPa 538 mV 2086 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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HYDCPT45

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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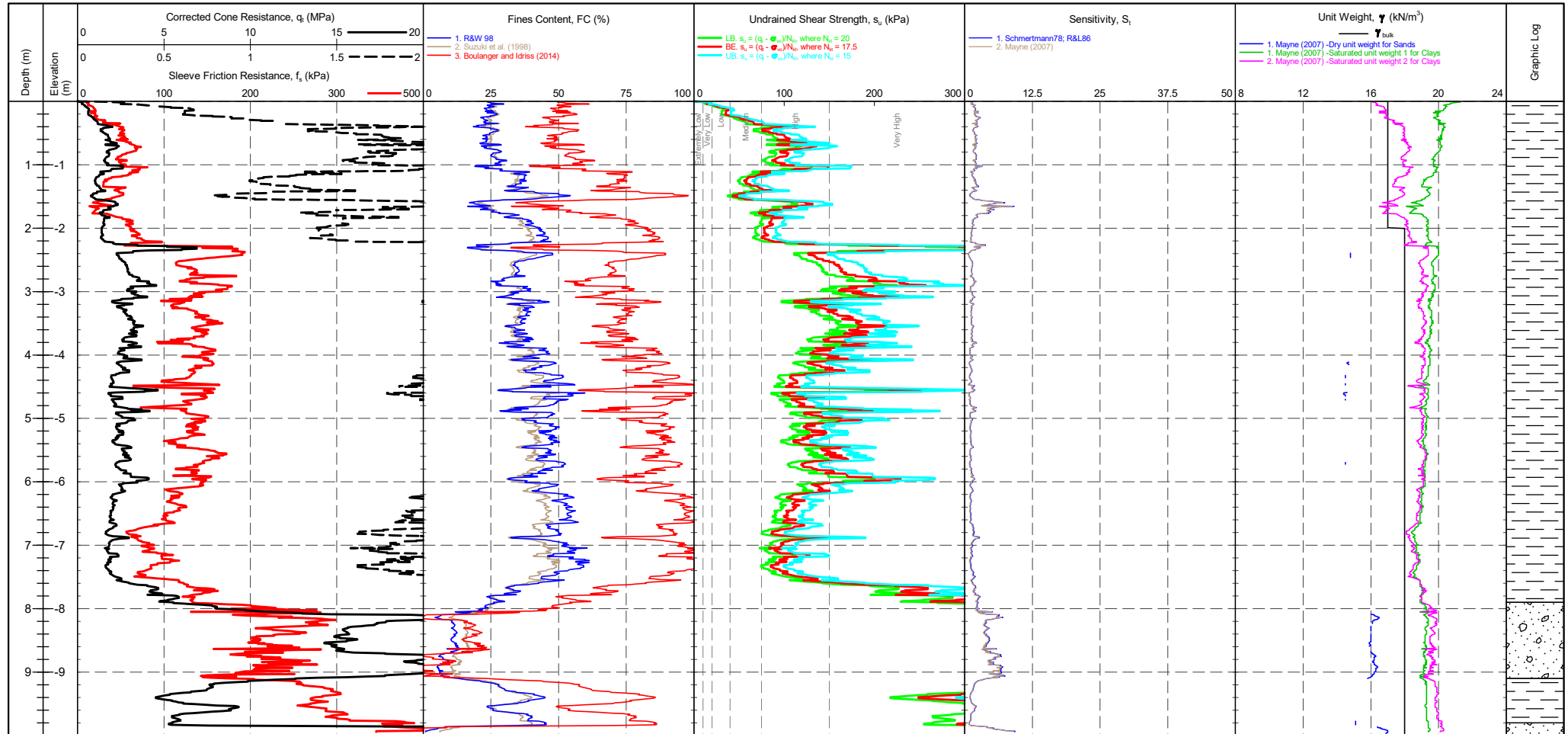


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 234 mV Sleeve : 261 mV Pore Pressure 2 : 460 mV X-Y Inclinator : 2053 mV	CPTU ZERO VALUES Pre : 233 mV Post : 259 mV Difference : -0.011 MPa Difference : -0.001 kPa Difference : 0.022 kPa Difference : 2086 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 234 mV / 233 mV Sleeve: 261 mV / 259 mV Pore Pressure 2: 460 mV / 538 mV X-Y Inclinator: 2053 mV / 2086 mV	CPTU ZERO VALUES Difference: -0.011 MPa Difference: -0.001 kPa Difference: 0.022 kPa	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 <table border="1"> <tr> <th>Term based on measurement</th> <th>su (kPa)</th> <th>Term based on measurement</th> <th>su (kPa)</th> </tr> <tr> <td>Extremely low strength</td> <td><10</td> <td>Medium strength</td> <td>40-75</td> </tr> <tr> <td>Very low strength</td> <td>10-20</td> <td>High strength</td> <td>75-150</td> </tr> <tr> <td>Low strength</td> <td>20-40</td> <td>Very high strength</td> <td>150-300</td> </tr> <tr> <td></td> <td></td> <td>Extremely high strength</td> <td>>300</td> </tr> </table>	Term based on measurement	su (kPa)	Term based on measurement	su (kPa)	Extremely low strength	<10	Medium strength	40-75	Very low strength	10-20	High strength	75-150	Low strength	20-40	Very high strength	150-300			Extremely high strength	>300	▽ Groundwater Level ▮ Dissipation Test
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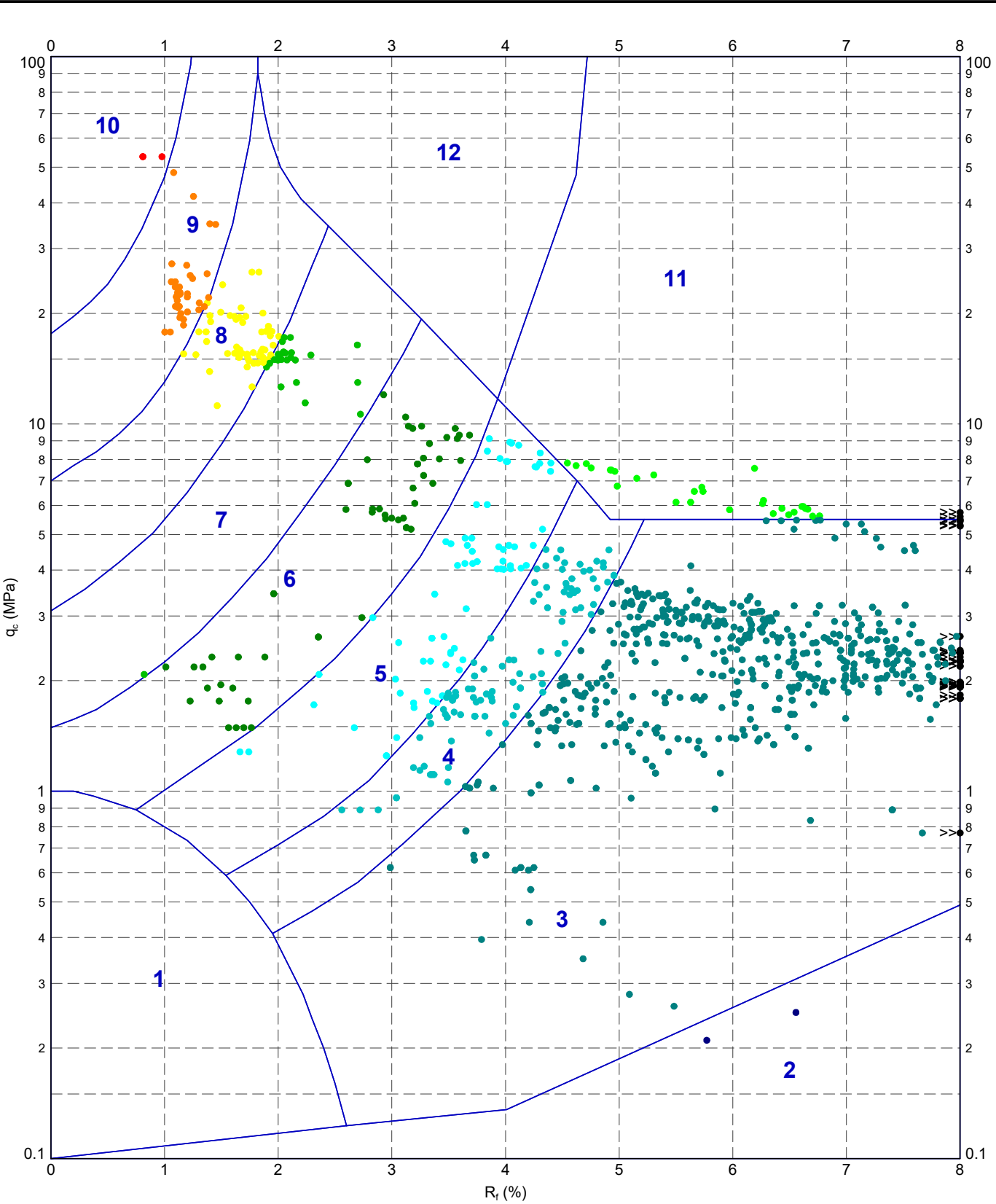
PointID
HYDCPT45

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr><th>Transducer</th><th>Pre</th><th>Post</th><th>Difference</th></tr> <tr><td>Tip</td><td>234 mV</td><td>233 mV</td><td>-0.011 MPa</td></tr> <tr><td>Sleeve</td><td>261 mV</td><td>259 mV</td><td>-0.001 kPa</td></tr> <tr><td>Pore Pressure 2</td><td>460 mV</td><td>538 mV</td><td>0.022 kPa</td></tr> <tr><td>X-Y Inclinator</td><td>2053 mV</td><td>2086 mV</td><td></td></tr> </table>	Transducer	Pre	Post	Difference	Tip	234 mV	233 mV	-0.011 MPa	Sleeve	261 mV	259 mV	-0.001 kPa	Pore Pressure 2	460 mV	538 mV	0.022 kPa	X-Y Inclinator	2053 mV	2086 mV		COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 <table border="1"> <tr><th>Term based on measurement</th><th>su (kPa)</th><th>Term based on measurement</th><th>su (kPa)</th></tr> <tr><td>Extremely low strength</td><td><10</td><td>Medium strength</td><td>40-75</td></tr> <tr><td>Very low strength</td><td>10-20</td><td>High strength</td><td>75-150</td></tr> <tr><td>Low strength</td><td>20-40</td><td>Very high strength</td><td>150-300</td></tr> <tr><td></td><td></td><td>Extremely high strength</td><td>>300</td></tr> </table>	Term based on measurement	su (kPa)	Term based on measurement	su (kPa)	Extremely low strength	<10	Medium strength	40-75	Very low strength	10-20	High strength	75-150	Low strength	20-40	Very high strength	150-300			Extremely high strength	>300	▽ Groundwater Level ▮ Dissipation Test
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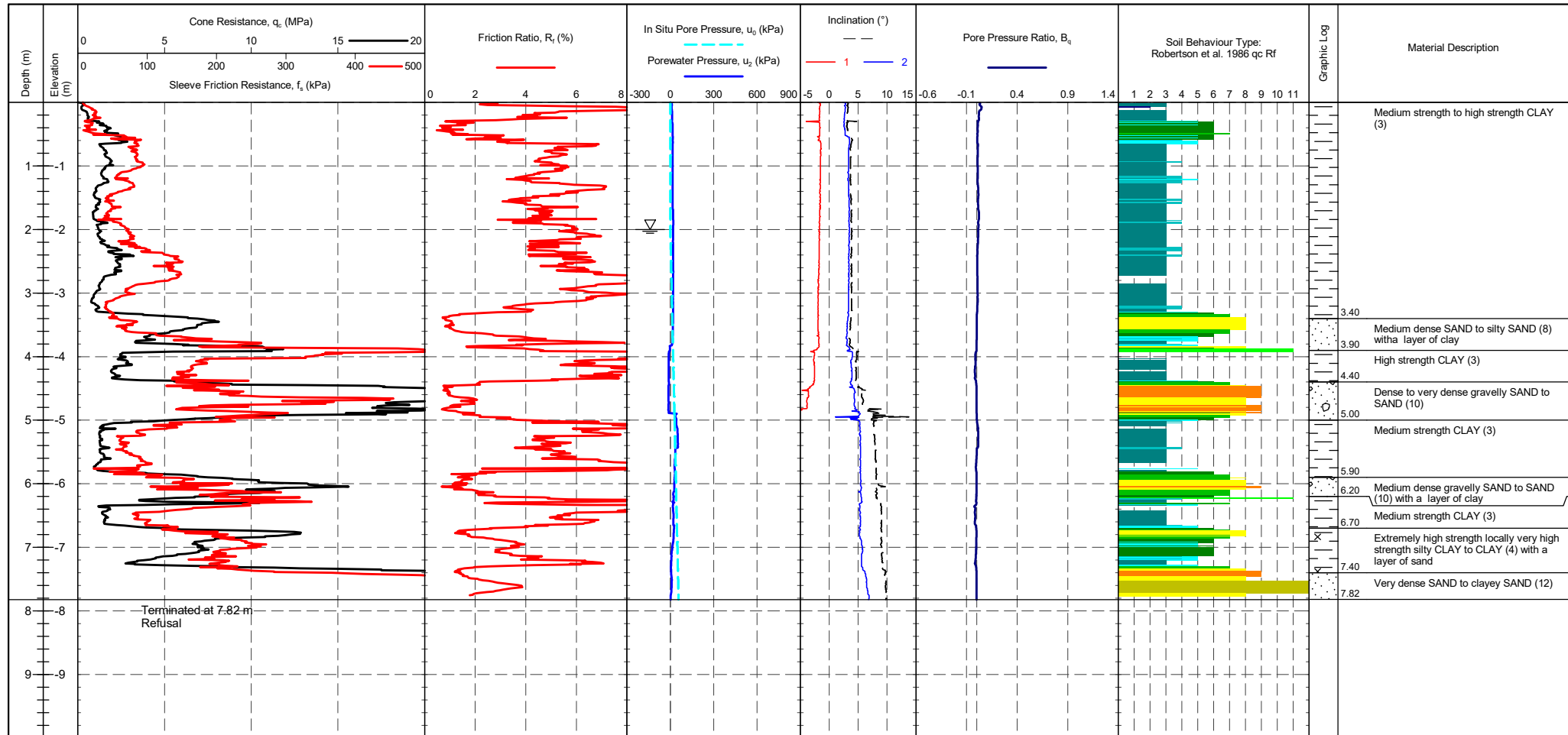
METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
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- 11 - Very stiff fine grained
- 3 - CLAY
- 6 - Sandy SILT to clayey SILT
- 9 - SAND
- 12 - SAND to clayey SAND

	<p>TITLE</p> <p>Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 qc vs. R_f - HYDCPT45</p>	DRAWN	DATE	09/06/2021	
		CHECKED	DATE	09/06/2021	
		SCALE	Not To Scale		A4
		PROJECT No	1210298		
		FIGURE No			

PointID	HYDCPT46
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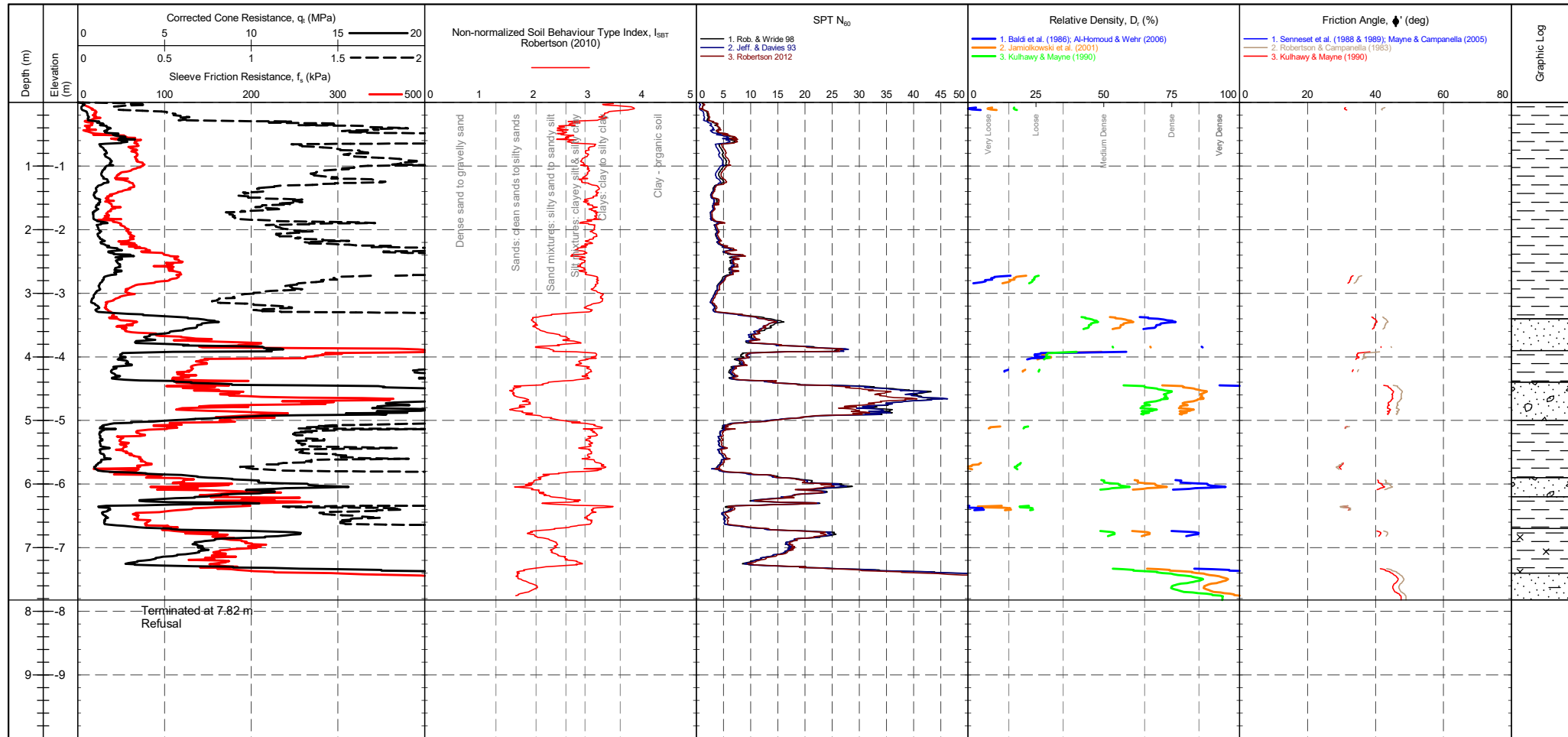
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Tip 234 mV 232 mV -0.022 MPa Sleeve 262 mV 259 mV -0.002 kPa Pore Pressure 2 467 mV 490 mV 0.006 kPa X-Y Inclinator 2230 mV 2245 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID
HYDCPT46

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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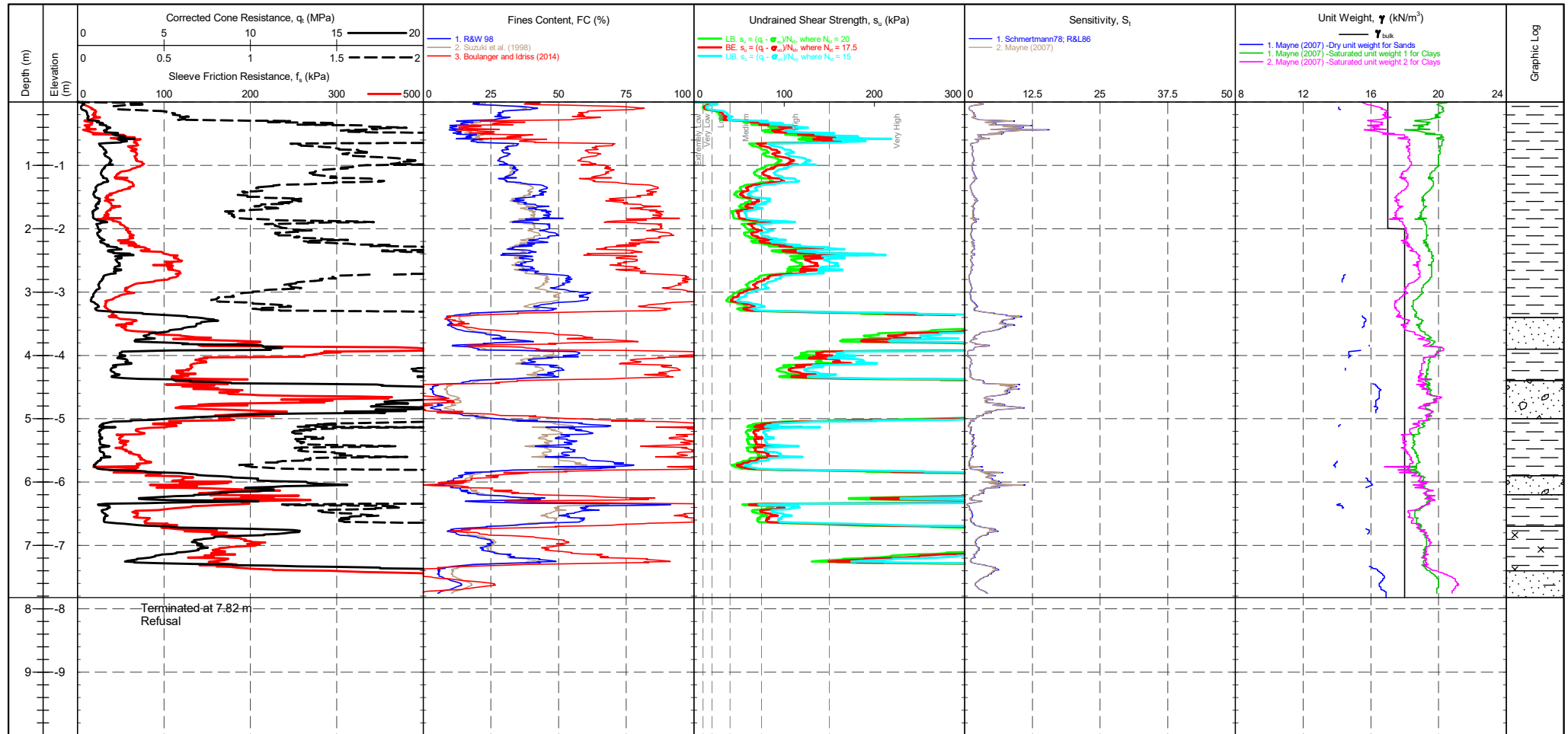


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 234 mV Sleeve: 262 mV Pore Pressure 2: 467 mV X-Y Inclinator: 2230 mV	CPTU ZERO VALUES Post: 232 mV Difference: -0.022 MPa -0.002 kPa 490 mV 2245 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)																																				
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PointID

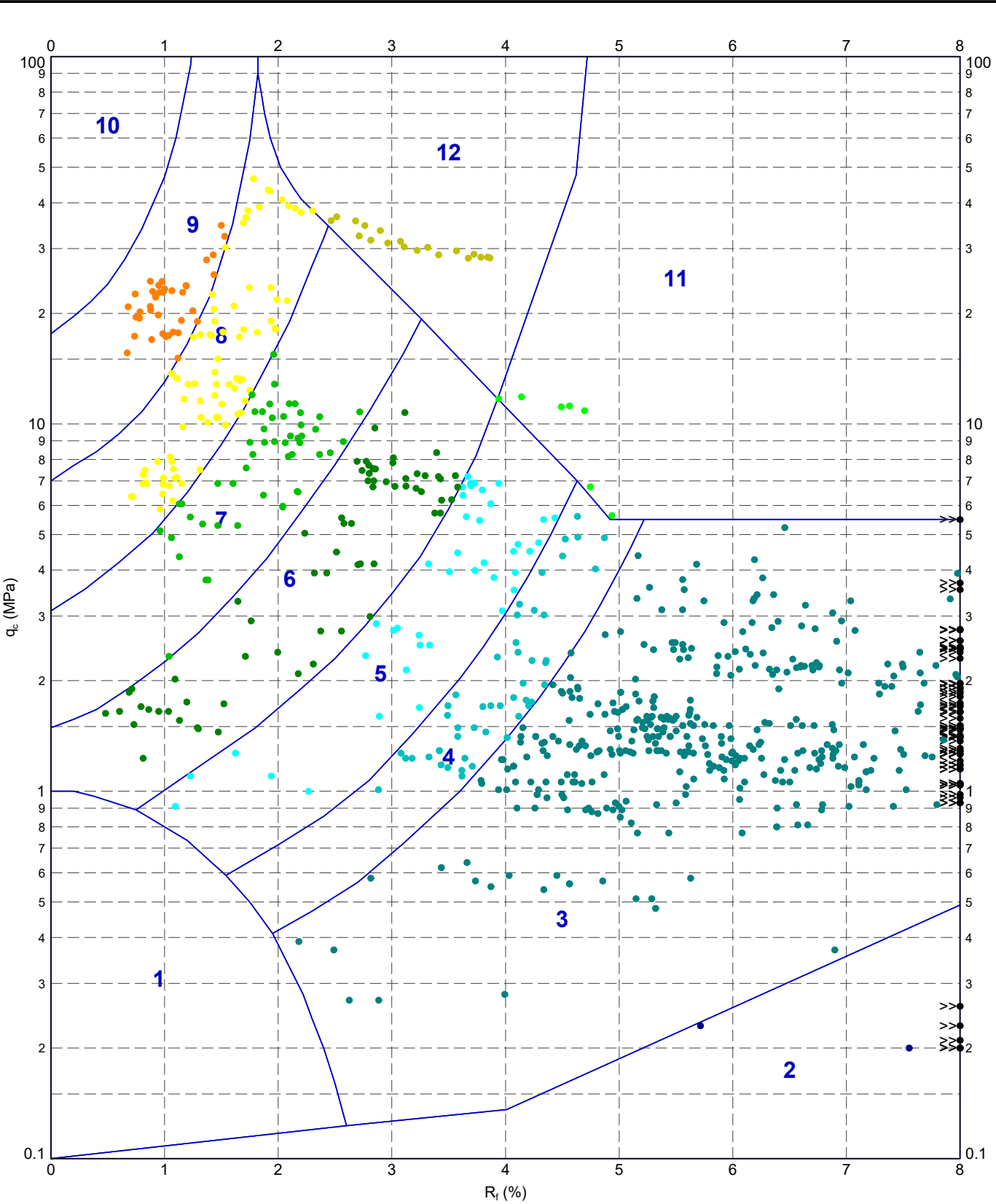
HYDCPT46

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 234 mV / 232 mV / -0.022 MPa Sleeve: 262 mV / 259 mV / -0.002 kPa Pore Pressure 2: 467 mV / 490 mV / 0.006 kPa X-Y Inclinator: 2230 mV / 2245 mV	CPTU ZERO VALUES Pre: 234 mV Post: 232 mV Difference: -0.022 MPa	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	▽ Groundwater Level ▮ Dissipation Test
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210586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<DrawingFile>> 09/06/2021 22:46 10.02.00.04. Dalgid Lab and In Situ Tool - In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10



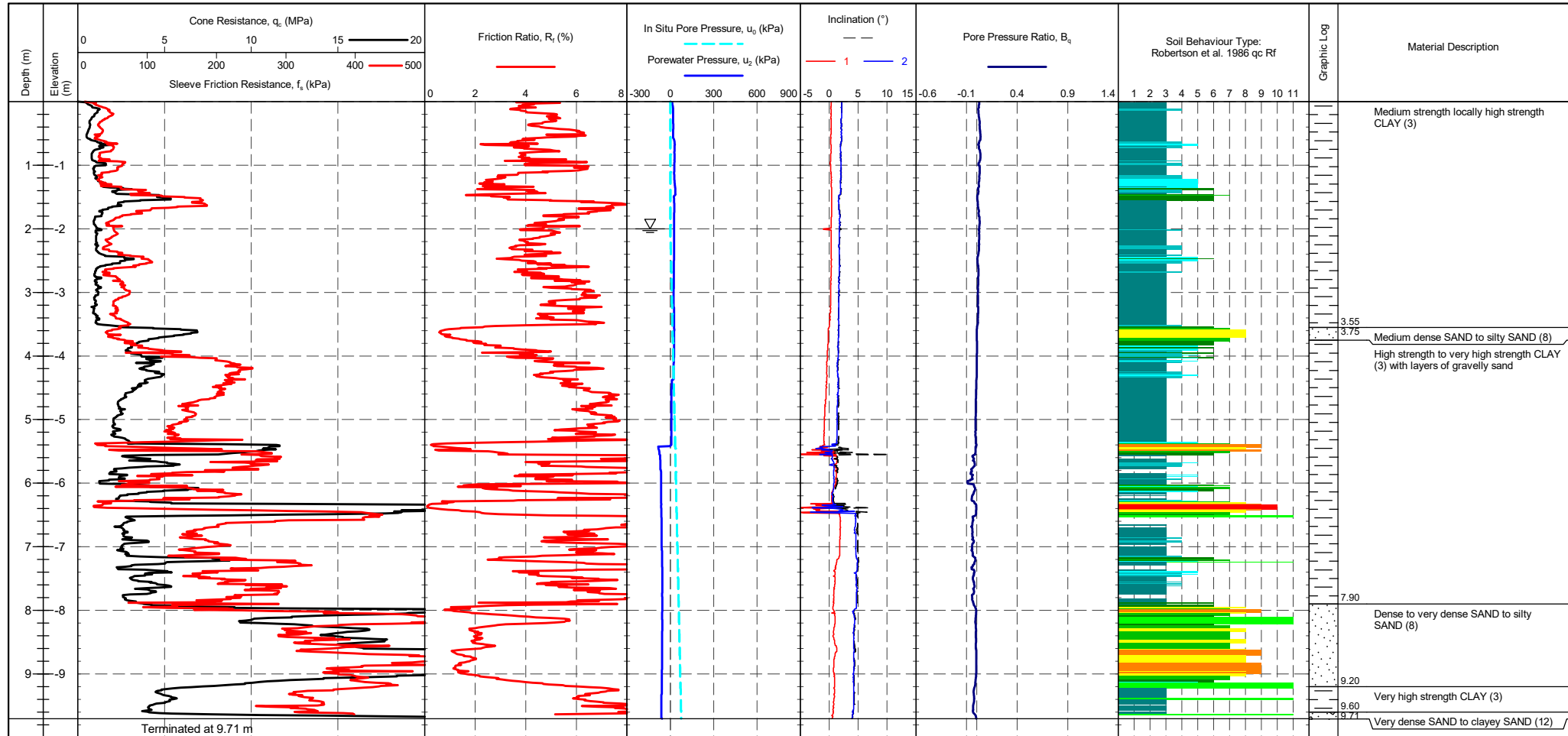
METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
- 7 - Silty SAND to sandy SILT
- 10 - Gravelly SAND to SAND
- 2 - Organic material
- 5 - Clayey SILT to silty CLAY
- 8 - SAND to silty SAND
- 11 - Very stiff fine grained
- 3 - CLAY
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	<p>TITLE</p> <p>Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 qc vs. R_f - HYDCPT46</p>	<p>DRAWN</p>	<p>DATE</p> <p>09/06/2021</p>
		<p>CHECKED</p>	<p>DATE</p> <p>09/06/2021</p>
		<p>SCALE</p> <p>Not To Scale</p>	<p>A4</p>
		<p>PROJECT No</p> <p>1210298</p>	<p>FIGURE No</p>

PointID	HYDCPT47
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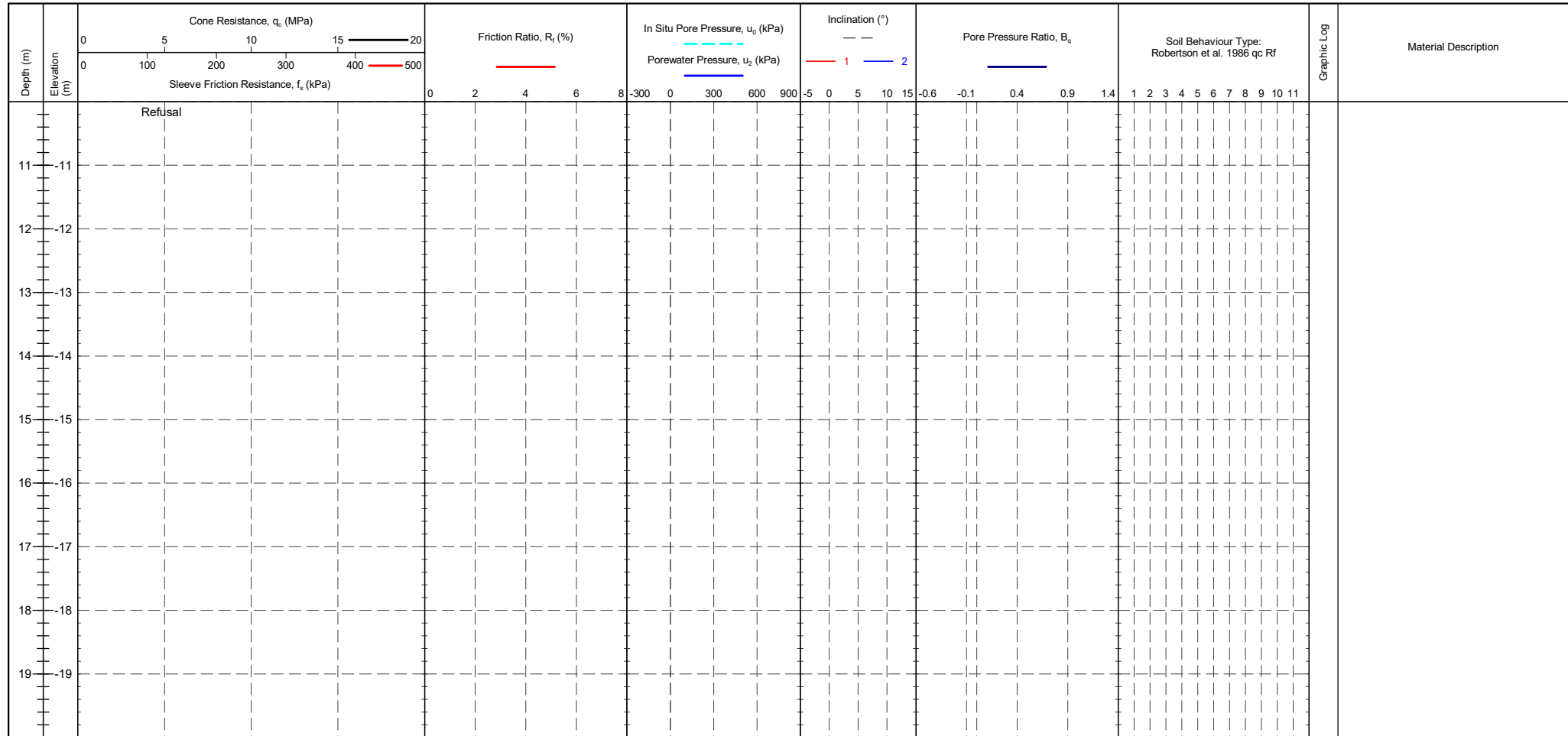
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Pre Post Difference Tip 233 mV 233 mV 0 MPa Sleeve 261 mV 259 mV -0.001 kPa Pore Pressure 2 436 mV 398 mV -0.011 kPa X-Y Inclinometer 2476 mV 2545 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT47
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CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Pre Post Difference Tip 233 mV 233 mV 0 MPa Sleeve 261 mV 259 mV -0.001 kPa Pore Pressure 2 436 mV 398 mV -0.011 kPa X-Y Inclinator 2476 mV 2545 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID

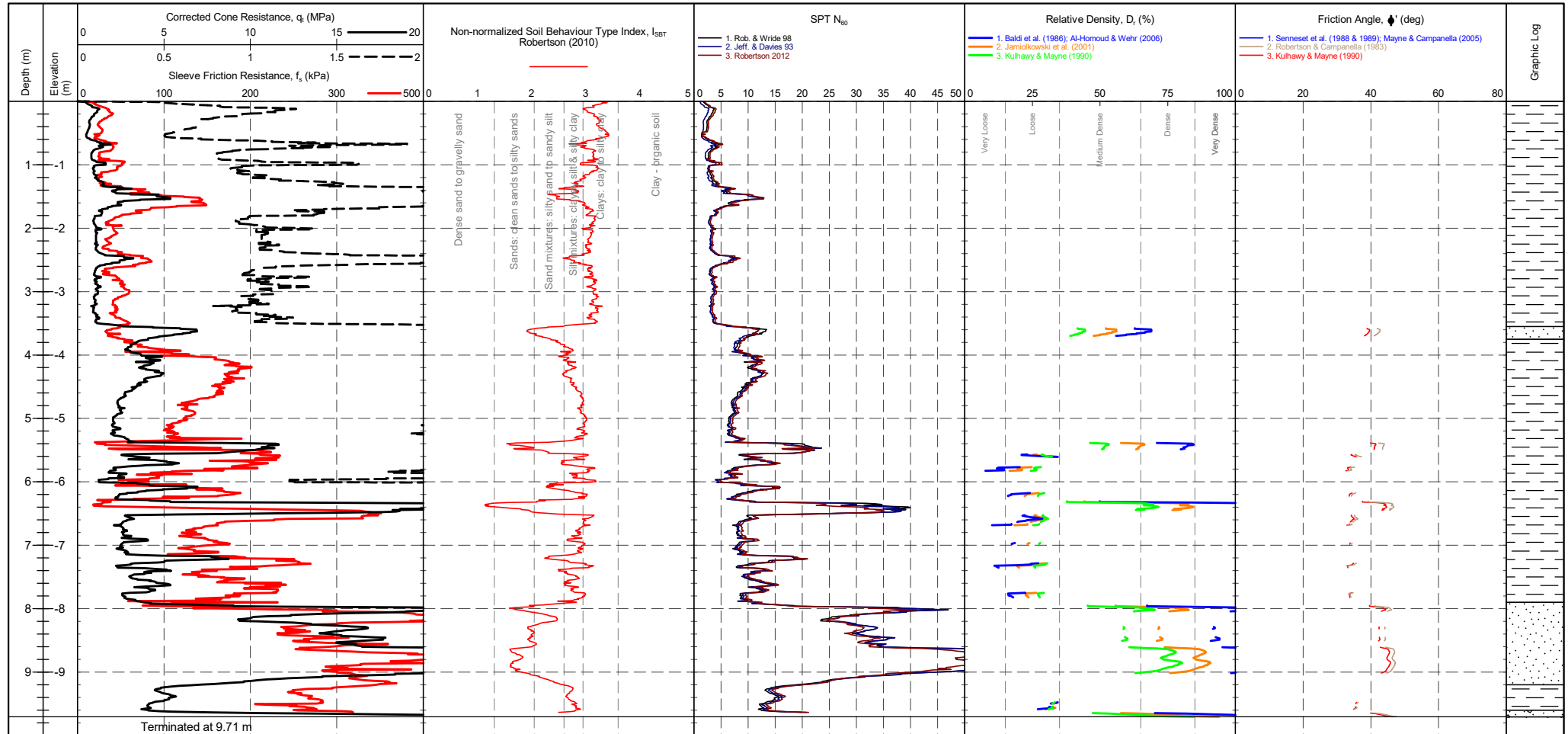
HYDCPT47

CLIENT : Hydrock
 PROJECT : Wingates, Bolton
 LOCATION : Wingate, Bolton
 PROJECT No. : 1210298

EASTING : 0.0 m
 NORTHING : 0.0 m
 ELEVATION : 0.00 m OD
 CHECKED BY : LD
 TERMINATION REASON : Refusal

Remark:
 Test refused on total pressure.

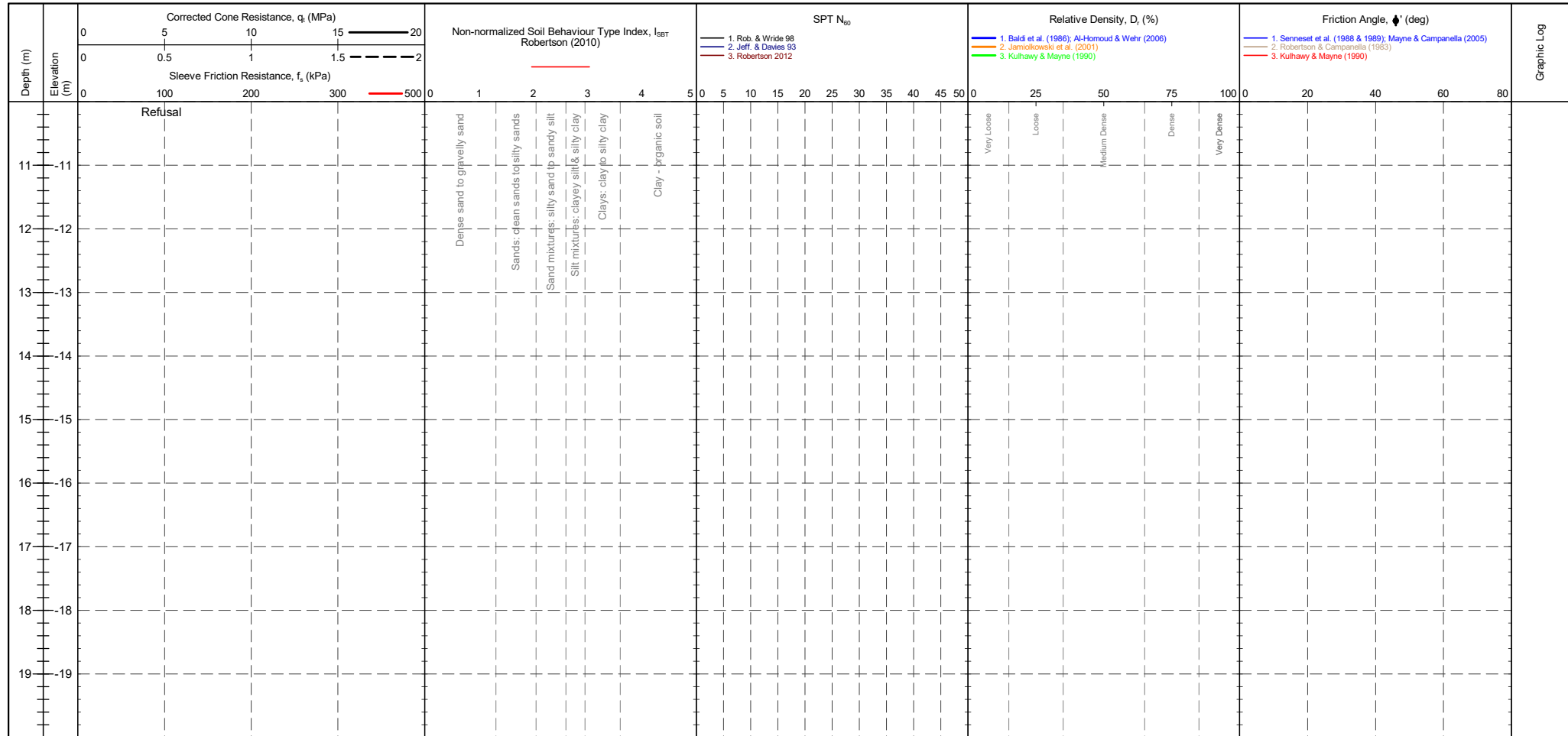
SHEET : 1 OF 2
 STATUS : Final
 TEST DATE : 27/05/2021
 PLOT DATE : 09/06/2021
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE		TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICTION REDUCER : None WEATHER : Overcast & Mild		CPTU ZERO VALUES Transducer Pre Post Difference Tip 233 mV 233 mV 0 MPa Sleeve 261 mV 259 mV -0.001 kPa Pore Pressure 2 436 mV 398 mV -0.011 kPa X-Y Inclinator 2476 mV 2545 mV			GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>				Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test	
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CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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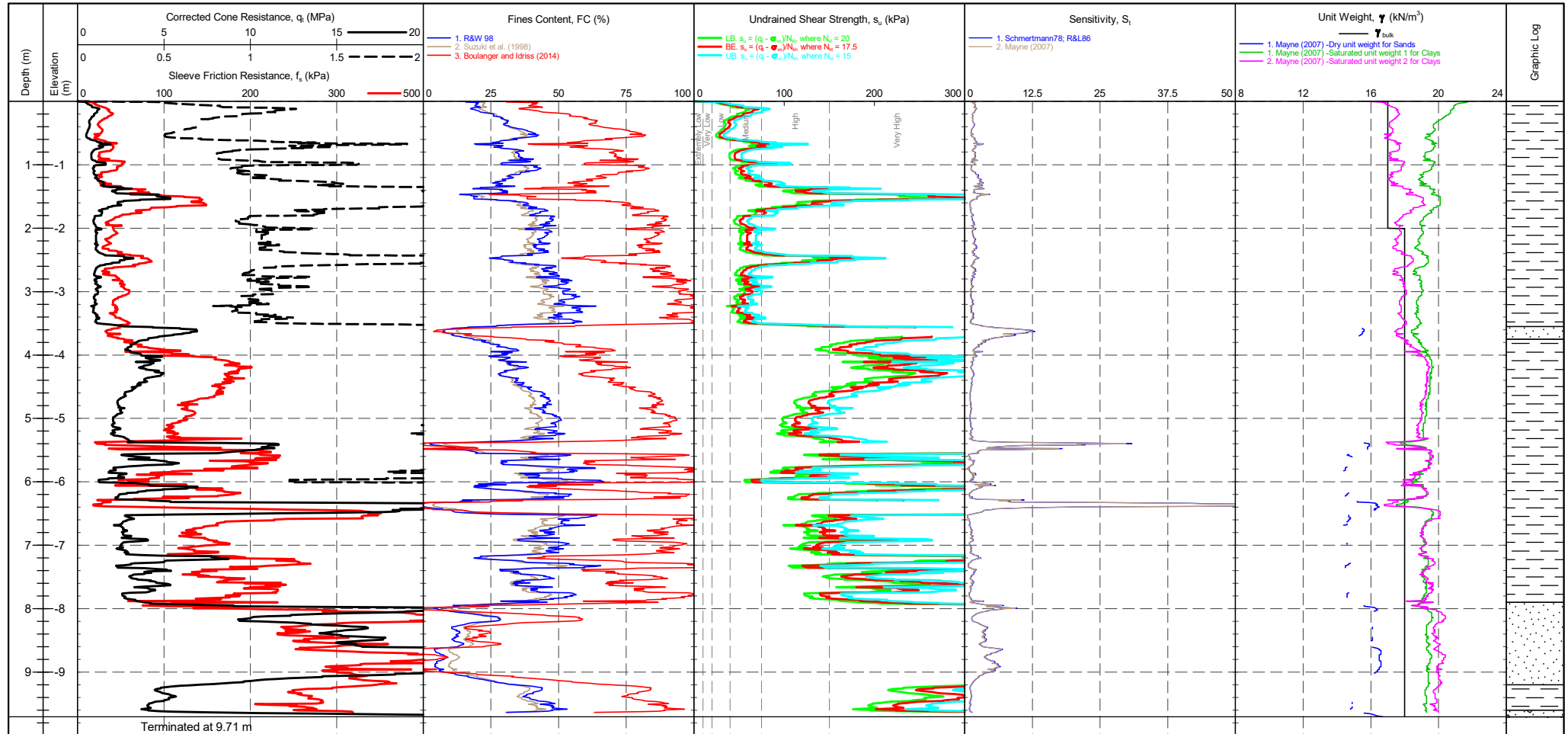


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 233 mV Sleeve : 261 mV Pore Pressure 2 : 436 mV X-Y Inclinator : 2476 mV	Post : 233 mV Difference : -0.001 kPa 3. Robertson 2012 : 398 mV 2545 mV	CPTU ZERO VALUES Pre: 233 mV, Post: 233 mV, Difference: 0 MPa Sleeve: 261 mV, Pore Pressure 2: 436 mV, X-Y Inclinator: 2476 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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HYDCPT47

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 233 mV Sleeve: 261 mV Pore Pressure 2: 436 mV X-Y Inclinator: 2476 mV	CPTU ZERO VALUES Post: 233 mV Difference: 0 MPa -0.001 kPa 398 mV -0.011 kPa 2545 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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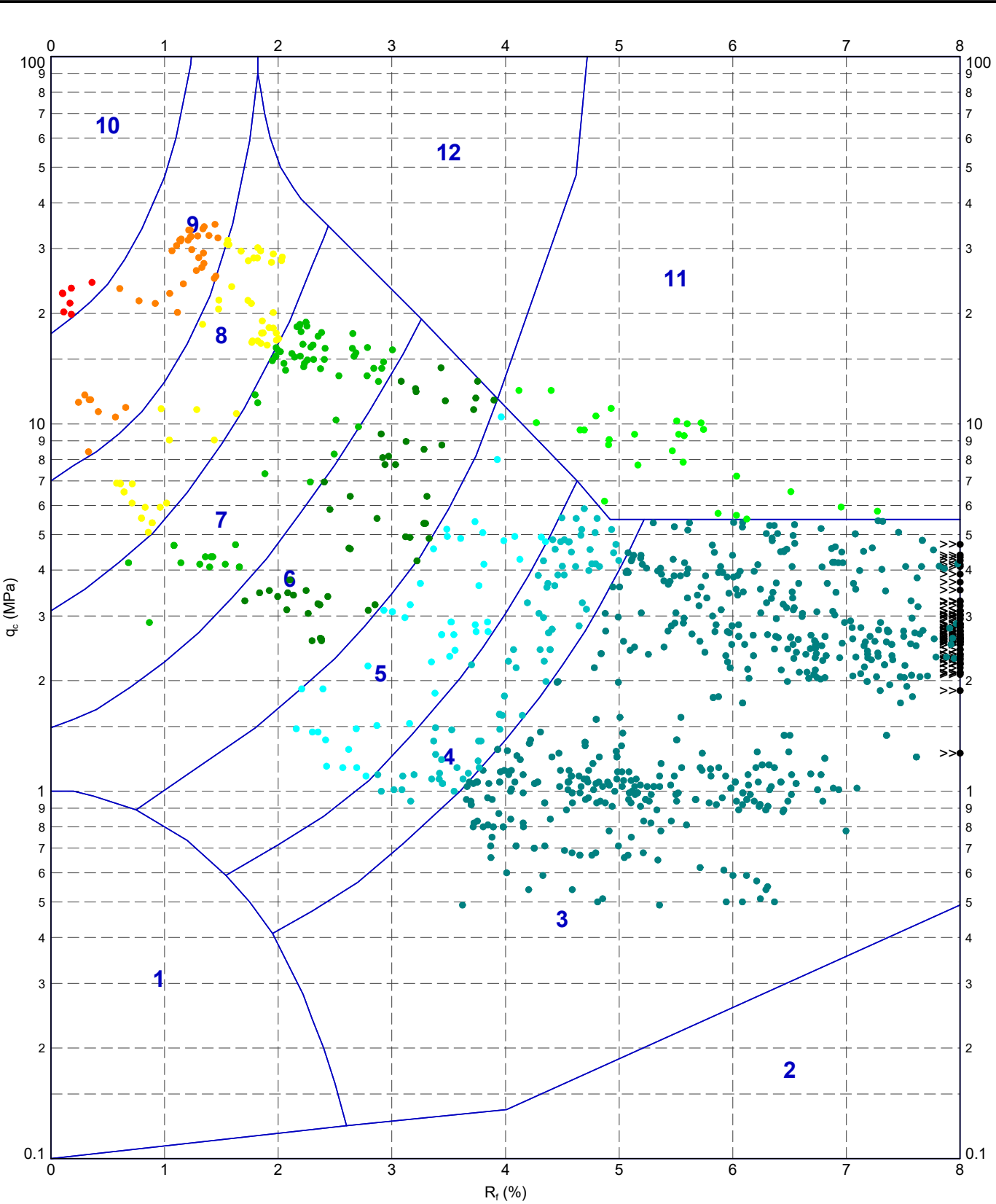
PointID
HYDCPT47

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr><td>Transducer</td><td>Pre</td><td>Post</td><td>Difference</td></tr> <tr><td>Tip</td><td>233 mV</td><td>233 mV</td><td>0 MPa</td></tr> <tr><td>Sleeve</td><td>261 mV</td><td>259 mV</td><td>-0.001 kPa</td></tr> <tr><td>Pore Pressure 2</td><td>436 mV</td><td>398 mV</td><td>-0.011 kPa</td></tr> <tr><td>X-Y Inclinator</td><td>2476 mV</td><td>2545 mV</td><td></td></tr> </table>	Transducer	Pre	Post	Difference	Tip	233 mV	233 mV	0 MPa	Sleeve	261 mV	259 mV	-0.001 kPa	Pore Pressure 2	436 mV	398 mV	-0.011 kPa	X-Y Inclinator	2476 mV	2545 mV		COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 <table border="1"> <tr><td>Term based on measurement</td><td>s_u (kPa)</td><td>Term based on measurement</td><td>s_u (kPa)</td></tr> <tr><td>Extremely low strength</td><td><10</td><td>Medium strength</td><td>40-75</td></tr> <tr><td>Very low strength</td><td>10-20</td><td>High strength</td><td>75-150</td></tr> <tr><td>Low strength</td><td>20-40</td><td>Very high strength</td><td>150-300</td></tr> <tr><td></td><td></td><td>Extremely high strength</td><td>>300</td></tr> </table>	Term based on measurement	s_u (kPa)	Term based on measurement	s_u (kPa)	Extremely low strength	<10	Medium strength	40-75	Very low strength	10-20	High strength	75-150	Low strength	20-40	Very high strength	150-300			Extremely high strength	>300	Groundwater Level Dissipation Test
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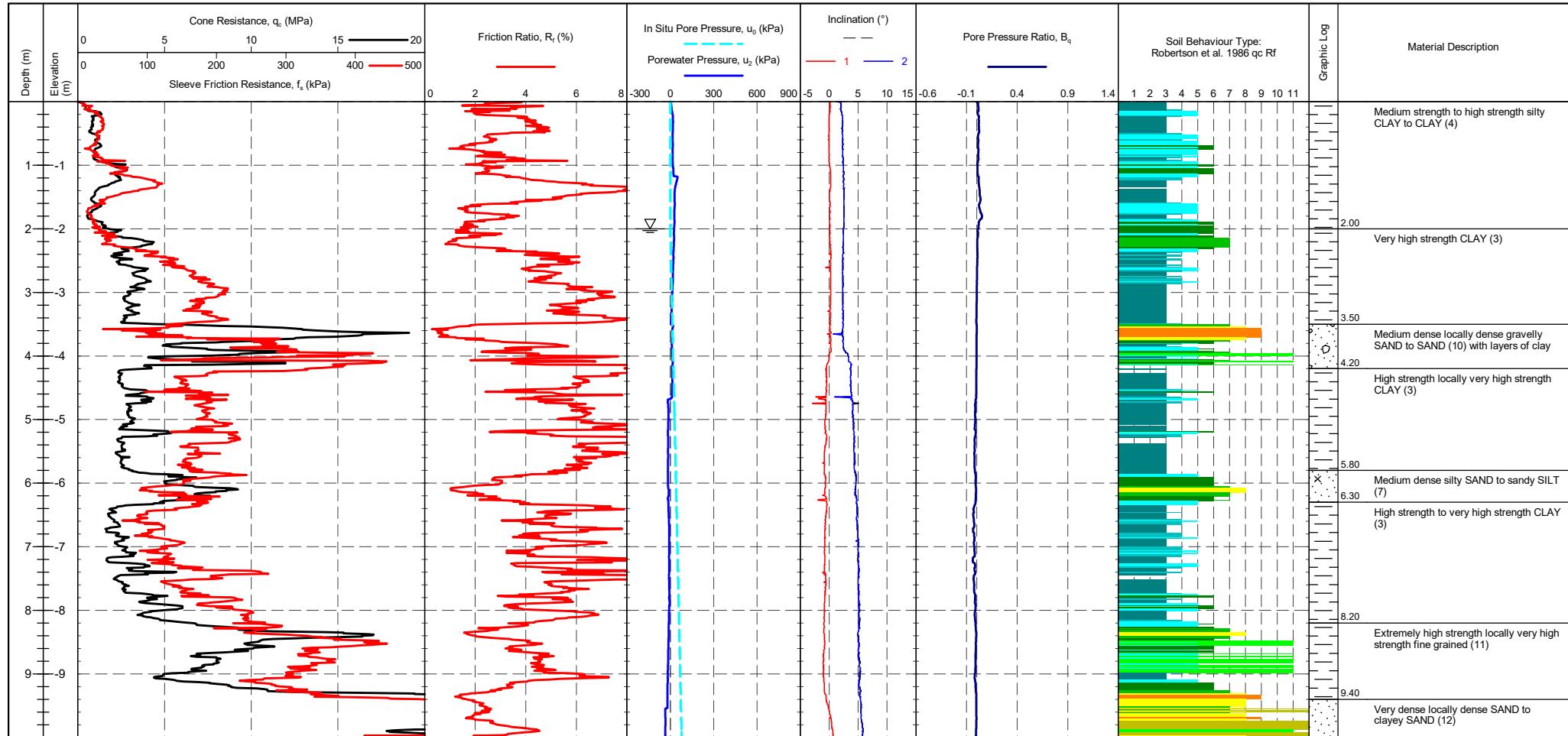
METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
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- 10 - Gravelly SAND to SAND
- 2 - Organic material
- 5 - Clayey SILT to silty CLAY
- 8 - SAND to silty SAND
- 11 - Very stiff fine grained
- 3 - CLAY
- 6 - Sandy SILT to clayey SILT
- 9 - SAND
- 12 - SAND to clayey SAND

	<p>TITLE</p> <p>Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 qc vs. R_f - HYDCPT47</p>	DRAWN	DATE	09/06/2021	
		CHECKED	DATE	09/06/2021	
		SCALE	Not To Scale		A4
		PROJECT No	FIGURE No		
		1210298			

PointID	HYDCPT48
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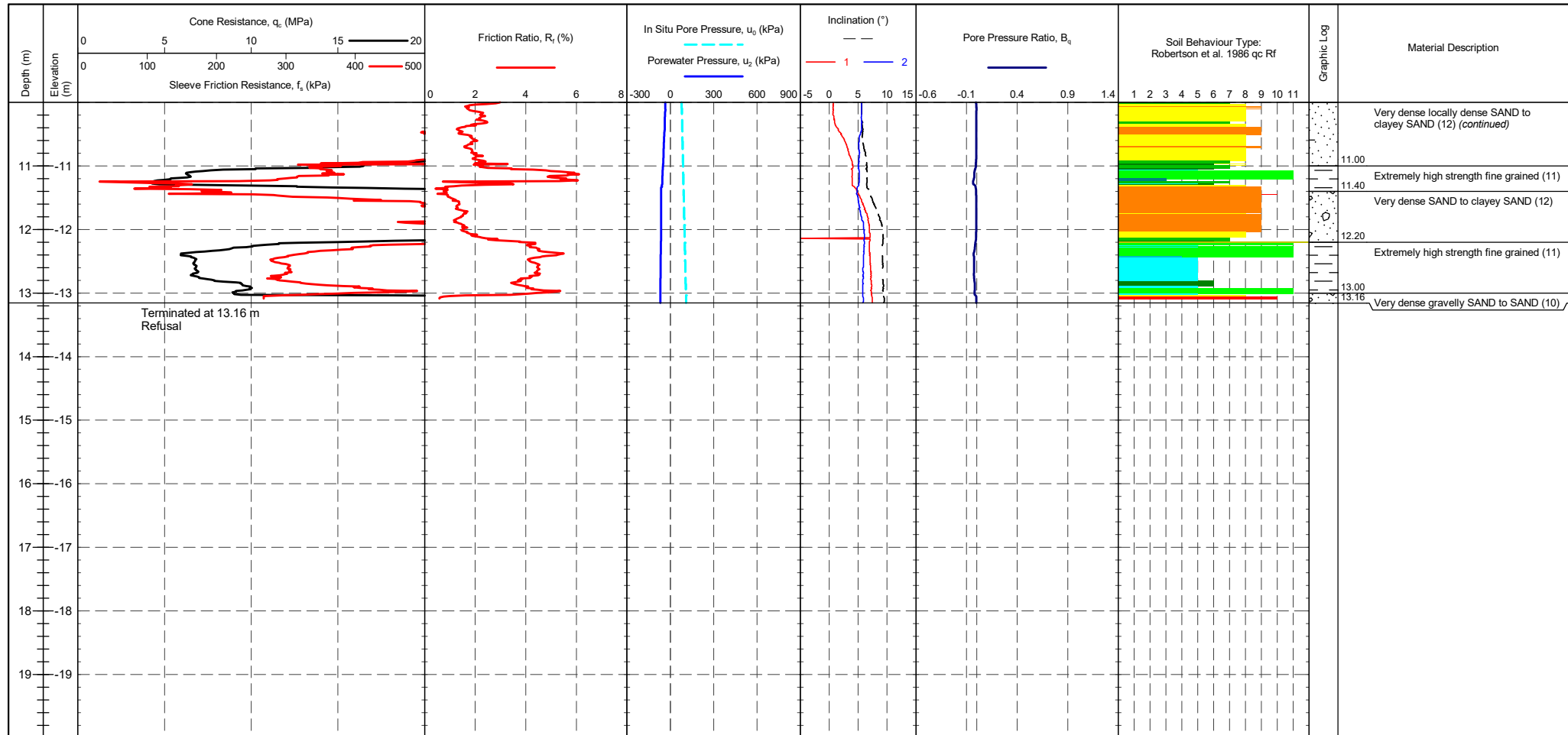
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Tip 235 mV 232 mV -0.033 MPa Sleeve 261 mV 258 mV -0.002 kPa Pore Pressure 2 451 mV 470 mV 0.005 kPa X-Y Inclinometer 2419 mV 2448 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT48
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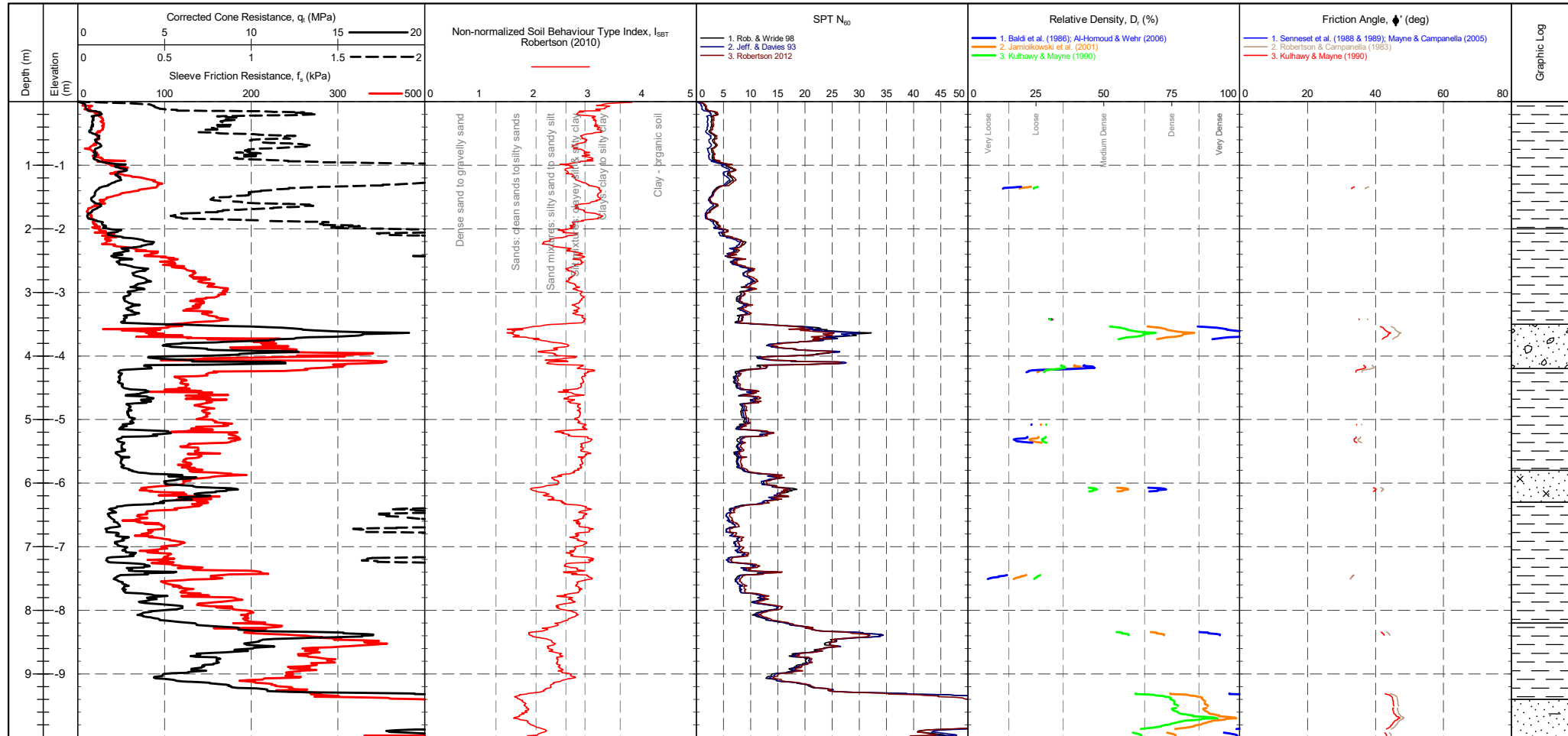
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICTION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre Post Difference Tip : 235 mV 232 mV -0.033 MPa Sleeve : 261 mV 258 mV -0.002 kPa Pore Pressure 2 : 451 mV 470 mV 0.005 kPa X-Y Inclinometer : 2419 mV 2448 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID
HYDCPT48

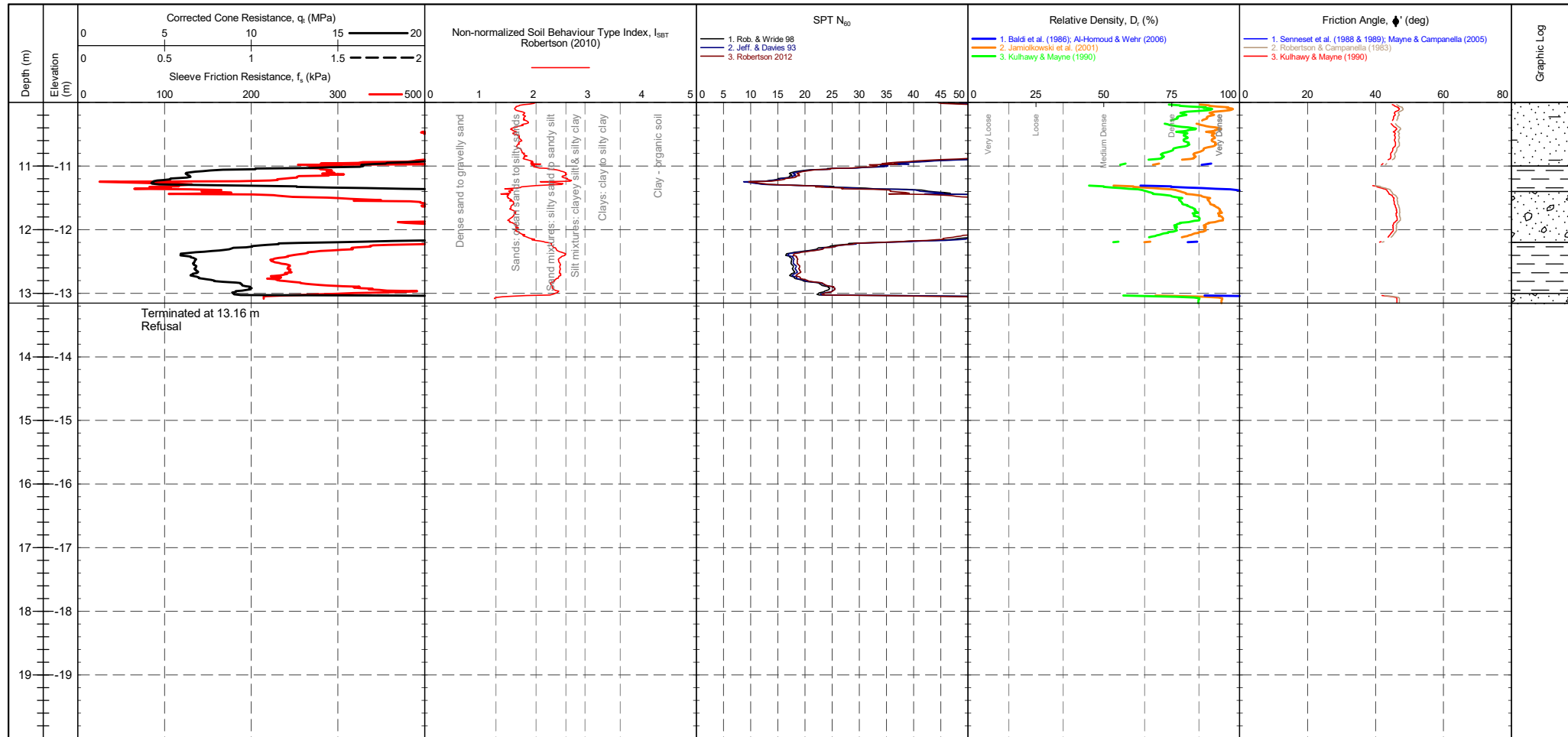
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr><td>Transducer</td><td>Pre</td><td>Post</td><td>Difference</td></tr> <tr><td>Tip</td><td>235 mV</td><td>232 mV</td><td>-0.033 MPa</td></tr> <tr><td>Sleeve</td><td>261 mV</td><td>258 mV</td><td>-0.002 kPa</td></tr> <tr><td>Pore Pressure 2</td><td>451 mV</td><td>470 mV</td><td>0.005 kPa</td></tr> <tr><td>X-Y Inclinator</td><td>2419 mV</td><td>2448 mV</td><td></td></tr> </table>	Transducer	Pre	Post	Difference	Tip	235 mV	232 mV	-0.033 MPa	Sleeve	261 mV	258 mV	-0.002 kPa	Pore Pressure 2	451 mV	470 mV	0.005 kPa	X-Y Inclinator	2419 mV	2448 mV		GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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PointID
HYDCPT48

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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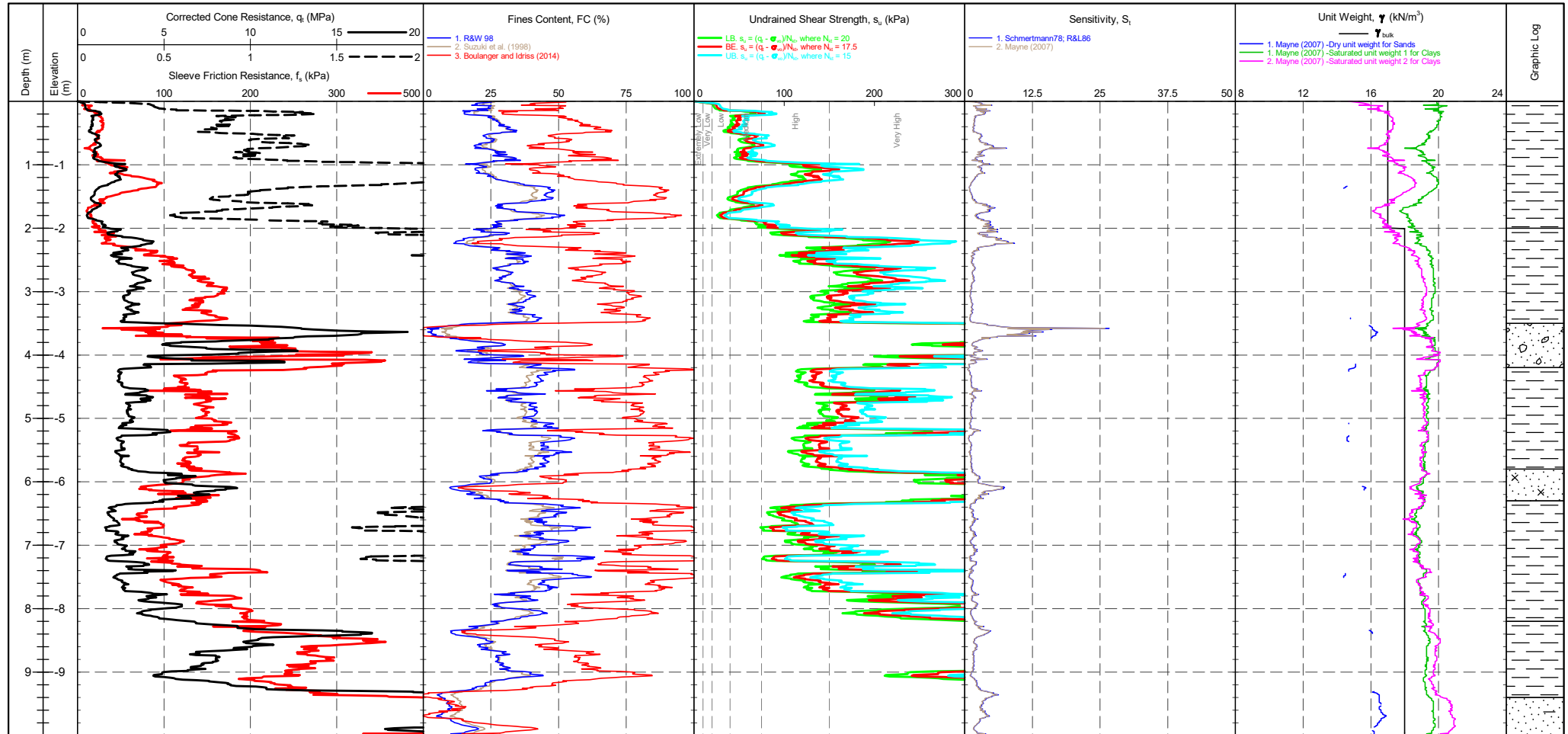


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 235 mV Sleeve : 261 mV Pore Pressure 2 : 451 mV X-Y Inclinator : 2419 mV	CPTU ZERO VALUES Post : 232 mV Difference : -0.033 MPa 2 : 258 mV 0.002 kPa 470 mV 0.005 kPa 2448 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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PointID

HYDCPT48

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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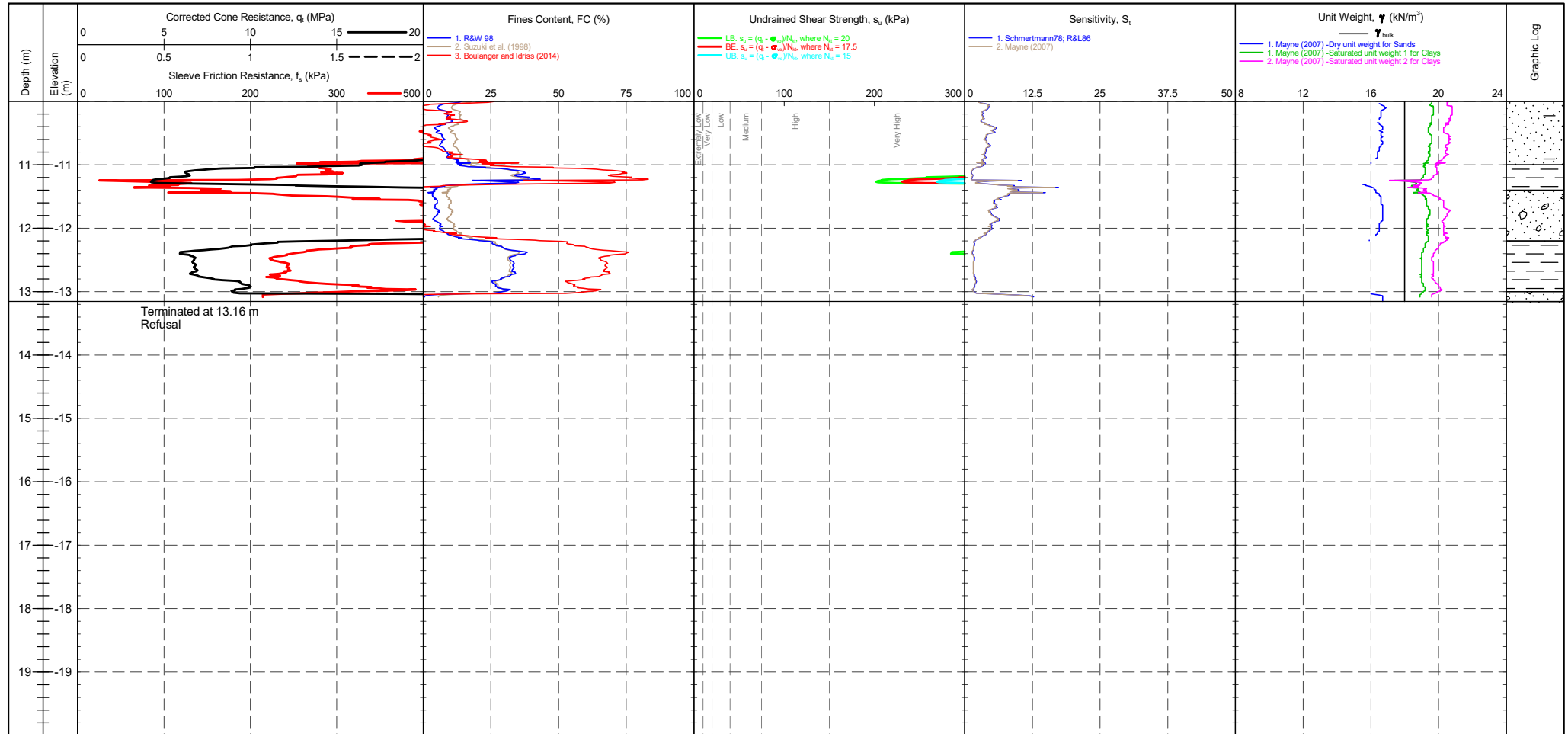


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 235 mV / 232 mV / -0.033 MPa Sleeve: 261 mV / 258 mV / -0.002 kPa Pore Pressure 2: 451 mV / 470 mV / 0.005 kPa X-Y Inclinator: 2419 mV / 2448 mV	CPTU ZERO VALUES Pre: 235 mV, Post: 232 mV, Difference: -0.033 MPa Sleeve: 261 mV, Post: 258 mV, Difference: -0.002 kPa Pore Pressure 2: 451 mV, Post: 470 mV, Difference: 0.005 kPa X-Y Inclinator: 2419 mV, Post: 2448 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement s_u (kPa) Term based on measurement s_u (kPa) Extremely low strength <10 Medium strength 40-75 Very low strength 10-20 High strength 75-150 Low strength 20-40 Very high strength 150-300 Extremely high strength >300	▽ Groundwater Level ▮ Dissipation Test
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PointID

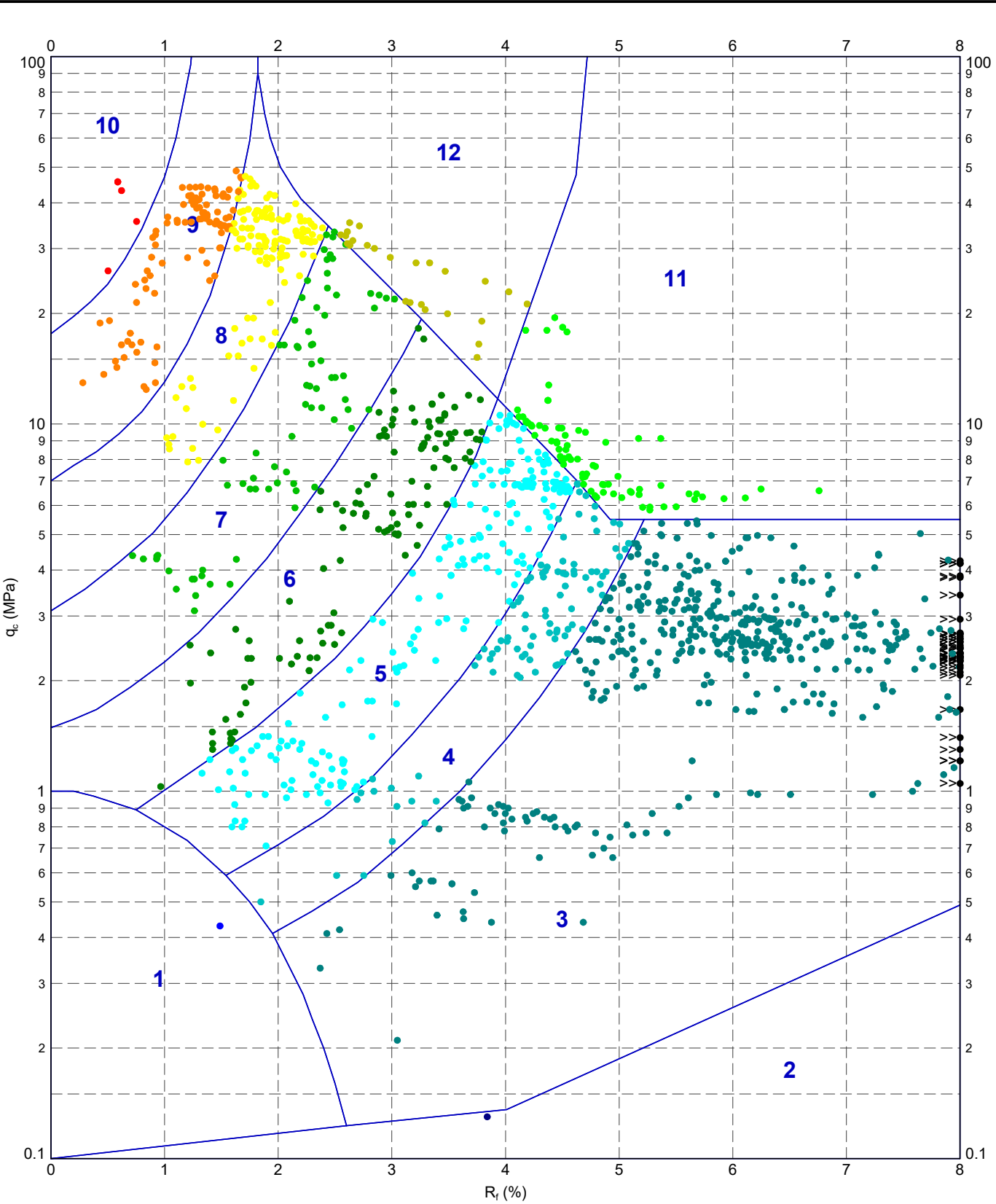
HYDCPT48

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 235 mV / 232 mV / -0.033 MPa Sleeve: 261 mV / 258 mV / -0.002 kPa Pore Pressure 2: 451 mV / 470 mV / 0.005 kPa X-Y Inclinator: 2419 mV / 2448 mV	CPTU ZERO VALUES Pre: 235 mV, Post: 232 mV, Difference: -0.033 MPa Sleeve: 261 mV, 258 mV, -0.002 kPa Pore Pressure 2: 451 mV, 470 mV, 0.005 kPa X-Y Inclinator: 2419 mV, 2448 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement s_u (kPa): Extremely low strength: <10 Very low strength: 10-20 Low strength: 20-40 Term based on measurement s_u (kPa): Medium strength: 40-75 High strength: 75-150 Very high strength: 150-300 Extremely high strength: >300	▽ Groundwater Level ▮ Dissipation Test
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210586-ADVANCED REPORT INSTITUSI 2.02.1.LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<drawingFile>> 09/06/2021 22:55 10.02.00.04 Dajnel Lab and In Situ Tool - In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10



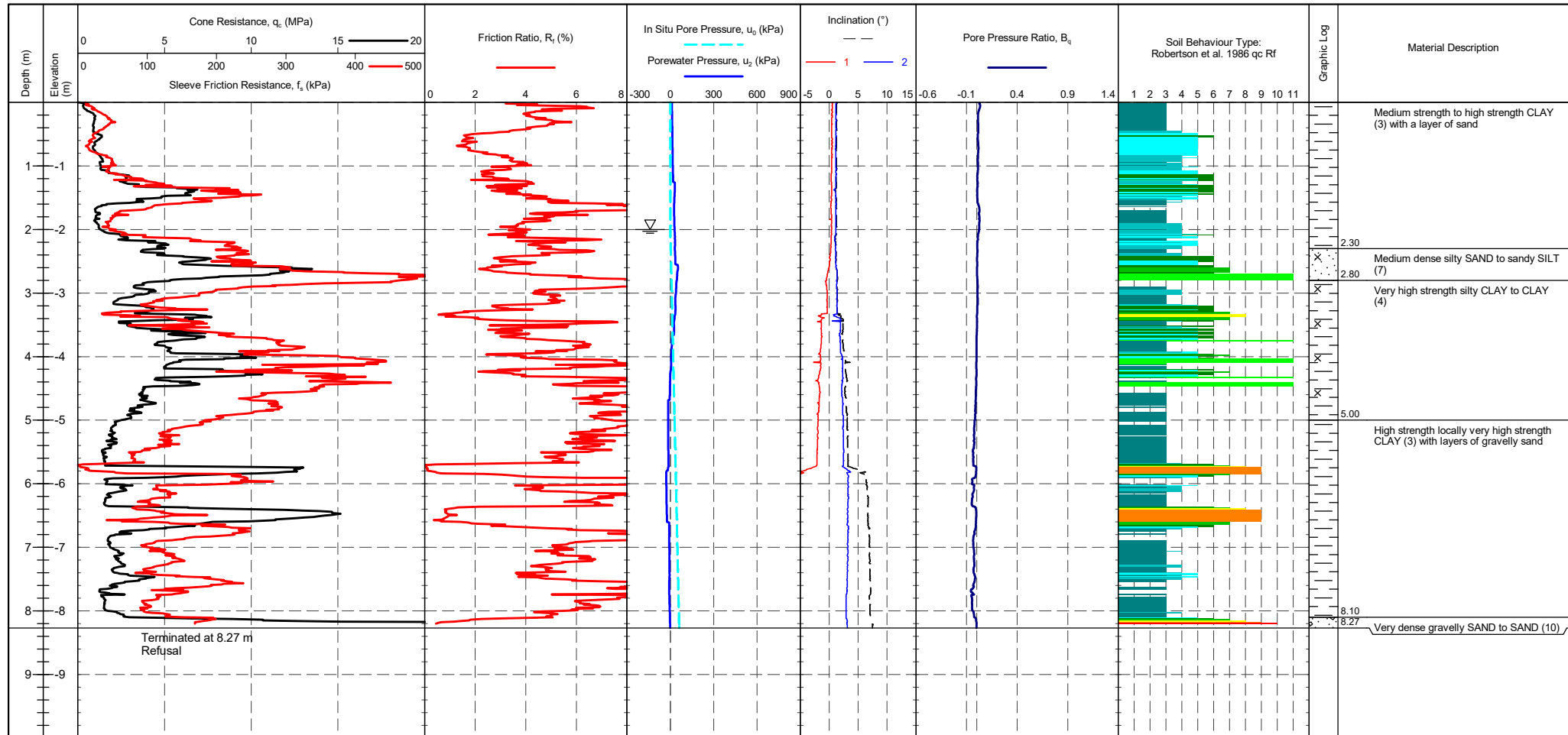
METHOD: Robertson et al. 1986 q_c R_f

1 - Sensitive fine grained material	4 - Silty CLAY to CLAY	7 - Silty SAND to sandy SILT	10 - Gravelly SAND to SAND
2 - Organic material	5 - Clayey SILT to silty CLAY	8 - SAND to silty SAND	11 - Very stiff fine grained
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	TITLE	Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 q _c vs. R _f - HYDCPT48	
	DRAWN	DATE	09/06/2021
	CHECKED	DATE	09/06/2021
	SCALE	Not To Scale	
PROJECT No	1210298	FIGURE No	A4

PointID	HYDCPT49
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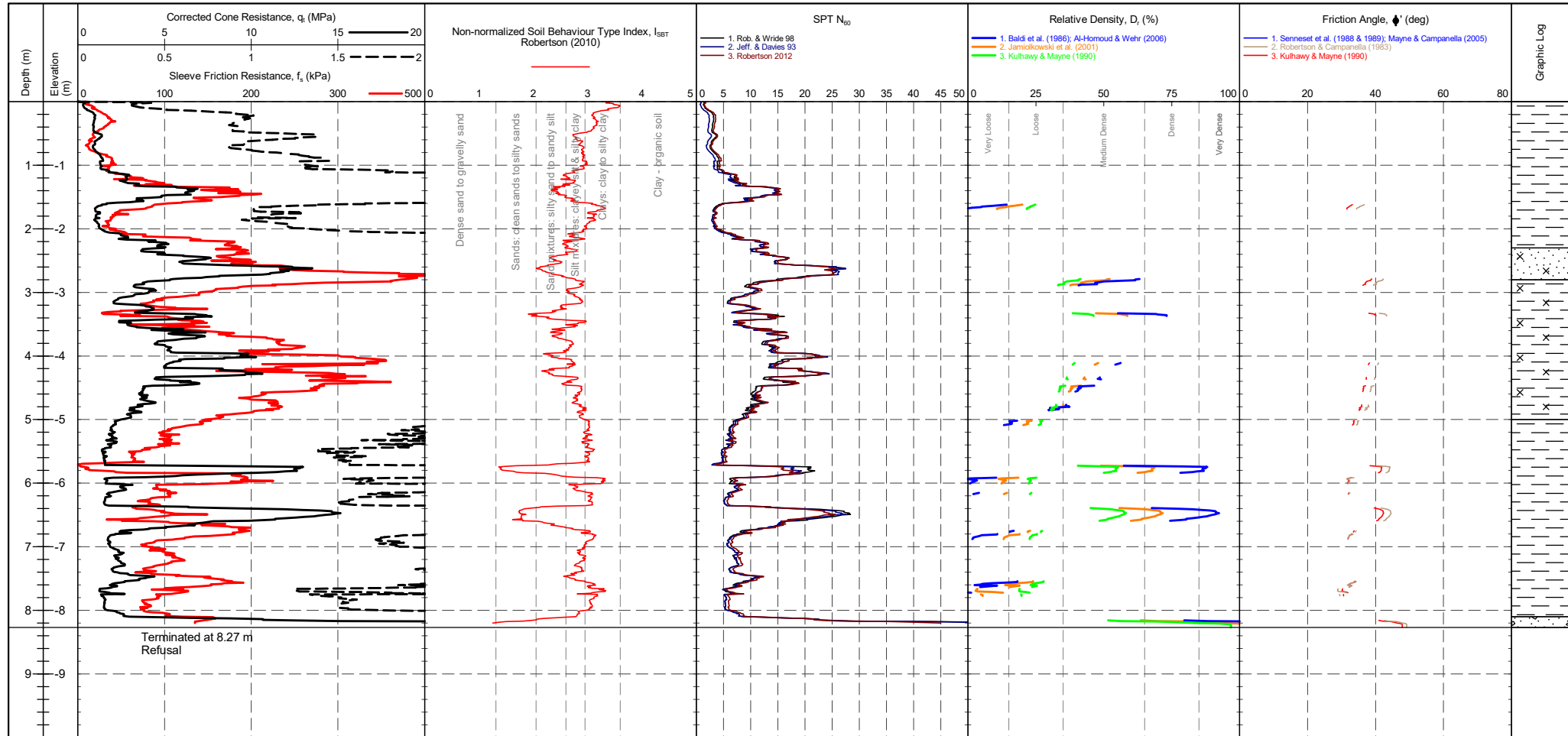
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICTION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre 235 mV, Post 233 mV, Difference -0.022 MPa Tip : 261 mV, 260 mV, -0.001 kPa Sleeve : 481 mV, 554 mV, 0.02 kPa Pore Pressure 2 : 2482 mV, 2466 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT49
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CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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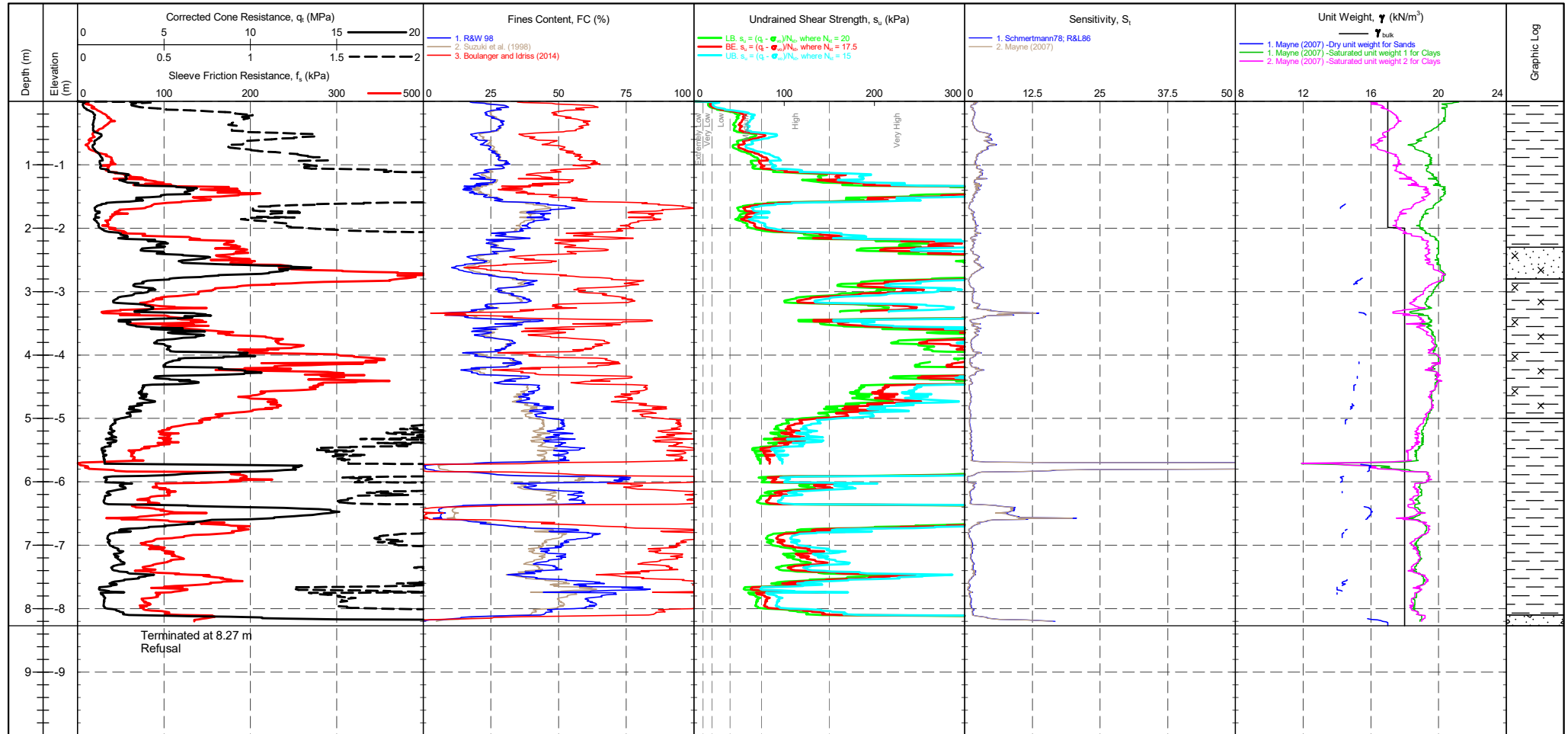


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 235 mV / 233 mV / -0.022 MPa Sleeve: 261 mV / 260 mV / -0.001 kPa Pore Pressure 2: 481 mV / 554 mV / 0.02 kPa X-Y Inclinator: 2482 mV / 2466 mV	CPTU ZERO VALUES Pre: 235 mV, Post: 233 mV, Difference: -0.022 MPa Pre: 261 mV, Post: 260 mV, Difference: -0.001 kPa Pre: 481 mV, Post: 554 mV, Difference: 0.02 kPa Pre: 2482 mV, Post: 2466 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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PointID

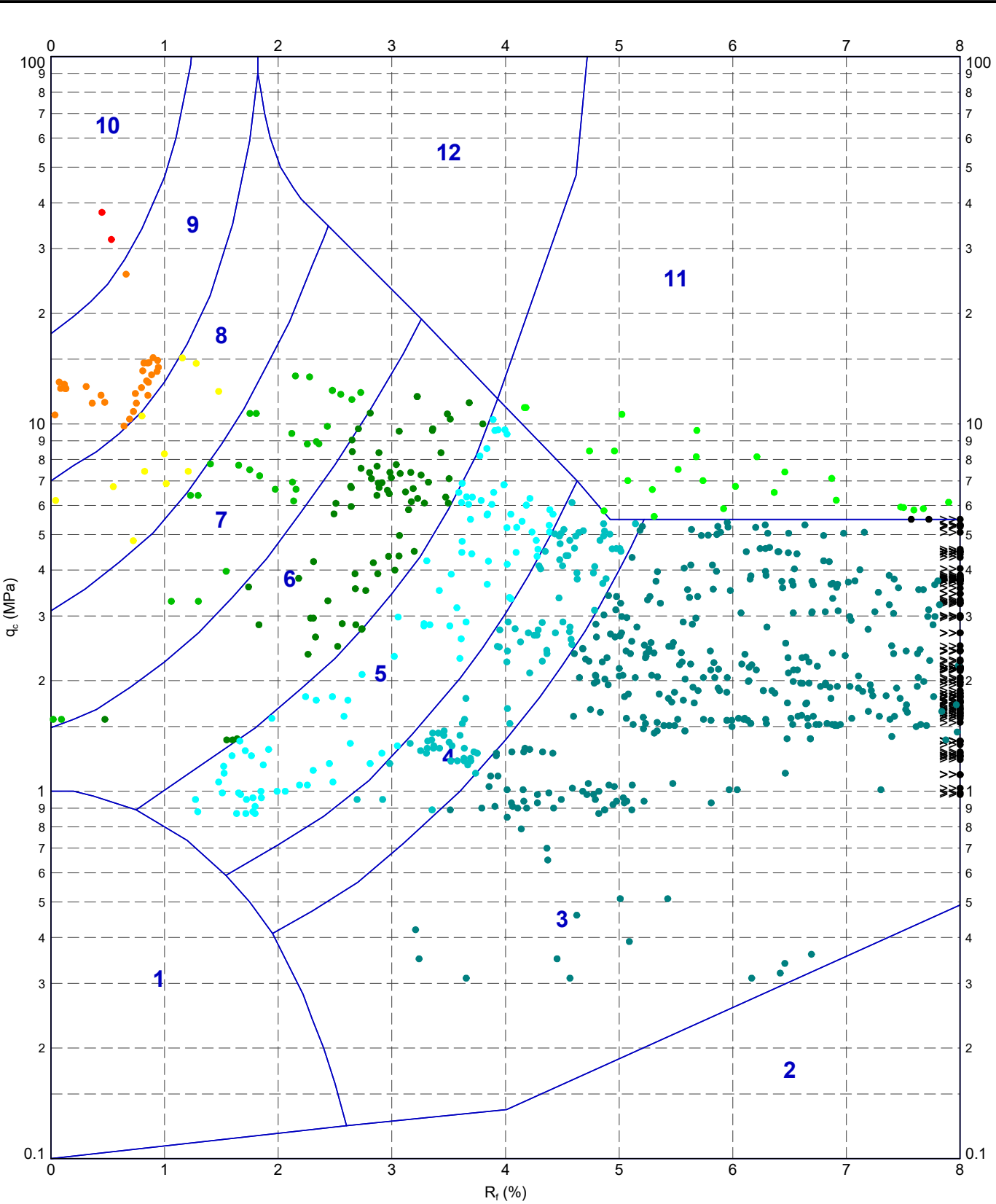
HYDCPT49

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 235 mV / 233 mV / -0.022 MPa Sleeve: 261 mV / 260 mV / -0.001 kPa Pore Pressure 2: 481 mV / 554 mV / 0.02 kPa X-Y Inclinator: 2482 mV / 2466 mV	CPTU ZERO VALUES Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	▽ Groundwater Level ▮ Dissipation Test
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<DrawingFile>> 09/06/2021 22:59 10.02.00.04 Dalgid Lab and In Situ Tool - DGD Lib: In Situ SI 2.02.0 2017-07-10 Proj: In Situ SI 2.02.0 2017-07-10



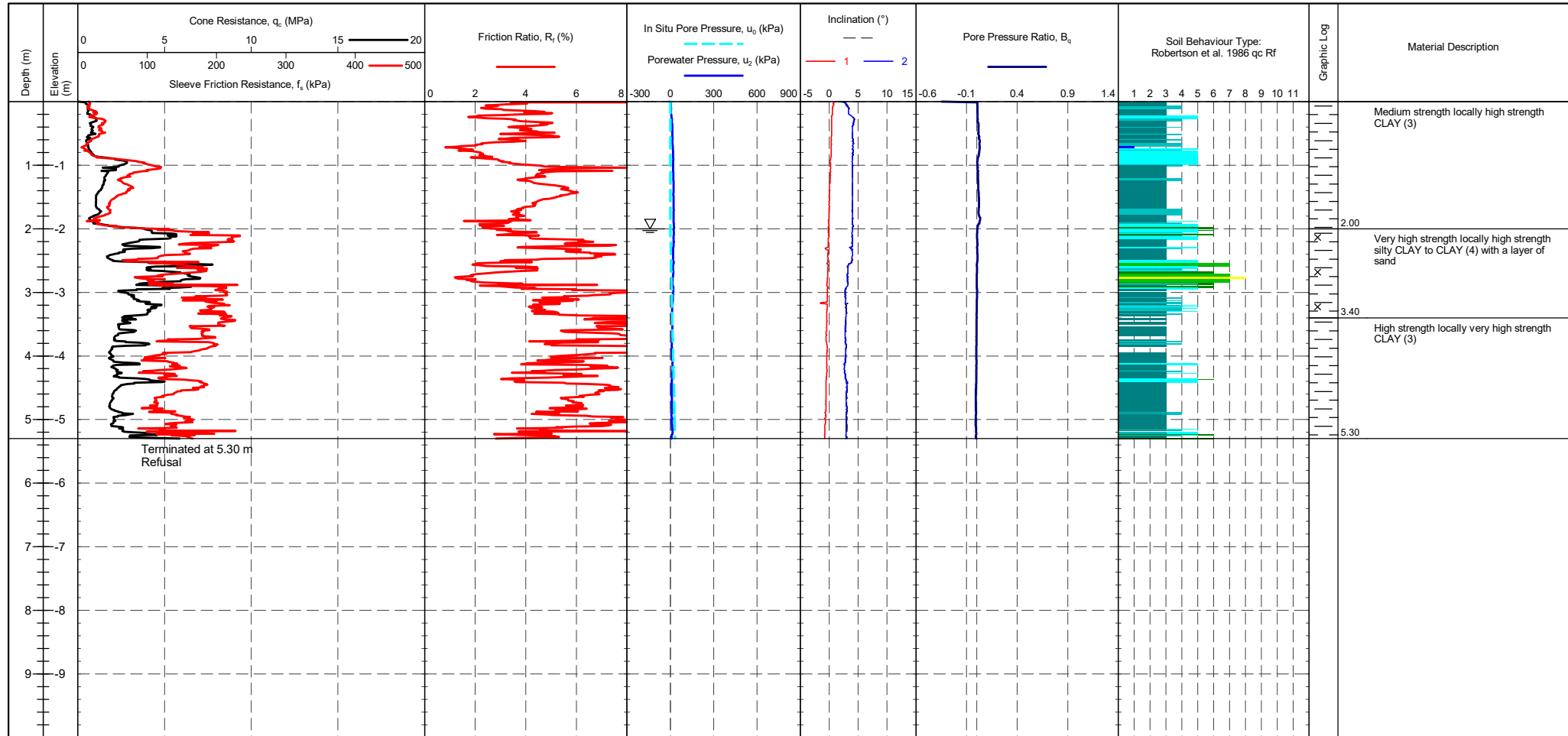
METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
- 7 - Silty SAND to sandy SILT
- 10 - Gravelly SAND to SAND
- 2 - Organic material
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- 11 - Very stiff fine grained
- 3 - CLAY
- 6 - Sandy SILT to clayey SILT
- 9 - SAND
- 12 - SAND to clayey SAND

	TITLE	DRAWN	DATE
	Hydrock Wingate, Bolton Wingates, Bolton	CHECKED	DATE
	Robertson et al. 1986 qc vs. Rf - HYDCPT49	SCALE	FIGURE No
		PROJECT No 1210298	A4

PointID	HYDCPT50
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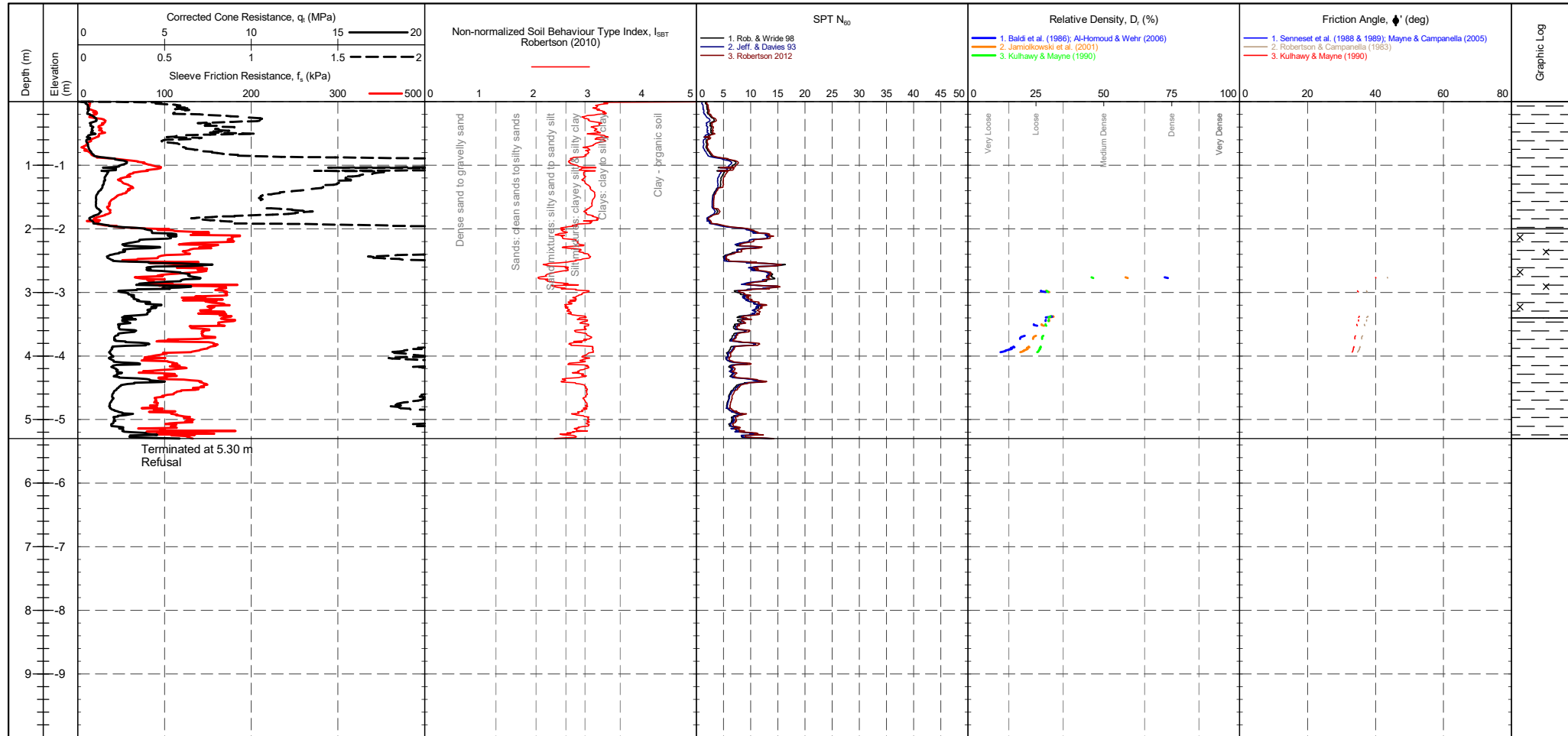
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test stopped due to technical issues.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Pre Post Difference Tip 232 mV 499 mV 2.925 MPa Sleeve 259 mV 715 mV 0.325 kPa Pore Pressure 2 513 mV 503 mV -0.003 kPa X-Y Inclinometer 2448 mV 2315 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID
HYDCPT50

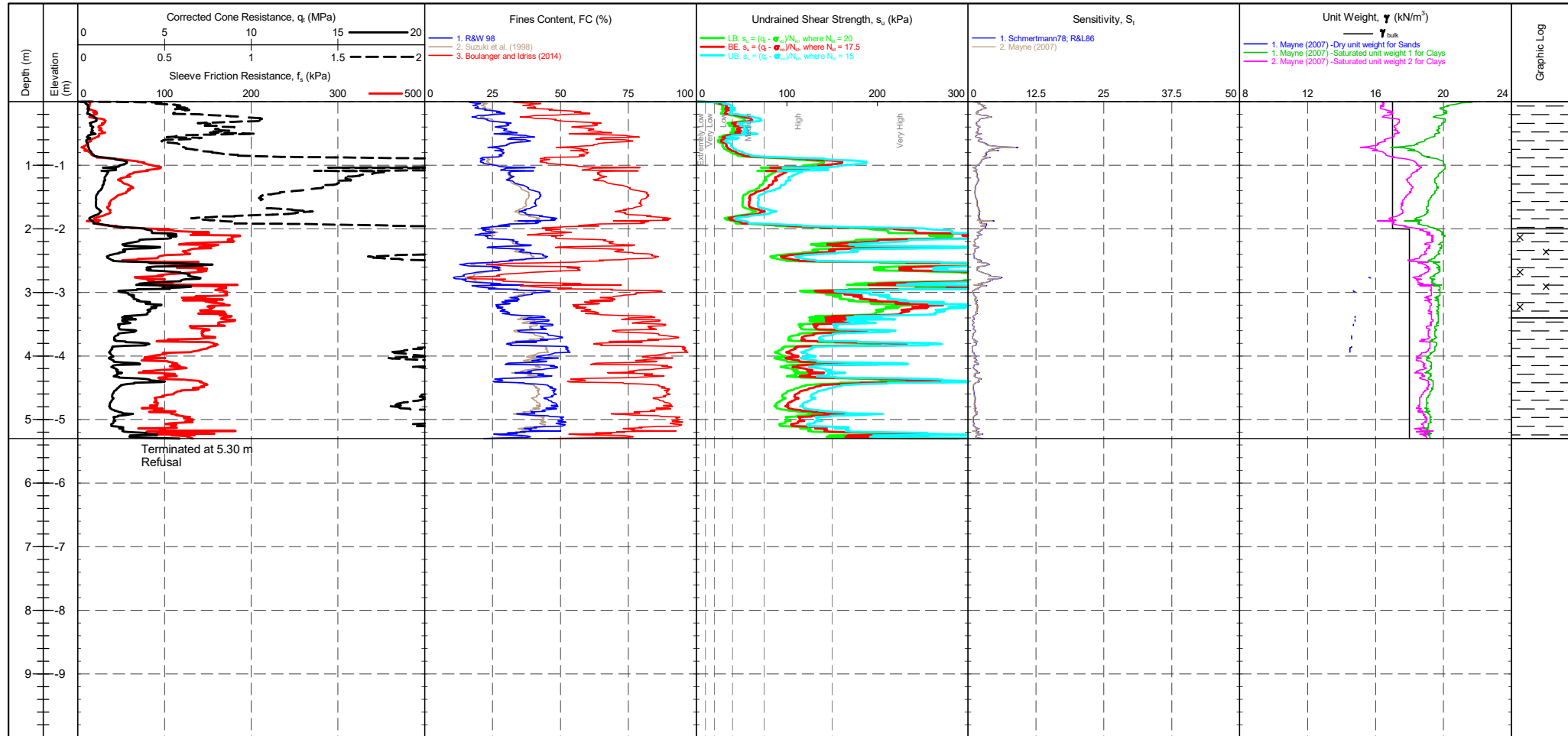
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test stopped due to technical issues.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr> <th>Transducer</th> <th>Pre</th> <th>Post</th> <th>Difference</th> </tr> <tr> <td>Tip</td> <td>232 mV</td> <td>499 mV</td> <td>2.925 MPa</td> </tr> <tr> <td>Sleeve</td> <td>259 mV</td> <td>715 mV</td> <td>0.325 kPa</td> </tr> <tr> <td>Pore Pressure 2</td> <td>513 mV</td> <td>503 mV</td> <td>-0.003 kPa</td> </tr> <tr> <td>X-Y Inclinator</td> <td>2448 mV</td> <td>2315 mV</td> <td></td> </tr> </table>	Transducer	Pre	Post	Difference	Tip	232 mV	499 mV	2.925 MPa	Sleeve	259 mV	715 mV	0.325 kPa	Pore Pressure 2	513 mV	503 mV	-0.003 kPa	X-Y Inclinator	2448 mV	2315 mV		GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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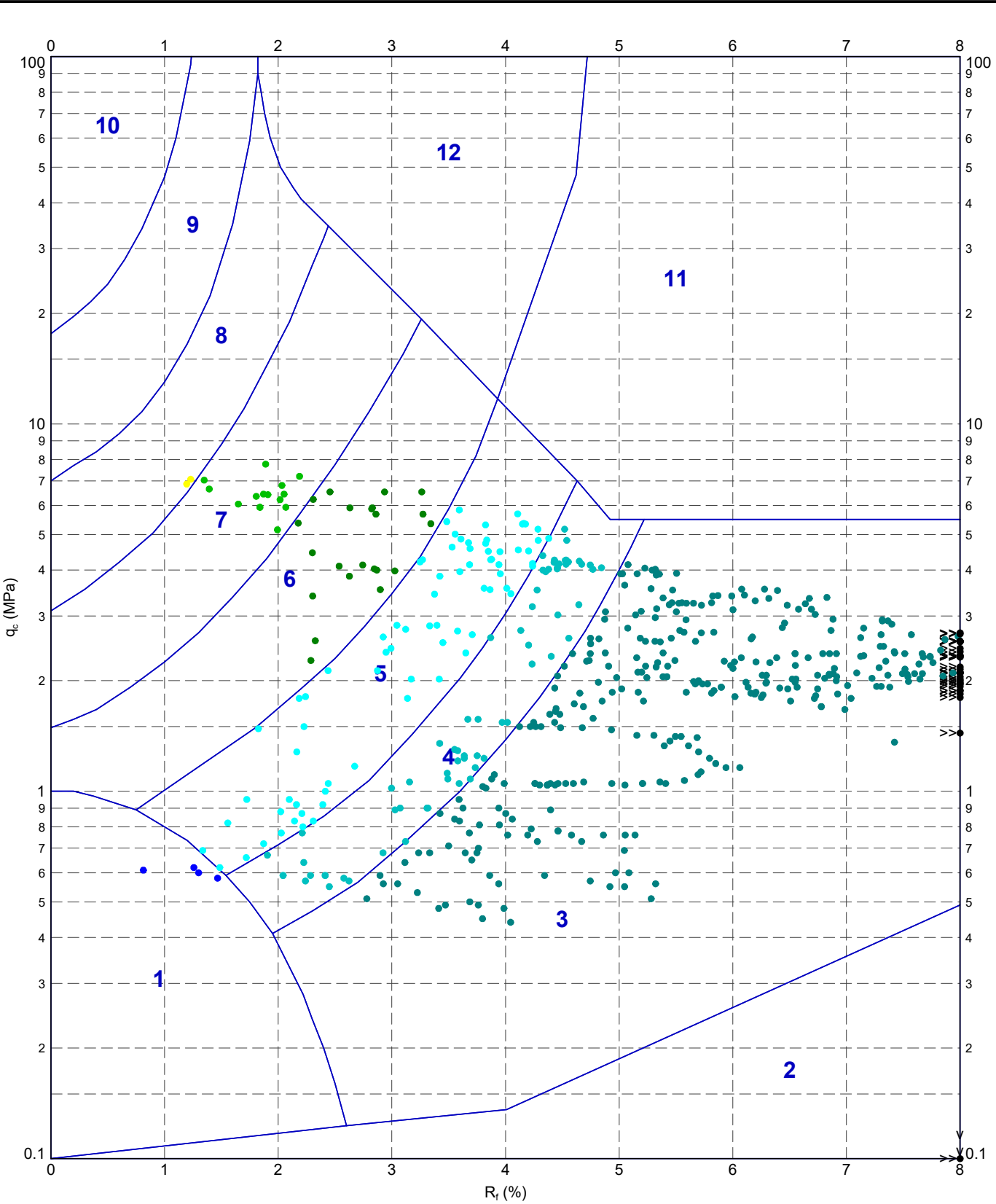
PointID
HYDCPT50

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test stopped due to technical issues.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 232 mV Sleeve: 259 mV Pore Pressure 2: 513 mV X-Y Inclinator: 2448 mV	CPTU ZERO VALUES Post: 499 mV Difference: 2.925 MPa 715 mV 0.325 kPa 503 mV -0.003 kPa 2315 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<drawingFile>> 09/06/2021 23:01 10.02.00.04 - Dajdel Lab and In Situ Tool - In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10

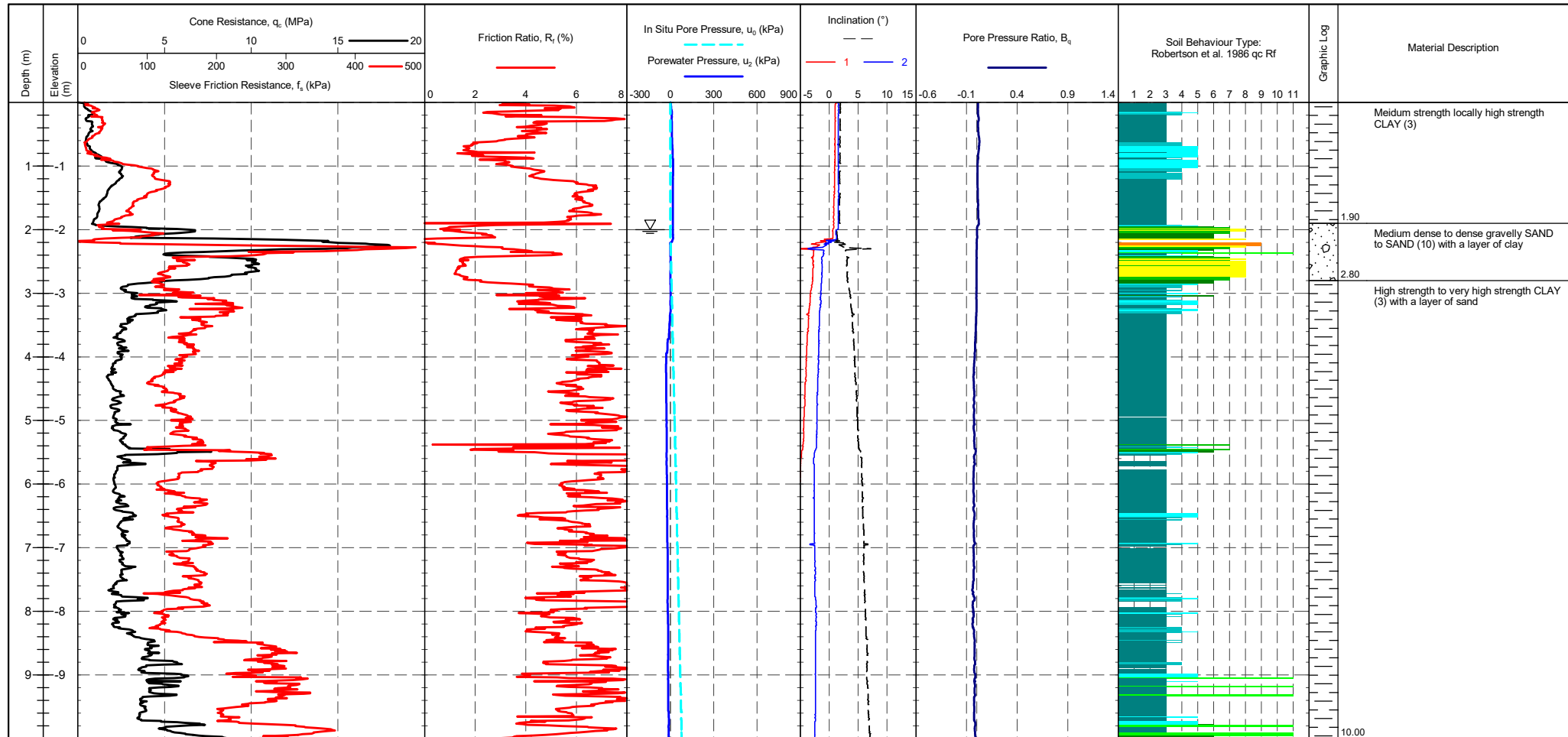


- METHOD: Robertson et al. 1986 q_c R_f**
- 1 - Sensitive fine grained material
 - 4 - Silty CLAY to CLAY
 - 7 - Silty SAND to sandy SILT
 - 10 - Gravelly SAND to SAND
 - 2 - Organic material
 - 5 - Clayey SILT to silty CLAY
 - 8 - SAND to silty SAND
 - 11 - Very stiff fine grained
 - 3 - CLAY
 - 6 - Sandy SILT to clayey SILT
 - 9 - SAND
 - 12 - SAND to clayey SAND

	TITLE	DRAWN	DATE
	Hydrock Wingate, Bolton Wingates, Bolton	CHECKED	DATE
	Robertson et al. 1986 q _c vs. R _f - HYDCPT50	SCALE	
		Not To Scale	
		PROJECT No	FIGURE No
	1210298	A4	

PointID	HYDCPT50a
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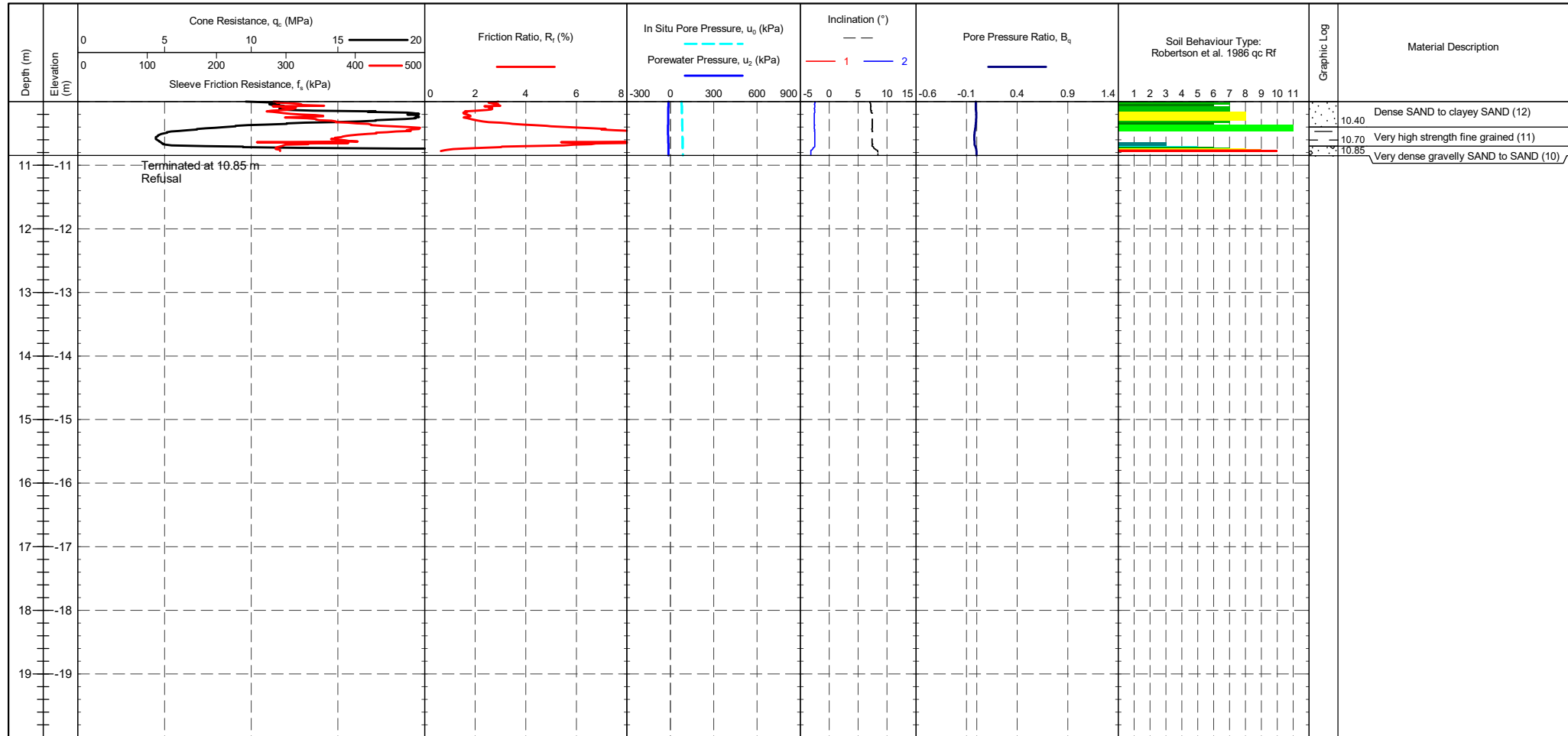
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Tip: Pre 234 mV, Post 232 mV, Difference -0.022 MPa Sleeve: Pre 263 mV, Post 260 mV, Difference -0.002 kPa Pore Pressure 2: Pre 460 mV, Post 446 mV, Difference -0.004 kPa X-Y Inclinator: Pre 2564 mV, Post 2544 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID
HYDCPT50a

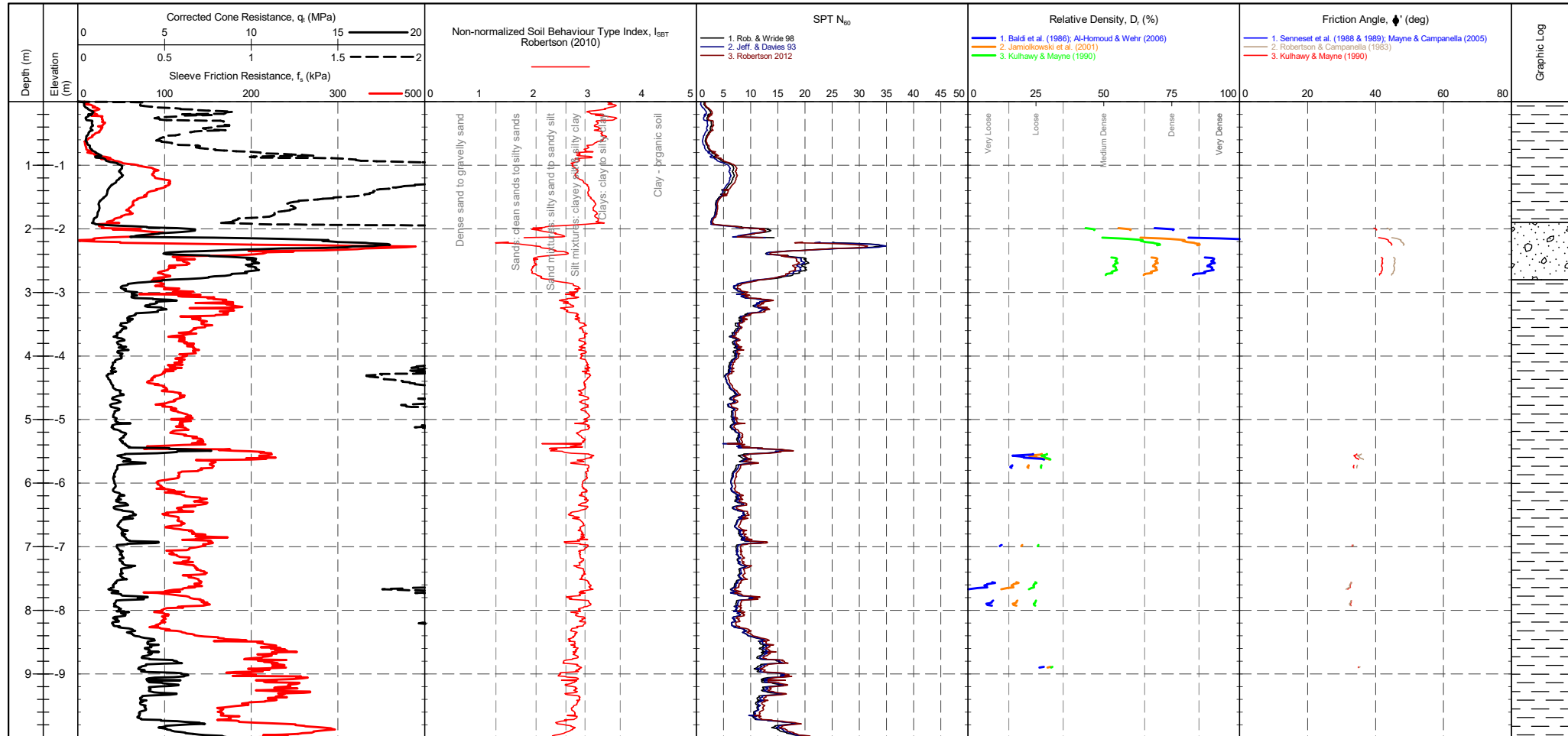
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	Transducer Tip : 234 mV / 232 mV / -0.022 MPa Sleeve : 263 mV / 260 mV / -0.002 kPa Pore Pressure 2 : 460 mV / 446 mV / -0.004 kPa X-Y Inclinometer : 2564 mV / 2544 mV	CPTU ZERO VALUES Tip : 234 mV / 232 mV / -0.022 MPa Sleeve : 263 mV / 260 mV / -0.002 kPa Pore Pressure 2 : 460 mV / 446 mV / -0.004 kPa X-Y Inclinometer : 2564 mV / 2544 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT50a
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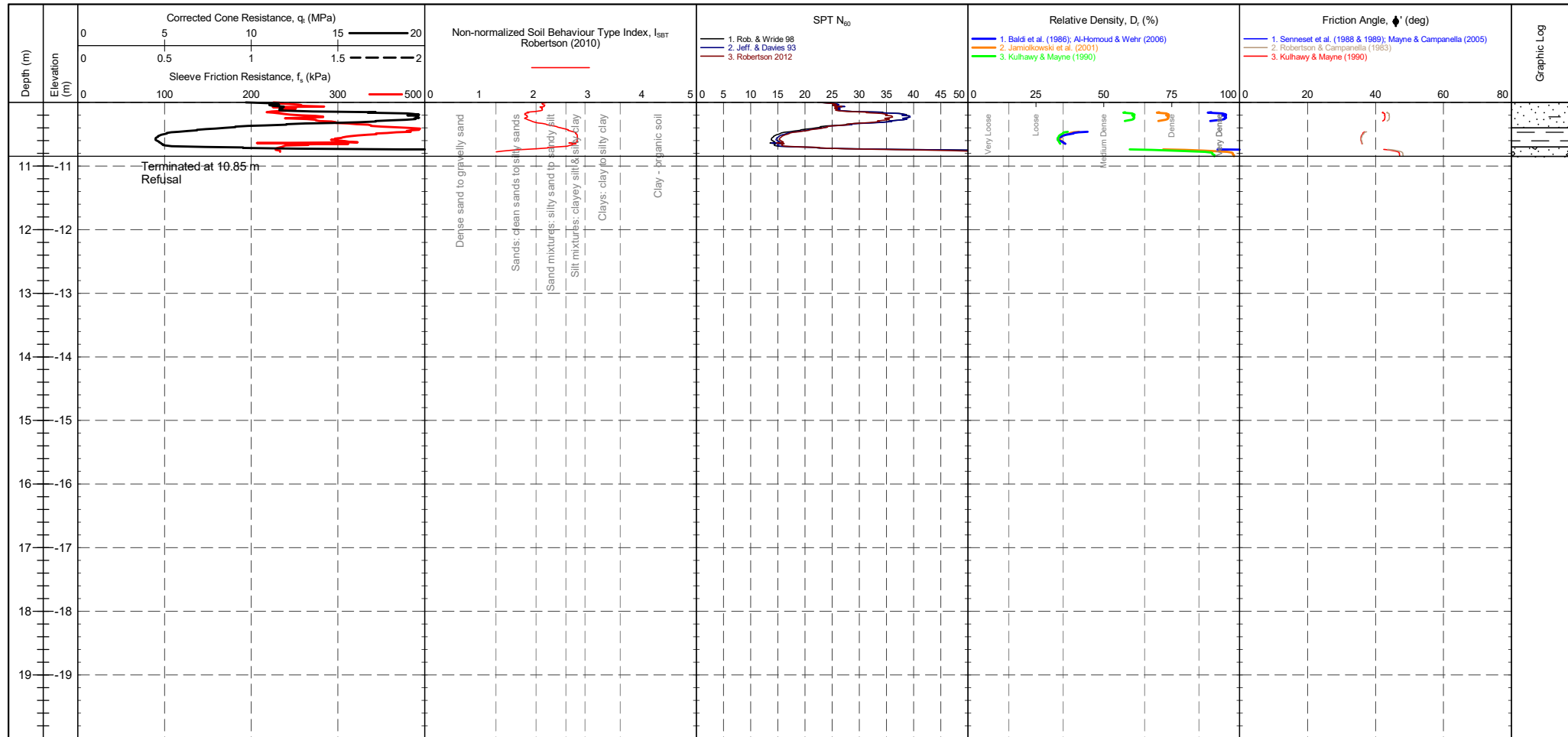
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 234 mV Pre, 232 mV Post, Difference: -0.022 MPa Sleeve: 263 mV Pre, 260 mV Post, Difference: -0.002 kPa Pore Pressure 2: 460 mV Pre, 446 mV Post, Difference: -0.004 kPa X-Y Inclinator: 2564 mV Pre, 2544 mV Post	CPTU ZERO VALUES Pre: 234 mV, Post: 232 mV, Difference: -0.022 MPa Sleeve: 263 mV, Post: 260 mV, Difference: -0.002 kPa Pore Pressure 2: 460 mV, Post: 446 mV, Difference: -0.004 kPa X-Y Inclinator: 2564 mV, Post: 2544 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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PointID
HYDCPT50a

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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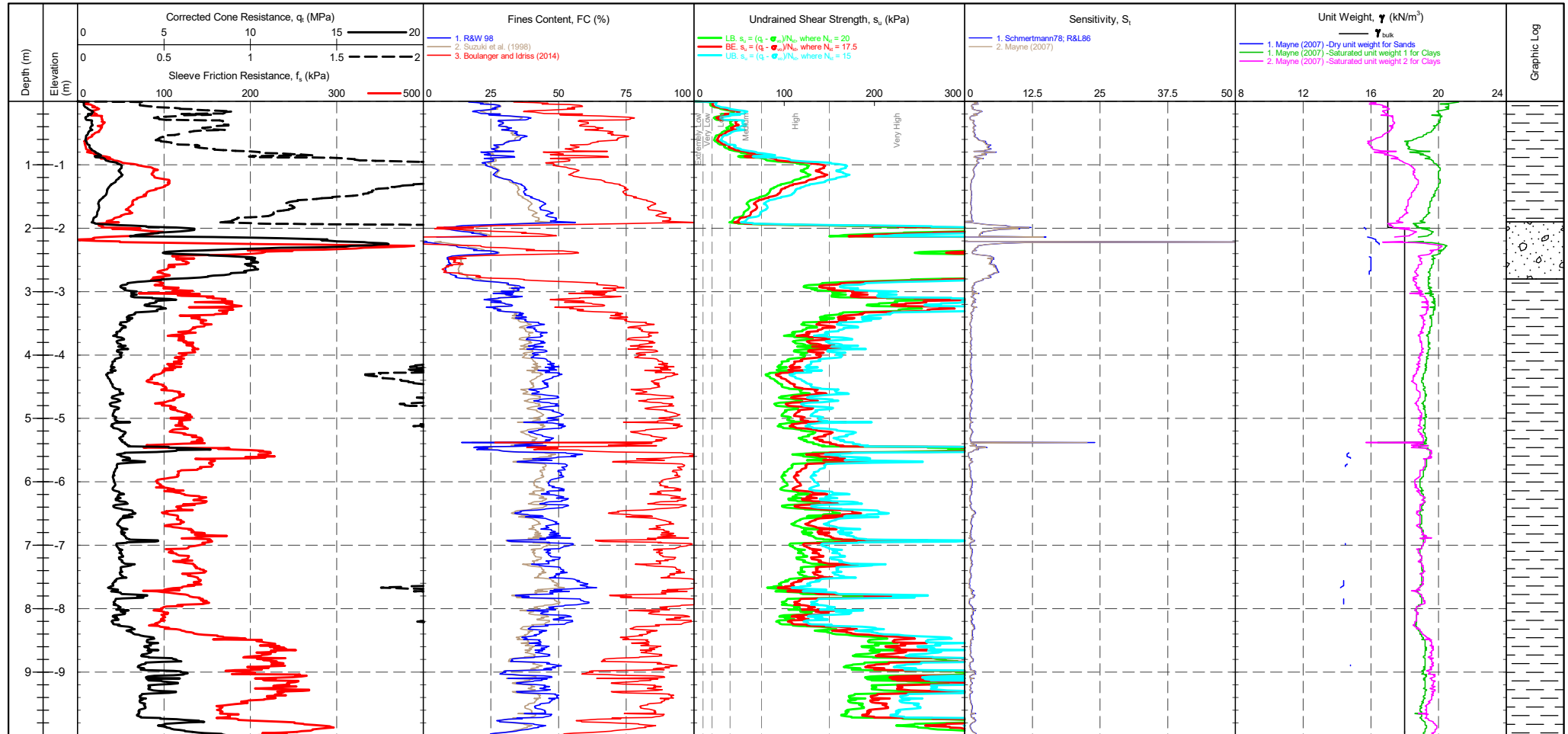


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 234 mV / 232 mV Sleeve: 263 mV / 260 mV Pore Pressure 2: 460 mV / 446 mV X-Y Inclinator: 2564 mV / 2544 mV	CPTU ZERO VALUES Pre: 234 mV, Post: 232 mV, Difference: -0.022 MPa Pre: 263 mV, Post: 260 mV, Difference: -0.002 kPa Pre: 460 mV, Post: 446 mV, Difference: -0.004 kPa Pre: 2564 mV, Post: 2544 mV, Difference: -0.020 MPa	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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PointID

HYDCPT50a

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 234 mV / 232 mV / -0.022 MPa Sleeve: 263 mV / 260 mV / -0.002 kPa Pore Pressure 2: 460 mV / 446 mV / -0.004 kPa X-Y Inclinator: 2564 mV / 2544 mV	CPTU ZERO VALUES Pre: 232 mV Post: 232 mV Difference: -0.022 MPa Pre: 260 mV Post: 260 mV Difference: -0.002 kPa Pre: 446 mV Post: 446 mV Difference: -0.004 kPa Pre: 2544 mV Post: 2544 mV Difference: 0	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 <table border="1"> <tr> <th>Term based on measurement</th> <th>su (kPa)</th> <th>Term based on measurement</th> <th>su (kPa)</th> </tr> <tr> <td>Extremely low strength</td> <td><10</td> <td>Medium strength</td> <td>40-75</td> </tr> <tr> <td>Very low strength</td> <td>10-20</td> <td>High strength</td> <td>75-150</td> </tr> <tr> <td>Low strength</td> <td>20-40</td> <td>Very high strength</td> <td>150-300</td> </tr> <tr> <td></td> <td></td> <td>Extremely high strength</td> <td>>300</td> </tr> </table>	Term based on measurement	su (kPa)	Term based on measurement	su (kPa)	Extremely low strength	<10	Medium strength	40-75	Very low strength	10-20	High strength	75-150	Low strength	20-40	Very high strength	150-300			Extremely high strength	>300	Groundwater Level Dissipation Test
Term based on measurement	su (kPa)	Term based on measurement	su (kPa)																						
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PointID

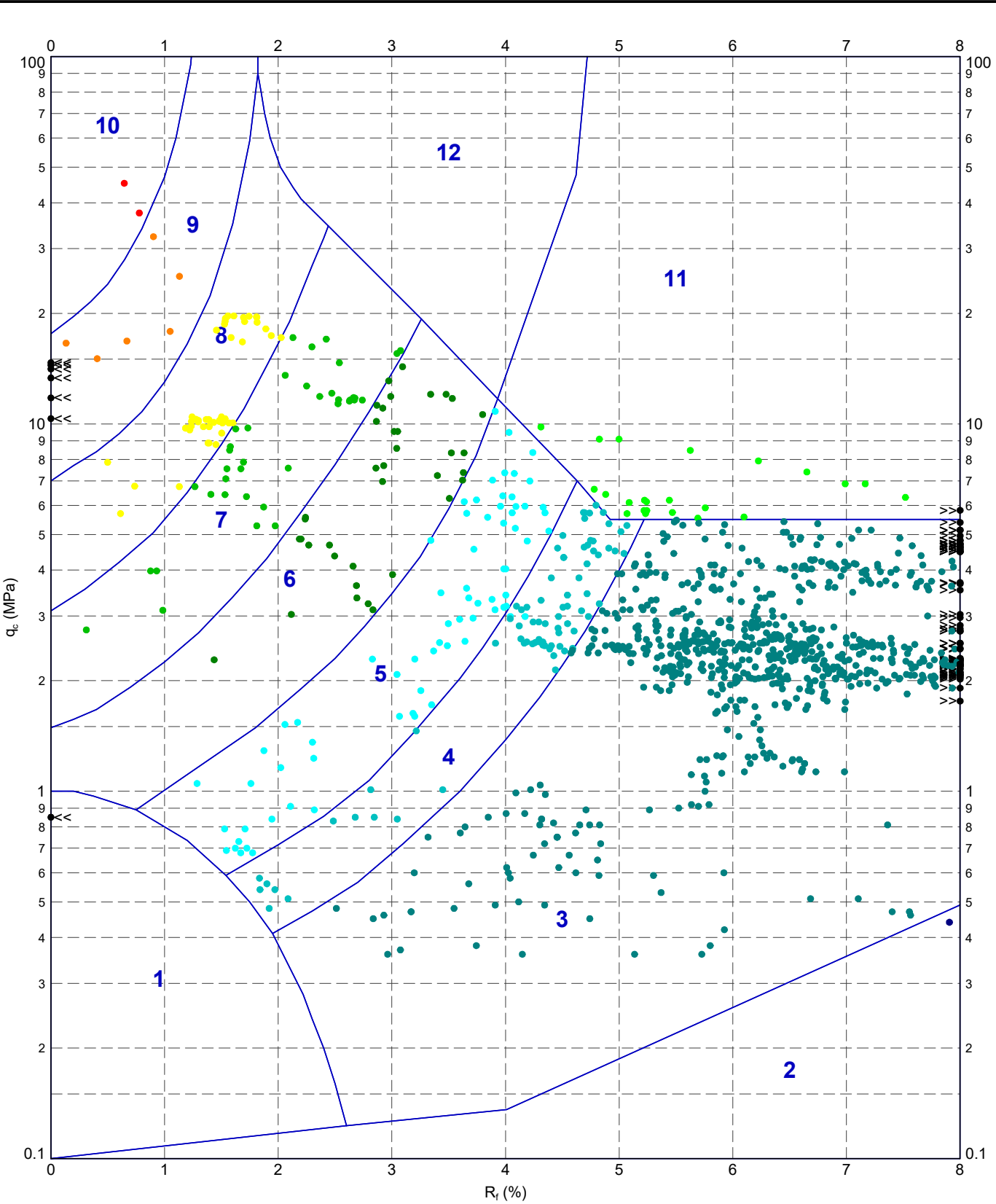
HYDCPT50a

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 234 mV Sleeve: 263 mV Pore Pressure 2: 460 mV X-Y Inclinator: 2564 mV Post: 232 mV Difference: -0.022 MPa -0.002 kPa 446 mV 2544 mV	CPTU ZERO VALUES Pre: 234 mV Post: 232 mV Difference: -0.022 MPa -0.002 kPa 446 mV 2544 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40 Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1.LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86QC VS. RF AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<drawingFile>> 09/06/2021 23:06 10.02.00.04 Dajdel Lab and In Situ Tool - In Situ SI 2.02.0.2017-07-10 Proj. In Situ SI 2.02.0.2017-07-10



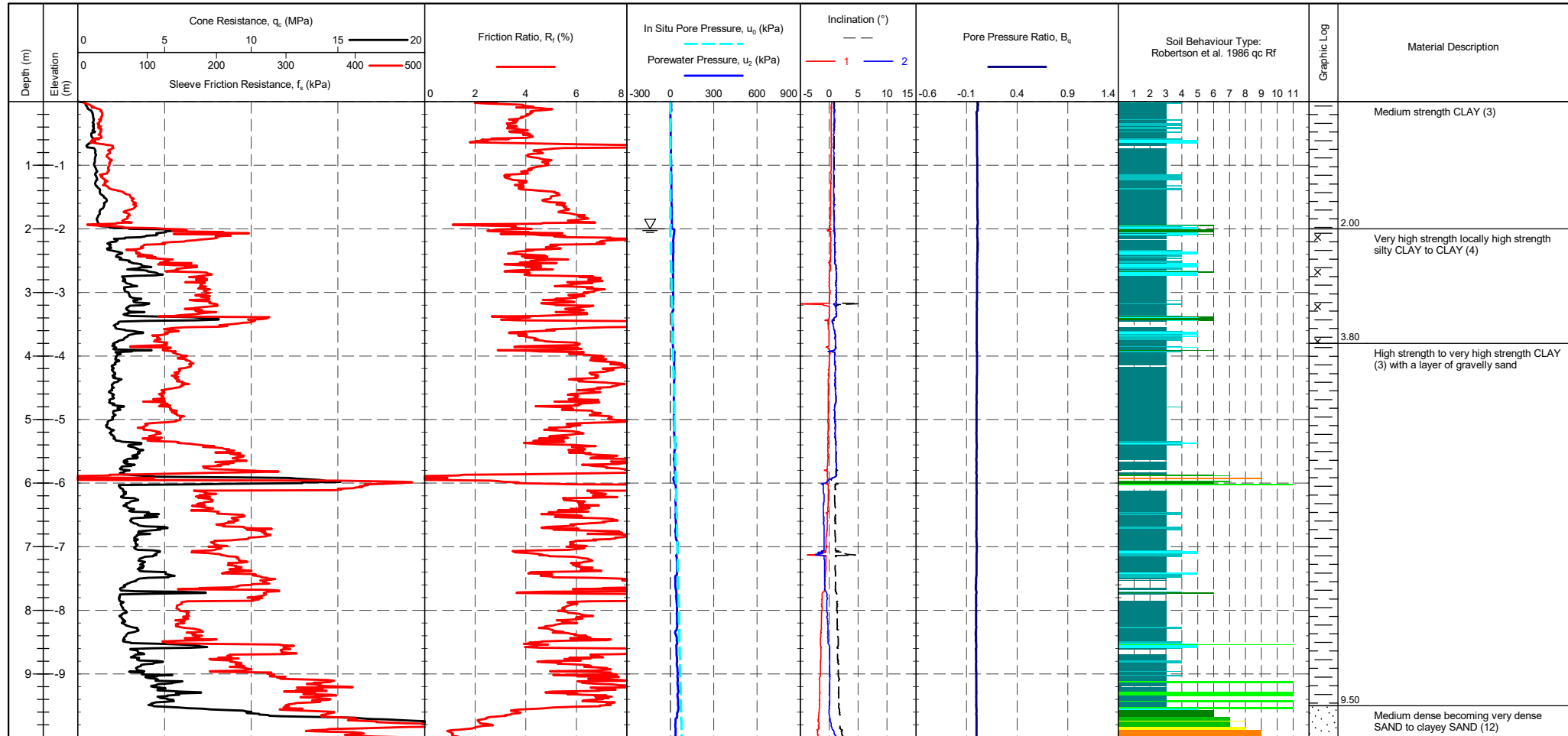
METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material	4 - Silty CLAY to CLAY	7 - Silty SAND to sandy SILT	10 - Gravelly SAND to SAND
2 - Organic material	5 - Clayey SILT to silty CLAY	8 - SAND to silty SAND	11 - Very stiff fine grained
3 - CLAY	6 - Sandy SILT to clayey SILT	9 - SAND	12 - SAND to clayey SAND

	TITLE	DRAWN	DATE
	Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 qc vs. Rf - HYDCPT50a	CHECKED	DATE
		SCALE	FIGURE No
		PROJECT No	
		A4	

PointID	HYDCPT51
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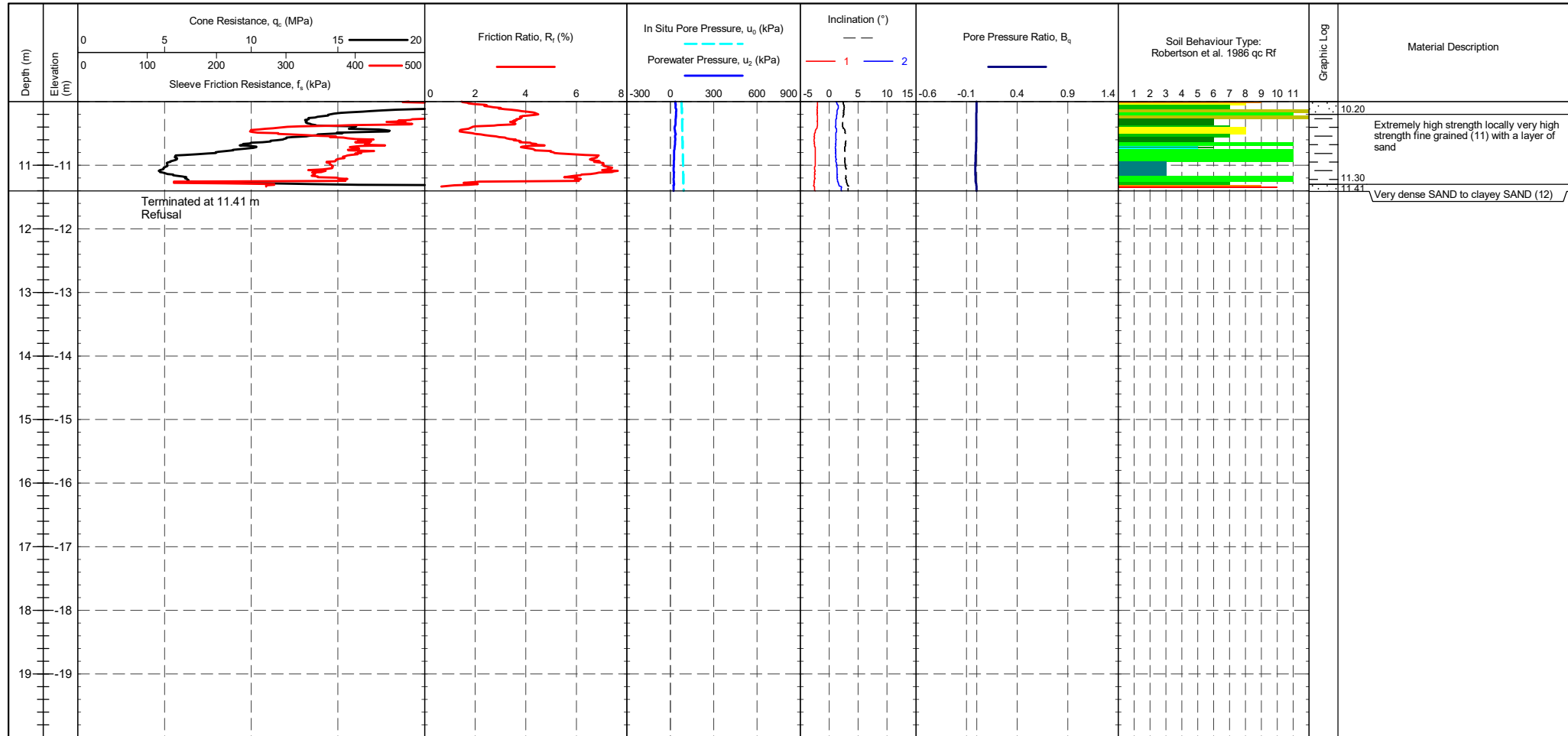
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Tip: Pre 235 mV, Post 232 mV, Difference -0.033 MPa Sleeve: Pre 260 mV, Post 258 mV, Difference -0.001 kPa Pore Pressure 2: Pre 449 mV, Post 517 mV, Difference 0.019 kPa X-Y Inclinometer: Pre 2449 mV, Post 2444 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clay SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT51
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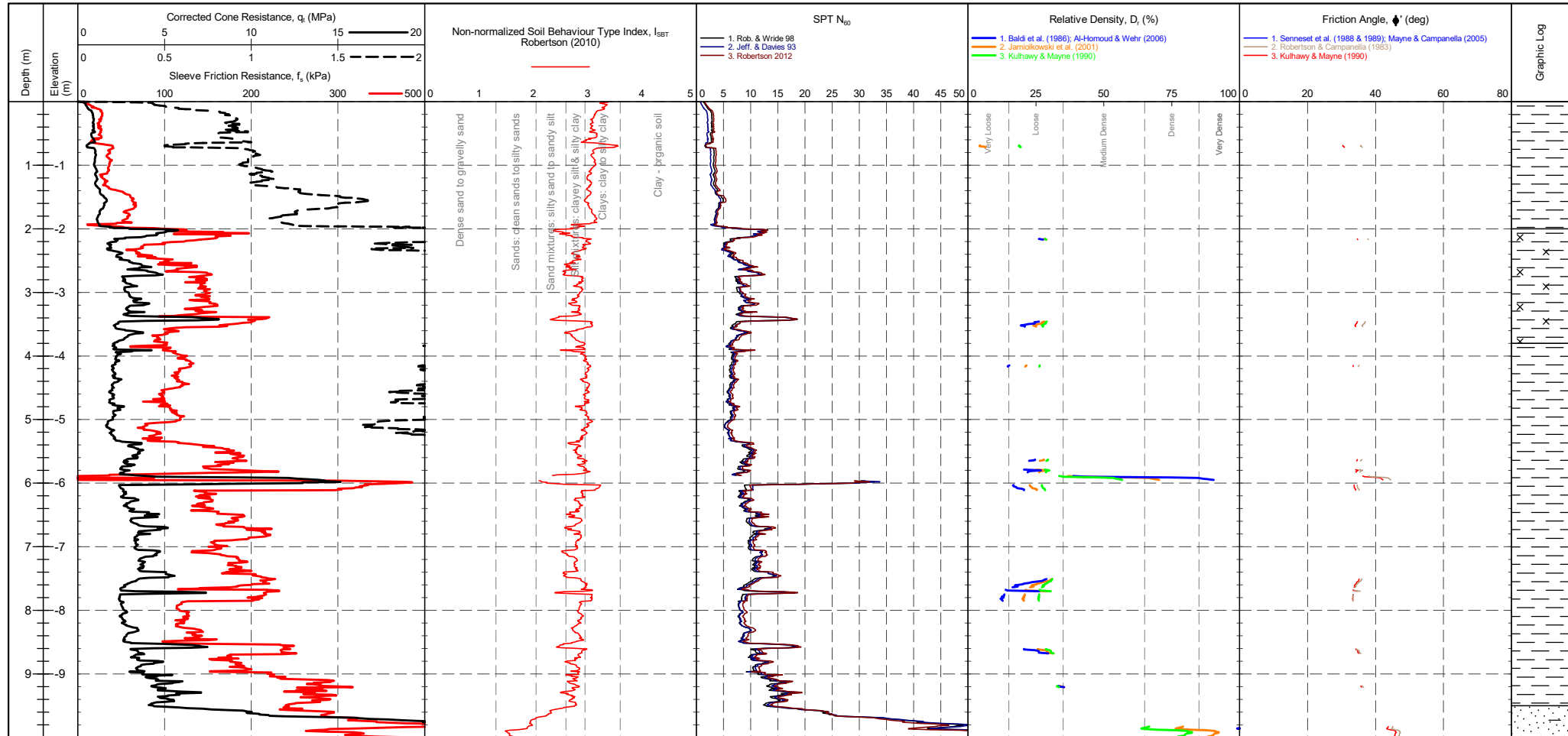
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICTION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Pre Post Difference Tip 235 mV 232 mV -0.033 MPa Sleeve 260 mV 258 mV -0.001 kPa Pore Pressure 2 449 mV 517 mV 0.019 kPa X-Y Inclinometer 2449 mV 2444 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravely SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT51
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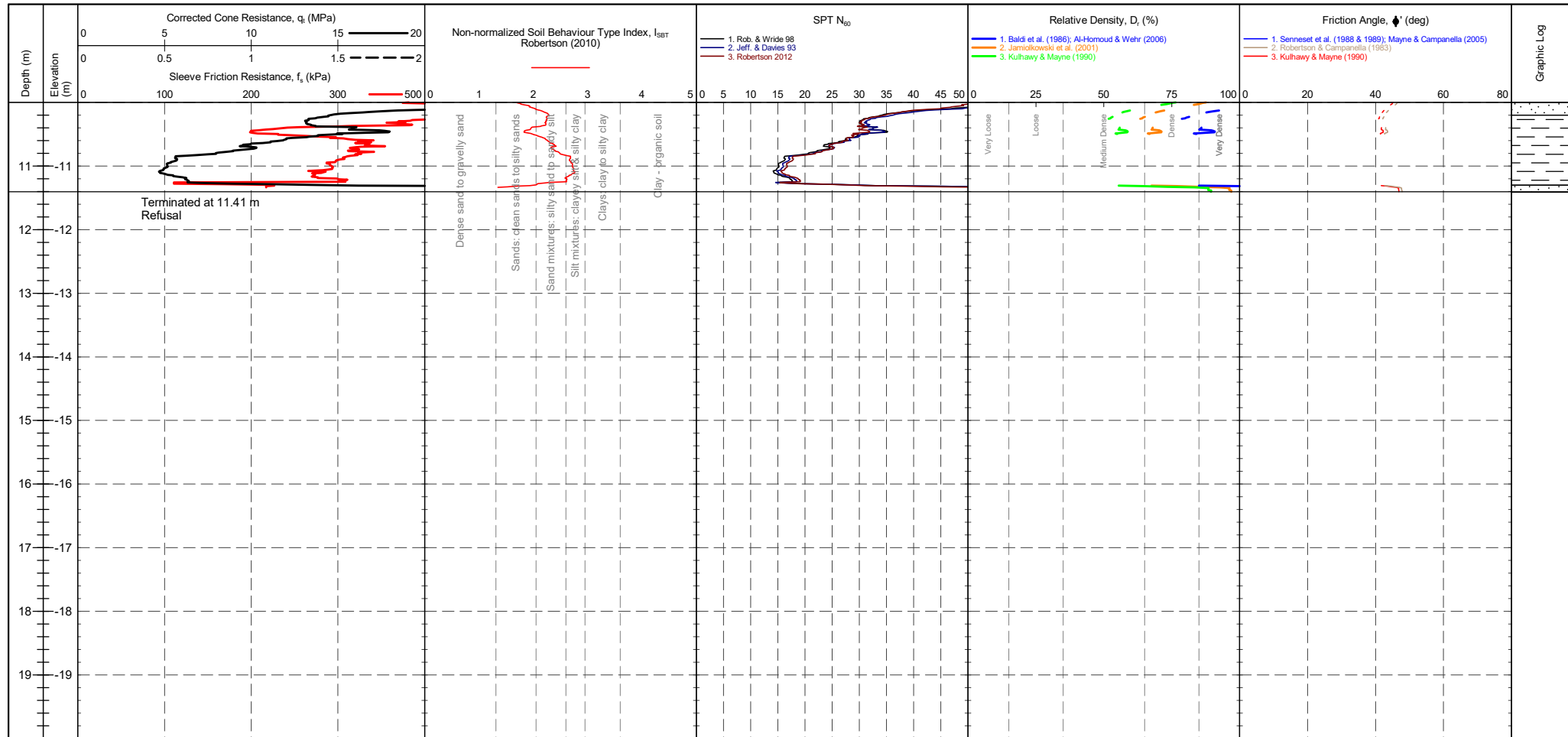
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 235 mV 232 mV -0.033 MPa Sleeve 260 mV 258 mV -0.001 kPa Pore Pressure 2 449 mV 517 mV 0.019 kPa X-Y Inclinometer 2449 mV 2444 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density D _r (%)																																			
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Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85																																			

PointID	HYDCPT51
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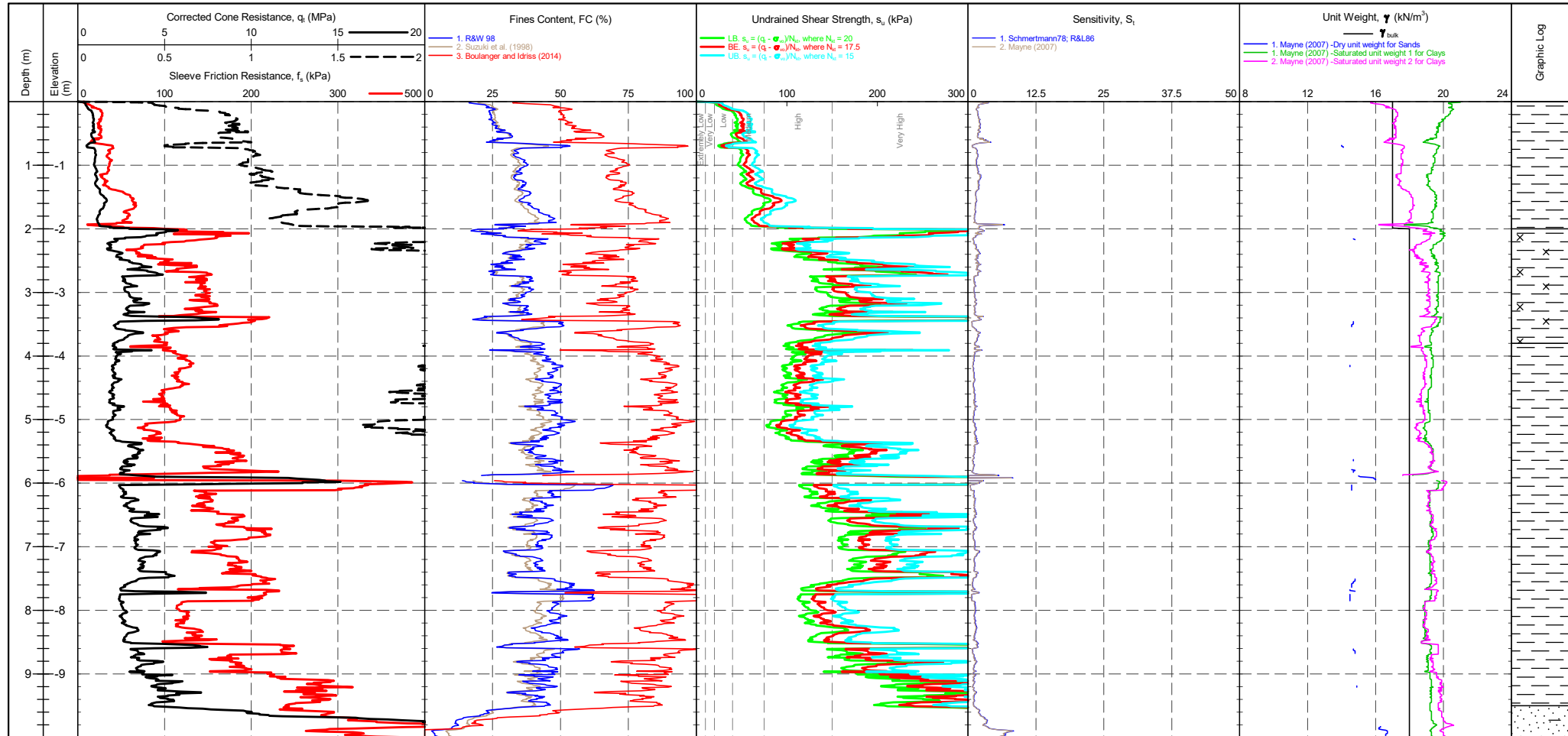
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 235 mV Sleeve : 260 mV Pore Pressure 2 : 449 mV X-Y Inclinator : 2449 mV	CPTU ZERO VALUES Pre : 232 mV Post : 258 mV Difference : -0.033 MPa Difference : -0.001 kPa Difference : 0.019 kPa Difference : 2444 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density Dr (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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PointID
HYDCPT51

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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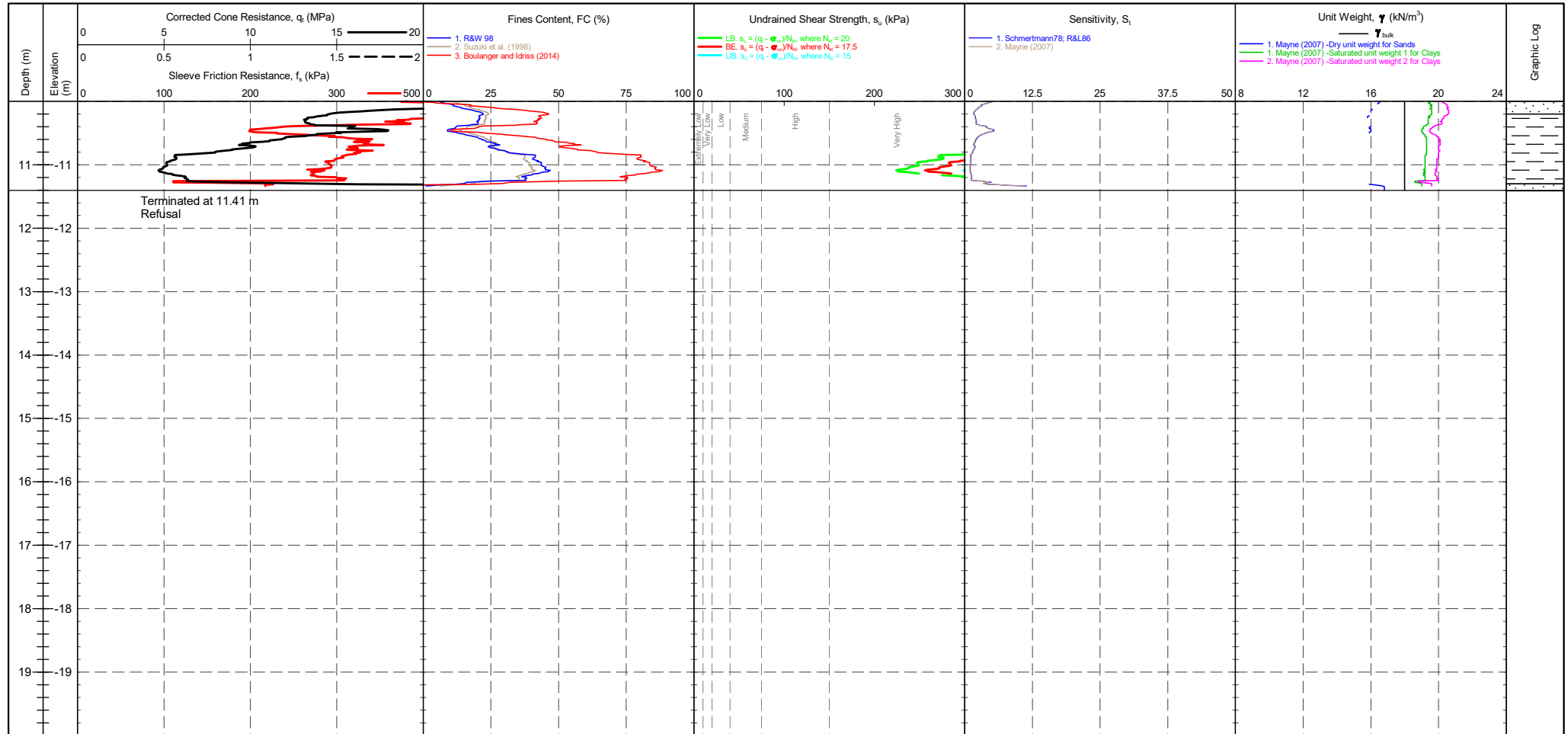


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 235 mV Sleeve: 260 mV Pore Pressure 2: 449 mV X-Y Inclinator: 2449 mV Post: 232 mV Difference: -0.033 MPa 517 mV 2444 mV	CPTU ZERO VALUES Term based on measurement Extremely low strength Very low strength Low strength	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 su (kPa) <10 10-20 20-40	Term based on measurement Medium strength High strength Very high strength Extremely high strength	su (kPa) 40-75 75-150 150-300 >300	Groundwater Level Dissipation Test
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PointID

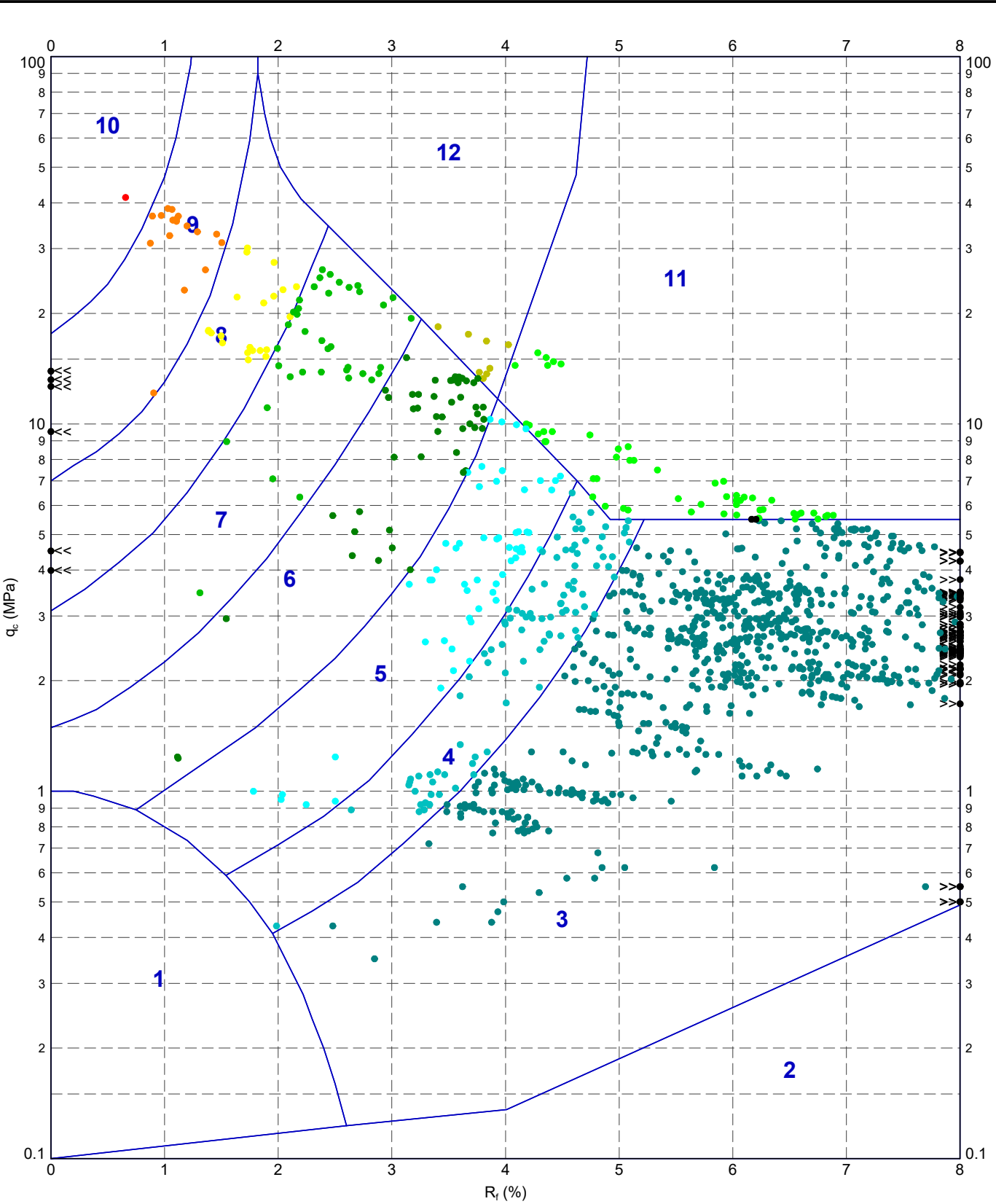
HYDCPT51

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 235 mV Sleeve: 260 mV Pore Pressure 2: 449 mV X-Y Inclinator: 2449 mV	CPTU ZERO VALUES Post: 232 mV Difference: -0.033 MPa Post: 258 mV Difference: -0.001 kPa Post: 517 mV Difference: 0.019 kPa Post: 2444 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	Groundwater Level Dissipation Test
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<DrawingFile>> 09/06/2021 23:11 10.02.00.04 - Dalgid Lab and In Situ Tool - DGD Lib: In Situ SI 2.02.0 2017-07-10 Proj: In Situ SI 2.02.0 2017-07-10

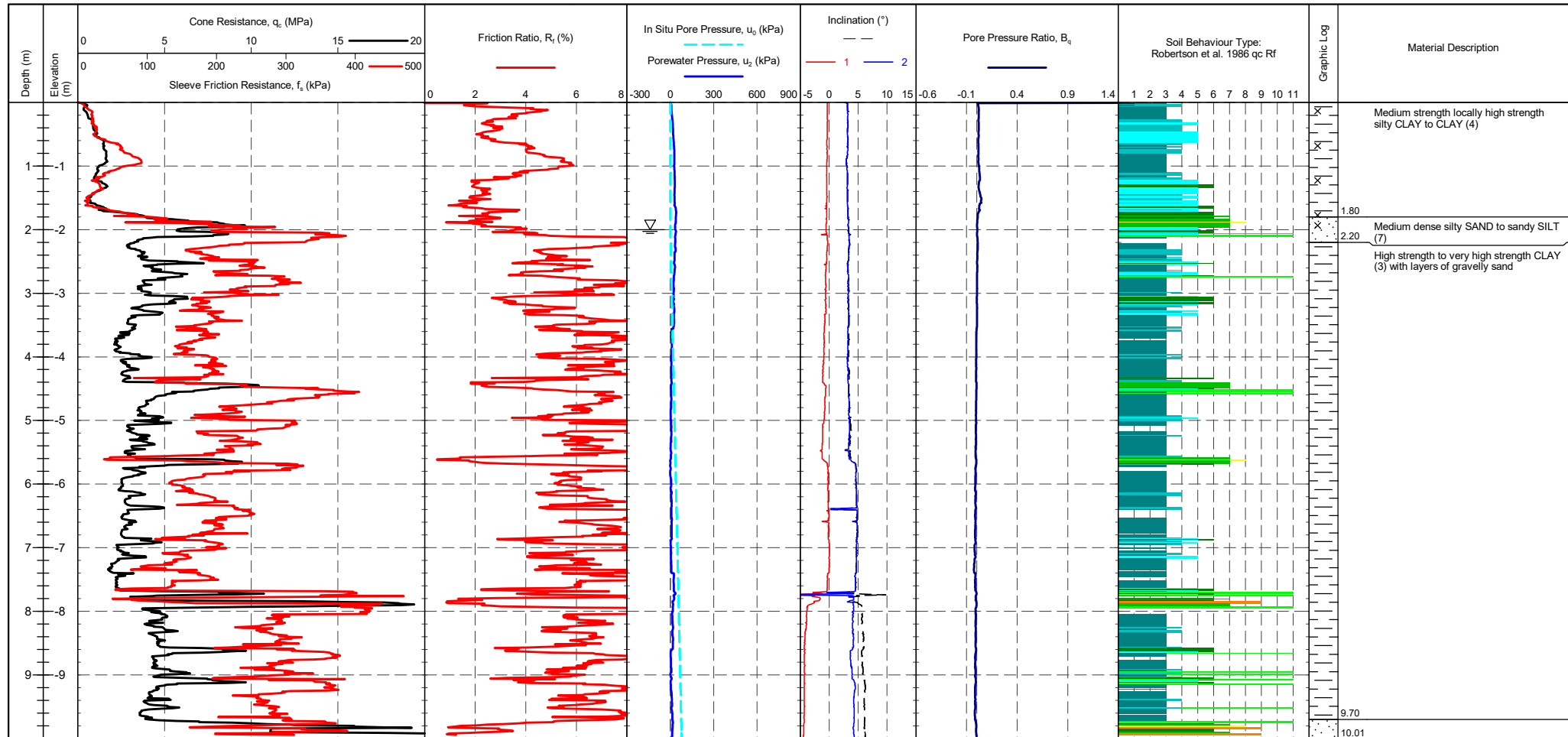


- METHOD: Robertson et al. 1986 qc Rf**
- 1 - Sensitive fine grained material
 - 4 - Silty CLAY to CLAY
 - 7 - Silty SAND to sandy SILT
 - 10 - Gravelly SAND to SAND
 - 2 - Organic material
 - 5 - Clayey SILT to silty CLAY
 - 8 - SAND to silty SAND
 - 11 - Very stiff fine grained
 - 3 - CLAY
 - 6 - Sandy SILT to clayey SILT
 - 9 - SAND
 - 12 - SAND to clayey SAND

	TITLE Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 qc vs. R _f - HYDCPT51	DRAWN _____	DATE 09/06/2021	
		CHECKED _____	DATE 09/06/2021	
		SCALE Not To Scale	A4	
		PROJECT No 1210298	FIGURE No _____	
	IN SITU SITE INVESTIGATION			

PointID	HYDCPT52
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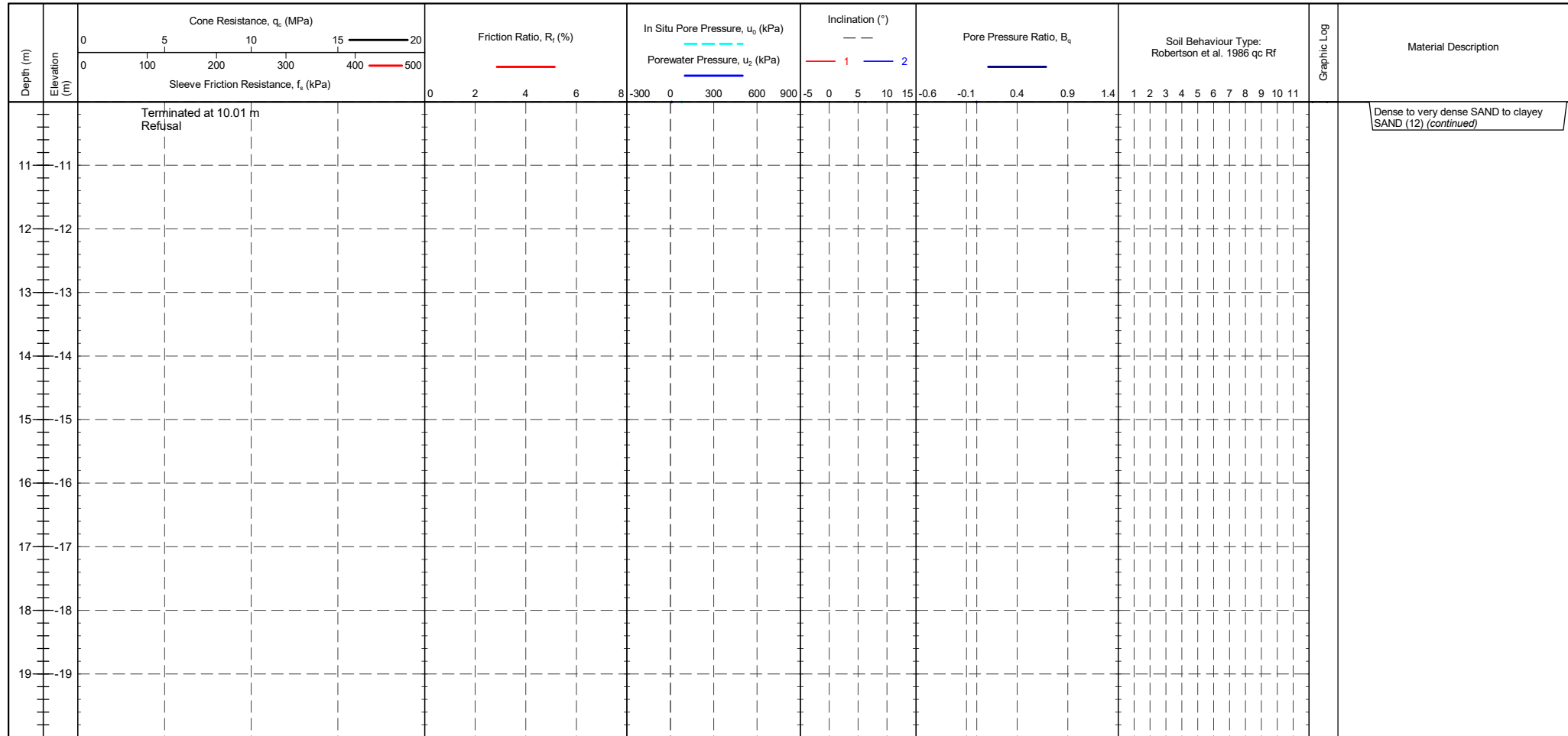
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Pre Post Difference Tip 235 mV 3918 mV 40.351 MPa Sleeve 261 mV 4342 mV 2.91 kPa Pore Pressure 2 470 mV 502 mV 0.009 kPa X-Y Inclinator 2410 mV 1973 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID
HYDCPT52

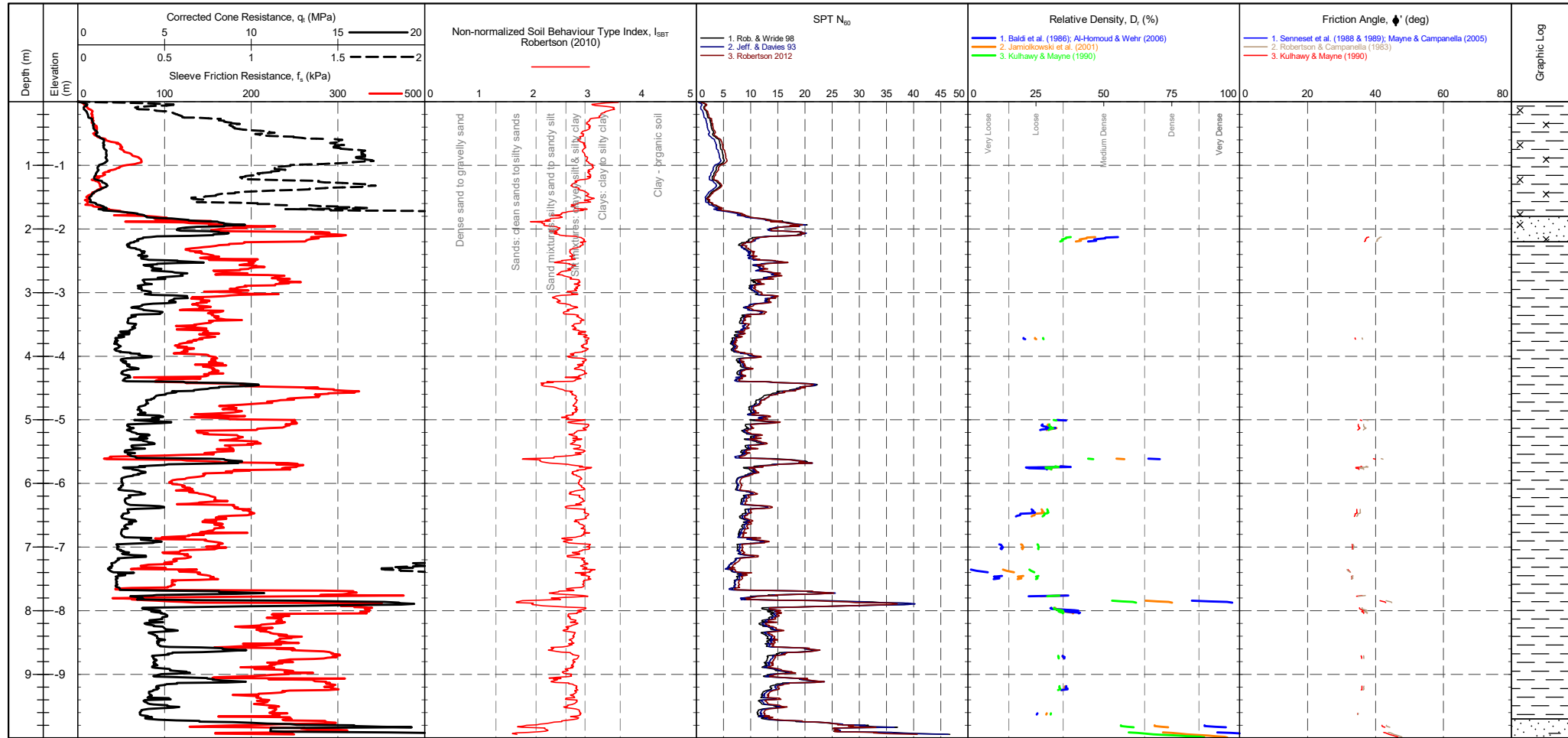
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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PointID	HYDCPT52
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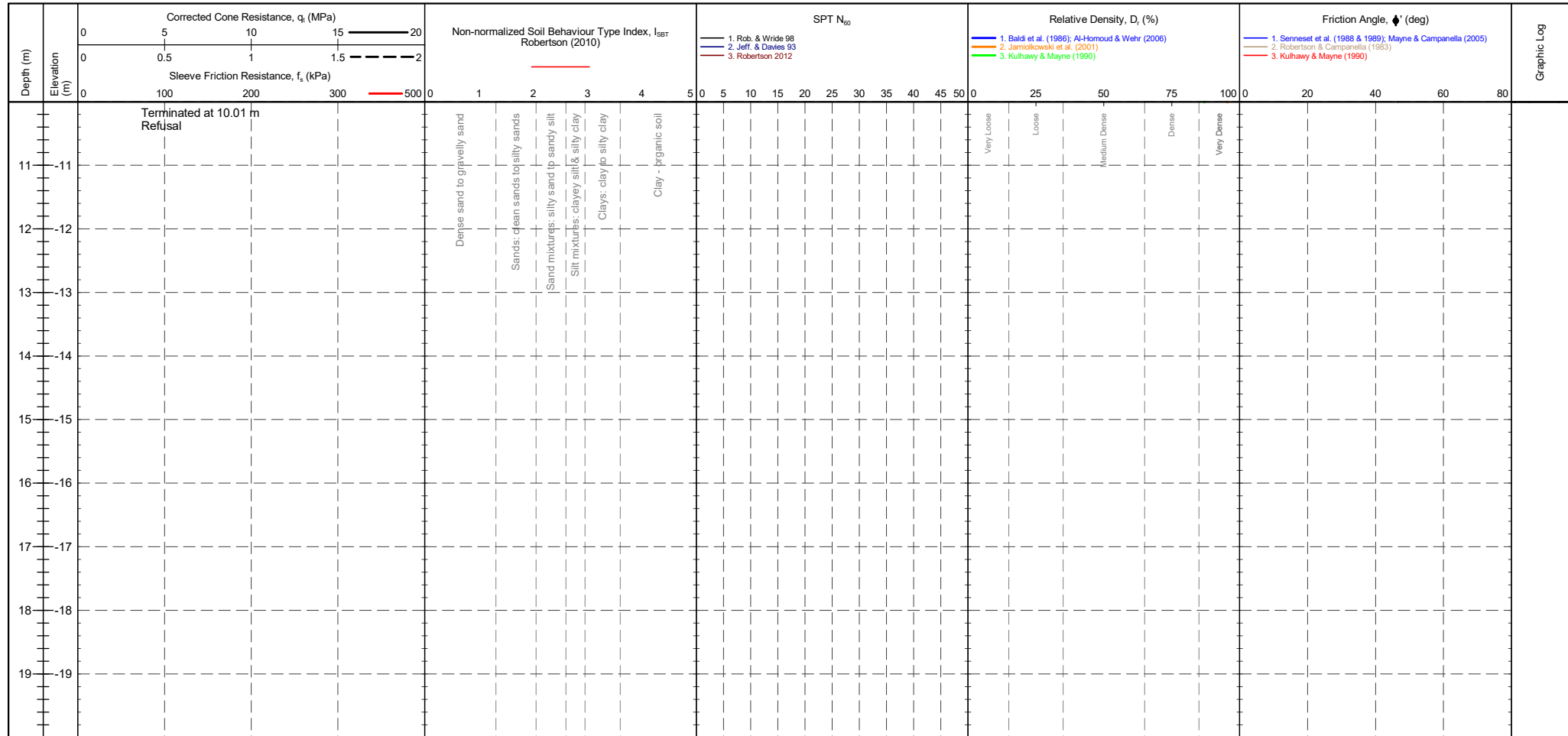
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PointID
HYDCPT52

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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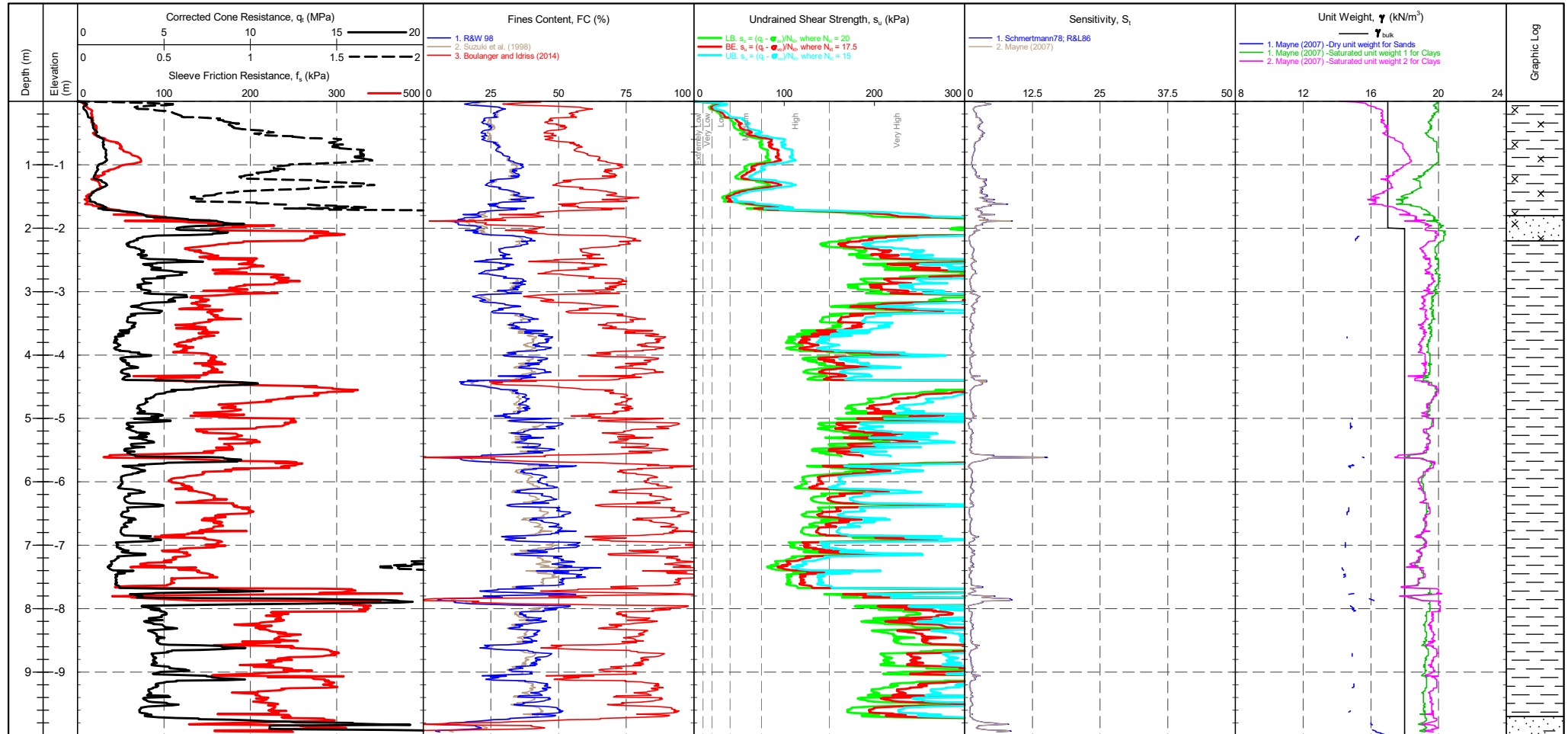


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip : 235 mV Sleeve : 261 mV Pore Pressure 2 : 470 mV X-Y Inclinator : 2410 mV	Post : 3918 mV Difference : 40.351 MPa 2.91 kPa 502 mV 1973 mV	CPTU ZERO VALUES Pre Post Difference 235 mV 3918 mV 40.351 MPa 261 mV 4342 mV 2.91 kPa 470 mV 502 mV 0.009 kPa 2410 mV 1973 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density Dr (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)																																					
Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15																																					
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Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85																																					
Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85																																					

PointID

HYDCPT52

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 235 mV Sleeve: 261 mV Pore Pressure 2: 470 mV X-Y Inclinator: 2410 mV	CPTU ZERO VALUES Pre: 3918 mV Post: 4342 mV Difference: 40.351 MPa 2.91 kPa 502 mV 0.009 kPa 1973 mV	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement s_u (kPa) Term based on measurement s_u (kPa) Extremely low strength <10 Medium strength 40-75 Very low strength 10-20 High strength 75-150 Low strength 20-40 Very high strength 150-300 Extremely high strength >300	▽ Groundwater Level ▮ Dissipation Test
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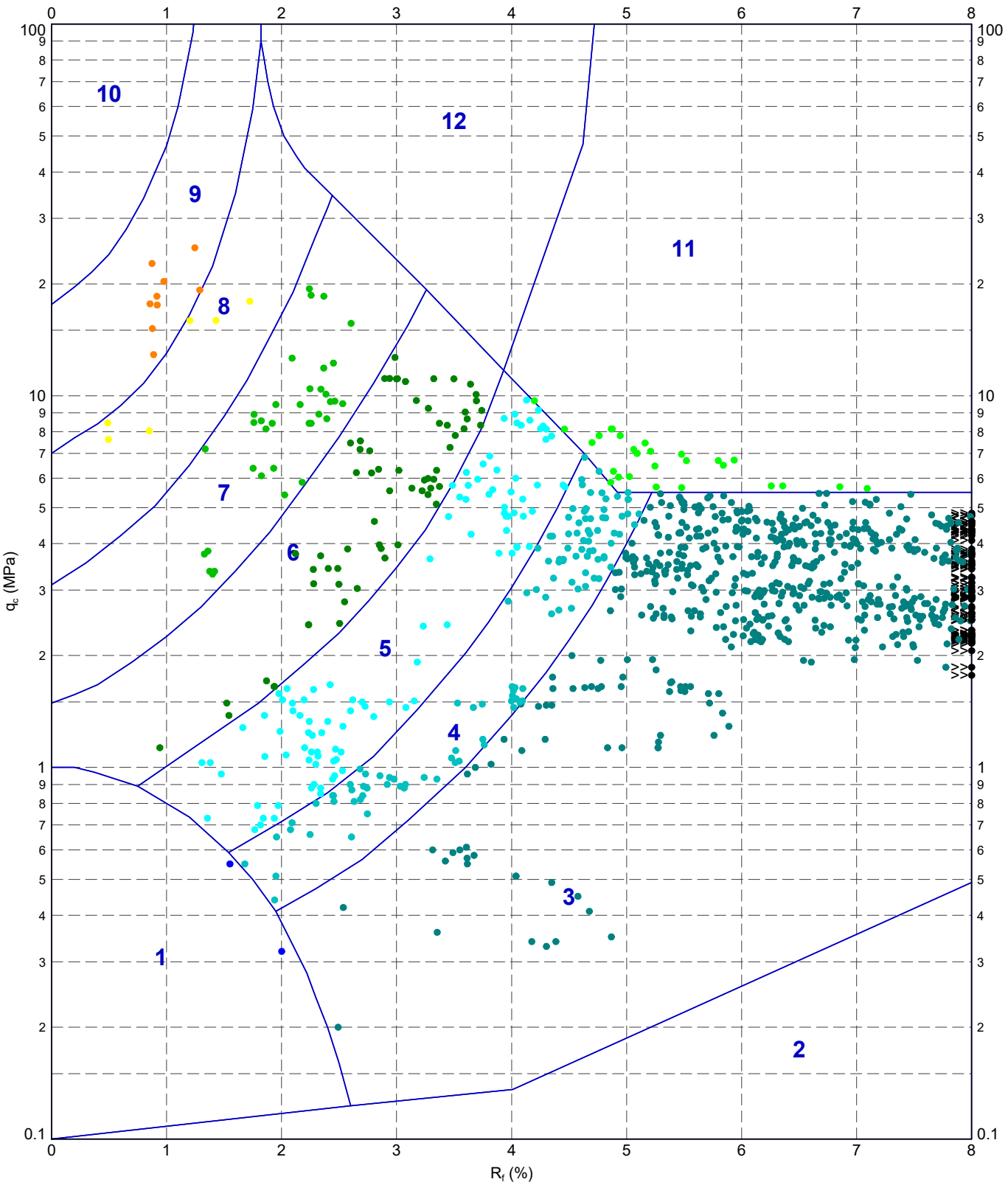
PointID
HYDCPT52

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Pre Post Difference Tip 235 mV 3918 mV 40.351 MPa Sleeve 261 mV 4342 mV 2.91 kPa Pore Pressure 2 470 mV 502 mV 0.009 kPa X-Y Inclinator 2410 mV 1973 mV	CPTU ZERO VALUES Term based on measurement su (kPa) Extremely low strength <10 Very low strength 10-20 Low strength 20-40	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 Term based on measurement su (kPa) Medium strength 40-75 High strength 75-150 Very high strength 150-300 Extremely high strength >300	▽ Groundwater Level ▮ Dissipation Test
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LUB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<DrawingFile>> 09/06/2021 20:16 10.02.00.04 Dajdel Lab and In Situ Tool - In Situ SI 2.02.0 2017-07-10 P16: In Situ SI 2.02.0 2017-07-10

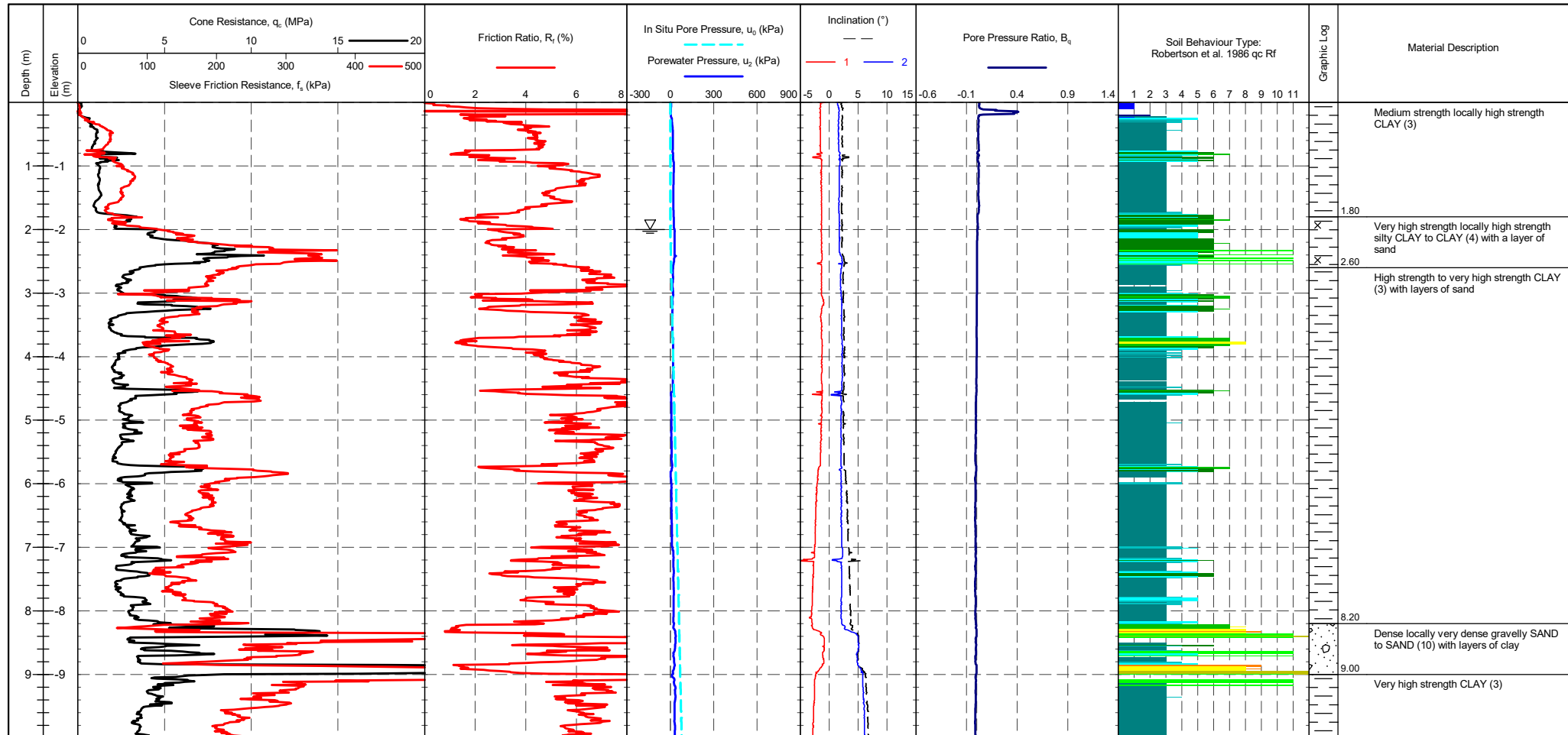


- METHOD: Robertson et al. 1986 q_c R_f**
- 1 - Sensitive fine grained material
 - 4 - Silty CLAY to CLAY
 - 7 - Silty SAND to sandy SILT
 - 10 - Gravelly SAND to SAND
 - 2 - Organic material
 - 5 - Clayey SILT to silty CLAY
 - 8 - SAND to silty SAND
 - 11 - Very stiff fine grained
 - 3 - CLAY
 - 6 - Sandy SILT to clayey SILT
 - 9 - SAND
 - 12 - SAND to clayey SAND

	TITLE Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 q _c vs. R _f - HYDCPT52	DRAWN _____	DATE 09/06/2021	
		CHECKED _____	DATE 09/06/2021	
		SCALE Not To Scale		A4
		PROJECT No 1210298		FIGURE No _____
	IN SITU SITE INVESTIGATION			

PointID	HYDCPT53
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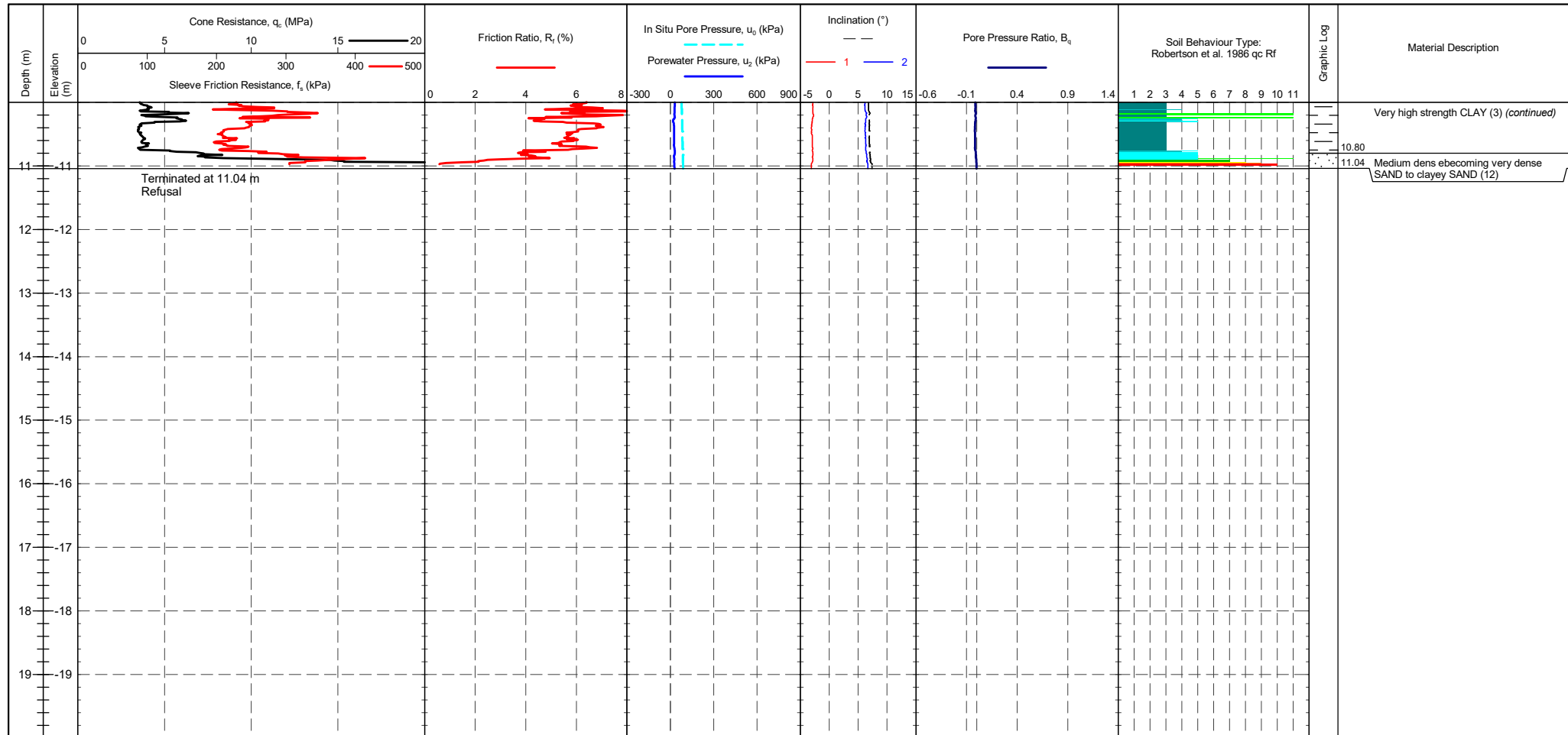
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Tip: Pre 235 mV, Post 236 mV, Difference 0.011 MPa Sleeve: Pre 260 mV, Post 262 mV, Difference 0.001 kPa Pore Pressure 2: Pre 438 mV, Post 483 mV, Difference 0.013 kPa X-Y Inclinometer: Pre 2333 mV, Post 2329 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID	HYDCPT53
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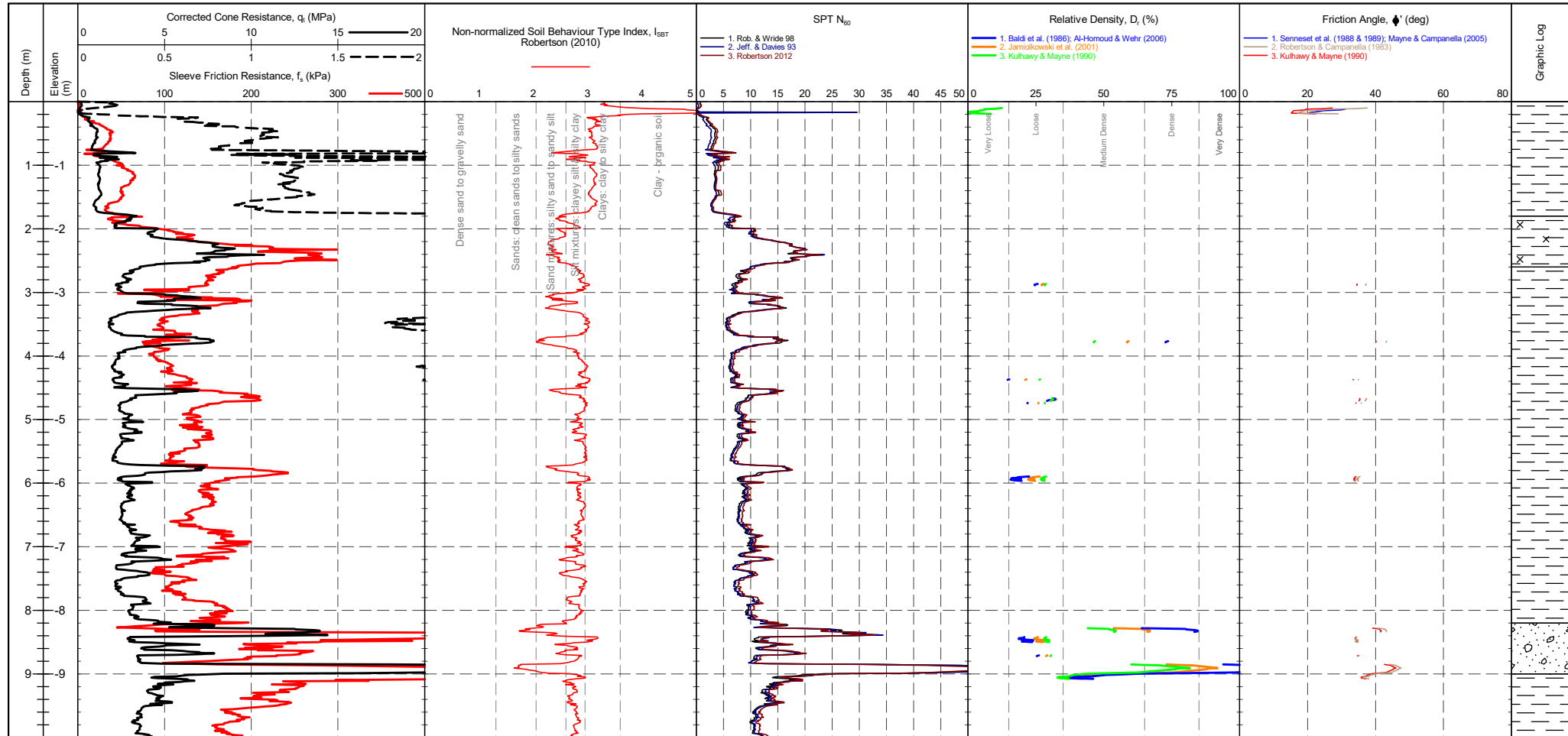
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICTION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer : Pre Post Difference Tip : 235 mV 236 mV 0.011 MPa Sleeve : 260 mV 262 mV 0.001 kPa Pore Pressure 2 : 438 mV 483 mV 0.013 kPa X-Y Inclinometer : 2333 mV 2329 mV	METHOD: Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID
HYDCPT53

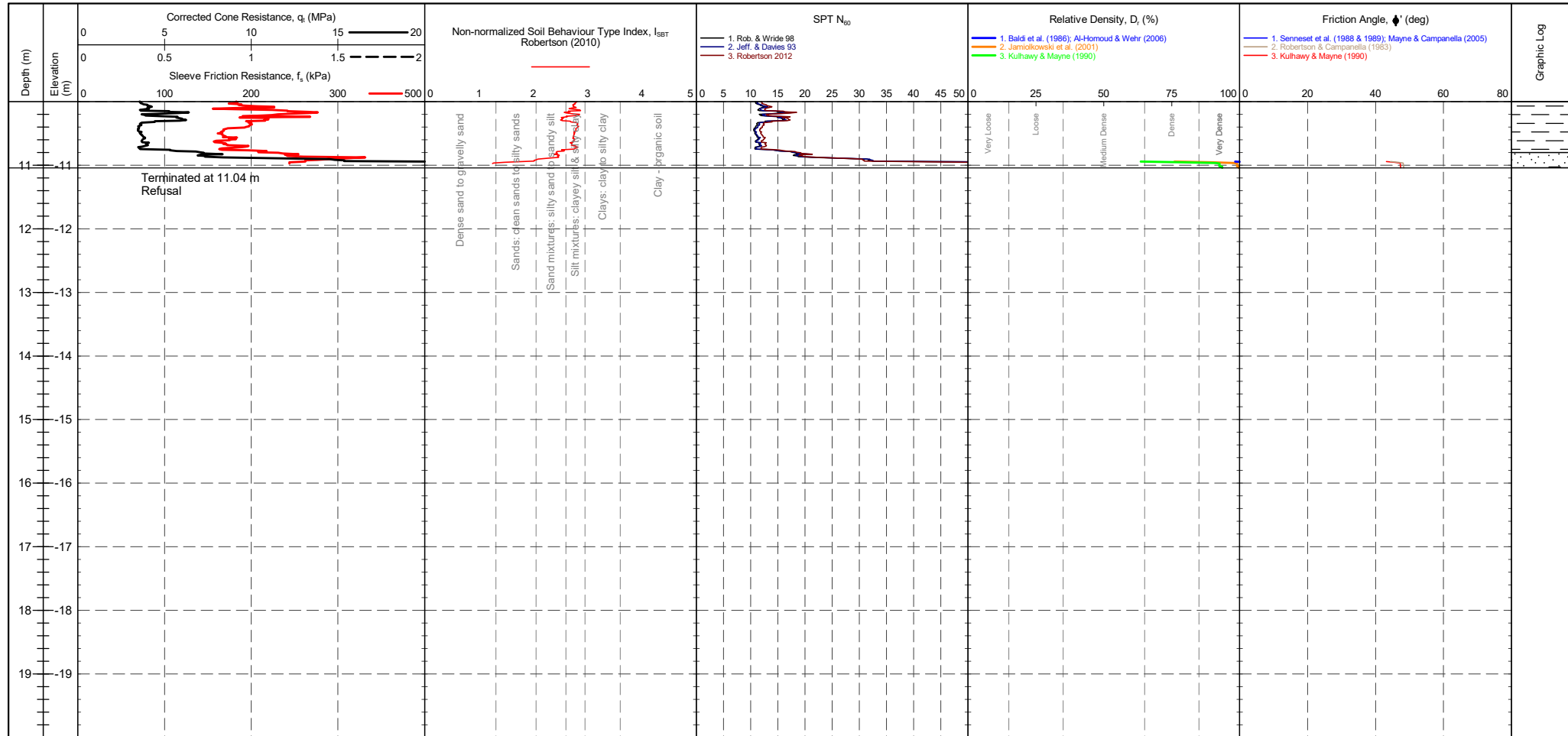
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 235 mV / 236 mV / 0.011 MPa Sleeve: 260 mV / 262 mV / 0.001 kPa Pore Pressure 2: 438 mV / 483 mV / 0.013 kPa X-Y Inclinator: 2333 mV / 2329 mV	CPTU ZERO VALUES Pre: 235 mV, Post: 236 mV, Difference: 0.011 MPa Pre: 260 mV, Post: 262 mV, Difference: 0.001 kPa Pre: 438 mV, Post: 483 mV, Difference: 0.013 kPa Pre: 2333 mV, Post: 2329 mV, Difference: 0.004 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density Dr (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
Description	SBT Index, I _c	Description	SPT N value, NSPT	Description	Relative Density Dr (%)																																				
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HYDCPT53

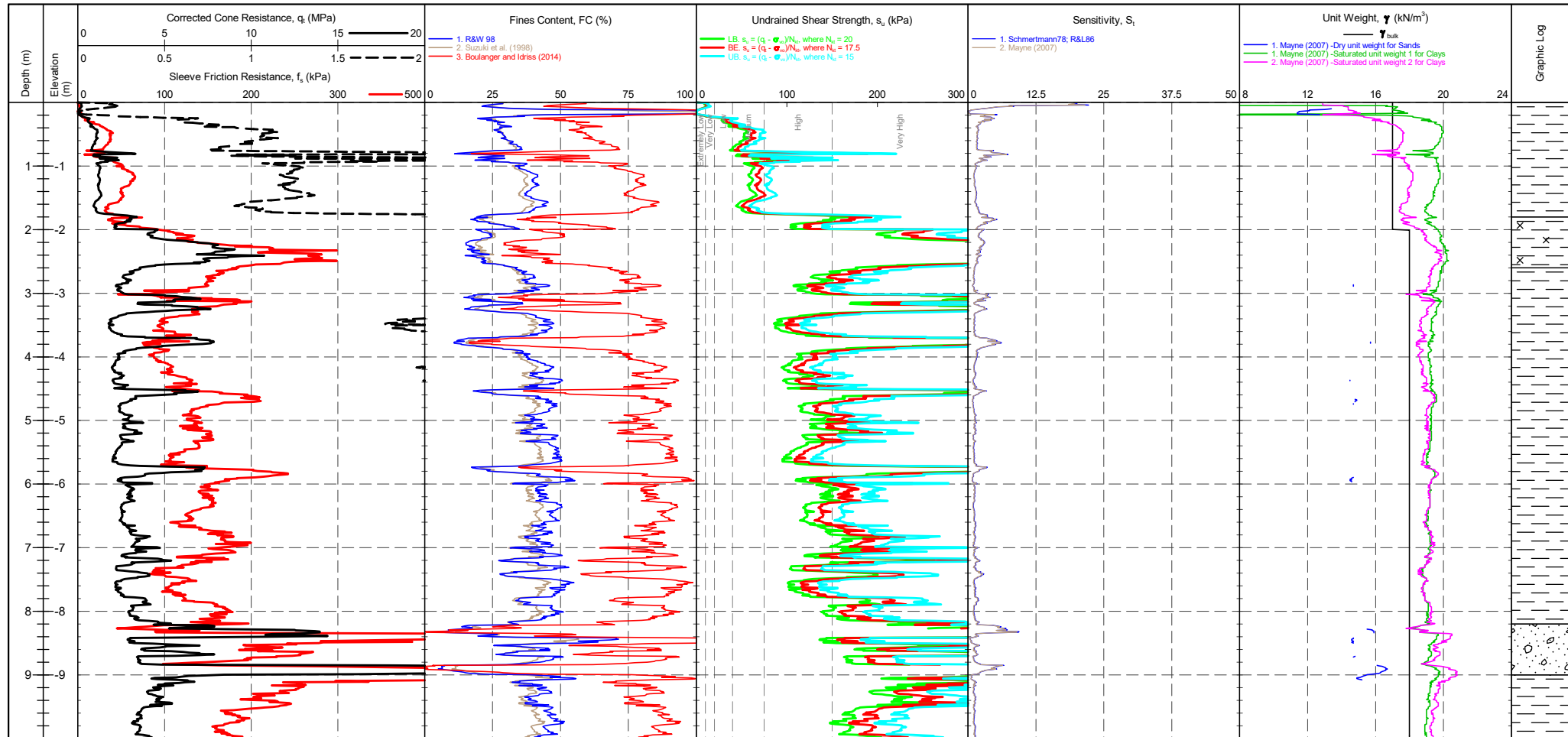
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES Transducer Pre Post Difference Tip 235 mV 236 mV 0.011 MPa Sleeve 260 mV 262 mV 0.001 kPa Pore Pressure 2 438 mV 483 mV 0.013 kPa X-Y Inclinometer 2333 mV 2329 mV	GRANULAR SOILS (Sands & Gravels) Robertson et al. 1986 Zones 7-10 and Zone 12 <table border="1"> <thead> <tr> <th>Description</th> <th>SBT Index, I_c</th> <th>Description</th> <th>SPT N value, NSPT</th> <th>Description</th> <th>Relative Density D_r (%)</th> </tr> </thead> <tbody> <tr> <td>Clays</td> <td>2.95-3.60</td> <td>Very Loose</td> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 15</td> </tr> <tr> <td>Silt mixtures</td> <td>2.60-2.95</td> <td>Loose</td> <td>4 - 10</td> <td>Loose</td> <td>15 - 35</td> </tr> <tr> <td>Sand mixtures</td> <td>2.05-2.60</td> <td>Medium Dense</td> <td>10 - 30</td> <td>Medium Dense</td> <td>35 - 65</td> </tr> <tr> <td>Sands</td> <td>1.31-2.05</td> <td>Dense</td> <td>30 - 50</td> <td>Dense</td> <td>65 - 85</td> </tr> <tr> <td>Gravelly sand</td> <td><1.31</td> <td>Very Dense</td> <td>>50</td> <td>Very Dense</td> <td>>85</td> </tr> </tbody> </table>	Description	SBT Index, I_c	Description	SPT N value, NSPT	Description	Relative Density D_r (%)	Clays	2.95-3.60	Very Loose	0 - 4	Very Loose	0 - 15	Silt mixtures	2.60-2.95	Loose	4 - 10	Loose	15 - 35	Sand mixtures	2.05-2.60	Medium Dense	10 - 30	Medium Dense	35 - 65	Sands	1.31-2.05	Dense	30 - 50	Dense	65 - 85	Gravelly sand	<1.31	Very Dense	>50	Very Dense	>85	Groundwater Level Dissipation Test
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PointID
HYDCPT53

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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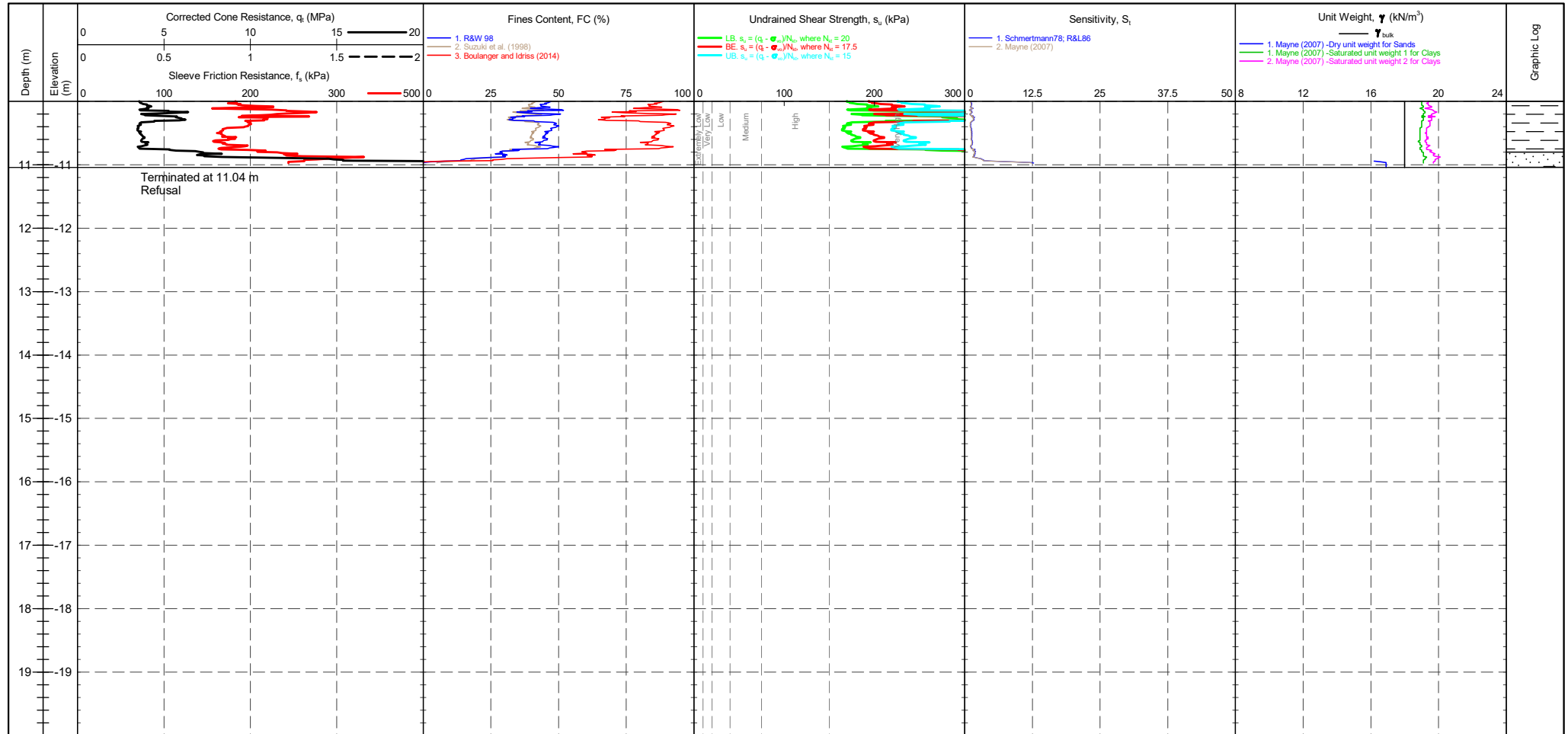


CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	Transducer Tip: 235 mV Sleeve: 260 mV Pore Pressure 2: 438 mV X-Y Inclinator: 2333 mV Post 236 mV 262 mV 483 mV 2329 mV Difference 0.011 MPa 0.001 kPa 0.013 kPa	CPTU ZERO VALUES Term based on measurement Extremely low strength Very low strength Low strength	COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 su (kPa) <10 10-20 20-40	Term based on measurement Medium strength High strength Very high strength Extremely high strength	su (kPa) 40-75 75-150 150-300 >300	▽ Groundwater Level ▭ Dissipation Test
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PointID

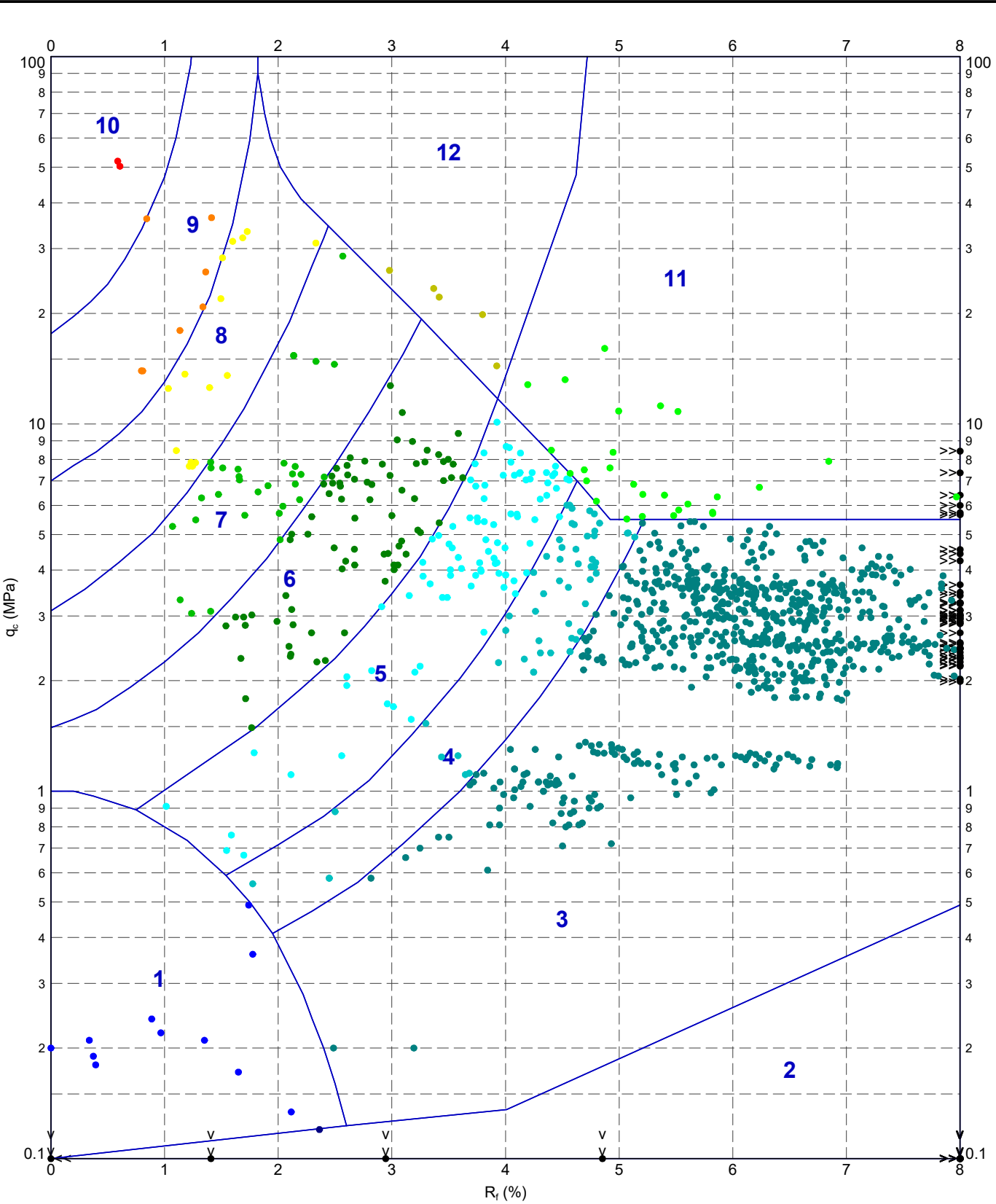
HYDCPT53

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 2 OF 2 STATUS : Final TEST DATE : 27/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild	CPTU ZERO VALUES <table border="1"> <tr><th>Transducer</th><th>Pre</th><th>Post</th><th>Difference</th></tr> <tr><td>Tip</td><td>235 mV</td><td>236 mV</td><td>0.011 MPa</td></tr> <tr><td>Sleeve</td><td>260 mV</td><td>262 mV</td><td>0.001 kPa</td></tr> <tr><td>Pore Pressure 2</td><td>438 mV</td><td>483 mV</td><td>0.013 kPa</td></tr> <tr><td>X-Y Inclinator</td><td>2333 mV</td><td>2329 mV</td><td></td></tr> </table>	Transducer	Pre	Post	Difference	Tip	235 mV	236 mV	0.011 MPa	Sleeve	260 mV	262 mV	0.001 kPa	Pore Pressure 2	438 mV	483 mV	0.013 kPa	X-Y Inclinator	2333 mV	2329 mV		COHESIVE SOILS (Clays & Silts) Robertson et al. 1986 Zones 1-6 and Zone 11 <table border="1"> <tr><th>Term based on measurement</th><th>su (kPa)</th><th>Term based on measurement</th><th>su (kPa)</th></tr> <tr><td>Extremely low strength</td><td><10</td><td>Medium strength</td><td>40-75</td></tr> <tr><td>Very low strength</td><td>10-20</td><td>High strength</td><td>75-150</td></tr> <tr><td>Low strength</td><td>20-40</td><td>Very high strength</td><td>150-300</td></tr> <tr><td></td><td></td><td>Extremely high strength</td><td>>300</td></tr> </table>	Term based on measurement	su (kPa)	Term based on measurement	su (kPa)	Extremely low strength	<10	Medium strength	40-75	Very low strength	10-20	High strength	75-150	Low strength	20-40	Very high strength	150-300			Extremely high strength	>300	▽ Groundwater Level ▮ Dissipation Test
Transducer	Pre	Post	Difference																																									
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LIB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<drawingFile>> 09/06/2021 23:21 10.02.00.04 Dalgid Lab and In Situ Tool - In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10



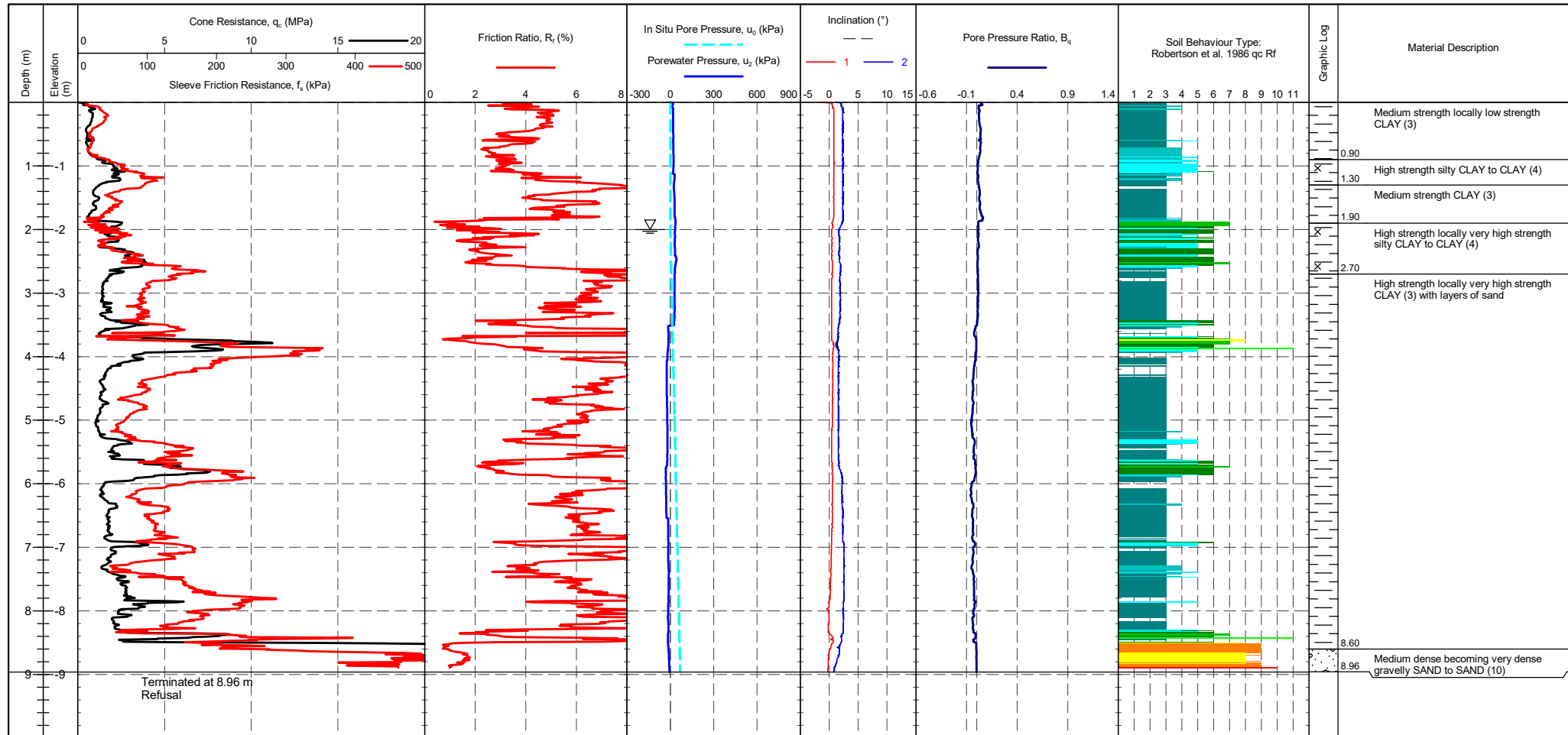
METHOD: Robertson et al. 1986 qc Rf

1 - Sensitive fine grained material	4 - Silty CLAY to CLAY	7 - Silty SAND to sandy SILT	10 - Gravelly SAND to SAND
2 - Organic material	5 - Clayey SILT to silty CLAY	8 - SAND to silty SAND	11 - Very stiff fine grained
3 - CLAY	6 - Sandy SILT to clayey SILT	9 - SAND	12 - SAND to clayey SAND

	TITLE	DRAWN	DATE
	Hydrock Wingate, Bolton Wingates, Bolton Robertson et al. 1986 qc vs. R _f - HYDCPT53	CHECKED	DATE
		SCALE	FIGURE No
		PROJECT No	
		1210298	

PointID	HYDCPT54
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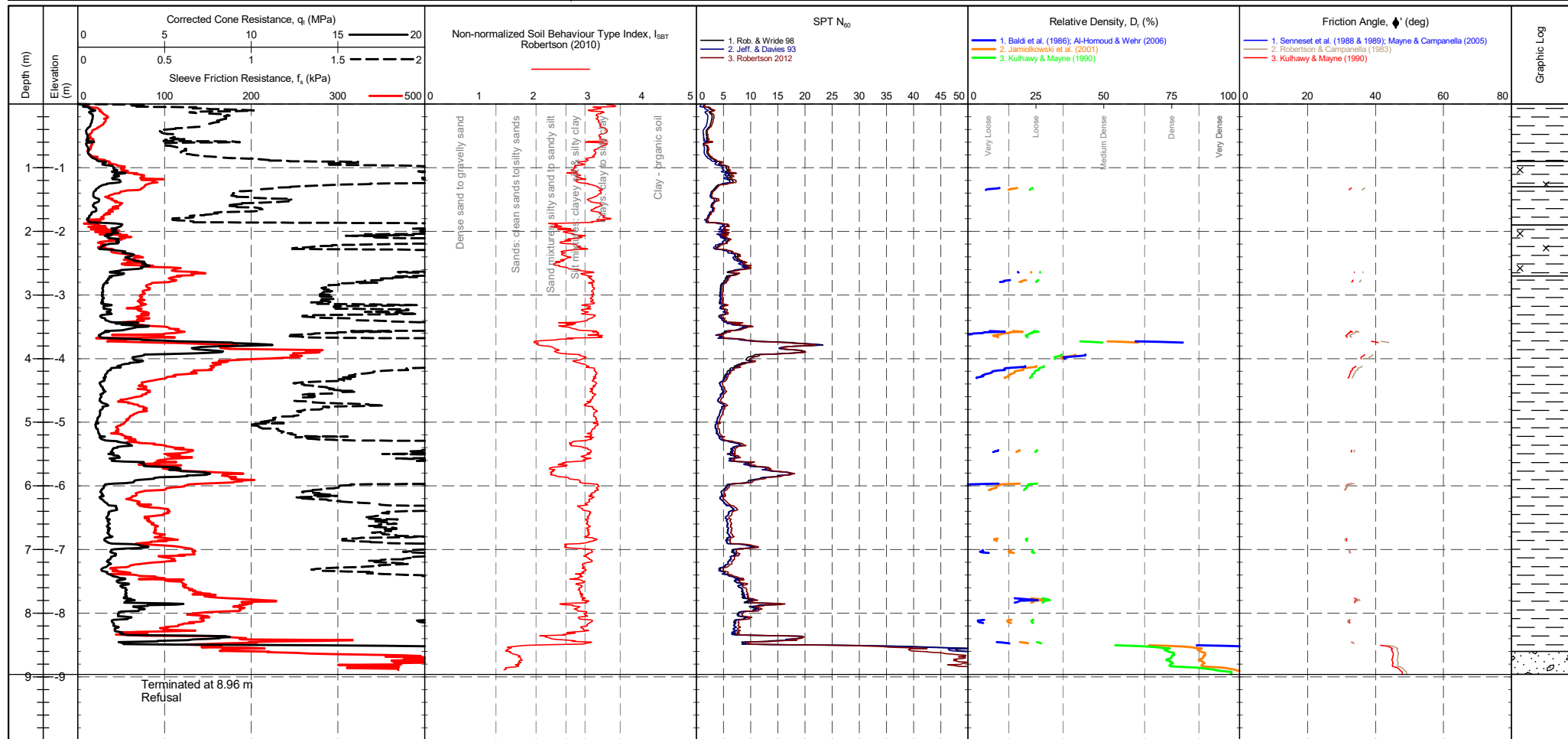
CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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CONE ID : S15-CFIP.1360 CALIBRATION DATE : 16/02/2021 CONE MODEL : Subtraction CONE AREA : 15cm ² CONE AREA RATIO : 0.79 FILTER POSITION : u2 FILTER TYPE : HDPE	TEST TYPE : TE2 APPLICATION CLASS : 2 RIG : CPT 017 - Griffen OPERATOR : JE FRICITION REDUCER : None WEATHER : Overcast & Mild GROUNDWATER DEPTH : Assumed for calculation purposes	CPTU ZERO VALUES Transducer Tip 235 mV 234 mV -0.011 MPa Sleeve 261 mV 260 mV -0.001 kPa Pore Pressure 2 462 mV 488 mV 0.007 kPa X-Y Inclinometer 2278 mV 2466 mV	METHOD : Robertson et al. 1986 qc Rf 1 - Sensitive fine grained material 2 - Organic material 3 - CLAY 4 - Silty CLAY to CLAY 5 - Clayey SILT to silty CLAY 6 - Sandy SILT to clayey SILT 7 - Silty SAND to sandy SILT 8 - SAND to silty SAND 9 - SAND 10 - Gravelly SAND to SAND 11 - Very stiff fine grained 12 - SAND to clayey SAND	Groundwater Level Dissipation Test
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PointID
HYDCPT54

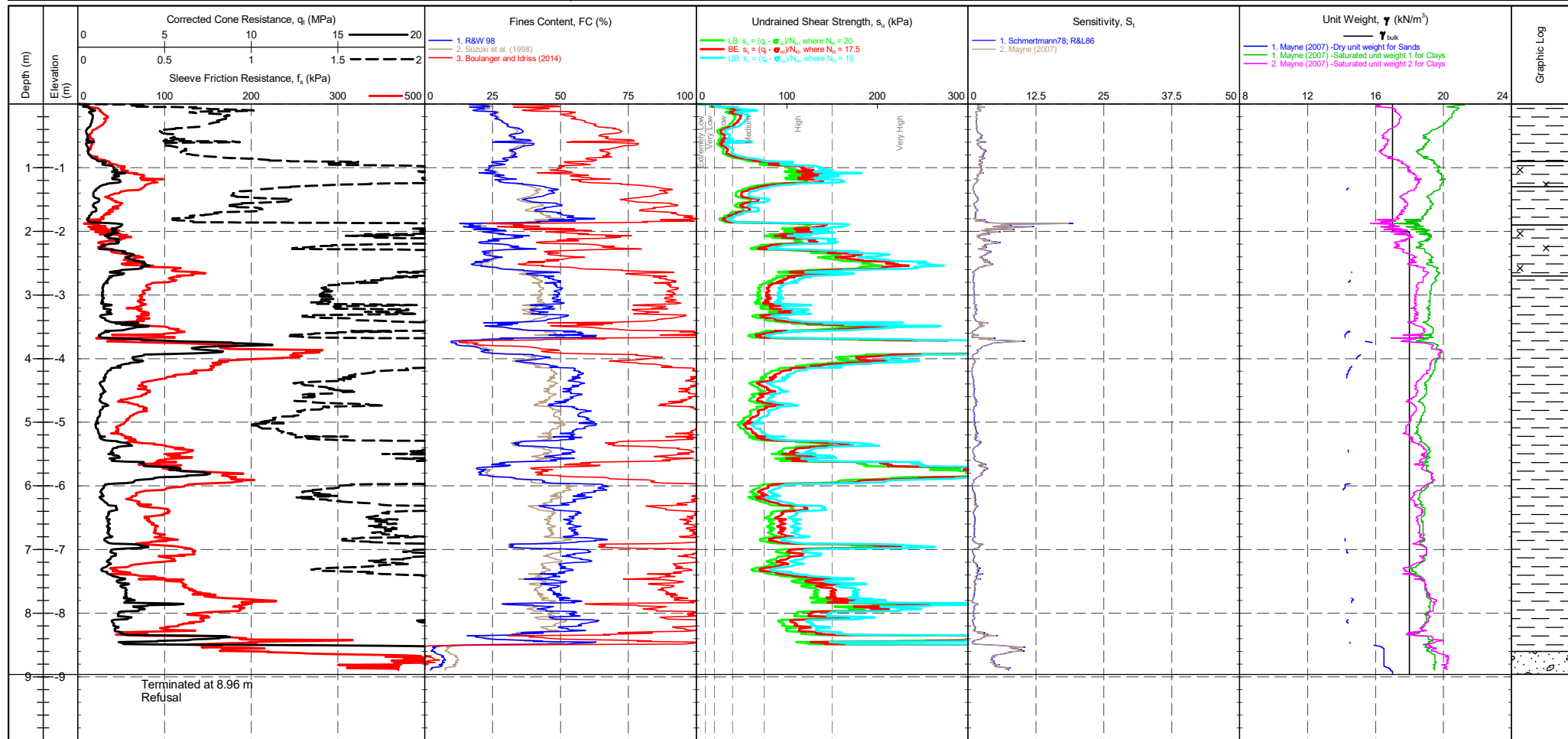
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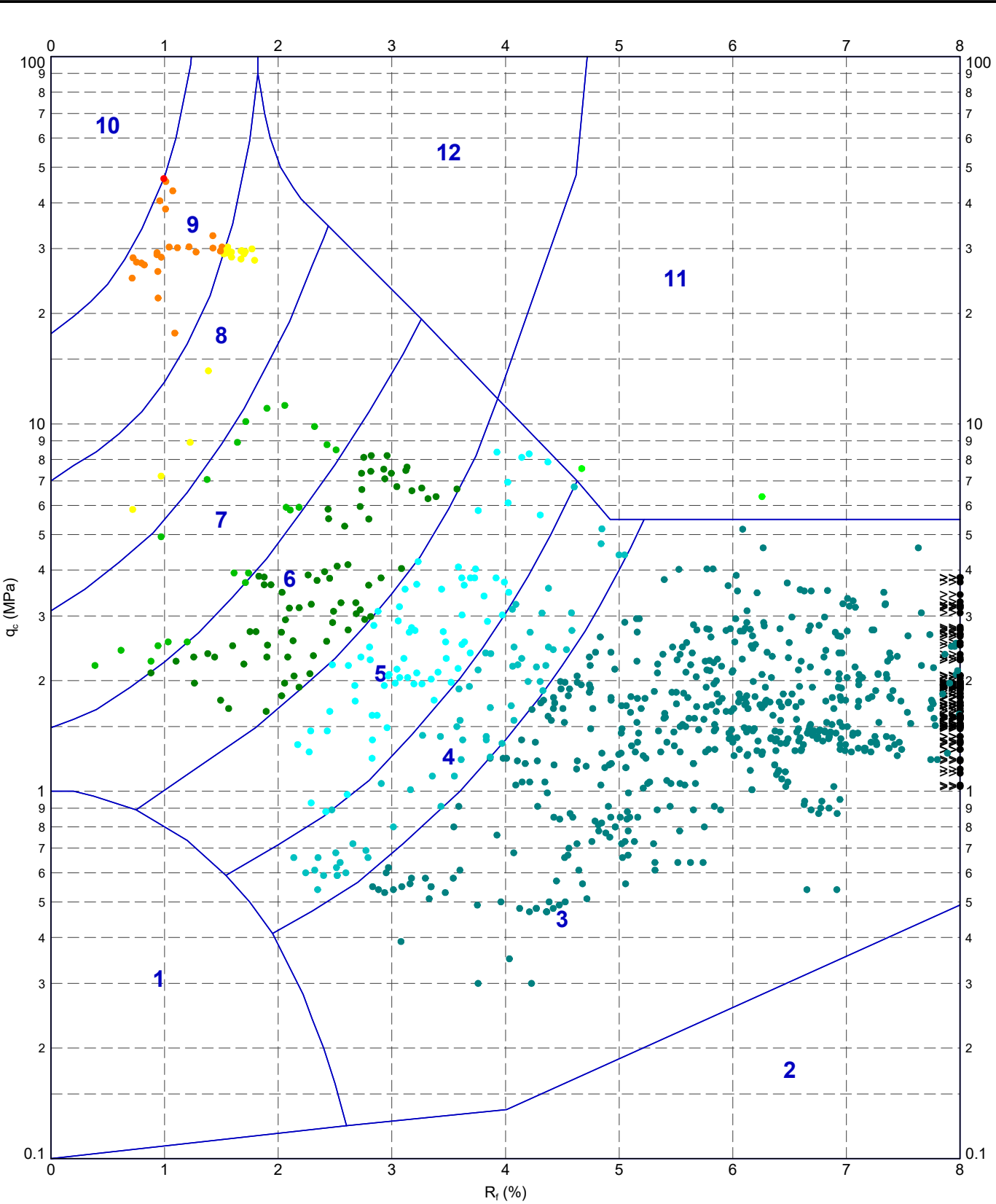
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HYDCPT54

CLIENT : Hydrock PROJECT : Wingates, Bolton LOCATION : Wingate, Bolton PROJECT No. : 1210298	EASTING : 0.0 m NORTHING : 0.0 m ELEVATION : 0.00 m OD CHECKED BY : LD TERMINATION REASON : Refusal	Remark: Test refused on total pressure.	SHEET : 1 OF 1 STATUS : Final TEST DATE : 28/05/2021 PLOT DATE : 09/06/2021 METHOD : ISO 22476-1:2012
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2:10586-ADVANCED REPORT INSTITUTE 2.02.1 LUB - ZOE.GLB Graph: CPT ROBERTSON ET AL. 86 QC VS. Rf AMP. 1210298 - WINGATES, BOLTON - HYDROCK.GPJ -<DrawingFile>> 09/06/2021 23:25 10.02.00.04. Dalgel Lab and In Situ Tool. In Situ SI 2.02.0 2017-07-10 Proj. In Situ SI 2.02.0 2017-07-10



METHOD: Robertson et al. 1986 qc Rf

- 1 - Sensitive fine grained material
- 4 - Silty CLAY to CLAY
- 7 - Silty SAND to sandy SILT
- 10 - Gravelly SAND to SAND
- 2 - Organic material
- 5 - Clayey SILT to silty CLAY
- 8 - SAND to silty SAND
- 11 - Very stiff fine grained
- 3 - CLAY
- 6 - Sandy SILT to clayey SILT
- 9 - SAND
- 12 - SAND to clayey SAND

	TITLE	DRAWN	DATE
	Hydrock Wingate, Bolton Wingates, Bolton	CHECKED	DATE
	Robertson et al. 1986 qc vs. Rf - HYDCPT54	SCALE	FIGURE No
		PROJECT No 1210298	A4