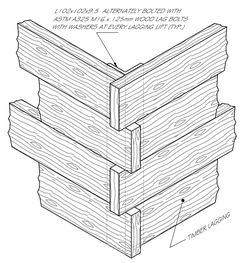
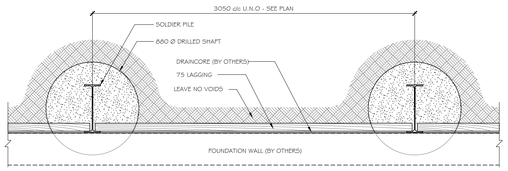
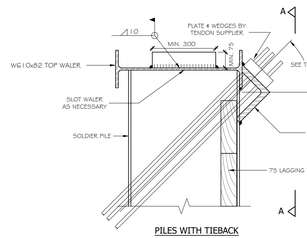


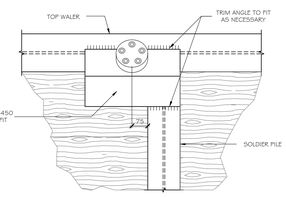
01 SH3 TYPICAL LAGGING BASKET WEAVE DETAIL
SCALE N.T.S.



TYPICAL SOLDIER PILE & LAGGING DETAIL
SCALE 1:20

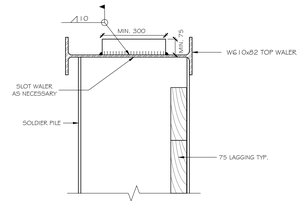


PILES WITH TIEBACK



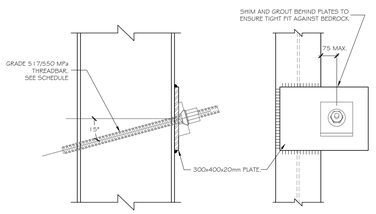
VIEW A - A

ALL WELDS SHOWN OR IMPLIED TO BE 10mm FILLET UNLESS NOTED OTHERWISE.



PILES WITHOUT TIEBACK

TYPICAL TIEBACK/TOP WALER CONNECTION DETAIL FOR SOLDIER PILE AND LAGGING
SCALE 1:10



THREADBAR CONNECTION DETAIL AT BEDROCK
SCALE 1:10

NOTES

A. REFERENCE DRAWINGS, CODES AND STANDARDS

1. Architectural Drawings A201-A212, Project no. 15-125, received on 04 August, 2017 and A200-A205, Project no. 17-135, received on August 08, 2017, prepared by Core Architects Inc.
2. Topographic Survey Drawing "15-2875K02-Exp(Jun09,2017) - MMM Modified (1).dwg" received on August 04, 2017.
3. Services Drawing "10053-Sew.dwg" received from MMM Group on May 04, 2017.
4. Utility Plans UP1-UP7, dated April 2012, prepared by W5P, received on October 6, 2017.
5. Geotechnical Reports, file no. G-4170-11 and G-4170-12, dated June , 2017, prepared by McClymont & Rak Engineers Inc.
6. SUE Plan "M-City_SUE.dwg" prepared by Urban X, dated 27 Sept. 2017.
7. CSA S16-14 Design of Steel Structures
8. CSA A23.1-14 Concrete Materials and Methods of Concrete Construction
9. CSA A23.2-14 Test Methods and Standard Practices for Concrete
10. CSA A23.3-14 Design of Concrete Structures
11. PTI DC35.1-14 Recommendations for Prestressed Rock and Soil Anchors
12. PTI M55.1-12 Specification for Grouting of Post-Tensioned Structures
13. Segments of the Canadian National Building Code 2015 (CNBC)
14. Segments of the Canadian Highway Bridge Design Code CSA S6-14 (CHBDC)
15. Segments of the Ontario Building Code (OBC) 2012
16. Segments of the Canadian Foundation Engineering Manual (CFEM) 4th Edition

B. DESIGN ASSUMPTIONS

1. The current design scheme illustrates a temporary excavation shoring system capable of supporting between 2.0m and 5.5m of overburden soil.
2. The current design is based upon the assumption that the assumed existing structure foundation configurations, elevations and loads indicated on the shoring drawings are correct. Should any or all of these assumptions change, redesign of the shoring may be required. See General Notes.
3. Shoring systems are intended to be temporary structures and have a limited design life. Design assumes the permanent lateral structure will be capable of replacing the temporary shoring within one year of commencement of excavation.

C. DESIGN PARAMETERS

1. Active lateral earth pressure coefficient, ka = 0.28
2. Bulk unit weight of soil, γ = 21 kN/m3
3. General surcharge loading, q = 12 kPa
4. Groundwater table assumed to be below influence of bulk excavation and/or shoring toes. Therefore no hydrostatic pressures are considered in the design. Engineered dewatering systems may be required. See General Notes.
5. Tieback design based on achieving an adhesion of 620kPa in sound bedrock. Tieback design is subject to the following conditions:
   i. Anchor alternatives are subject to review by the Shoring Engineer.
   ii. Adhesion capacity to be confirmed by 200% Design Load (DL) performance test tiebacks as noted on the drawing elevations.
   iii. All production anchors are to be proof-tested to 133% DL.
   iv. Shoring Engineer to witness all tieback testing. Provide 24 hours' notice to the Shoring Engineer prior to tieback testing.
   v. Shoring Contractor to provide sufficient number of cable strands (or solid bar cross-sectional area) to facilitate all 200% DL performance tests.
   vi. Shoring Contractor to provide calibrated hydraulic test jacks and any and all assistance required by the Shoring Engineer to carry out all tieback testing.
6. Supermormal loads applied to the shoring system, other than those indicated on these drawings, are subject to review by the Shoring Engineer. Supermormal loads may include, but are not limited to; tracked and/or vehicles utilizing outrigger pads such as excavators, mobile cranes, and concrete pump trucks.

D. MATERIALS

1. Structural Steel:
   i. Structural steel to be new our sound material conforming to CAN/CSA G40.20-13/G40.21-13, grade 350W
   ii. Alternative grades or sections of equivalent strength/stiffness may be substituted subject to the Shoring Engineer's approval.
   iii. All welding to comply with the latest version of CSA W59 and CSA S16.1
   iv. All welding to be carried out by a CWB W47.1 certified company with CWB certified welders.
   v. All welds shown or implied on this drawing set are to be 10mm fillet, all around and both sides, unless noted otherwise.
2. Concrete:
   i. Soldier Pile & Lagging: 20 MPa pile toes and 0.4 MPa unshrinkable fill above.
   ii. Concrete exposure class N for all concrete elements.
   iii. The use of down-the-hole mixed toes utilizing Portland cement bags is not permitted.
3. Strand Tieback Anchors:
   i. Strand anchors shall consist of 0.6" dia. 7-wire grade 1861 MPa strand conforming to ASTM A416 (bare strand) or ASTM A882 (epoxy coated strand).
   ii. Number of strands is determined by dividing design load (DL) by 60% of ultimate tensile load (Fu x As) to allow for 133% proof-stressing in accordance with the applicable stressing standards
   iii. Centralizers shall be provided at minimum 6m spacing.
   iv. Tieback grout:
      1. Minimum compressive strength 25 MPa.
      2. Use of High Early strength grout is not recommended.
      3. Water-cement ratio between 0.45 and 0.5.
4. Threadbar Tieback Anchors:
   i. Threadbar anchors shall consist of grade 517 MPa for #14 bars and grade 550MPa for #18 bars conforming to CSA G30.18 and ASTM A615.
   ii. Minimum bar area is equal to the greater of yield load (Fy x As) and 60% of ultimate tensile load (Fu x As) to allow for 133% proof-stressing.
   iii. Centralizers shall be provided at minimum 6m spacing.
   iv. Tieback grout:
      1. Minimum compressive strength 25 MPa.
      2. Use of High Early strength grout is not recommended.
      3. Water-cement ratio between 0.45 and 0.5.
5. Timber lagging:
   i. Typical 3050mm bays to be lagged with 75mm thick hardwood boards, unless noted otherwise.
   ii. Bays up to 3650mm long must be lagged with 100mm thick hardwood boards, unless noted otherwise.
   iii. Pressure treated lagging may be required. See drawing elevations.
   iv. Lagging alternatives may be substituted subject to the Shoring Engineer's approval.

E. GENERAL NOTES

1. General Contractor to verify the configuration and elevation of all existing adjacent structure foundations during the demolition phase of the work. Report same prior to start of shoring installation to Shoring Engineer. Reduce grade to top of shoring piles as part of site preparation work.
2. Owner to secure encroachment agreements and municipal permits where shoring components extend beyond project property boundaries.
3. Owner/General Contractor to provide and maintain an engineered working platform suitable for shoring construction equipment, certified in accordance with O. Reg. 213/91 as amended, s. 156.1-156.9.
4. Demolition/Excavation Contractor to excavate in advance to remove any underground obstructions interfering with the shoring system layout. Backfill with suitable engineered fill or lean concrete as appropriate.
5. Utilities shown on the shoring drawings are schematic in nature and are based on utility drawings listed under Section 'A' above. G.C. to locate and identify all underground and overhead services within the influence of the shoring; protect and/or relocate as necessary.
6. Advise Shoring Engineer of any potential interference with elements of the excavation shoring system that may require redesign. Report any discrepancies to the Shoring Engineer.
7. Project Surveyor to lay out pile locations and check all dimensions against Architectural Drawings. Report any discrepancies to the Shoring Engineer.
8. Shoring Contractor to set piles within a 25mm construction tolerance of theoretical pile locations as laid out by Project Surveyor.
9. Verticality tolerance of piles to be within 0.5% of excavation height.
10. Dewater as necessary to at least 1.0m below the base of excavation in advance of all excavation stages.
11. Excavator to bulk in lifts per project procedures, never over-excavating beyond design or Shoring Contractor's requirements.
12. Excavator to report any wall breaches or signs of structural distress (cracking, bending, buckling) immediately. Backfill and berm material at any such location and report to Shoring Engineer prior to carrying on with further excavation in the area.
13. Excavator to exercise caution when digging within 1000mm of stressed anchors/struts/rakers.

F. PROCEDURE

1. Drill holes for piles, utilizing temporary liners, drilling slurry/treme methods, and/or other techniques as necessary to prevent groundwater infiltration or loss of soil.
2. Provide drill holes large enough that piles may be set plumb despite the misalignment of drill holes.
3. Set piles, wedge and fill holes with specified concrete. Withdraw temporary liners if used.
4. Ensure caisson wall shafts have minimum interlock as specified at grade such that interlock exists at depth, cognizant of verticality tolerance. Advise Shoring Engineer of any deficiencies immediately.
5. Excavate in stages to suit shoring work.
6. Excavation Contractor to shave caissons to front face of soldier pile, or as directed by General Contractor.
7. Install lagging in maximum 1200mm lifts. Should caving or raveling occur, reduce lift height as appropriate. Fill all voids behind lagging with granular fill rammed in place. Leave no vertical excavation open overnight.
8. In wet ground provide spacers to create 10mm gaps between individual lagging boards, place filter material behind lagging to allow passage of water without loss of soil fines.
9. Do not excavate more than 500mm below brace elevations until bracing is installed and/or stressed.
10. Shoring Contractor to select tieback drilling methods to prevent ground loss.
11. When grouting tiebacks, if grout takes are observed to be abnormally higher than theoretical volume, cease work and notify appropriate site personnel and Shoring Engineer immediately.
12. Install 1 test tieback in advance with additional strand/bar area to facilitate 200% Design Load (DL) performance testing. Production tieback lengths may require modification based on test results.
13. Proof stress all production tiebacks to 133% DL, hold for ten minutes and lock in at DL. Halt stressing if pile moves out of site more than 10mm, unless otherwise directed by Shoring Engineer.
14. Maintain stickup of 600mm for tieback strands/bars to allow for re-stressing if necessary to control lateral movements, prior to build-back of permanent structure.
15. Lateral brace removals, if required, are to be made only after structural slabs and walls immediately below brace elevation are constructed to design strength. Removal circumstances vary on a case-by-case basis and shall be reviewed by the Shoring Engineer and Structural Engineer.

G. FIELD REVIEW AND MONITORING

1. Carry out pre- & post-construction condition survey of all structures within the influence of excavation shoring systems.
2. Monitor vibration levels at structures within the influence of excavation shoring systems during entirety of shoring installation and excavation work.
3. Monitor movement of shoring system through construction at least once per week during active excavation in accordance with City of Toronto requirements. Report results promptly to Shoring Engineer.
4. Provide and monitor a minimum of 2 inclinometers.
5. All monitoring reports to be distributed promptly to project team as directed by Owner and to include at a minimum the Shoring Engineer and Shoring Contractor.

H. WINTER PROTECTION BY GENERAL CONTRACTOR

1. Protect shoring and/or slope faces from the effects of frost.
2. Provide protection at existing buildings to prevent effects of frost.
3. Minimum R8 frost blankets must be available on site by November 1st, should their placement become necessary. Heating may be required to combat manifested frost effects.

I. HEALTH AND SAFETY

1. All work to be carried out in accordance with the latest version of the Occupational Health and Safety Act.
2. Fall prevention measures (guard rails or equivalent, designed in accordance with OHSA requirements) shall be placed around entire shoring perimeter to allow access to top of shoring for inspection and/or monitoring. In certain cases, General Contractor may be required to provide safe access to top of shoring walls by installing temporary pedestrian decking.

NO	DATE	REMARKS
3	06 NOVEMBER 2017	ISSUED FOR PERMIT/TENDER - ALTERNATE DESIGN
2	06 NOVEMBER 2017	ISSUED FOR PERMIT/TENDER
1	17 AUGUST 2017	ISSUED FOR PERMIT

REVISIONS

LEGEND

- TPE — EXTENDED PERFORMANCE TEST 200% FOR 12 HOURS
- TP — PERFORMANCE TEST 200%
- APPROXIMATE BOREHOLE LOCATION
- APPROXIMATE TEST PIT LOCATION
- INCLINOMETER
- STRUCTURALLY LOADED SHORING
- EXISTING SHORING

SERVICE LOCATIONS INDICATED ON SHORING DRAWINGS ARE PROVIDED FOR COORDINATION PURPOSES ONLY.

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Client

URBAN CAPITAL PROPERTY GROUP
17 NELSON STREET
TORONTO, ONTARIO

Job Title

M CITY, PHASE I & II
3980 BURNHAMTHORPE RD
MISSISSAUGA, ONTARIO

Sheet Title

EXCAVATION SHORING DETAILS AND NOTES

Seal

LICENSED PROFESSIONAL ENGINEER
M.A. PORCO
100175817
PROVINCE OF ONTARIO

North

Terraprobe Inc.
Engineering Solutions
11 Indell Lane
Brampton, ON L6T 3Y3
Tel: (905) 796-2650
Fax: (905) 796-2250

Scale : 1:200	Designed By: N.S.
Drawn By : C.M.	Reviewed By : M. P.
Job No : 1-17-0267-80	Sheet No: SH0

Plot: 06Nov2017–1:00pm \\192.168.1.18\PDCb\1-Project Files\2017\1-17-0267 – M City, Mississauga\80 – Design Drawings\Drawings\Current\Alternate Shoring\1-17-0267 Shoring Plan.dwg

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REVISIONS

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17 NELSON STREET
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Job Title

M CITY, PHASE I & II

3980 BURNHAMTHORPE RD
MISSISSAUGA, ONTARIO

Sheet Title

EXCAVATION SHORING KEY PLAN

Seal

M.A. PORCO
100175817
Nov. 06, 2017

North

Terraprobe Inc.
Engineering Solutions

11 Indell Lane
Brampton, ON L6T 3Y3
Tel: (905) 796–2650
Fax: (905) 796–2250

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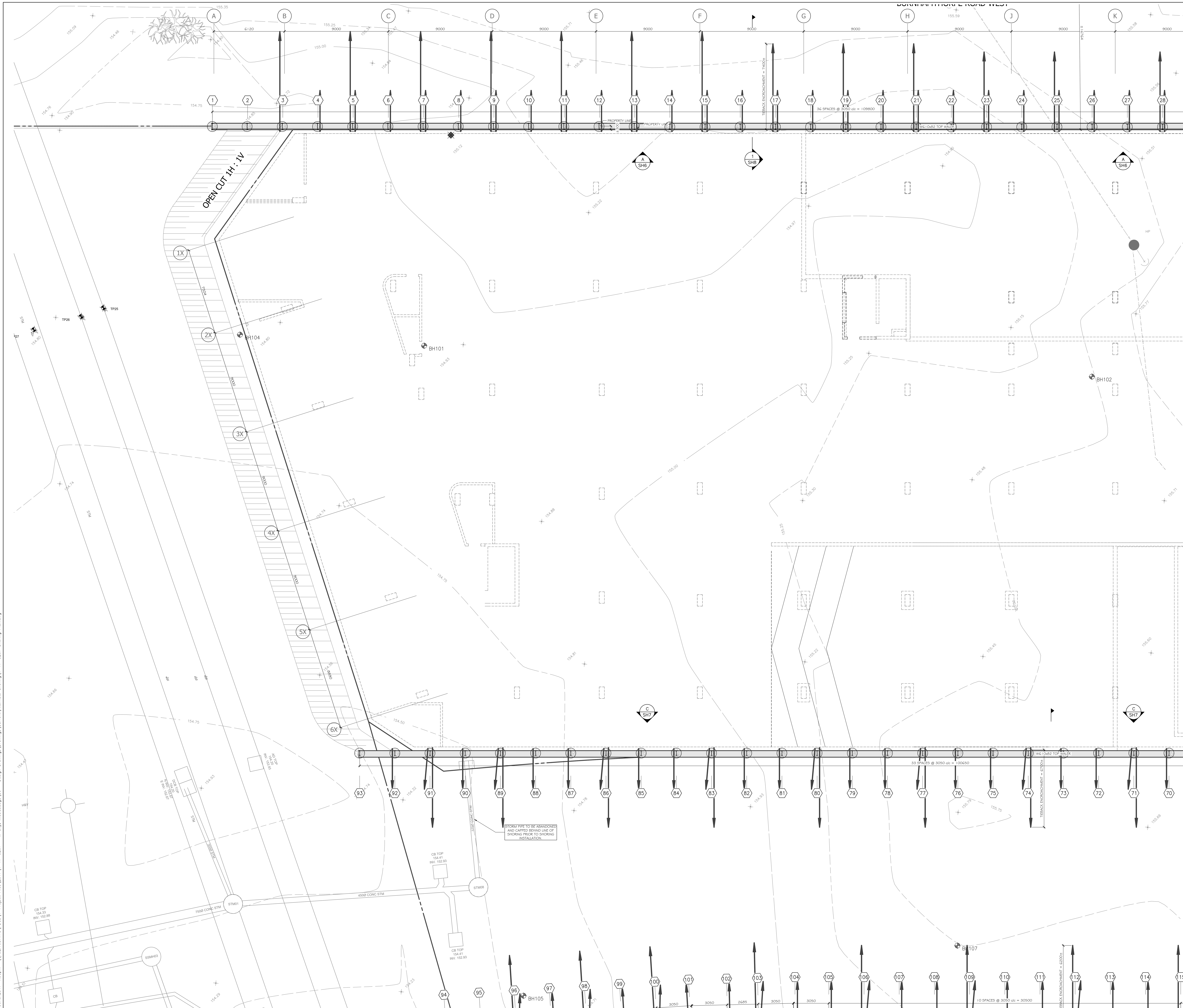
Drawn By : C.M.	Reviewed By : M. P.
Job No : 1-17-0267-80	Sheet No: SH1



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EXCAVATION SHORING PLAN

Seal

LICENSED PROFESSIONAL ENGINEER
M.A. PORCO
100175817
Nov. 06, 2017
PROVINCE OF ONTARIO

North

Terraprobe Inc.
Engineering Solutions

11 Indell Lane
Brampton, ON L6T 3Y3
Tel: (905) 796–2650
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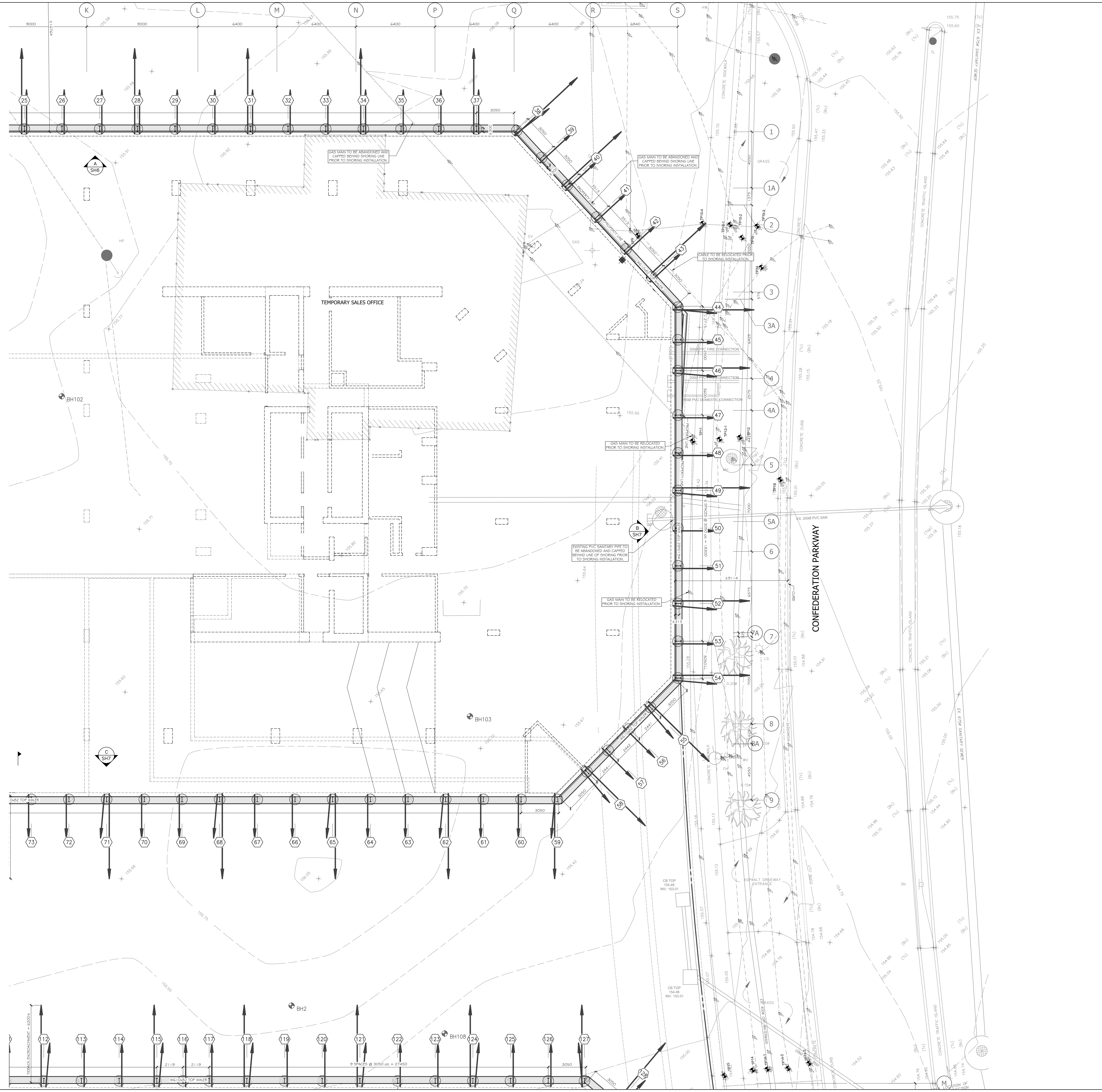
Job No : **1-17-0267-80**	Sheet No: **SH2**



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M.A. PORCO
100175817
Nov. 06, 2017
PROVINCE OF ONTARIO

North

Terraprobe Inc.
Engineering Solutions

11 Indell Lane
Brampton, ON L6T 3Y3
Tel: (905) 796-2650
Fax: (905) 796-2250

Scale : 1:100	Designed By: N.S.
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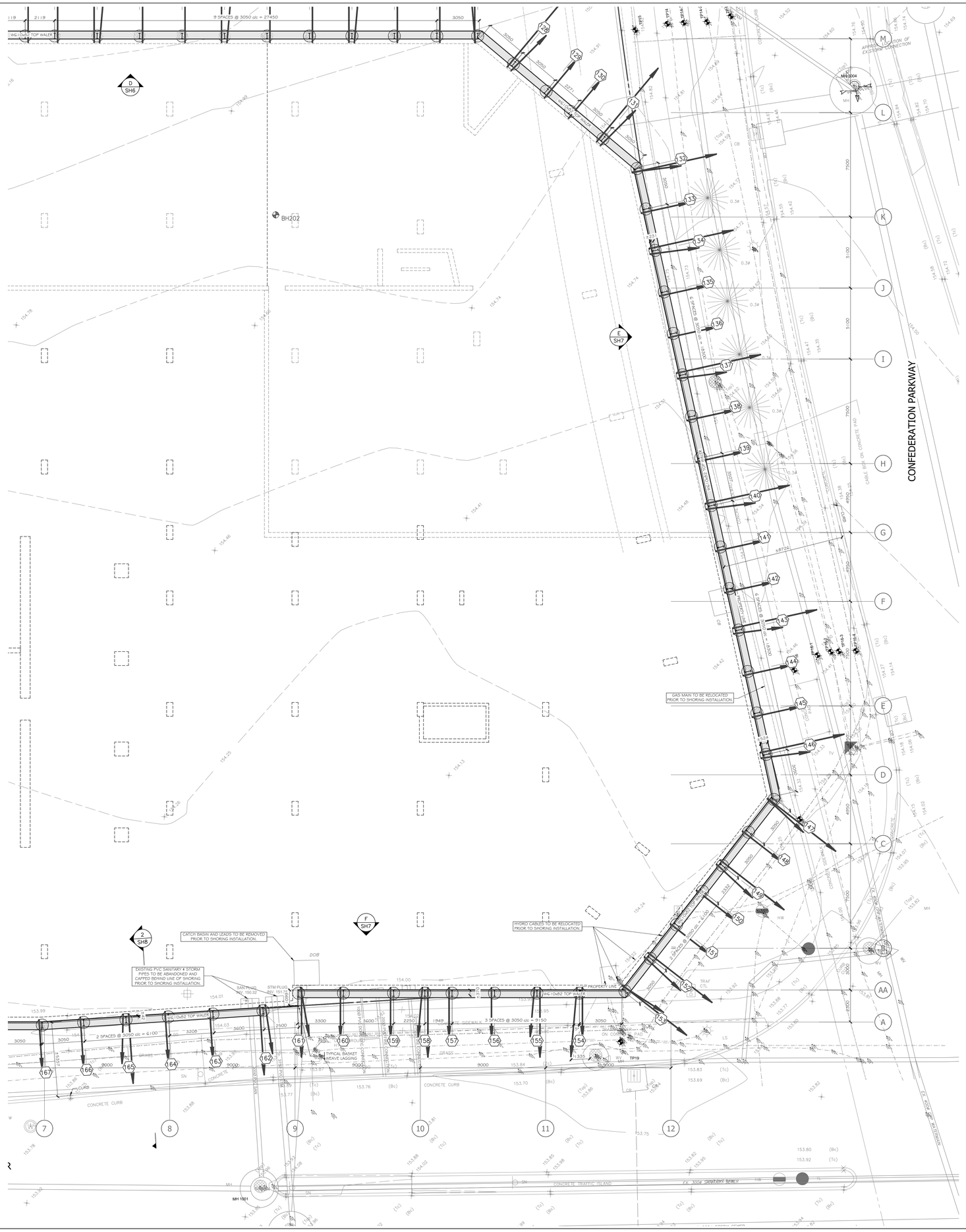

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EXCAVATION SHORING PLAN

Seal

LICENSED PROFESSIONAL ENGINEER
M.A. PORCO
100175817
ON CA 2017
PROVINCE OF ONTARIO

North

Terraprobe Inc.
Engineering Solutions

11 Indell Lane
Brampton, ON L6T 3Y3
Tel: (905) 796-2650
Fax: (905) 796-2250

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Drawn By : C.M.	Reviewed By : M. P.
Job No : **1-17-0267-80**	Sheet No: **SH4**

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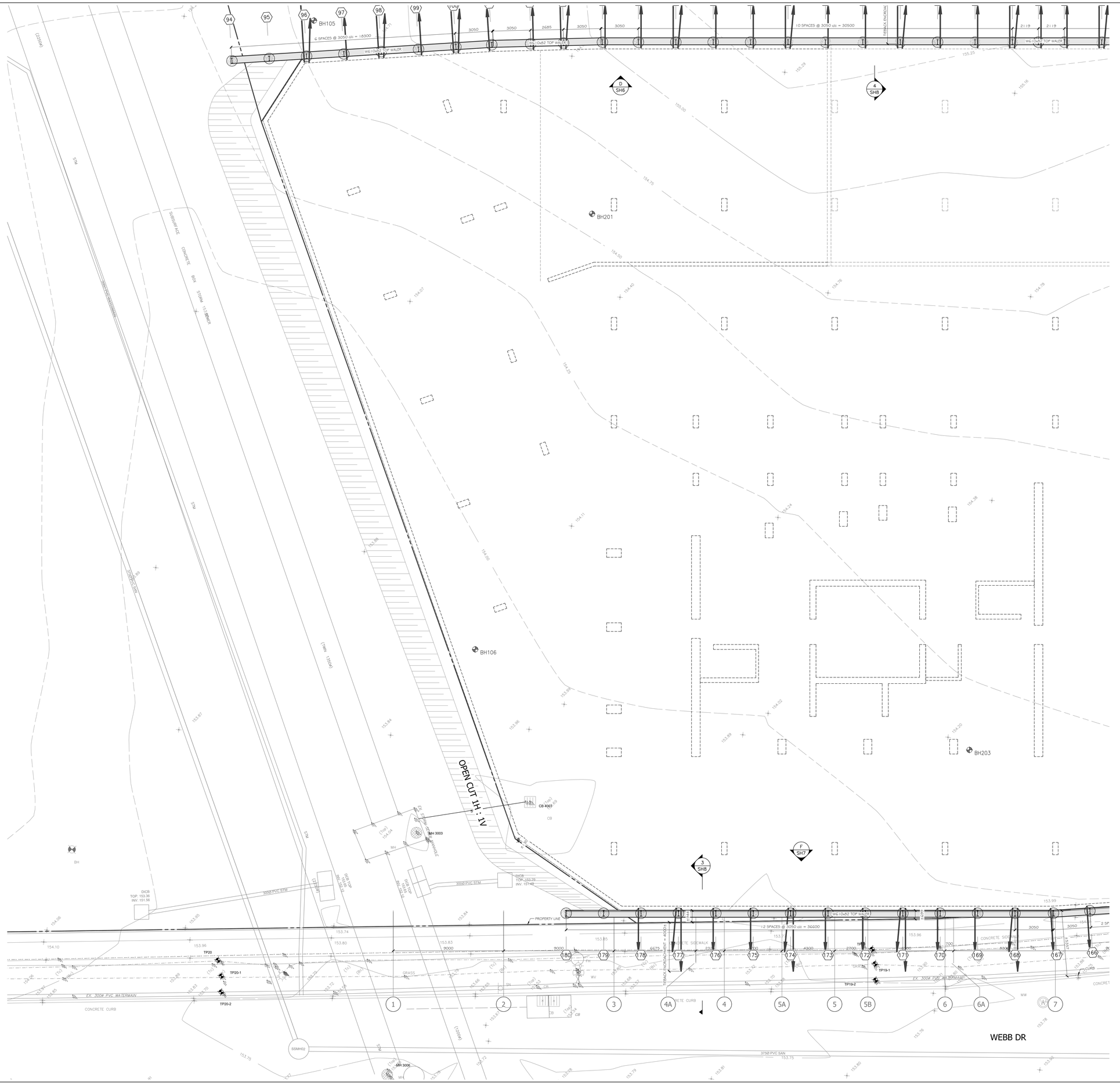

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Client

URBAN CAPITAL PROPERTY GROUP
17 NELSON STREET
TORONTO, ONTARIO

Job Title

M CITY, PHASE I & II
3980 BURNHAMTHORPE RD
MISSISSAUGA, ONTARIO

Sheet Title

EXCAVATION SHORING PLAN

Seal

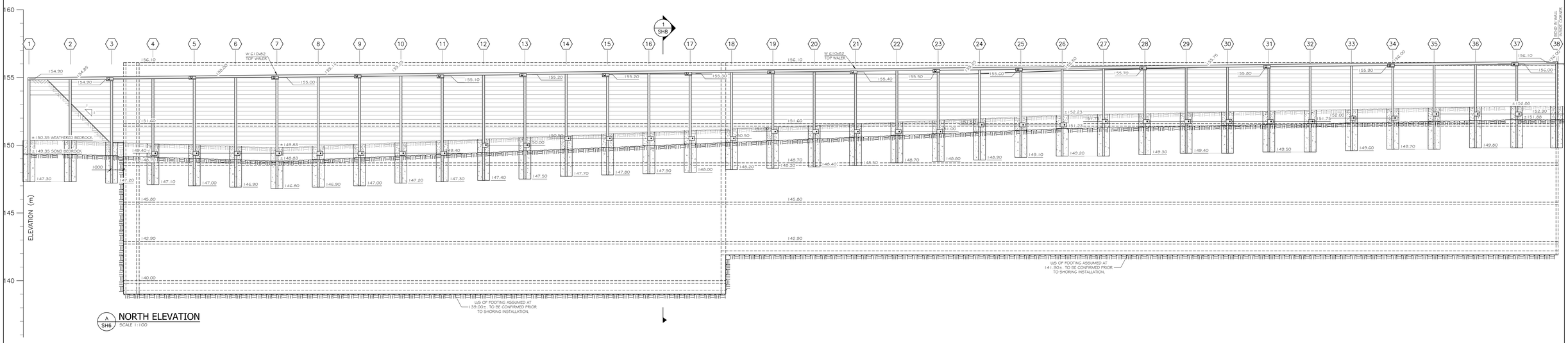
LICENSED PROFESSIONAL ENGINEER
M.A. PORCO
100175817
Nov. 06, 2017
PROVINCE OF ONTARIO

North

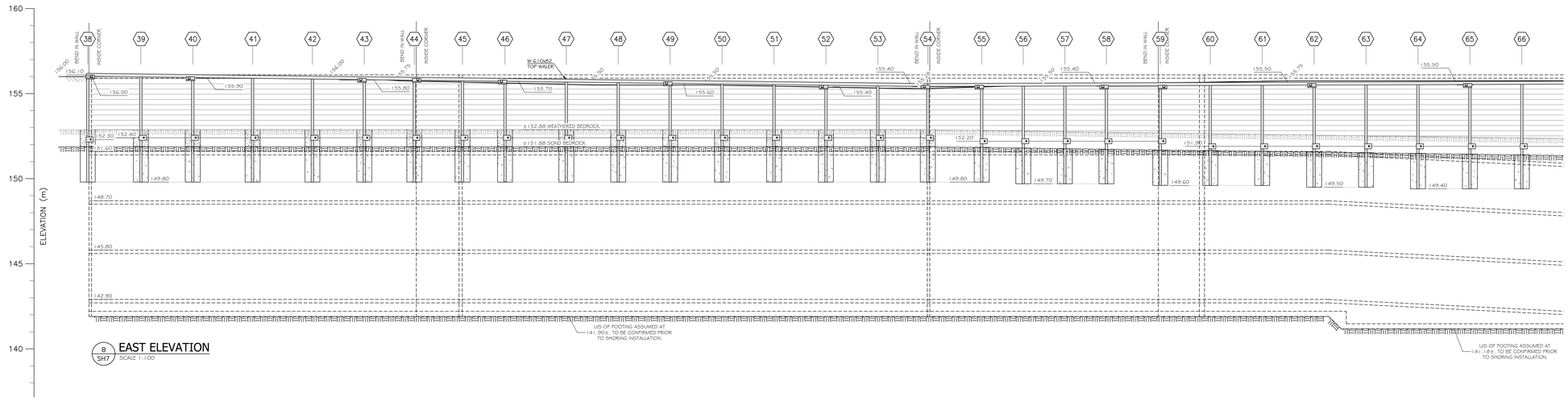
Terraprobe Inc.
Engineering Solutions

11 Indell Lane
Brampton, ON L6T 3Y3
Tel: (905) 796-2650
Fax: (905) 796-2250

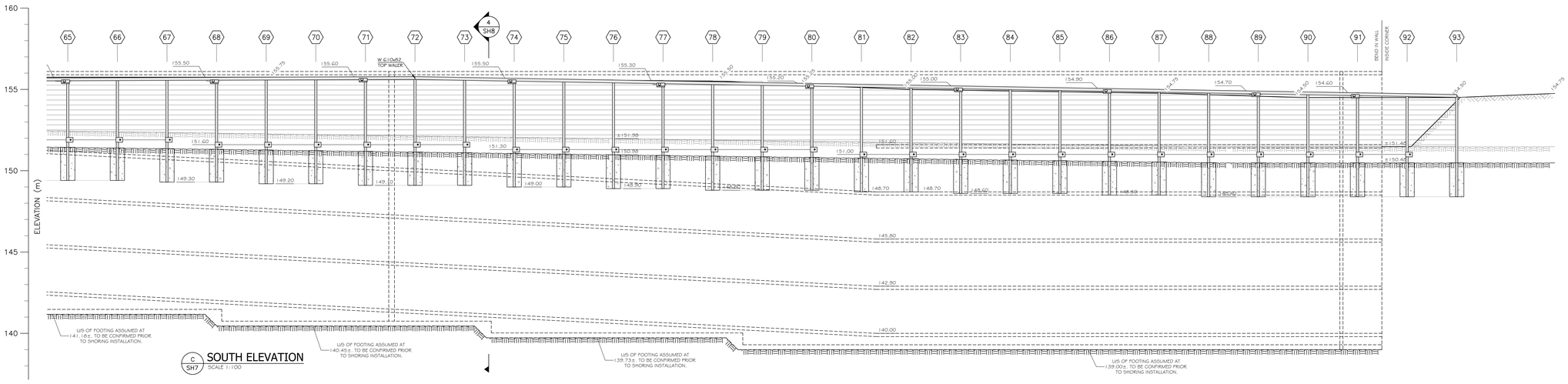
Scale : 1:100	Designed By: N.S.
Drawn By : C.M.	Reviewed By : M. P.
Job No : **1-17-0267-80**	Sheet No: **SH5**



A SH6 **NORTH ELEVATION**
SCALE 1:100



B SH7 **EAST ELEVATION**
SCALE 1:100



C SH7 **SOUTH ELEVATION**
SCALE 1:100

NO	DATE	REMARKS
3	06 NOVEMBER 2017	ISSUED FOR PERMIT/TENDER - ALTERNATE DESIGN
2	06 NOVEMBER 2017	ISSUED FOR PERMIT/TENDER
1	17 AUGUST 2017	ISSUED FOR PERMIT

REVISIONS

LEGEND

- (TPE) EXTENDED PERFORMANCE TEST 200% FOR 12 HOURS
- (TP) PERFORMANCE TEST 200%
- APPROXIMATE BOREHOLE LOCATION
- APPROXIMATE TEST PIT LOCATION
- INCLINOMETER
- STRUCTURALLY LOADED SHORING
- EXISTING SHORING

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URBAN CAPITAL PROPERTY GROUP

17 NELSON STREET
TORONTO, ONTARIO

Job Title

M CITY, PHASE I & II

3980 BURNHAMTHORPE RD
MISSISSAUGA, ONTARIO

Sheet Title

EXCAVATION SHORING ELEVATIONS

Seal

LICENSED PROFESSIONAL ENGINEER
M.A. PORCO
100175817
PROVINCE OF ONTARIO
(Nov. 06, 2017)

North

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Engineering Solutions
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Brampton, ON L6T 3Y3
Tel: (905) 796-2650
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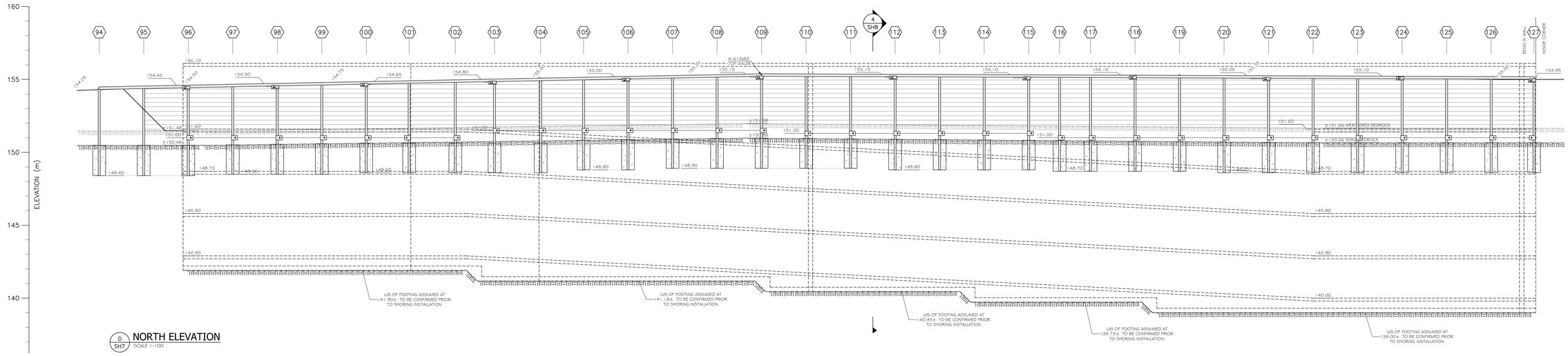
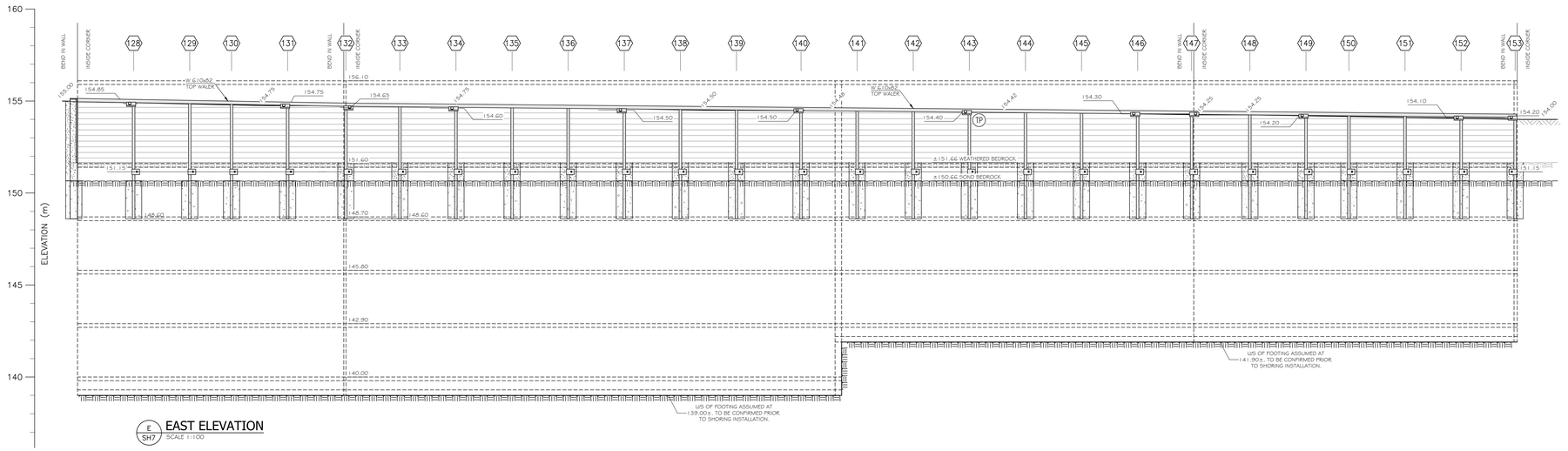
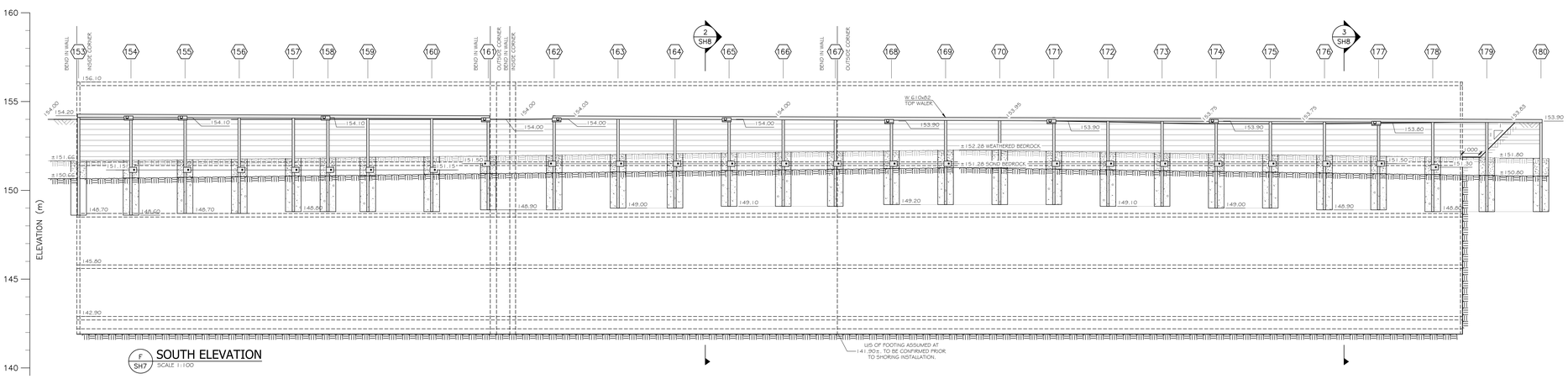
Drawn By : C.M.	Reviewed By : M. P.
Job No : **1-17-0267-80**	Sheet No: **SH6**



D SH7 **NORTH ELEVATION**
SCALE 1:100



E SH7 **EAST ELEVATION**
SCALE 1:100



F SH7 **SOUTH ELEVATION**
SCALE 1:100

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REVISIONS

LEGEND
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- (TP) PERFORMANCE TEST 200%
- APPROXIMATE BOREHOLE LOCATION
- APPROXIMATE TEST PIT LOCATION
- INCLINOMETER
- (I) STRUCTURALLY LOADED SHORING
- (I) EXISTING SHORING

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Client

URBAN CAPITAL PROPERTY GROUP
17 NELSON STREET
TORONTO, ONTARIO

Job Title

M CITY, PHASE I & II
3980 BURNHAMTHORPE RD
MISSISSAUGA, ONTARIO

Sheet Title

EXCAVATION SHORING ELEVATIONS

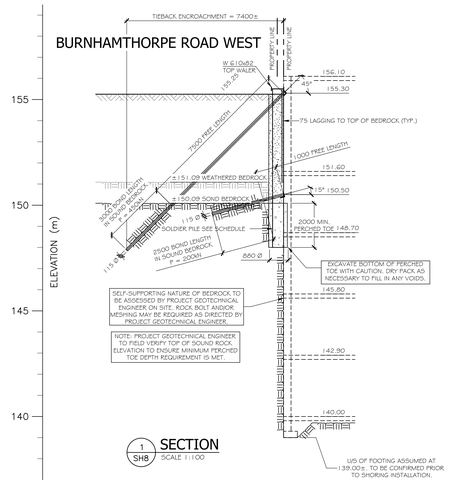
Seal

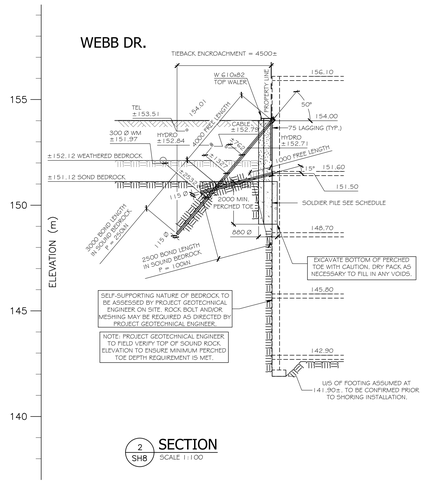
LICENCED PROFESSIONAL ENGINEER
M.A. PORCO
100175817
Nov. 09, 2017
PROVINCE OF ONTARIO

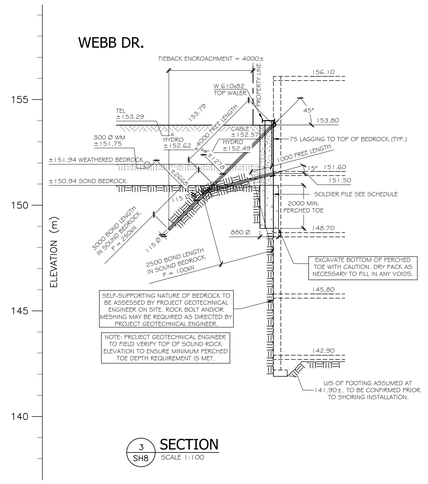
North

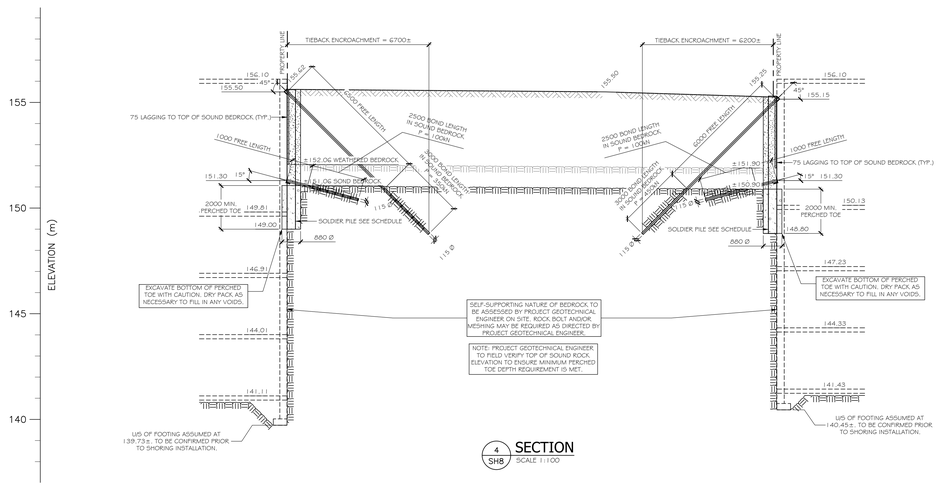
Terraprobe Inc.
Engineering Solutions
11 Indell Lane
Brampton, ON L6T 3Y3
Tel: (905) 796-2650
Fax: (905) 796-2250

Scale :	Designed By:
AS INDICATED	N.S.
Drawn By : C.M.	Reviewed By : M. P.
Job No : **1-17-0267-80**	Sheet No: **SH7**









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TORONTO, ONTARIO

Job Title

M CITY, PHASE I & II

3980 BURNHAMTHORPE RD
MISSISSAUGA, ONTARIO

Sheet Title

EXCAVATION SHORING SECTIONS

Seal

LICENSED PROFESSIONAL ENGINEER
M.A. PORCO
100175817
Nov. 09, 2017
PROVINCE OF ONTARIO

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Engineering Solutions
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Fax: (905) 796-2250

Scale : AS INDICATED	Designed By: N.S.
Drawn By : C.M.	Reviewed By : M. P.
Job No : 1-17-0267-80	Sheet No: SH8

PILE SCHEDULE

PILE NO.	PILE SIZE	TOP OF PILE (m)	BOTTOM OF PILE (m)	LENGTH (mm)	HOLE DIAMETER (mm)	QTY.
1	W530x74	154.90	147.30	7600	880	1
2	W530x74	155.00	147.30	7700	880	1
3	W530x74	155.00	147.20	7800	880	1
4	W530x74	155.00	147.10	7900	880	1
5	W530x74	155.10	147.00	8100	880	1
6	W530x74	155.10	146.90	8200	880	1
7	W530x74	155.10	146.80	8300	880	1
8	W530x74	155.20	146.90	8300	880	1
9	W530x74	155.20	147.00	8200	880	1
10	W530x74	155.20	147.20	8000	880	1
11	W530x74	155.30	147.30	8000	880	1
12	W530x74	155.30	147.40	7900	880	1
13	W530x74	155.30	147.50	7800	880	1
14	W530x66	155.40	147.70	7700	880	1
15	W530x66	155.40	147.80	7600	880	1
16	W530x66	155.40	147.90	7500	880	1
17	W530x66	155.50	148.00	7500	880	1
18	W460x60	155.50	148.20	7300	880	1
19	W460x60	155.50	148.30	7200	880	1
20	W460x60	155.60	148.40	7200	880	1
21	W460x60	155.60	148.50	7100	880	1
22	W460x60	155.60	148.70	6900	880	1
23	W460x60	155.70	148.80	6900	880	1
24	W410x46	155.70	148.90	6800	880	1
25	W410x46	155.70	149.10	6600	880	1
26 & 27	W410x46	155.80	149.20	6600	880	2
28	W410x46	155.80	149.30	6500	880	1
29 & 30	W410x46	155.90	149.40	6500	880	2
31	W410x46	155.90	149.50	6400	880	1
32	W410x46	156.00	149.50	6500	880	1
33	W410x46	156.00	149.60	6400	880	1
34	W410x46	156.00	149.70	6300	880	1
35	W410x46	156.10	149.70	6400	880	1
36 to 40	W410x46	156.10	149.80	6300	880	5
41 & 42	W410x46	156.00	149.80	6200	880	2
43 & 44	W410x46	155.90	149.80	6100	880	2
45 to 47	W410x39	155.80	149.80	6000	880	3
48 & 49	W410x39	155.70	149.80	5900	880	2
50 & 51	W410x39	155.60	149.80	5800	880	2
52 to 54	W410x39	155.50	149.80	5700	880	3
55	W410x39	155.50	149.80	5700	880	1
56 & 57	W410x39	155.60	149.70	5900	880	2
58	W410x39	155.70	149.70	6000	880	1
59	W410x39	155.70	149.60	6100	880	1
60 & 61	W410x39	155.80	149.60	6200	880	2
62 & 63	W410x39	155.80	149.50	6300	880	2
64 to 66	W410x39	155.80	149.40	6400	880	3
67 & 68	W410x39	155.80	149.30	6500	880	2
69 & 70	W410x39	155.80	149.20	6600	880	2
71	W410x39	155.80	149.10	6700	880	1
72 & 73	W410x39	155.70	149.10	6600	880	2
74 & 75	W410x39	155.70	149.00	6700	880	2
76 & 77	W410x39	155.60	148.90	6700	880	2
78 & 79	W410x39	155.60	148.80	6800	880	2
80	W410x39	155.40	148.80	6600	880	1
81	W410x39	155.30	148.70	6600	880	1
82	W410x39	155.20	148.70	6500	880	1
83 to 85	W410x39	155.00	148.60	6400	880	3
86 & 87	W410x39	154.90	148.50	6400	880	2
88	W410x39	154.80	148.40	6400	880	1
89	W410x39	154.70	148.40	6300	880	1
90 to 92	W410x39	154.60	148.40	6200	880	3
93	W410x39	154.70	148.40	6300	880	1
94	W410x39	154.50	148.40	6100	880	1
95 & 96	W410x39	154.60	148.40	6200	880	2
97	W410x39	154.70	148.50	6200	880	1
98 & 99	W410x39	154.80	148.50	6300	880	2
100 to 104	W410x39	154.80	148.60	6200	880	5
105	W410x39	155.20	148.80	6400	880	1
106	W410x39	155.30	148.80	6500	880	1
107 to 111	W410x39	155.30	148.90	6400	880	5
112 to 115	W410x39	155.30	148.80	6500	880	4
116 to 119	W410x39	155.30	148.70	6600	880	4
120 to 122	W410x39	155.30	148.60	6700	880	3
123 & 124	W410x39	155.20	148.60	6600	880	2
125 to 127	W410x39	155.10	148.60	6500	880	3
128 to 135	W410x46	154.80	148.60	6200	880	8
136 to 138	W410x46	154.70	148.60	6100	880	3
139 to 142	W410x39	154.60	148.60	6000	880	4
143 to 145	W410x39	154.50	148.60	5900	880	3
146 to 149	W410x39	154.40	148.60	5800	880	4
150 to 152	W410x39	154.30	148.60	5700	880	3
153 & 154	W410x39	154.20	148.60	5600	880	2
155 & 156	W410x39	154.20	148.70	5500	880	2
157 to 160	W410x39	154.20	148.80	5400	880	4
161 & 162	W410x39	154.20	148.90	5300	880	2
163 & 164	W410x39	154.10	149.00	5100	880	2
165 to 167	W410x39	154.10	149.10	5000	880	3
168 to 171	W410x39	154.10	149.20	4900	880	4
172 & 173	W410x39	154.00	149.10	4900	880	2
174 & 175	W410x39	154.00	149.00	5000	880	2
176 & 177	W410x39	154.00	148.90	5100	880	2
178 & 179	W410x39	154.00	148.80	5200	880	2
180	W410x39	153.90	148.80	5100	880	1

ROCK PIN SCHEDULE

PILE NO.	LEVEL OF ROCK PINS PER PILE	ELEVATION (m)	LOAD (kN)	ROCK PIN DIAMETER (mm)	ANGLE (deg.)	FREE LENGTH (mm)	BOND LENGTH (mm)	ESTIMATED TOTAL ANCHOR LENGTH (mm)	SPLAY (deg.) CW + CCW −	QTY.	DYWIDAG THREADBAR SIZE
4 to 11	A	149.40	200	115	15°	1000	2500	3500	0°	8	#18
12 & 13	A	150.00	200	115	15°	1000	2500	3500	0°	2	#18
14 to 17	A	150.50	200	115	15°	1000	2500	3500	0°	4	#18
18	A	150.50	150	115	15°	1000	2500	3500	0°	1	#18
19 to 23	A	151.00	150	115	15°	1000	2500	3500	0°	5	#18
24 to 26	A	151.50	150	115	15°	1000	2500	3500	0°	3	#18
27 to 32	A	151.75	150	115	15°	1000	2500	3500	0°	6	#18
33 & 34	A	152.00	150	115	15°	1000	2500	3500	0°	2	#18
35 to 37	A	152.30	150	115	15°	1000	2500	3500	0°	3	#18
38	A	152.30	150	115	15°	1000	2500	3500	5°	1	#18
39 to 43	A	152.40	150	115	15°	1000	2500	3500	0°	5	#18
44	A	152.40	150	115	15°	1000	2500	3500	5°	1	#18
45	A	152.40	100	115	15°	1000	2500	3500	0°	1	#14
46	A	152.40	100	115	15°	1000	2500	3500	5°	1	#14
47 & 48	A	152.40	100	115	15°	1000	2500	3500	0°	2	#14
49	A	152.40	100	115	15°	1000	2500	3500	5°	1	#14
50 & 51	A	152.40	100	115	15°	1000	2500	3500	0°	2	#14
52	A	152.40	100	115	15°	1000	2500	3500	5°	1	#14
53	A	152.40	100	115	15°	1000	2500	3500	0°	1	#14
54	A	152.40	100	115	15°	1000	2500	3500	5°	1	#14
55	A	152.20	100	115	15°	1000	2500	3500	5°	1	#14
56 & 57	A	152.20	100	115	15°	1000	2500	3500	0°	2	#14
58 & 59	A	152.20	100	115	15°	1000	2500	3500	5°	2	#14
60 & 61	A	151.90	100	115	15°	1000	2500	3500	0°	2	#14
62	A	151.90	100	115	15°	1000	2500	3500	5°	1	#14
63 & 64	A	151.90	100	115	15°	1000	2500	3500	0°	2	#14
65	A	151.90	100	115	15°	1000	2500	3500	5°	1	#14
66 & 67	A	151.90	100	115	15°	1000	2500	3500	0°	2	#14
68	A	151.60	100	115	15°	1000	2500	3500	5°	1	#14
69 & 70	A	151.60	100	115	15°	1000	2500	3500	0°	2	#14
71	A	151.60	100	115	15°	1000	2500	3500	5°	1	#14
72 & 73	A	151.60	100	115	15°	1000	2500	3500	0°	2	#14
74	A	151.30	100	115	15°	1000	2500	3500	5°	1	#14
75 & 76	A	151.30	100	115	15°	1000	2500	3500	0°	2	#14
77	A	151.30	100	115	15°	1000	2500	3500	5°	1	#14
78 & 79	A	151.30	100	115	15°	1000	2500	3500	0°	2	#14
80	A	151.30	100	115	15°	1000	2500	3500	5°	1	#14
81 & 82	A	151.00	100	115	15°	1000	2500	3500	0°	2	#14
83	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
84 & 85	A	151.00	100	115	15°	1000	2500	3500	0°	2	#14
86	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
87 & 88	A	151.00	100	115	15°	1000	2500	3500	0°	2	#14
89	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
90	A	151.00	100	115	15°	1000	2500	3500	0°	1	#14
91	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
92	A	151.00	100	115	15°	1000	2500	3500	0°	1	#14
96	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
97	A	151.00	100	115	15°	1000	2500	3500	0°	1	#14
98	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
99	A	151.00	100	115	15°	1000	2500	3500	0°	1	#14
100	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
101 & 102	A	151.00	100	115	15°	1000	2500	3500	0°	2	#14
103	A	151.50	100	115	15°	1000	2500	3500	5°	1	#18
104 & 105	A	151.50	100	115	15°	1000	2500	3500	0°	2	#18
106	A	151.50	100	115	15°	1000	2500	3500	5°	1	#18
107 & 108	A	151.50	100	115	15°	1000	2500	3500	0°	2	#18
109	A	151.50	100	115	15°	1000	2500	3500	5°	1	#18
110 & 111	A	151.30	100	115	15°	1000	2500	3500	0°	2	#18
112	A	151.30	100	115	15°	1000	2500	3500	5°	1	#18
113 & 114	A	151.30	100	115	15°	1000	2500	3500	0°	2	#18
115	A	151.30	100	115	15°	1000	2500	3500	5°	1	#18
116 & 117	A	151.00	100	115	15°	1000	2500	3500	0°	2	#14
118	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
119 & 120	A	151.00	100	115	15°	1000	2500	3500	0°	2	#14
121	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
122 & 123	A	151.00	100	115	15°	1000	2500	3500	0°	2	#14
124	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
125 & 126	A	151.00	100	115	15°	1000	2500	3500	0°	2	#14
127	A	151.00	100	115	15°	1000	2500	3500	5°	1	#14
128	A	151.15	150	115	15°	1000	2500	3500	5°	1	#14
129 & 130	A	151.15	150	115	15°	1000	2500	3500	0°	2	#14
131 & 132	A	151.15	150	115	15°	1000	2500	3500	5°	2	#14
133	A	151.15	150	115	15°	1000	2500	3500	0°	1	#14
134	A	151.15	150	115	15°	1000	2500	3500	5°	1	#14
135 & 136	A	151.15	150	115	15°	1000	2500	3500	0°	2	#14
137	A	151.15	150	115	15°	1000	2500	3500	5°	1	#14
138	A	151.15	150	115	15°	1000	2500	3500	0°	1	#14
139	A	151.15	100	115	15°	1000	2500	3500	0°	1	#14
140	A	151.15	100	115	15°	1000	2500	3500	5°	1	#14
141 & 142	A	151.15	100	115	15°	1000	2500	3500	0°	2	#14
143	A	151.15	100	115	15°	1000	2500	3500	5°	1	#14
144 & 145	A	151.15	100	115	15°	1000	2500	3500	0°	2	#14
146 & 147	A	151.15	100	115	15°	1000	2500	3500	5°	2	#14
148	A	151.15	100	115	15°	1000	2500	3500	0°	1	#14
149	A	151.15	100	115	15°	1000	2500	3500	5°	1	#14
150 & 151	A	151.15	100	115	15°	1000	2500	3500	0°	2	#14
152 & 153	A	151.15	100	115	15°	1000	2500	3500	5°	2	#14
154	A	151.15	100	115	15°	1000	2500	3500	0°	1	#14
155	A	151.15	100	115	15°	1000	2500	3500	5°	1	#14
156 & 157	A	151.15	100	115	15°	1000	2500	3500	0°	2	#14
158	A	151.15	100	115	15°	1000	2500	3500	5°	1	#14
159 & 160	A	151.15	100	115	15°	1000	2500	3500	0°	2	#14
161 & 162	A	151.50	100	115	15°	1000	2500	3500	5°	2	#14
163 & 164	A	151.50	100	115	15°	1000	2500	3500	0°	2	#14
165	A	151.50	100	115	15°	1000	2500	3500	5°	1	#14
166 & 167	A	151.50	100	115	15°	1000	2500	3500	0°	2	#14
168	A	151.50	100	115	15°	1000	2500	3500	5°	1	#14
169 & 170	A	151.50	100	115	15°	1000	2500	3500	0°	2	#14
171	A	151.50	100	115	15°	1000	2500	3500	5°	1	#14
172 & 173	A	151.50	100	115	15°	1000	2500	3500	0°	2	#14
174	A	151.50	100	115	15°	1000	2500	3500	5°	1	#14
175 & 176	A	151.50	100	115	15°	1000	2500	3500	0°	2	#14
177	A	151.50	100	115	15°	1000	2500	3500	5°	1	#14
178	A	151.30	100	115	15°	1000	2500	3500	0°	1	#14

TIEBACK SCHEDULE

PILE NO.	LEVEL OF TIEBACKS PER PILE	ELEVATION (m)	LOAD (kN)	TIEBACK DIAMETER (mm)	ANGLE (deg.)	FREE LENGTH (mm)	BOND LENGTH (mm)	ESTIMATED TOTAL ANCHOR LENGTH (mm)	NO. OF STRANDS	QTY.	REMARKS
3	A	154.90	550	115	45°	8000	3000	11000	4	1	
5	A	155.00	550	115	45°	8500	3000	11500	4	1	
7	A	155.00	550	115	45°	9000	3000	12000	4	1	
9	A	155.10	550	115	45°	8500	3000	11500	4	1	
11	A	155.10	550	115	45°	8500	3000	11500	4	1	
13	A	155.20	550	115	45°	8000	3000	11000	4	1	
15	A	155.20	450	115	45°	7500	3000	10500	3	1	
17	A	155.30	450	115	45°	7500	3000	10500	3	1	
19	A	155.40	350	115	45°	7500	3000	10500	3	1	
21	A	155.40	350	115	45°	7000	3000	10000	3	1	
23	A	155.50	350	115	45°	6500	3000	9500	3	1	
25	A	155.60	450	115	45°	6500	3000	9500	3	1	
28	A	155.70	450	115	45°	6500	3000	9500	3	1	
31	A	155.80	450	115	45°	6000	3000	9000	3	1	
34	A	155.90	450	115	45°	6000	3000	9000	3	1	
37 & 38	A	156.00	450	115	45°	6000	3000	9000	3	2	
40	A	155.90	450	115	45°	6000	3000	9000	3	1	
43 & 44	A	155.80	450	115	45°	5500	3000	8500	3	2	
46	A	155.70	350	115	45°	5500	3000	8500	3	1	
49	A	155.60	350	115	45°	5500	3000	8500	3	1	
52	A	155.40	350	115	45°	5000	3000	8000	3	1	
54 & 55	A	155.40	350	115	45°	5000	3000	8000	3	2	
58 & 59	A	155.40	350	115	45°	5500	3000	8500	3	2	
62	A	155.50	350	115	45°	5500	3000	8500	3	1	
65	A	155.50	350	115	45°	6000	3000	9000	3	1	
68	A	155.50	350	115	45°	6000	3000	9000	3	1	
71	A	155.60	350	115	45°	6500	3000	9500	3	1	
74	A	155.50	350	115	45°	6500	3000	9500	3	1	
77	A	155.30	350	115	45°	6500	3000	9500	3	1	
80	A	155.20	350	115	45°	6500	3000	9500	3	1	
83	A	155.00	350	115	45°	6000	3000	9000	3	1	
86	A	154.90	350	115	45°	6500	3000	9500	3	1	
89	A	154.70	350	115	45°	6000	3000	9000	3	1	
91	A	154.60	350	115	45°	6000	3000	9000	3	1	
96	A	154.45	450	115	45°	6000	3000	9000	3	1	
98	A	154.50	450	115	45°	5500	3000	8500	3	1	
100	A	154.65	450	115	45°	6000	3000	9000	3	1	
103	A	154.80	450	115	45°	6000	3000	9000	3	1	
106	A	155.00	450	115	45°	6000	3000	9000	3	1	
109	A	155.15	450	115	45°	6000	3000	9000	3	1	
112	A	155.15	450	115	45°	6000	3000	9000	3	1	
115	A	155.10	450	115	45°	6000	3000	9000	3	1	
118	A	155.15	450	115	45°	6500	3000	9500	3	1	
121	A	155.05	450	115	45°	6500	3000	9500	3	1	
124	A	155.10	450	115	45°	6500	3000	9500	3	1	
127	A	154.95	450	115	45°	6000	3000	9000	3	1	
128	A	154.85	450	115	45°	6000	3000	9000	3	1	
131	A	154.75	450	115	45°	6000	3000	9000	3	1	
132	A	154.65	450	115	45°	6000	3000	9000	3	1	
134	A	154.60	450	115	45°	5500	3000	8500	3	1	
137	A	154.50	450	115	45°	5500	3000	8500	3	1	
140	A	154.50	350	115	45°	5500	3000	8500	3	1	
143	A	154.40	350	115	45°	5500	3000	8500	3	1	
146 & 147	A	154.30	350	115	45°	5500	3000	8500	3	2	
149	A	154.20	350	115	45°	5000	3000	8000	3	1	
152 & 153	A	154.10	350	115	45°	5000	3000	8000	3	2	
154 & 155	A	154.10	350	115	50°	4500	3000	7500	3	2	
158	A	154.10	250	115	50°	4500	3000	7500	2	1	
161 & 162	A	154.00	250	115	50°	4000	3000	7000	2	2	
165	A	154.00	250	115	50°	4000	3000	7000	2	1	
168	A	153.90	250	115	50°	3500	3000	6500	2	1	
171	A	153.90	250	115	45°	4000	3000	7000	2	1	
174	A	153.90	250	115	45°	4000	3000	7000	2	1	
177	A	153.80	250	115	45°	4000	3000	7000	2	1	

NOTE: FREE LENGTH OF TIEBACK ANCHORED IN BEDROCK EXTEND TO ASSUMED SOUND BEDROCK ELEVATION; ACTUAL LENGTH MAY VARY.

NO	DATE	REMARKS
3	06 NOVEMBER 2017	ISSUED FOR PERMIT/TENDER - ALTERNATE DESIGN
2	06 NOVEMBER 2017	ISSUED FOR PERMIT/TENDER
1	17 AUGUST 2017	ISSUED FOR PERMIT

REVISIONS

LEGEND

- (TPE) EXTENDED PERFORMANCE TEST 200% FOR 12 HOURS
- (TP) PERFORMANCE TEST 200%
- APPROXIMATE BOREHOLE LOCATION
- APPROXIMATE TEST PIT LOCATION
- INCLINOMETER
- STRUCTURALLY LOADED SHORING
- EXISTING SHORING

SERVICE LOCATIONS INDICATED ON SHORING DRAWINGS ARE PROVIDED FOR COORDINATION PURPOSES ONLY.

OTHER SERVICES NOT INDICATED ON THIS DRAWING MAY EXIST.

THE OWNER / GENERAL CONTRACTOR / PROJECT MANAGER SHALL ENSURE THAT ALL THE UNDERGROUND AND OVERHEAD SERVICES BE IDENTIFIED, PROTECTED AND / OR RELOCATED, PRIOR TO PROCEEDING WITH ANY DRILLING OR EXCAVATION WORK. DO NOT EXCAVATE OR DRILL BEFORE ALL SERVICES HAVE BEEN LOCATED.

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME REPORTING ANY DISCREPANCIES TO THE ARCHITECT BEFORE COMMENCING THE WORK.

PRINTS ARE NOT TO BE SCALED. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

DRAWINGS WITHOUT ENGINEER'S SIGNATURE SHALL BE CONSTRUED AS INCOMPLETE AND ARE FOR INFORMATION ONLY.

Client

URBAN CAPITAL PROPERTY GROUP

17 NELSON STREET
TORONTO, ONTARIO

Job Title

M CITY, PHASE I & II

3980 BURNHAMTHORPE RD
MISSISSAUGA, ONTARIO

Sheet Title

EXCAVATION SHORING SCHEDULES

Seal

LICENSED PROFESSIONAL ENGINEER
M.A. PORCO
100175817
View QR. 2237
PROVINCE OF ONTARIO

North

Terraprobe Inc.
Engineering Solutions

11 Indell Lane
Brampton, ON L6T 3Y3
Tel: (905) 796-2650
Fax: (905) 796-2250

Scale :	Designed By:
AS INDICATED	N.S.
Drawn By :	Reviewed By :
C.M.	M. P.
Job No :	Sheet No:
1-17-0267-80	SH9