

Appendix A

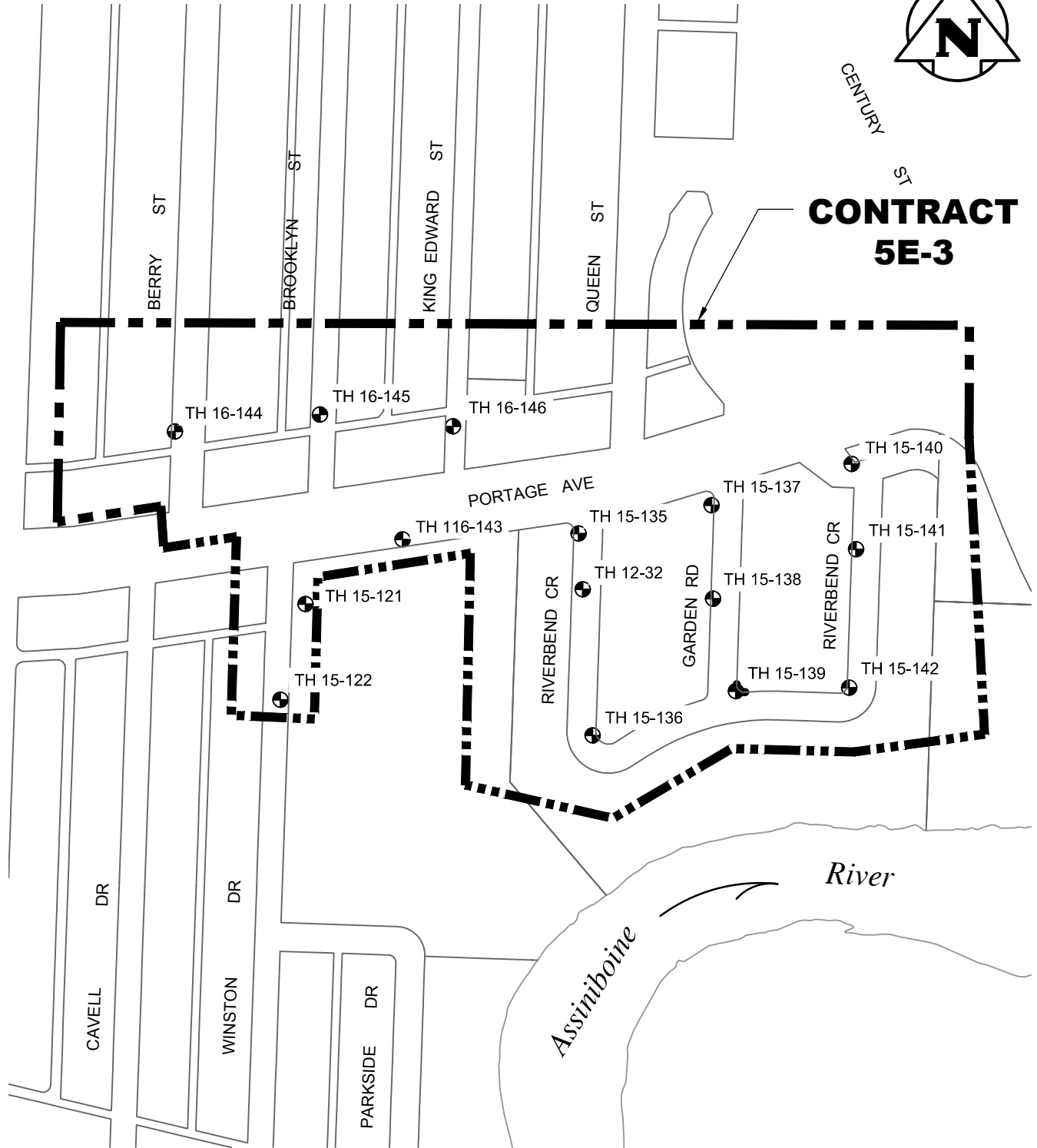
Test Hole Logs

APPENDIX A - TEST HOLE LOGS



CENTURY ST

**CONTRACT
5E-3**



X:\A-G\CITY OF WINNIPEG - WATER & WASTE DEPARTMENT - 0012\10001203.00 - FERRY ROAD\CONTRACT 5E\FR CONT 5E-3 PRODUCTION DRAWINGS\FR CONT 5-3 PRODUCTION DR 2017\5E-3 TEST HOLE SKETCH.DWG 18.05.24 3:14 PM

DYREGROV ROBINSON INC.

CONSULTING GEOTECHNICAL ENGINEERS

AUTHORIZED BY: X
DATE: X

CLIENT DRAWING NO.



THE CITY OF WINNIPEG

WATER AND WASTE DEPARTMENT



TETRA TECH

Complex World
Clear Solutions

DRAWING DESCRIPTION

TEST HOLE LOCATIONS FOR FERRY ROAD
CSR WORKS CONTRACT 5E-3

DESIGNED BY:
REVIEWED BY:

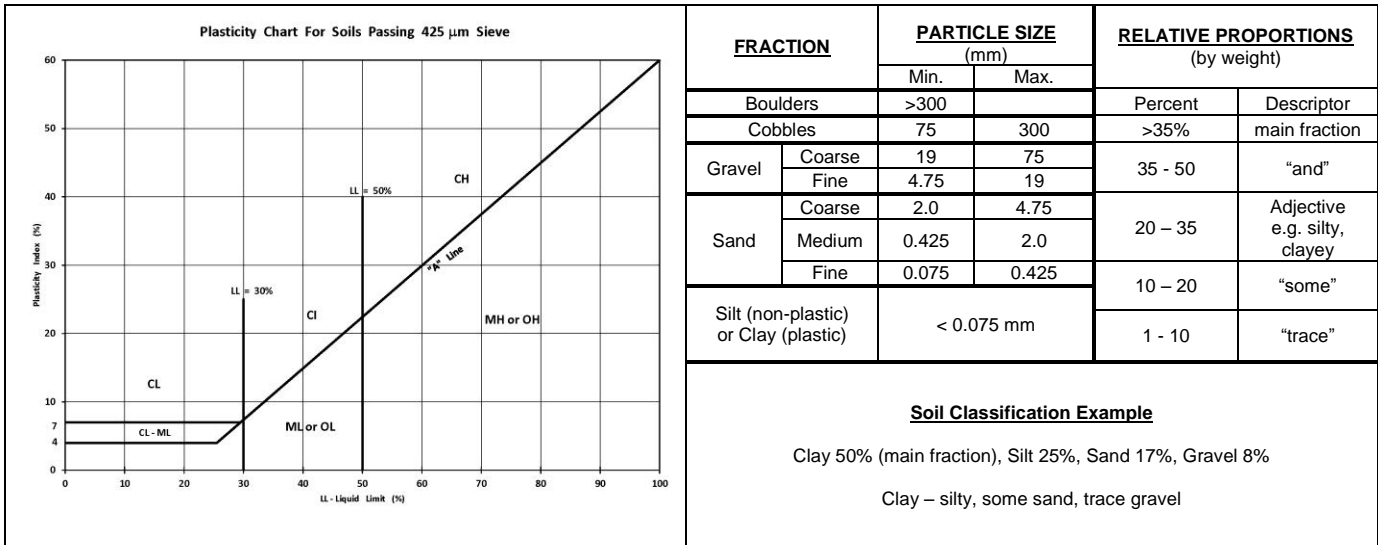
DRAWN BY: **GMD**
SCALE: **NTS**

DRAWING NO.
FIGURE_1

REV.
00

EXPLANATION OF TERMS & SYMBOLS

| Description | | | TH Log Symbols | USCS Classification | Laboratory Classification Criteria | | | | |
|-----------------------------|--|---------------------------------------|---|---------------------|------------------------------------|--|---|---|--|
| | | | | | Fines (%) | Grading | Plasticity | Notes | |
| COARSE GRAINED SOILS | GRAVELS (More than 50% of coarse fraction of gravel size) | CLEAN GRAVELS (Little or no fines) | Well graded gravels, sandy gravels, with little or no fines | | GW | 0-5 | $C_u > 4$ $1 < C_c < 3$ | Dual symbols if 5-12% fines. Dual symbols if above "A" line and $4 < W_p < 7$ $C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ | |
| | | | Poorly graded gravels, sandy gravels, with little or no fines | | GP | 0-5 | Not satisfying GW requirements | | |
| | | DIRTY GRAVELS (With some fines) | Silty gravels, silty sandy gravels | | GM | > 12 | | | Atterberg limits below "A" line or $W_p < 4$ |
| | | | Clayey gravels, clayey sandy gravels | | GC | > 12 | | | Atterberg limits above "A" line or $W_p < 7$ |
| | SANDS (More than 50% of coarse fraction of sand size) | CLEAN SANDS (Little or no fines) | Well graded sands, gravelly sands, with little or no fines | | SW | 0-5 | $C_u > 6$ $1 < C_c < 3$ | | |
| | | | Poorly graded sands, gravelly sands, with little or no fines | | SP | 0-5 | Not satisfying SW requirements | | |
| | | DIRTY SANDS (With some fines) | Silty sands, sand-silt mixtures | | SM | > 12 | | | Atterberg limits below "A" line or $W_p < 4$ |
| | | | Clayey sands, sand-clay mixtures | | SC | > 12 | | | Atterberg limits above "A" line or $W_p < 7$ |
| FINE GRAINED SOILS | SILTS (Below 'A' line negligible organic content) | $W_L < 50$ | Inorganic silts, silty or clayey fine sands, with slight plasticity | | ML | | Classification is Based upon Plasticity Chart | | |
| | | $W_L > 50$ | Inorganic silts of high plasticity | | MH | | | | |
| | CLAYS (Above 'A' line negligible organic content) | $W_L < 30$ | Inorganic clays, silty clays, sandy clays of low plasticity, lean clays | | CL | | | | |
| | | $30 < W_L < 50$ | Inorganic clays and silty clays of medium plasticity | | CI | | | | |
| | | $W_L > 50$ | Inorganic clays of high plasticity, fat clays | | CH | | | | |
| | ORGANIC SILTS & CLAYS (Below 'A' line) | $W_L < 50$ | Organic silts and organic silty clays of low plasticity | | OL | | | | |
| | | $W_L > 50$ | Organic clays of high plasticity | | OH | | | | |
| | HIGHLY ORGANIC SOILS | | Peat and other highly organic soils | | Pt | Von Post Classification Limit | | Strong colour or odour, and often fibrous texture | |
| | Asphalt | | Glacial Till | | Bedrock (Igneous) | DYREGROV ROBINSON INC. CONSULTING GEOTECHNICAL ENGINEERS | | | |
| | Concrete | | Clay Shale | | Bedrock (Limestone) | | | | |
| | Fill | | | | Bedrock (Undifferentiated) | | | | |



TERMS and SYMBOLS

Laboratory and field tests are identified as follows:

Unconfined Comp.: undrained shear strength (kPa or psf) derived from unconfined compression testing.

Torvane: undrained shear strength (kPa or psf) measured using a Torvane

Pocket Pen.: undrained shear strength (kPa or psf) measured using a pocket penetrometer.

Unit Weight bulk unit weight of soil or rock (kN/m³ or pcf).

SPT – N Standard Penetration Test: The number of blows (N) required to drive a 51 mm O.D. split barrel sampler 300 mm into the soil using a 63.5 kg hammer with a free fall drop height of 760 mm.

DCPT Dynamic Cone Penetration Test. The number of blows (N) required to drive a 50 mm diameter cone 300 mm into the soil using a 63.5 kg hammer with a free fall drop height of 760 mm.

M/C insitu soil moisture content in percent

PL Plastic limit, moisture content in percent

LL Liquid limit, moisture content in percent

The undrained shear strength (Su) of cohesive soil is related to its consistency as follows:

| Su (kPa) | Su (psf) | CONSISTENCY |
|-----------|-------------|-------------|
| <12 | 250 | very soft |
| 12 – 25 | 250 – 525 | soft |
| 25 – 50 | 525 – 1050 | firm |
| 50 – 100 | 1050 – 2100 | stiff |
| 100 – 200 | 2100 – 4200 | very stiff |
| 200 | 4200 | hard |

The SPT - N of non-cohesive soil is related to compactness condition as follows:

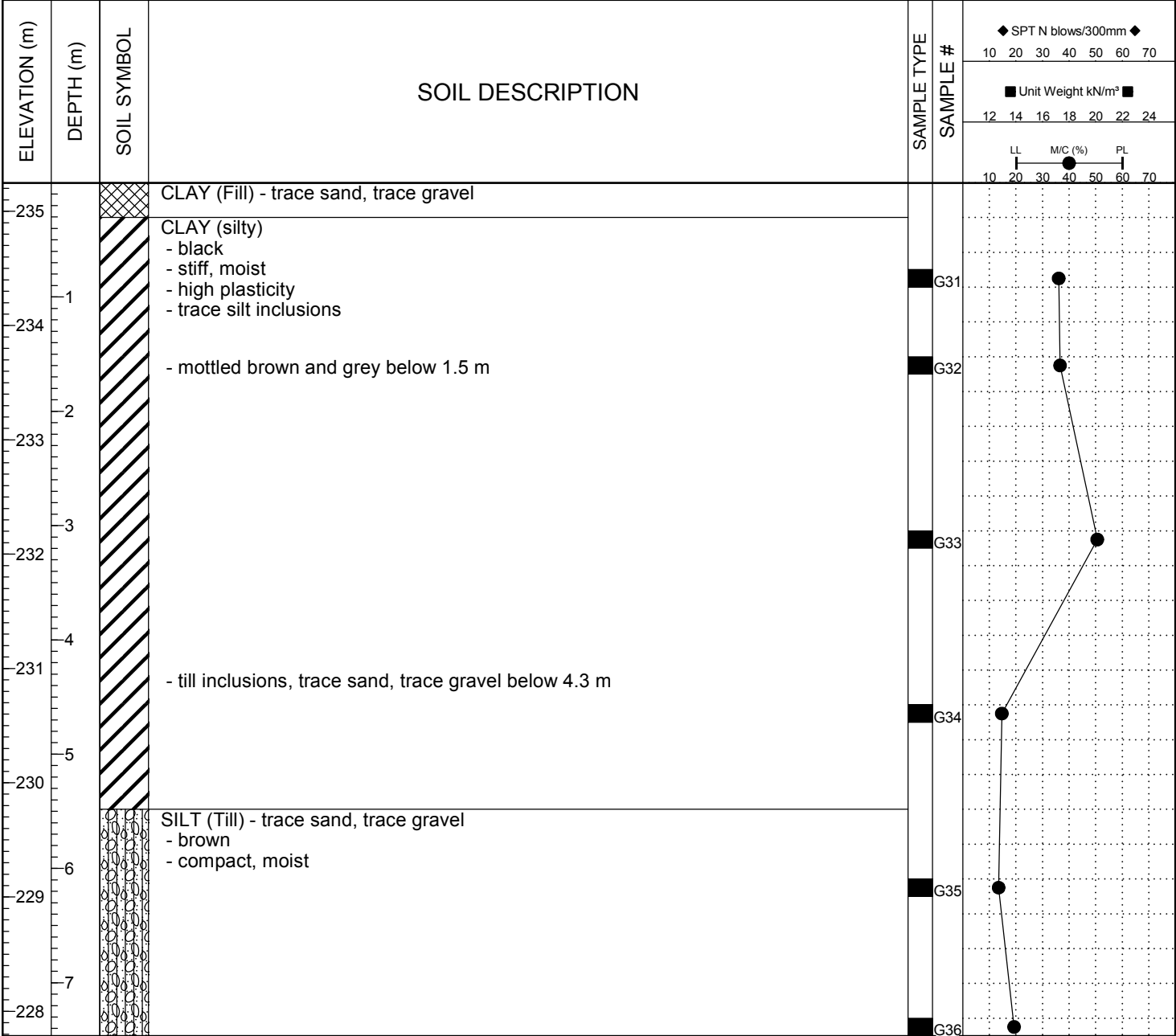
| N – Blows / 300 mm | COMPACTNESS |
|--------------------|-------------|
| 0 - 4 | very loose |
| 4 - 10 | loose |
| 10 - 30 | compact |
| 30 - 50 | dense |
| 50 + | very dense |

References:

ASTM D2487 – Classification of Soils For Engineering Purposes (Unified Soil Classification System)

Canadian Foundation Engineering Manual, 4th Edition, Canadian Geotechnical Society, 2006

| | | |
|---|---|------------------------|
| PROJECT: Ferry Road & Riverbend CSR Works | CLIENT: Tetra Tech WEI | TESTHOLE NO: 15-121 |
| LOCATION: Winston Drive - UTM 5526658 N, 628575 E | | PROJECT NO.: 143691 |
| CONTRACTOR: Paddock Drilling Ltd. | METHOD: BRAT 22R - 125 mm SSA diameter auger | ELEVATION (m): 235.405 |
| SAMPLE TYPE | <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE | |
| BACKFILL TYPE | <input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND | |



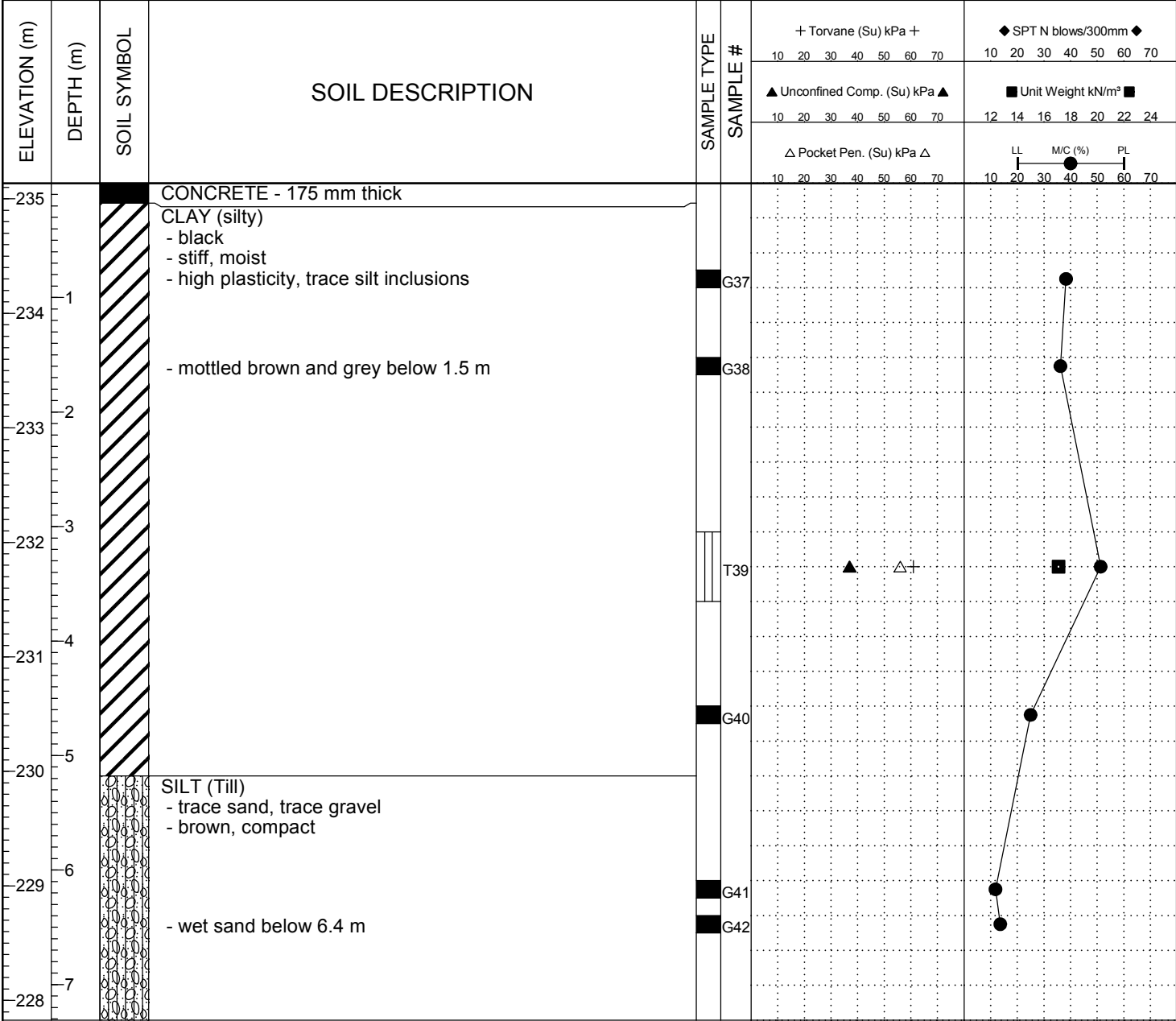
END OF TEST HOLE AT 7.5 m IN SILT (TILL) (AUGER REFUSAL)
Notes:
1. Frost to 1.5 m.
2. No sloughing or seepage observed.
3. Test hole backfilled with auger cuttings and bentonite chips.

BH GEOTECH PLOTS - NEW ALT1 143691 5A WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 28/11/15

DYREGROV ROBINSON INC.
Consulting Geotechnical Engineers

| | |
|--------------------------------|--------------------------|
| LOGGED BY: WG | COMPLETION DEPTH: 7.47 m |
| REVIEWED BY: GR | COMPLETION DATE: 27/2/15 |
| PROJECT ENGINEER: Gil Robinson | |

| | | | | | | |
|---|-----------|--|-------------|------------------------|-------------|------|
| PROJECT: Ferry Road & Riverbend CSR Works | | CLIENT: Tetra Tech WEI | | TESTHOLE NO: 15-122 | | |
| LOCATION: Winston Drive - UTM 5526601 N, 628561 E | | | | PROJECT NO.: 143691 | | |
| CONTRACTOR: Paddock Drilling Ltd. | | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | | ELEVATION (m): 235.293 | | |
| SAMPLE TYPE | GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE |
| BACKFILL TYPE | BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND |



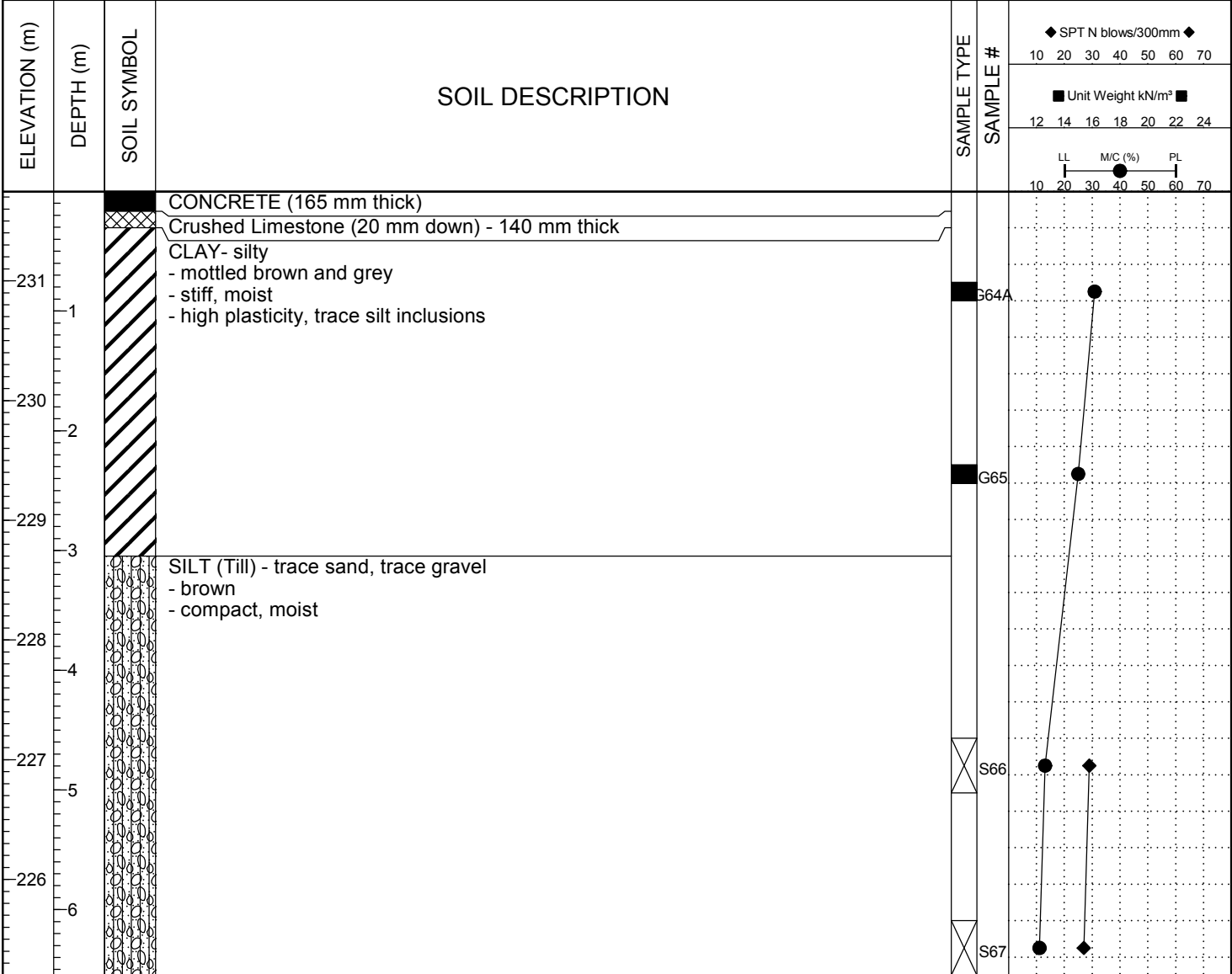
END OF TEST HOLE AT 7.3 m IN SILT (TILL) (AUGER REFUSAL)
Notes:
1. Frost to 1.5 m.
2. Seepage at 6.4 m from top of hole. Hole open to 5.8 m and water at 4.3 m from top of hole.
3. Test hole backfilled with auger cuttings and bentonite chips.
4. Cold patch filled over core.

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| | |
|--------------------------------|--------------------------|
| LOGGED BY: CR | COMPLETION DEPTH: 7.32 m |
| REVIEWED BY: GR | COMPLETION DATE: 27/2/15 |
| PROJECT ENGINEER: Gil Robinson | |

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|--|-----------|---|-------------|----------------------|-------------|------|
| PROJECT: Ferry Road & Riverbend CSR Works | | CLIENT: Tetra Tech WEI | | TESTHOLE NO: 15-132 | | |
| LOCATION: Parkside Drive - UTM 5526334 N, 628632 E | | | | PROJECT NO.: 143691 | | |
| CONTRACTOR: Maple Leaf Drilling Ltd. | | METHOD: Acker Renegade- 125mm SS augers | | ELEVATION (m): 231.9 | | |
| SAMPLE TYPE | GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE |
| BACKFILL TYPE | BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND |



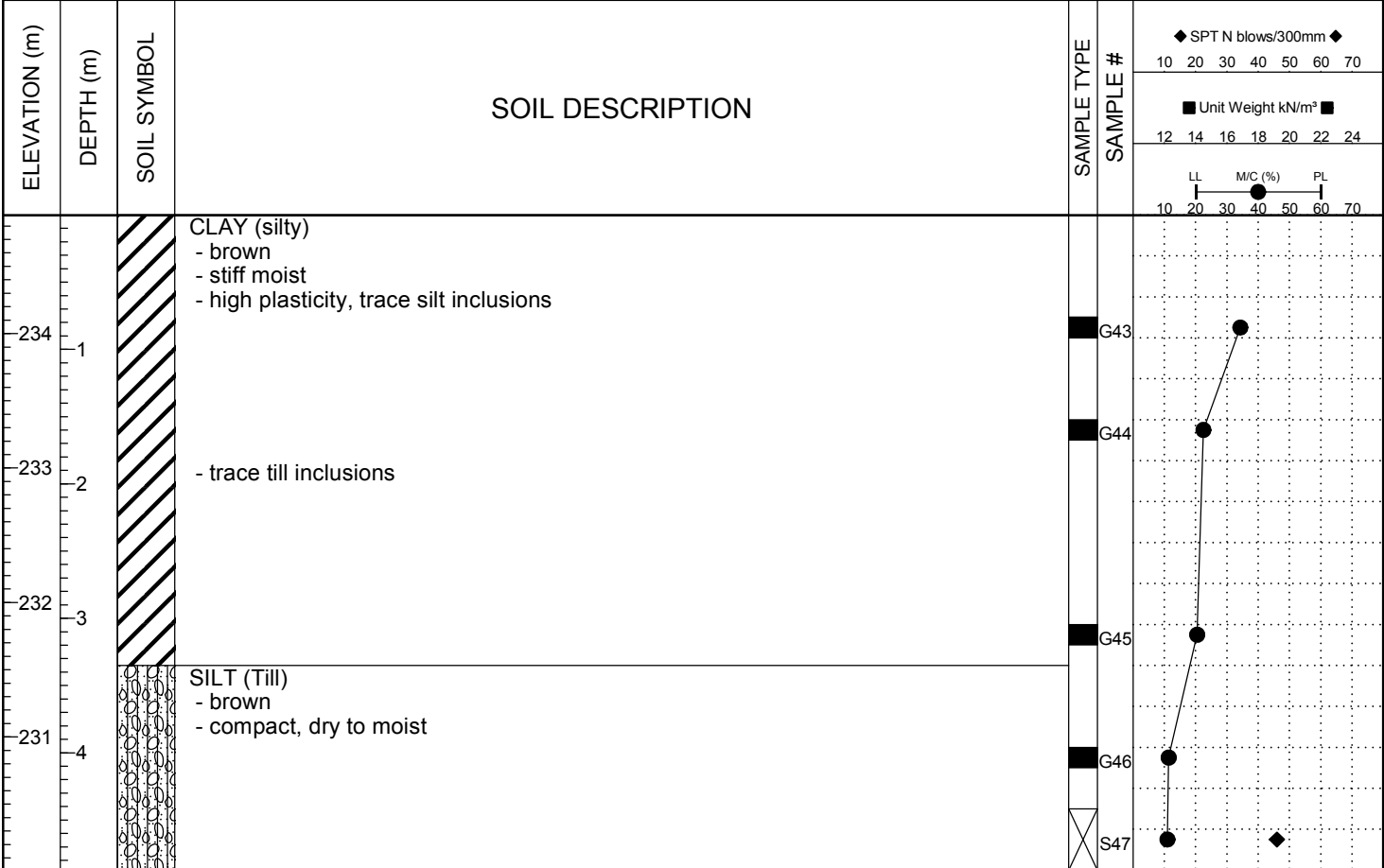
END OF TEST HOLE AT 6.5 m IN SILT (TILL)
Notes:
1. No sloughing or seepage observed.
2. Test hole backfilled with auger cuttings and bentonite chips.

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|--------------------------------|--------------------------|
| LOGGED BY: CR | COMPLETION DEPTH: 6.55 m |
| REVIEWED BY: GR | COMPLETION DATE: 26/6/15 |
| PROJECT ENGINEER: Gil Robinson | |

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|--|--|------------------------|
| PROJECT: Ferry Road & Riverbend CSR Works | CLIENT: Tetra Tech WEI | TESTHOLE NO: 15-133 |
| LOCATION: Scott Park - UTM 5526523 N, 628671 E | | PROJECT NO.: 143691 |
| CONTRACTOR: Paddock Drilling Ltd. | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | ELEVATION (m): 235.037 |
| SAMPLE TYPE | <input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE | |
| BACKFILL TYPE | <input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND | |



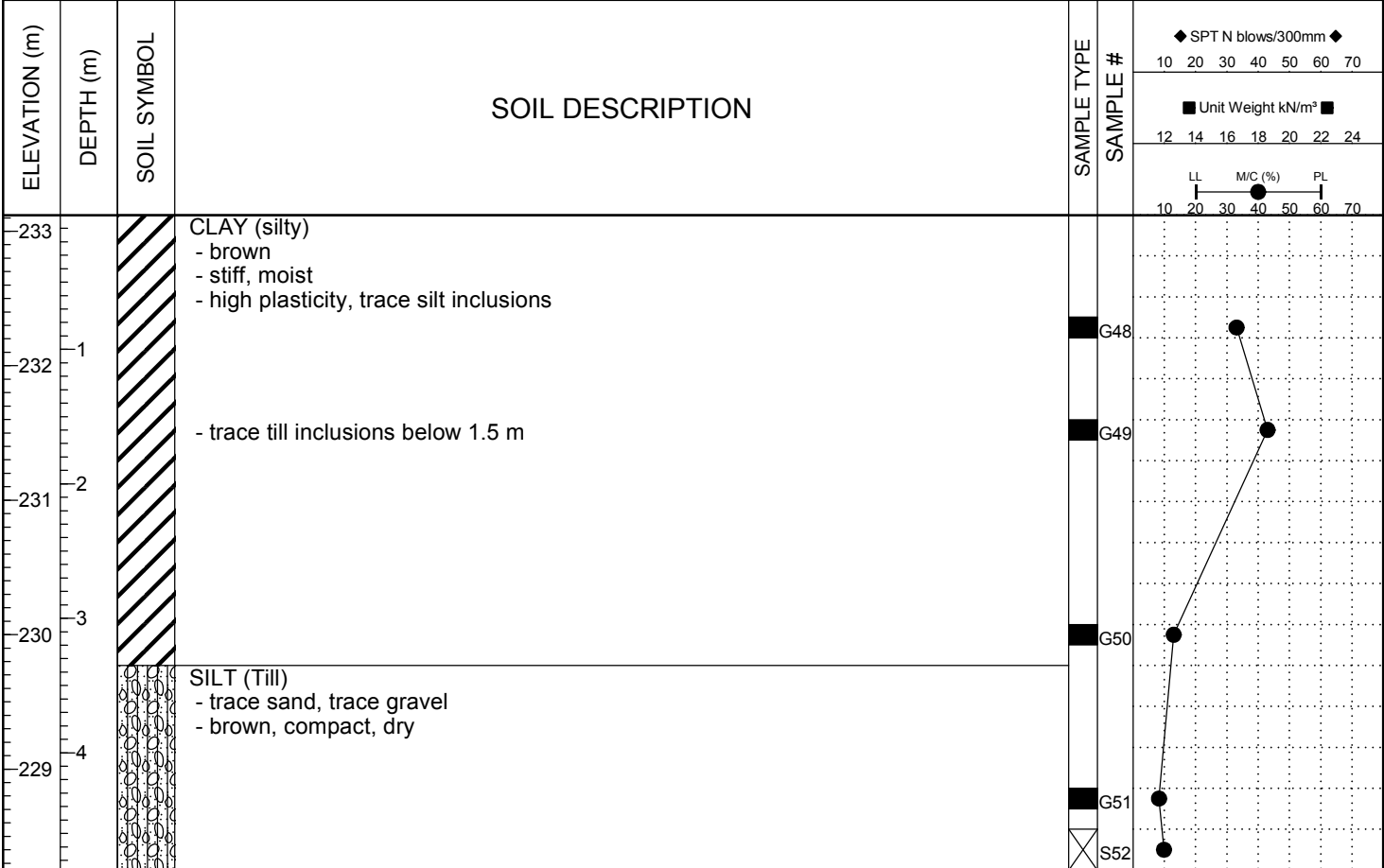
END OF TEST HOLE AT 4.9 m IN SILT (TILL) (AUGER REFUSAL)
 Notes:
 1. Frost to 1.5 m.
 2. No sloughing or seepage observed.
 3. Test hole backfilled with auger cuttings and bentonite chips.

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|--------------------------------|--------------------------|
| LOGGED BY: RB | COMPLETION DEPTH: 4.88 m |
| REVIEWED BY: GR | COMPLETION DATE: 25/2/15 |
| PROJECT ENGINEER: Gil Robinson | |

| | | |
|--|--|------------------------|
| PROJECT: Ferry Road & Riverbend CSR Works | CLIENT: Tetra Tech WEI | TESTHOLE NO: 15-134 |
| LOCATION: Scott Park - UTM 5526467 N, 628689 E | | PROJECT NO.: 143691 |
| CONTRACTOR: Paddock Drilling Ltd. | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | ELEVATION (m): 233.275 |
| SAMPLE TYPE | <input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE | |
| BACKFILL TYPE | <input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND | |



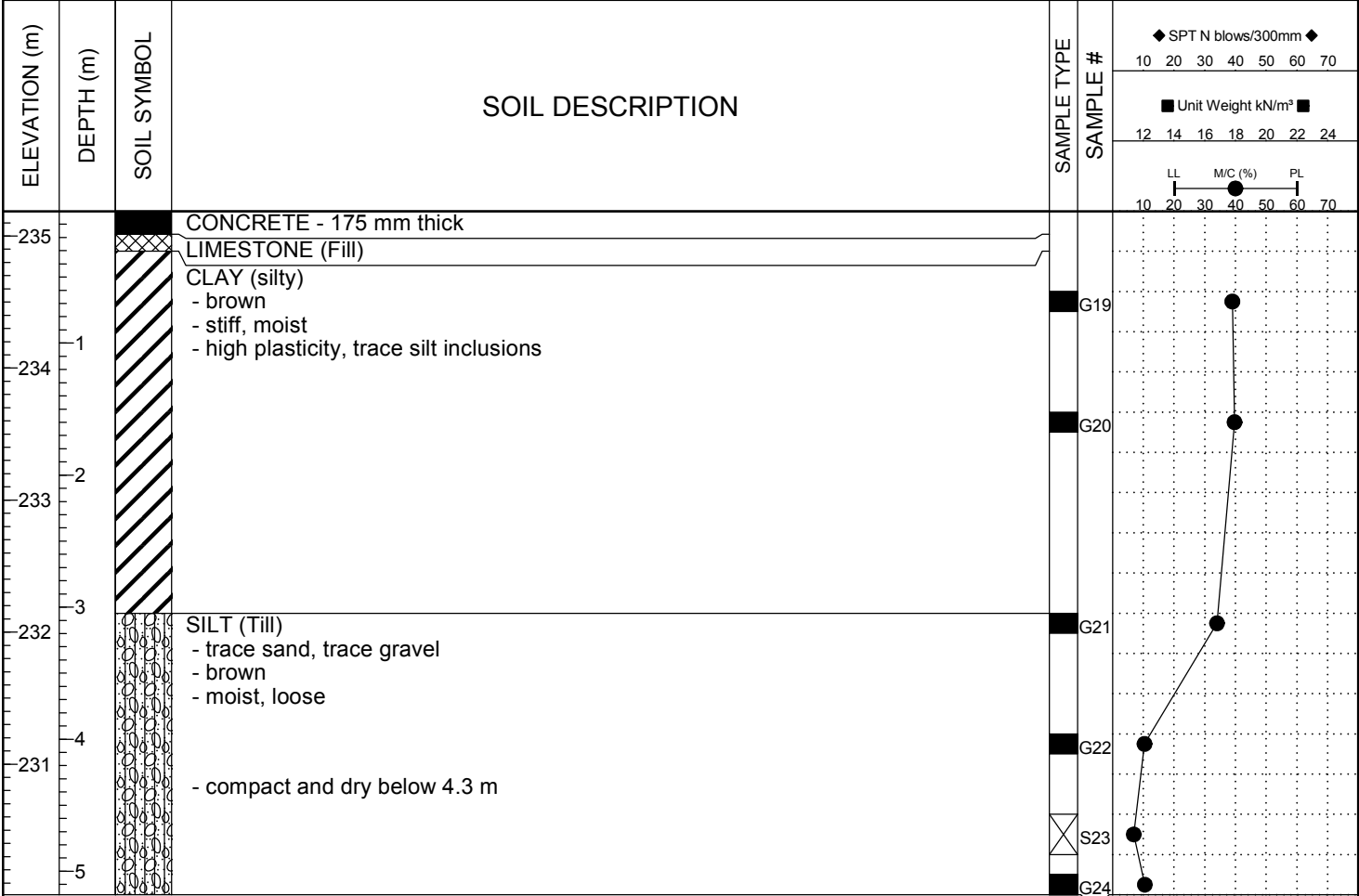
Notes:
1. Frost to 1.5 m.
2. No sloughing or seepage observed.
3. Test hole backfilled with auger cuttings and bentonite chips.

BH GEOTECH PLOTS - NEW ALT.1 143691 5A - WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 28/11/15

DYREGROV ROBINSON INC.
Consulting Geotechnical Engineers

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| LOGGED BY: WG | COMPLETION DEPTH: 4.88 m |
| REVIEWED BY: GR | COMPLETION DATE: 25/2/15 |
| PROJECT ENGINEER: Gil Robinson | |

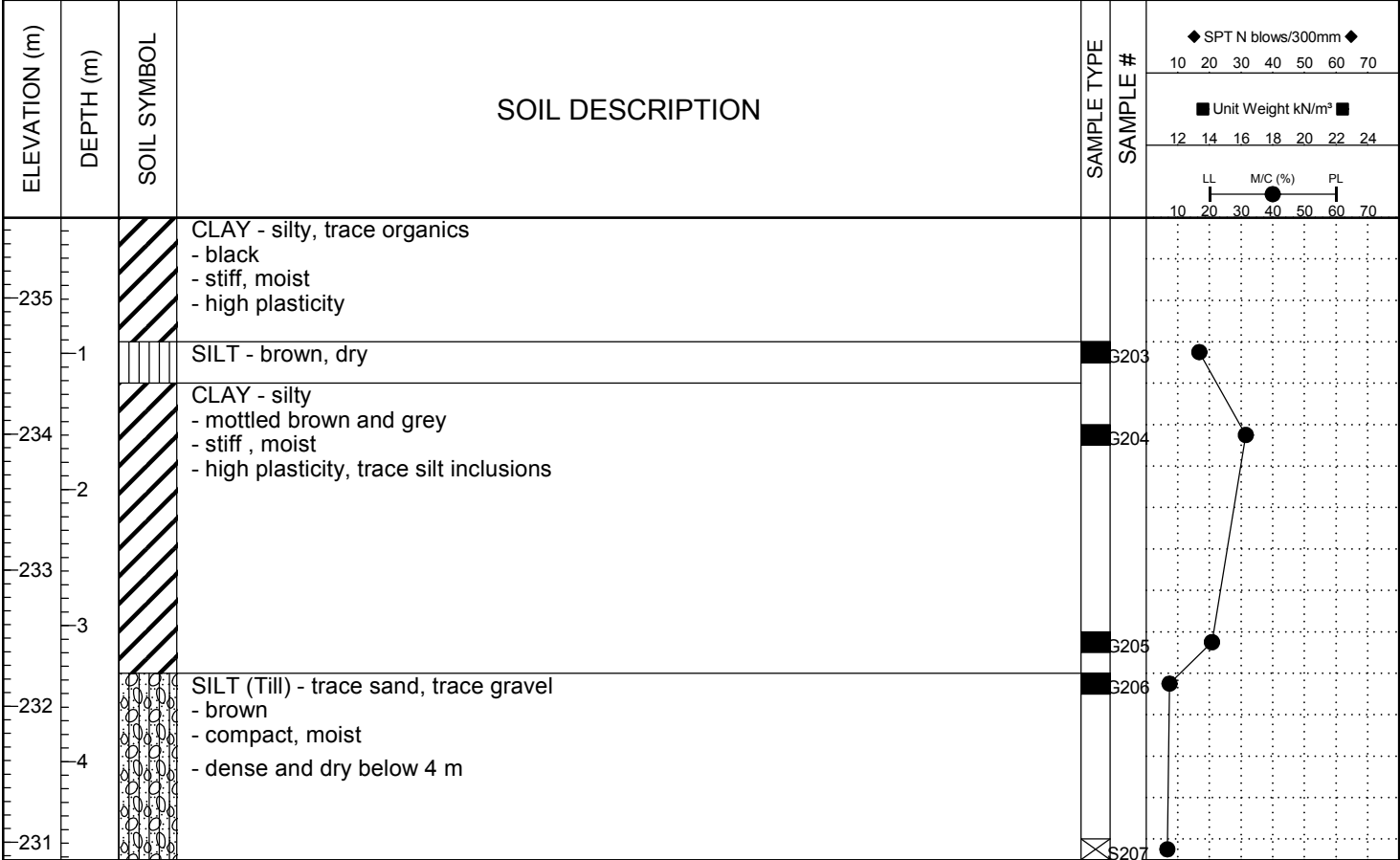
| | | |
|--|---|------------------------|
| PROJECT: Ferry Road & Riverbend CSR Works | CLIENT: Tetra Tech WEI | TESTHOLE NO: 15-135 |
| LOCATION: Riverbend Crescent - UTM 5526699 N, 628737 E | | PROJECT NO.: 143691 |
| CONTRACTOR: Paddock Drilling Ltd. | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | ELEVATION (m): 235.344 |
| SAMPLE TYPE | <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE | |
| BACKFILL TYPE | <input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND | |



BH GEOTECH PLOTS - NEW ALT.1 143691 5A - WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 28/11/15

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| DYREGROV ROBINSON INC. Consulting Geotechnical Engineers | LOGGED BY: WG | COMPLETION DEPTH: 5.18 m |
| | REVIEWED BY: GR | COMPLETION DATE: 25/2/15 |
| | PROJECT ENGINEER: Gil Robinson | |

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|--|---|------------------------|
| PROJECT: Ferry Road & Riverbend CSR Works | CLIENT: Tetra Tech WEI | TESTHOLE NO: 15-136 |
| LOCATION: Riverbend Crescent - UTM 5526580 N, 628745 E | | PROJECT NO.: 143691 |
| CONTRACTOR: Paddock Drilling Ltd. | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | ELEVATION (m): 235.748 |
| SAMPLE TYPE | <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE | |
| BACKFILL TYPE | <input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND | |

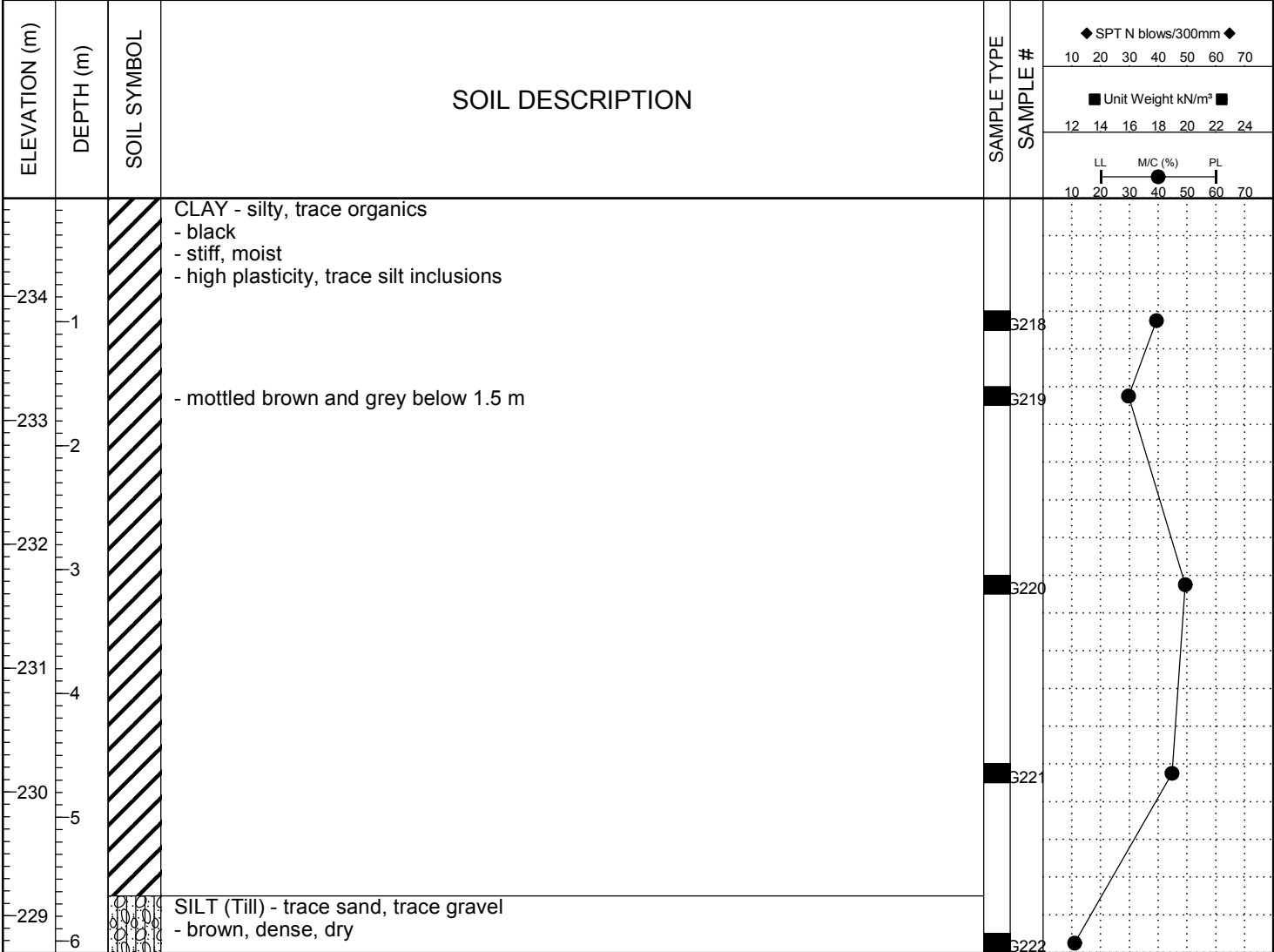


END OF TEST HOLE AT 4.7 m IN SILT (TILL) (AUGER REFUSAL)
 Notes:
 1. Frost to 1.5 m.
 2. No sloughing or seepage observed.
 3. Test hole backfilled with auger cuttings and bentonite chips.
 4. Cold patch placed over core.

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|--|--------------------------------|--------------------------|
| DYREGROV ROBINSON INC. Consulting Geotechnical Engineers | LOGGED BY: CR | COMPLETION DEPTH: 4.72 m |
| | REVIEWED BY: GR | COMPLETION DATE: 18/2/15 |
| | PROJECT ENGINEER: Gil Robinson | |

| | | | | | | |
|---|-----------|--|-------------|-----------------------|-------------|------|
| PROJECT: Ferry Road & Riverbend CSR Works | | CLIENT: Tetra Tech WEI | | TESTHOLE NO: 15-137 | | |
| LOCATION: Garden Road - UTM 5526716 N, 628816 E | | | | PROJECT NO.: 143691 | | |
| CONTRACTOR: Paddock Drilling Ltd. | | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | | ELEVATION (m): 234.95 | | |
| SAMPLE TYPE | GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE |
| BACKFILL TYPE | BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND |



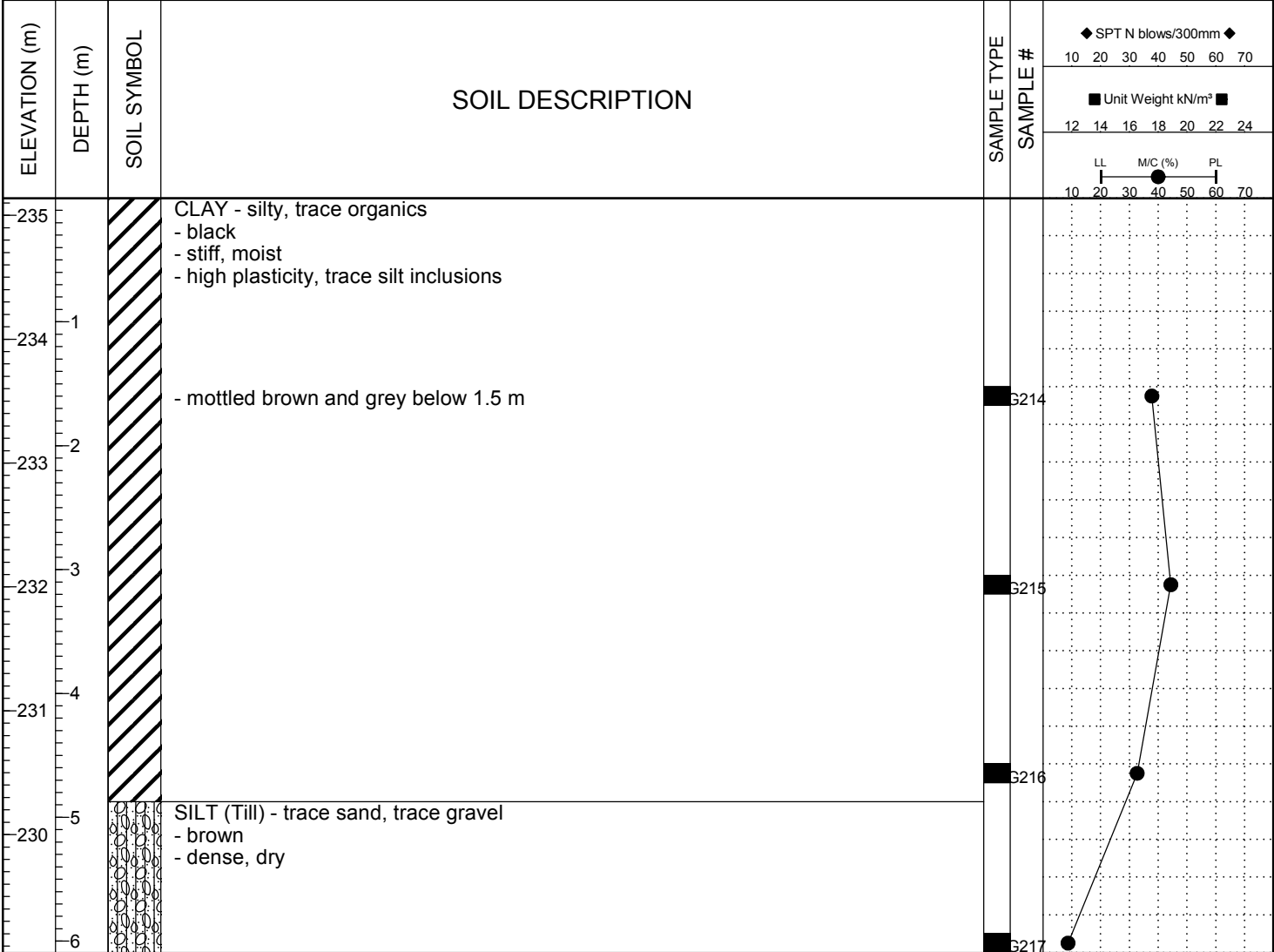
END OF TEST HOLE AT 6.1 m IN SILT (TILL) (AUGER REFUSAL)
Notes:
1. Frost to 1.5 m.
2. No sloughing or seepage observed.
3. Test hole backfilled with auger cuttings and bentonite chips.
4. Cold patch placed over core.

BH GEOTECH PLOTS - NEW ALT1 143691 5A - WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 28/11/15

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Consulting Geotechnical Engineers

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|--------------------------------|--------------------------|
| LOGGED BY: CR | COMPLETION DEPTH: 6.10 m |
| REVIEWED BY: GR | COMPLETION DATE: 18/2/15 |
| PROJECT ENGINEER: Gil Robinson | |

| | | |
|---|--|------------------------|
| PROJECT: Ferry Road & Riverbend CSR Works | CLIENT: Tetra Tech WEI | TESTHOLE NO: 15-138 |
| LOCATION: Garden Road - UTM 5526661 N, 628817 E | | PROJECT NO.: 143691 |
| CONTRACTOR: Paddock Drilling Ltd. | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | ELEVATION (m): 235.295 |
| SAMPLE TYPE | <input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE | |
| BACKFILL TYPE | <input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND | |



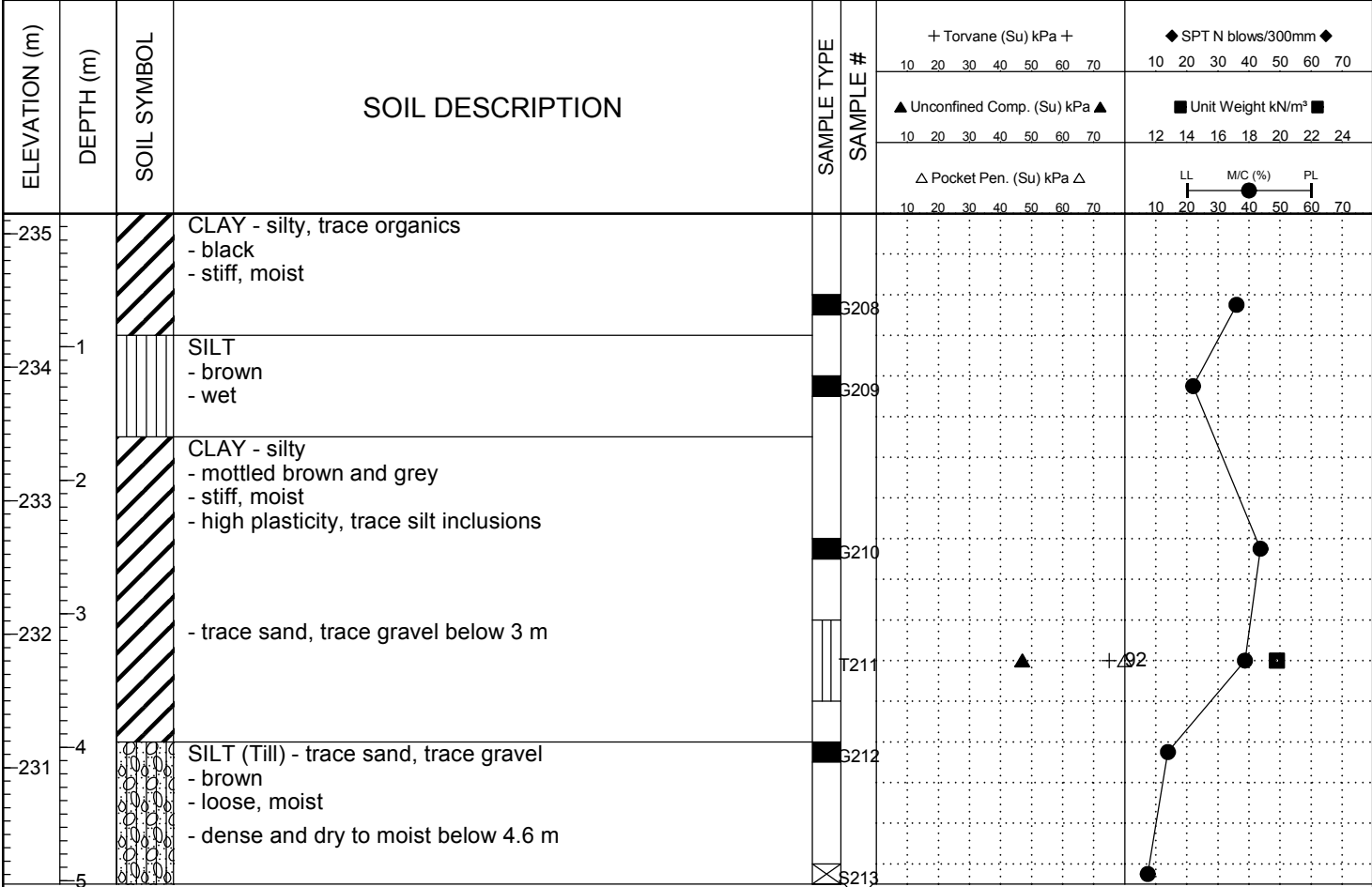
END OF TEST HOLE AT 6.1 m IN SILT (TILL) (AUGER REFUSAL)
Notes:
1. Frost to 1.5 m.
2. No sloughing or seepage observed.
3. Test hole backfilled with auger cuttings and bentonite chips.
4. Cold patch placed over core.

BH GEOTECH PLOTS - NEW ALT1 143691 5A - WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 28/11/15

DYREGROV ROBINSON INC.
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|--------------------------------|--------------------------|
| LOGGED BY: CR | COMPLETION DEPTH: 6.10 m |
| REVIEWED BY: GR | COMPLETION DATE: 18/2/15 |
| PROJECT ENGINEER: Gil Robinson | |

| | | |
|--|--|------------------------|
| PROJECT: Ferry Road & Riverbend CSR Works | CLIENT: Tetra Tech WEI | TESTHOLE NO: 15-139 |
| LOCATION: Riverbend Crescent - UTM 5526606 N, 628830 E | | PROJECT NO.: 143691 |
| CONTRACTOR: Paddock Drilling Ltd. | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | ELEVATION (m): 235.308 |
| SAMPLE TYPE | <input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE | |
| BACKFILL TYPE | <input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND | |

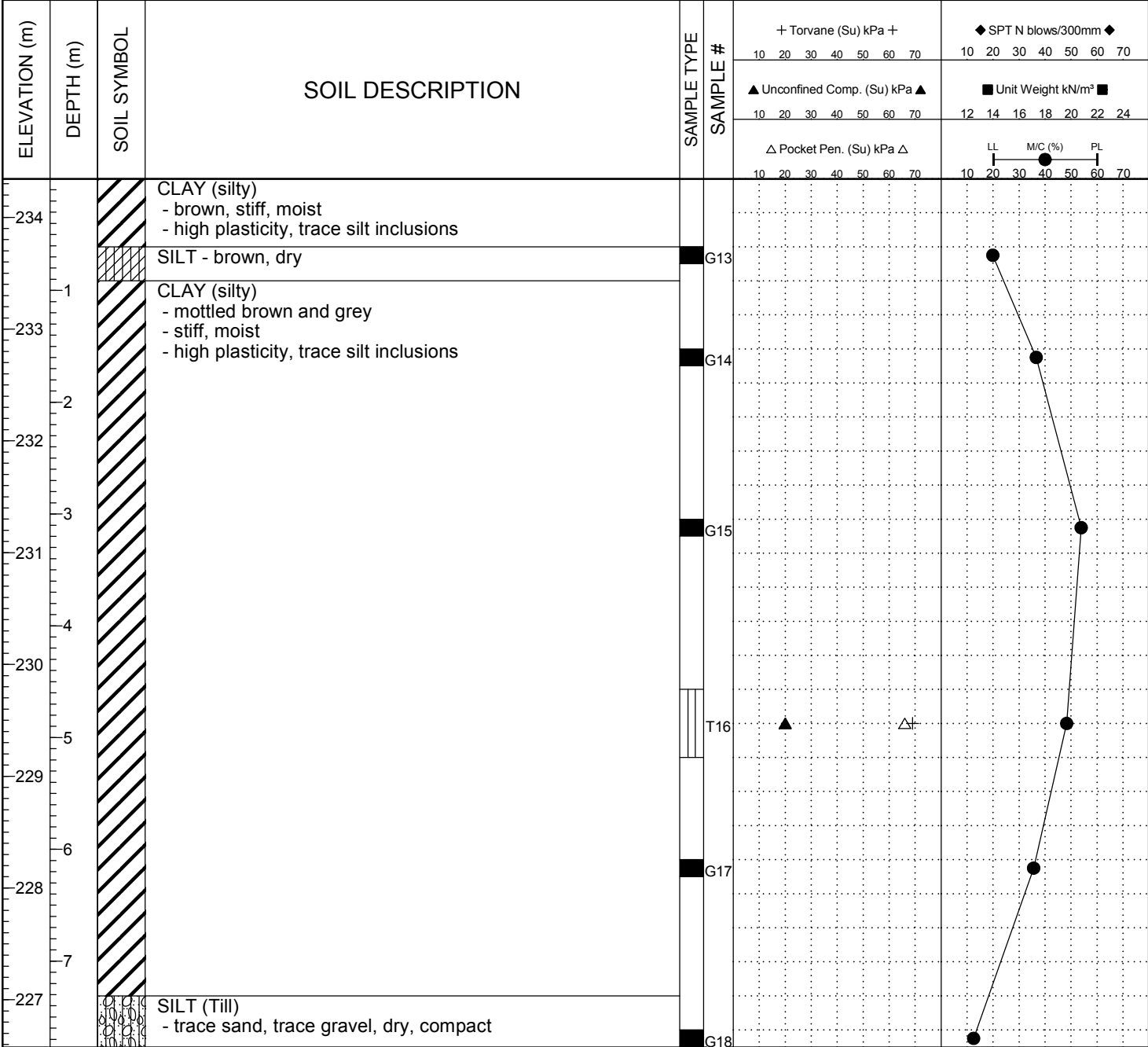


END OF TEST HOLE AT 5 m IN SILT (TILL) (AUGER REFUSAL)
Notes:
1. Frost to 1.5 m.
2. No sloughing or seepage observed.
3. Test hole backfilled with auger cuttings and bentonite chips.
4. Cold patch placed over core.

BH GEOTECH PLOTS - NEW ALT.1 143691 5A - WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 28/11/15

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|--|--------------------------------|--------------------------|
| DYREGROV ROBINSON INC. Consulting Geotechnical Engineers | LOGGED BY: CR | COMPLETION DEPTH: 5.03 m |
| | REVIEWED BY: GR | COMPLETION DATE: 18/2/15 |
| | PROJECT ENGINEER: Gil Robinson | |

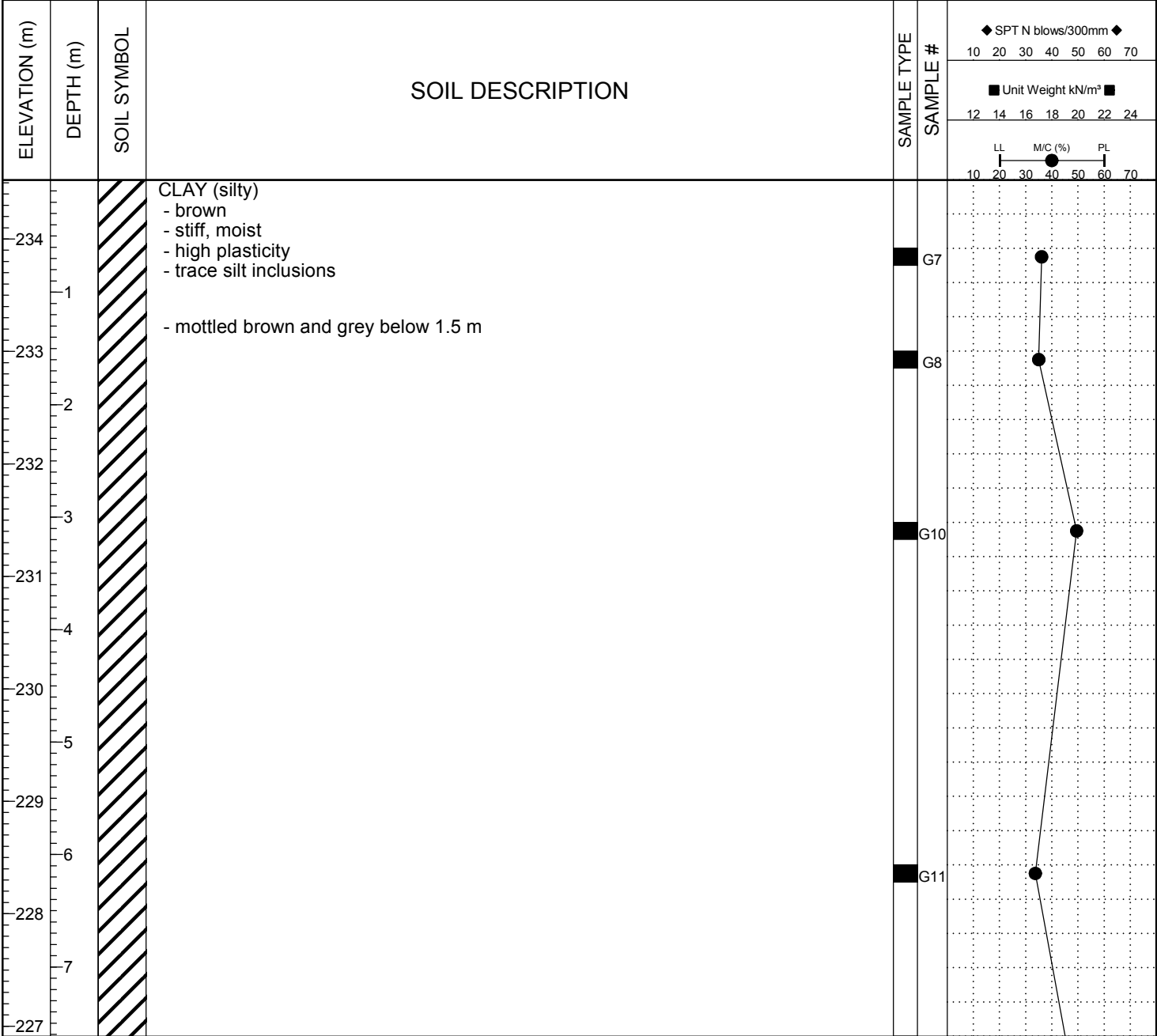
| | | |
|--|--|----------------------|
| PROJECT: Ferry Road & Riverbend CSR Works | CLIENT: Tetra Tech WEI | TESTHOLE NO: 15-140 |
| LOCATION: Riverbend Crescent - UTM 5526741 N, 628899 E | | PROJECT NO.: 143691 |
| CONTRACTOR: Paddock Drilling Ltd. | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | ELEVATION (m): 234.5 |
| SAMPLE TYPE | <input type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE | |
| BACKFILL TYPE | <input type="checkbox"/> BENTONITE <input type="checkbox"/> GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> CUTTINGS <input type="checkbox"/> SAND | |



END OF TEST HOLE AT 7.8 m IN SILT (TILL)
Notes:
1. No sloughing or seepage observed.
2. Test hole backfilled with auger cuttings and bentonite chips.
3. Frost to 1.5 m.

BH GEOTECH PLOTS - NEW ALT1 143691 5A_WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 28/11/15

| | | | | | | |
|--|-----------|--|-------------|------------------------|-------------|------|
| PROJECT: Ferry Road & Riverbend CSR Works | | CLIENT: Tetra Tech WEI | | TESTHOLE NO: 15-141 | | |
| LOCATION: Riverbend Crescent - UTM 5526690 N, 628902 E | | | | PROJECT NO.: 143691 | | |
| CONTRACTOR: Paddock Drilling Ltd. | | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | | ELEVATION (m): 234.681 | | |
| SAMPLE TYPE | GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE |
| BACKFILL TYPE | BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND |



END OF TEST HOLE AT 7.6 m IN CLAY

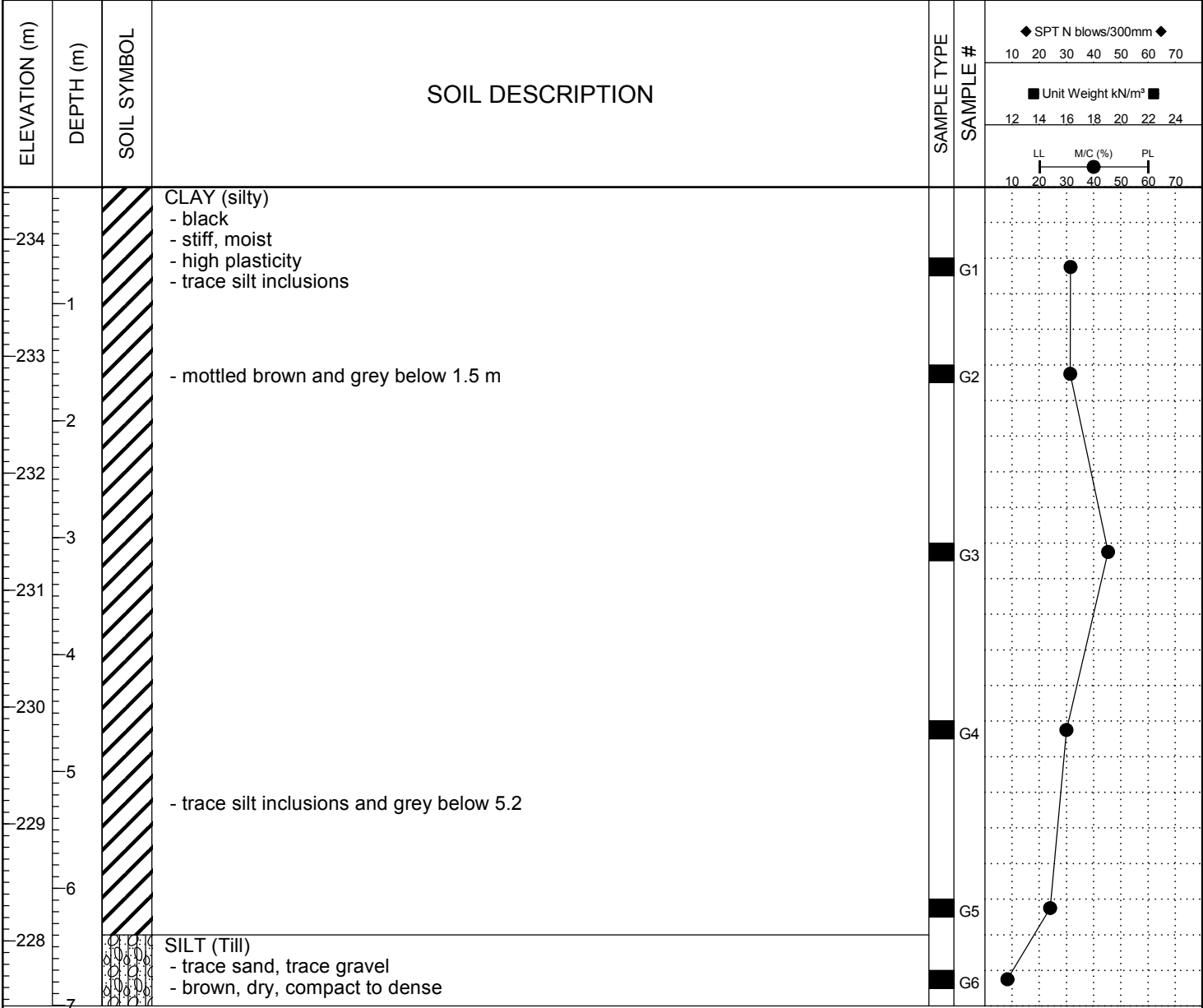
- Notes:
1. Frost to 1.5 m.
 2. No sloughing or seepage observed.
 3. Test hole backfilled with auger cuttings and bentonite chips.

BH GEOTECH PLOTS - NEW ALT1 143691 5A_WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 28/11/15

DYREGROV ROBINSON INC.
 Consulting Geotechnical Engineers

| | |
|--------------------------------|--------------------------|
| LOGGED BY: WG | COMPLETION DEPTH: 7.62 m |
| REVIEWED BY: GR | COMPLETION DATE: 25/2/15 |
| PROJECT ENGINEER: Gil Robinson | |

| | | | | | | |
|--|-----------|--|-------------|------------------------|-------------|------|
| PROJECT: Ferry Road & Riverbend CSR Works | | CLIENT: Tetra Tech WEI | | TESTHOLE NO: 15-142 | | |
| LOCATION: Riverbend Crescent - UTM 5526608 N, 628898 E | | | | PROJECT NO.: 143691 | | |
| CONTRACTOR: Paddock Drilling Ltd. | | METHOD: BRAT 22R - drill rig, 125 mm SS Augers | | ELEVATION (m): 234.603 | | |
| SAMPLE TYPE | GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE |
| BACKFILL TYPE | BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND |



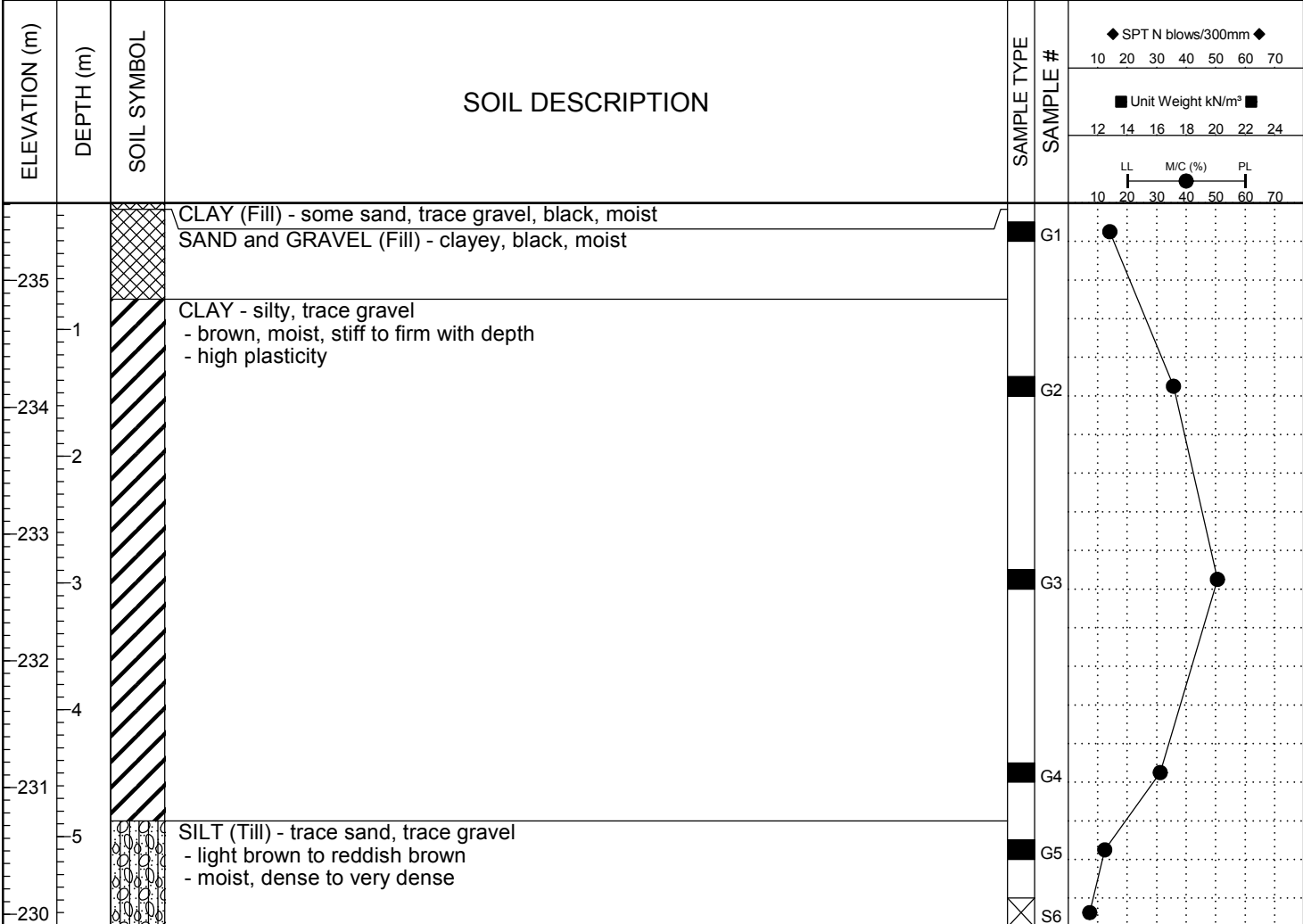
END OF TEST HOLE AT 7.0 m IN SILT (TILL) (AUGER REFUSAL)
Notes:
1. Frost to 1.5 m.
2. No sloughing or seepage observed.
3. Test hole backfilled with auger cuttings and bentonite chips.

BH GEOTECH PLOTS - NEW ALT1 143691 5A - WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 28/11/15

DYREGROV ROBINSON INC.
Consulting Geotechnical Engineers

| | |
|--------------------------------|--------------------------|
| LOGGED BY: WG | COMPLETION DEPTH: 7.01 m |
| REVIEWED BY: GR | COMPLETION DATE: 25/2/15 |
| PROJECT ENGINEER: Gil Robinson | |

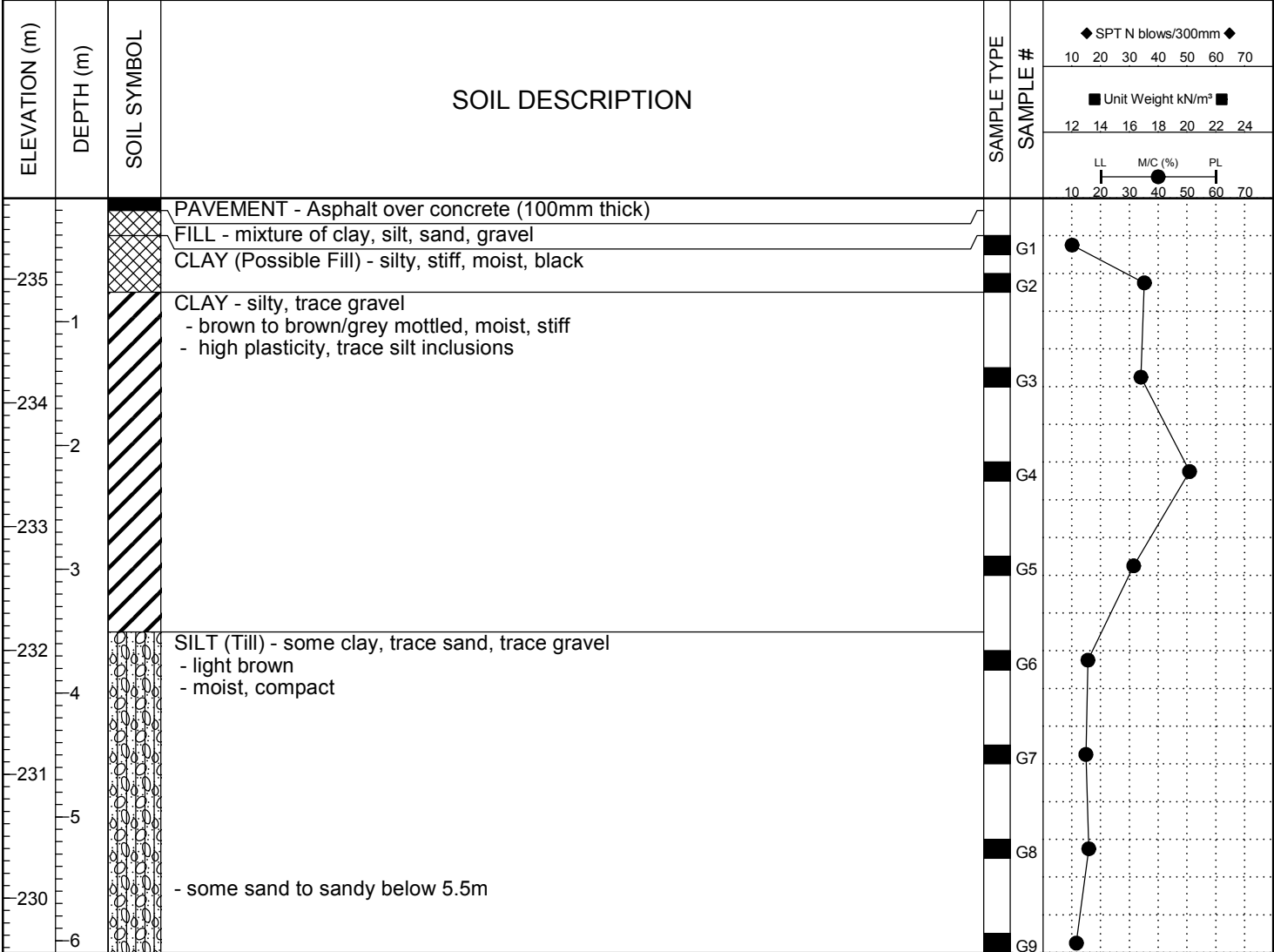
| | | | | | | |
|---|-----------|--|-------------|------------------------|-------------|------|
| PROJECT: Ferry Road & Riverbend CSR Works Contract 5e | | CLIENT: Tetra Tech WEI | | TEST HOLE NO: 16-143 | | |
| LOCATION: Portage Avenue: 5,526,696 N, 628,633 E | | | | PROJECT NO.: 143691 | | |
| CONTRACTOR: Paddock Drilling Ltd. | | METHOD: ACKER SS drill rig, 125 mm SS Augers | | ELEVATION (m): 235.625 | | |
| SAMPLE TYPE | GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE |
| BACKFILL TYPE | BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND |



END OF TEST HOLE AT 5.7 m IN SILT (TILL) (AUGER REFUSAL)
Notes:
1. No sloughing or seepage observed.
2. Test hole backfilled with auger cuttings and bentonite chips.

BH GEOTECH PLOTS-AUGUST 2013 - AUGUST 2, 2013.GDT 15/9/16

| | | | | | | |
|---|-----------|---|-------------|-----------------------------|-------------|------|
| PROJECT: Ferry Road & Riverbend CSR Works Contract 5e | | CLIENT: Tetra Tech WEI | | TEST HOLE NO: 16-144 | | |
| LOCATION: Berry St.: 5,526,760 N, 628,498 E | | | | PROJECT NO.: 143691 | | |
| CONTRACTOR: Paddock Drilling Ltd. | | METHOD: ACKER MP8 drill rig, 125 mm SS Augers | | ELEVATION (m): 235.667 | | |
| SAMPLE TYPE | GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE |
| BACKFILL TYPE | BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND |



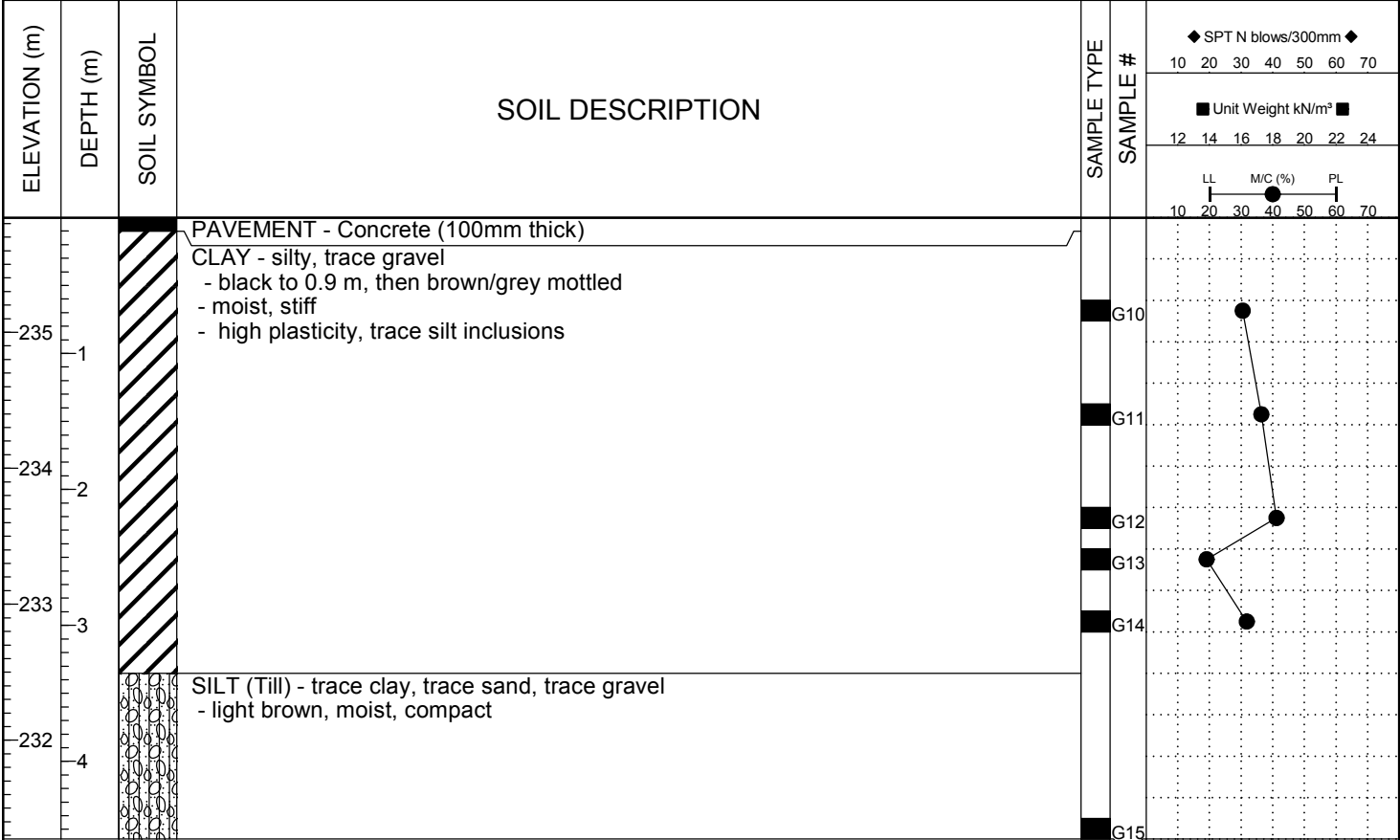
END OF TEST HOLE AT 6.1 m IN SILT (TILL)

Notes:

1. No sloughing or seepage observed.
2. Test hole backfilled with auger cuttings and bentonite chips.
Pavement surface patched with cold mix asphalt.

BH GEOTECH PLOTS-AUGUST 2013 143691 5A WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 16/9/16

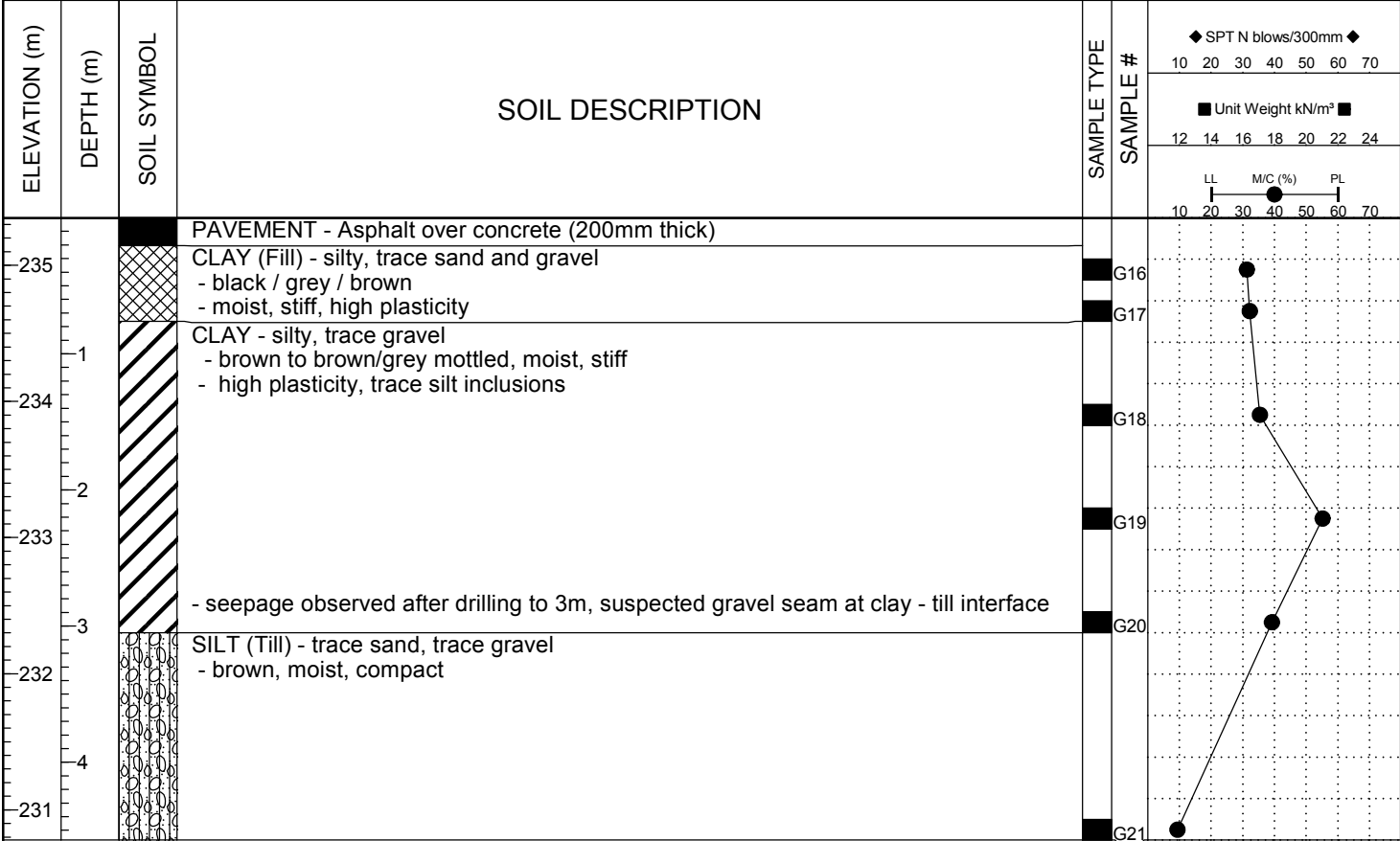
| | | | | | |
|---|---|---|--------------------------------------|--------------------------------|--------------------------------------|
| PROJECT: Ferry Road & Riverbend CSR Works Contract 5e | | CLIENT: Tetra Tech WEI | | TEST HOLE NO: 16-145 | |
| LOCATION: Brooklyn St.: 5,526,770 N, 628,584 E | | | | PROJECT NO.: 143691 | |
| CONTRACTOR: Paddock Drilling Ltd. | | METHOD: ACKER MP8 drill rig, 125 mm SS Augers | | ELEVATION (m): 235.856 | |
| SAMPLE TYPE | <input checked="" type="checkbox"/> GRAB | <input type="checkbox"/> SHELBY TUBE | <input type="checkbox"/> SPLIT SPOON | <input type="checkbox"/> BULK | <input type="checkbox"/> NO RECOVERY |
| BACKFILL TYPE | <input checked="" type="checkbox"/> BENTONITE | <input type="checkbox"/> GRAVEL | <input type="checkbox"/> SLOUGH | <input type="checkbox"/> GROUT | <input type="checkbox"/> CUTTINGS |
| | | | | <input type="checkbox"/> CORE | <input type="checkbox"/> SAND |



END OF TEST HOLE AT 4.6 m IN SILT (TILL)
Notes:
1. No sloughing or seepage observed.
2. Test hole backfilled with auger cuttings and bentonite chips.
Pavement surface patched with cold mix asphalt.

BH GEOTECH PLOTS-AUGUST 2013 - 143691 5A WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 16/9/16

| | | | | | |
|---|-----------|---|-------------|------------------------|-------------|
| PROJECT: Ferry Road & Riverbend CSR Works Contract 5e | | CLIENT: Tetra Tech WEI | | TEST HOLE NO: 16-146 | |
| LOCATION: King Edward St.: 5,526,763 N, 628,663 E | | | | PROJECT NO.: 143691 | |
| CONTRACTOR: Paddock Drilling Ltd. | | METHOD: ACKER MP8 drill rig, 125 mm SS Augers | | ELEVATION (m): 235.361 | |
| SAMPLE TYPE | GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY |
| BACKFILL TYPE | BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS |



END OF TEST HOLE AT 4.6 m IN SILT (TILL)
 Notes:
 1. No sloughing, trace seepage at 3m from suspected gravel seam.
 2. Test hole backfilled with auger cuttings and bentonite chips.
 Pavement surface patched with cold mix asphalt.

BH GEOTECH PLOTS-AUGUST 2013 143691 5A WINSTON AND AREA.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 16/9/16