SLOPE CUT

LANE

edge of asphalt

KING EDWARD AVENUE

SOUTH ABUTMENT ON EXISTING WALL

UNDERPINNING

STEEL BEAMS (IN RED)

SHOTCRETE FACING

TOP PANEL U/PIN

BH14-02
GWL at 187' (SEE GEOTECHINCAL REPORT)

BH14-01
GWL at 184' (SEE GEOTECHNICAL REPORT)

NORTH ABUTMENT ON SUBGRADE

CURB

PEDESTRIAN BRIDGE OVER RECESSED AREA, TWO STEEL BEAMS WITH DECKING AND RAILING/HOARDING SUPPORTED ON REINFORCED CONCRETE ABUTMENT & EXISTING CONCRETE WALL (BY OTHERS)

EXISTING TREES TO REMAIN WITH PROTECTION AS REQUIRED

CAMBIE STREET

CONCRETE LOCKBLOCK (TYPICAL) TO RETAIN TOP LEVEL (RAILING/HOARDING BY OTHERS)

SPLAY ANCHORS TO AVOID EXISTING AIR SHAFT

SHOTCRETE FACING

UNDERPINNING

NOTE: ELEVATIONS ARE IN FEET TO GEODETIC DATUM.

LOT 18

REFERENCE DRAWINGS
- J.C. TAM AND ASSOCIATES: TOPOGRAPHIC SURVEY PLAN DATED 2011-11-28
- W.T. LEUNG ARCHITECTS: PARKING PLANS RECEIVED 2014-09-22
- GLOTMAN SIMPSON: STRUCTURAL DRAWINGS, REV. 1 DATED 2014-10-03

TRANSLINK CANADA LINE RECORD DRAWINGS:
- STRUCTURAL (2009-06-10)
- ARCHITECTURAL (2010-03-26)
- CIVIL (2010-03-19)

NOTES
1. FOR ELEVATIONS AND DIMENSIONS, SEE LATEST ARCH. AND STRUCTURAL DWGS.
2. FOR REVIEW OF GROUNDWATER CONDITIONS, SEE GEOTECHNICAL REPORT.
3. FOR NOTES AND DETAILS, SEE DWGS. G15 TO G19.
4. SEE NOTES ON DWG. G2, G4 AND G9.

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

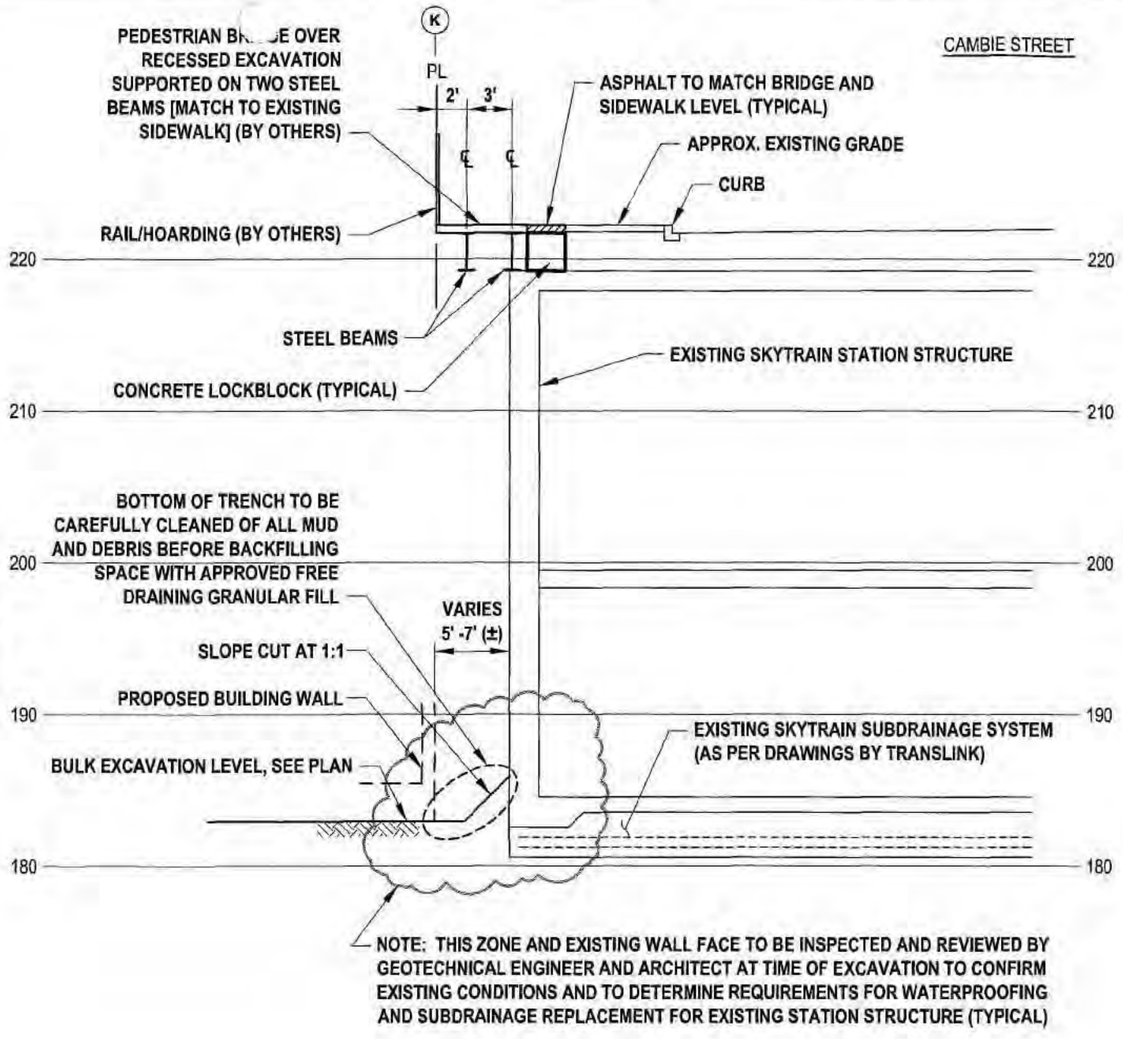
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K.S. HUI 24939

DRAWN: MG
DESIGN: GM
CHK: KSH

No.	REVISIONS DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-25
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

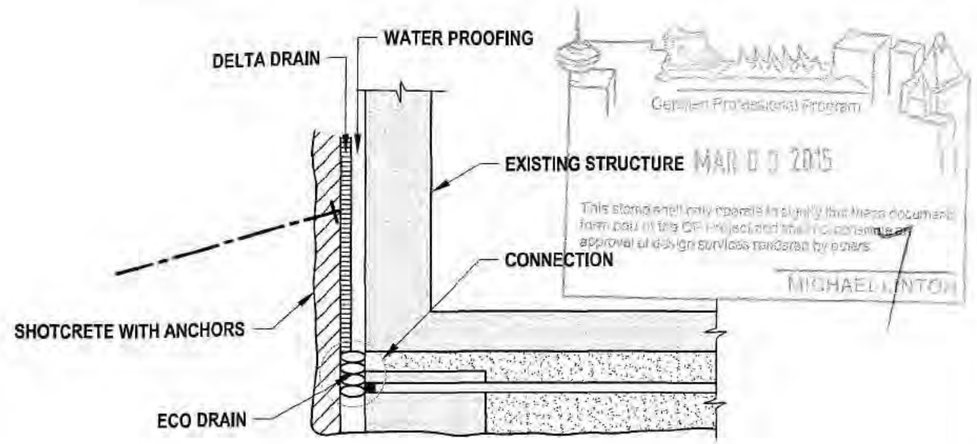
CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING PLAN
DATE: 2014-05-16
SCALE: 1"=30'
DWG NO: G1



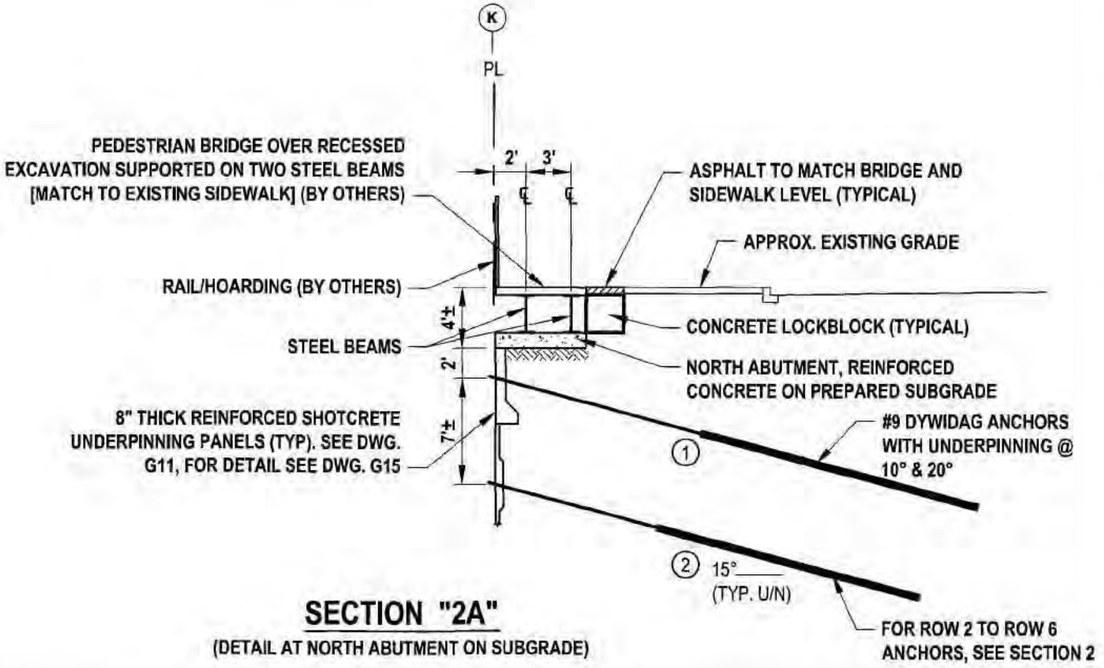
SECTION "1"

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



TYPICAL ASSUMED CONDITIONS (NTS)

ON OUTSIDE WALL OF EXISTING STATION STRUCTURE
-SEE 'AS BUILT' DWGS INCLUDING
STRUCTURAL - 5003(1)
CIVIL - 5002(3) & 5005(3)



SECTION "2A"

(DETAIL AT NORTH ABUTMENT ON SUBGRADE)

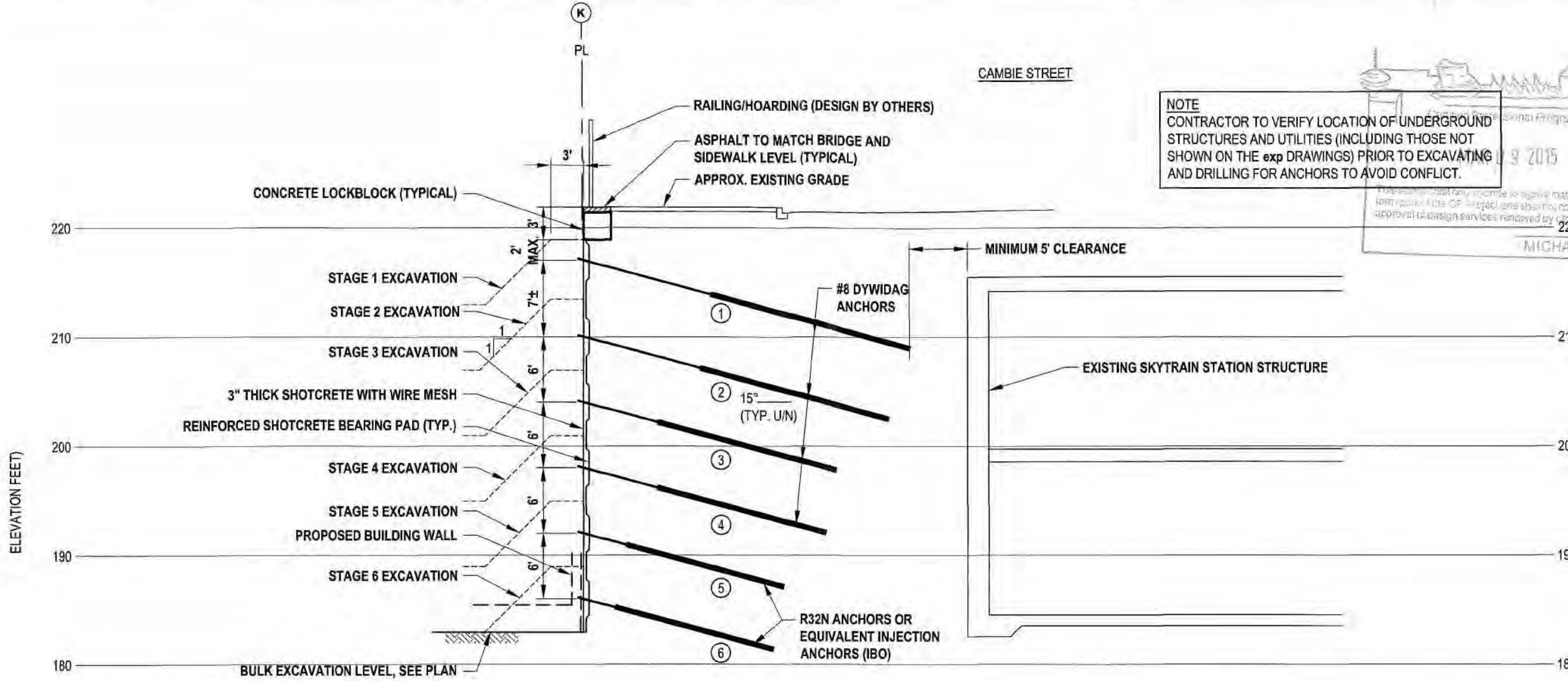
exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	DSGN.	CHK.
MG	GM	KSH

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING SECTION "1"
DATE: 2014-05-16
SCALE: 1"=10'
DWG. NO.: G2

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



SECTION "2"

ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	12	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	4	15	44	37	6
6	3	15	44	37	6

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604-874-1245
Fax: 604-874-2358
exp.com

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.S. HUI 24938

DFTR. MG
DSGN. GM
CHK. KSH

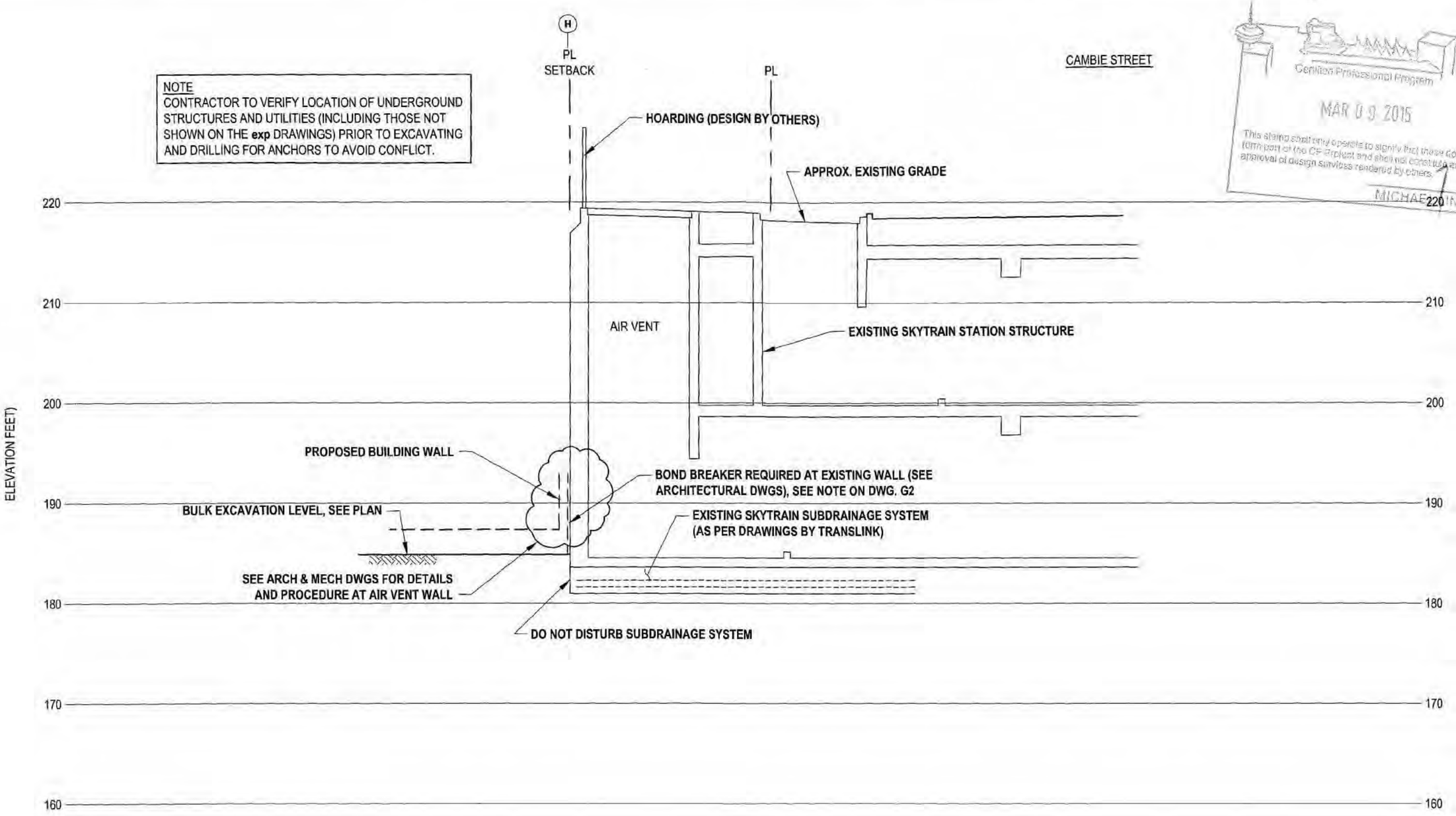
REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO. VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "2"

DATE 2014-05-16 SCALE: 1:10 DWG NO. S3

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



SECTION "3"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

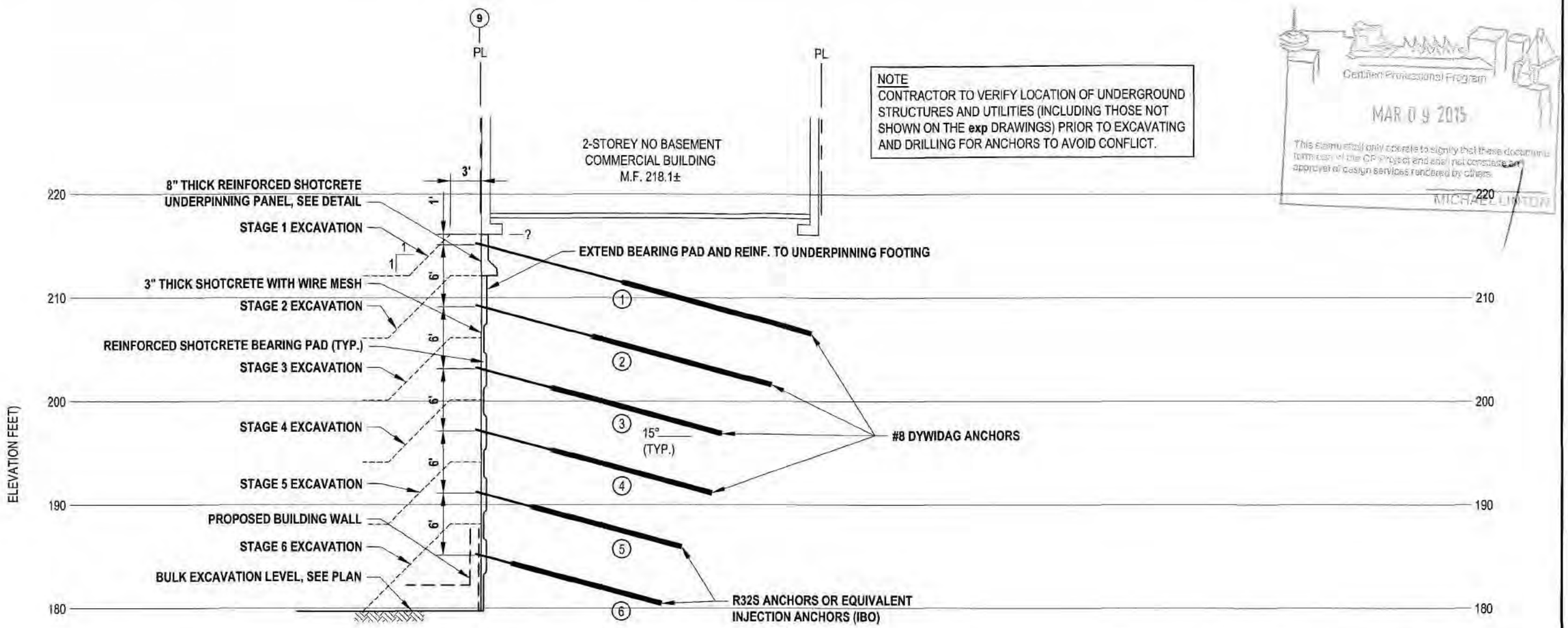
PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.S. HUI 24928

DFTR.	DSGN.	CHK.
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "3"
DATE: 2014-05-16 | SCALE: 1"=10' | DWG NO.: G4



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	14	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	5	15	44	37	6
6	3	15	44	37	6

SECTION "4"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

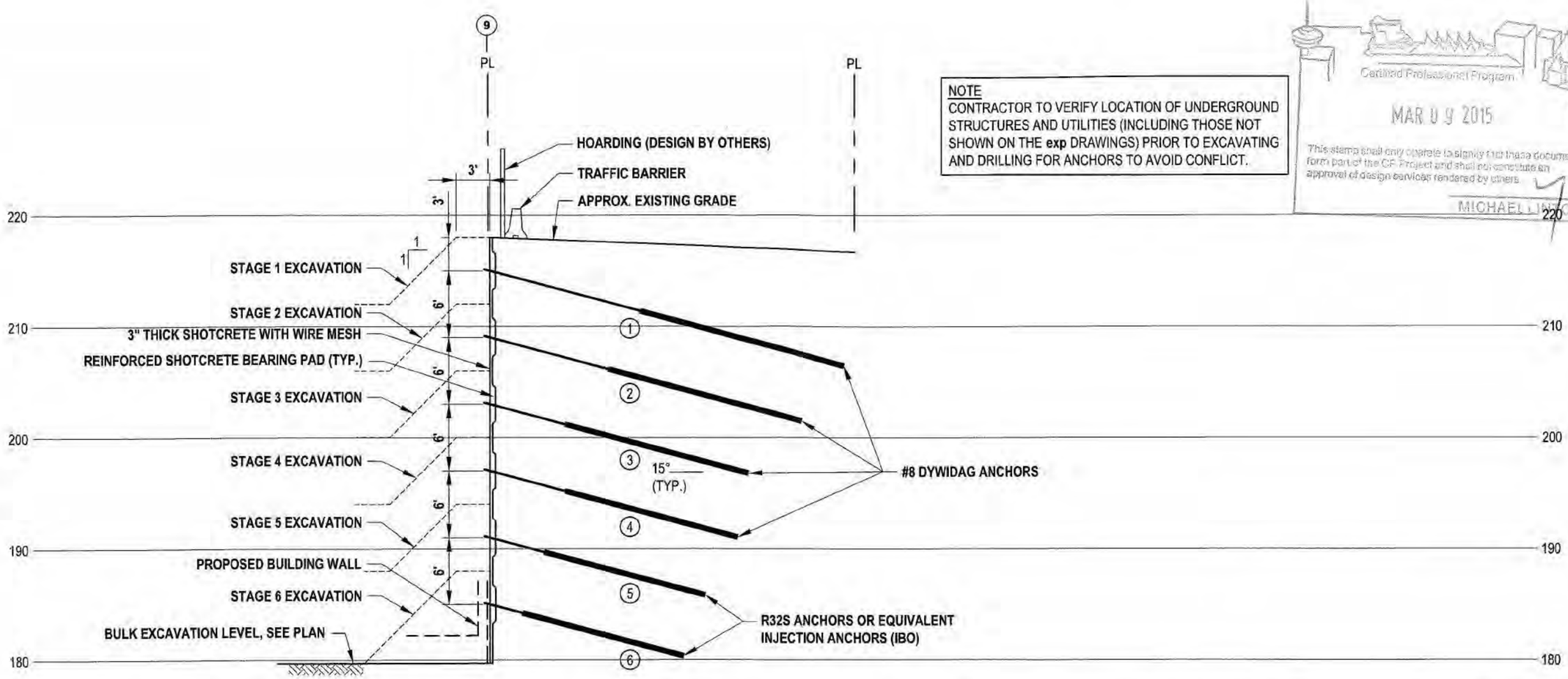
PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.S. HUI 24936

DFTR.	DSGN.	CHK.
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "4"
DATE: 2014-05-16
SCALE:
DWG NO.



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

Certified Professional Program
MAR 0 9 2015
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL LINTON

ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	14	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	5	15	44	37	6
6	3	15	44	37	6

SECTION "5"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

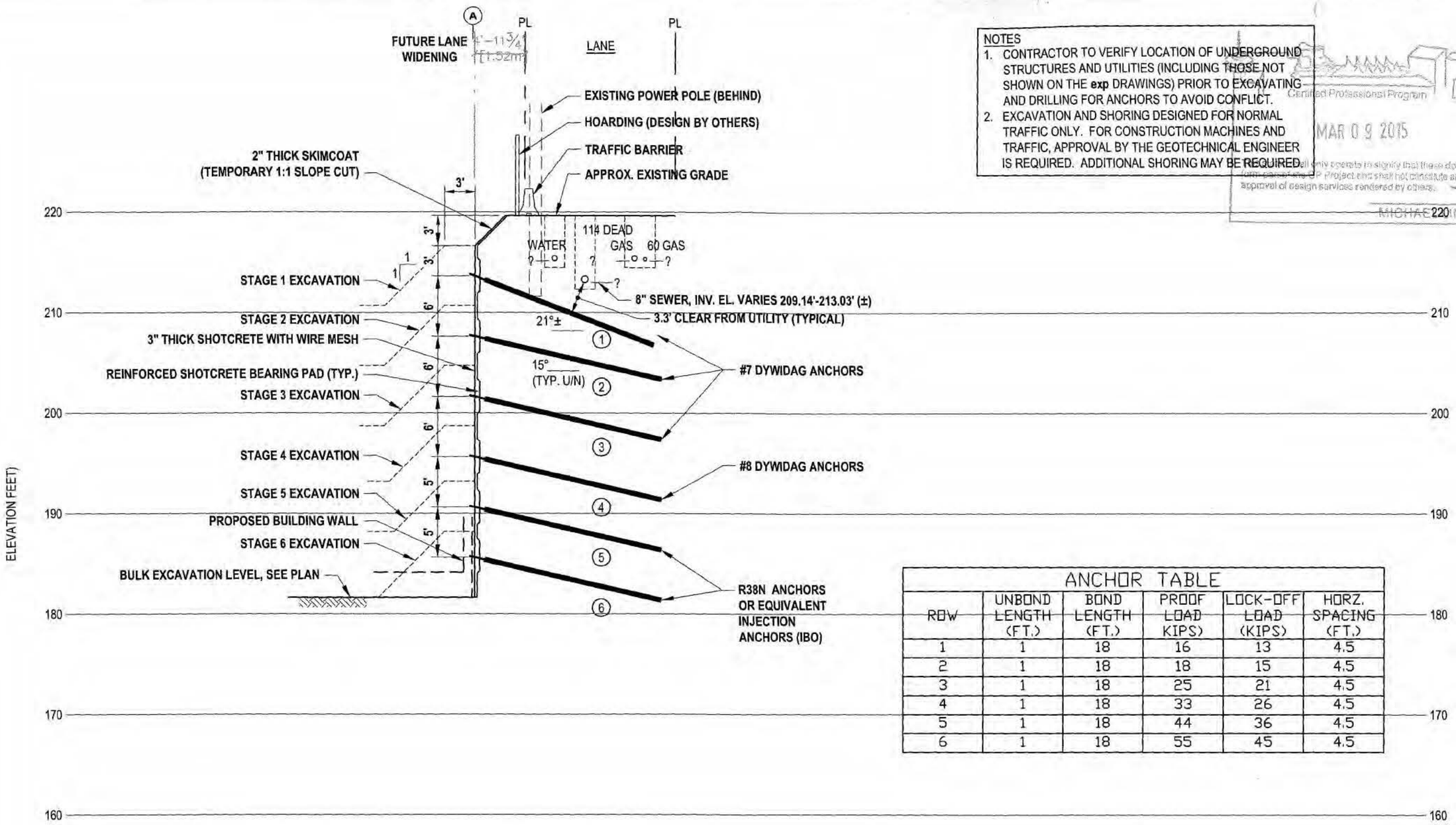
PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.S. HUI 24938

DFTR.	DSGN.	CHK.
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "5"
DATE: 2014-05-16
SCALE: 1"=10'
DWG NO.: C6



NOTES
1. CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.
2. EXCAVATION AND SHORING DESIGNED FOR NORMAL TRAFFIC ONLY. FOR CONSTRUCTION MACHINES AND TRAFFIC, APPROVAL BY THE GEOTECHNICAL ENGINEER IS REQUIRED. ADDITIONAL SHORING MAY BE REQUIRED.

ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	1	18	16	13	4.5
2	1	18	18	15	4.5
3	1	18	25	21	4.5
4	1	18	33	26	4.5
5	1	18	44	36	4.5
6	1	18	55	45	4.5

SECTION "6"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

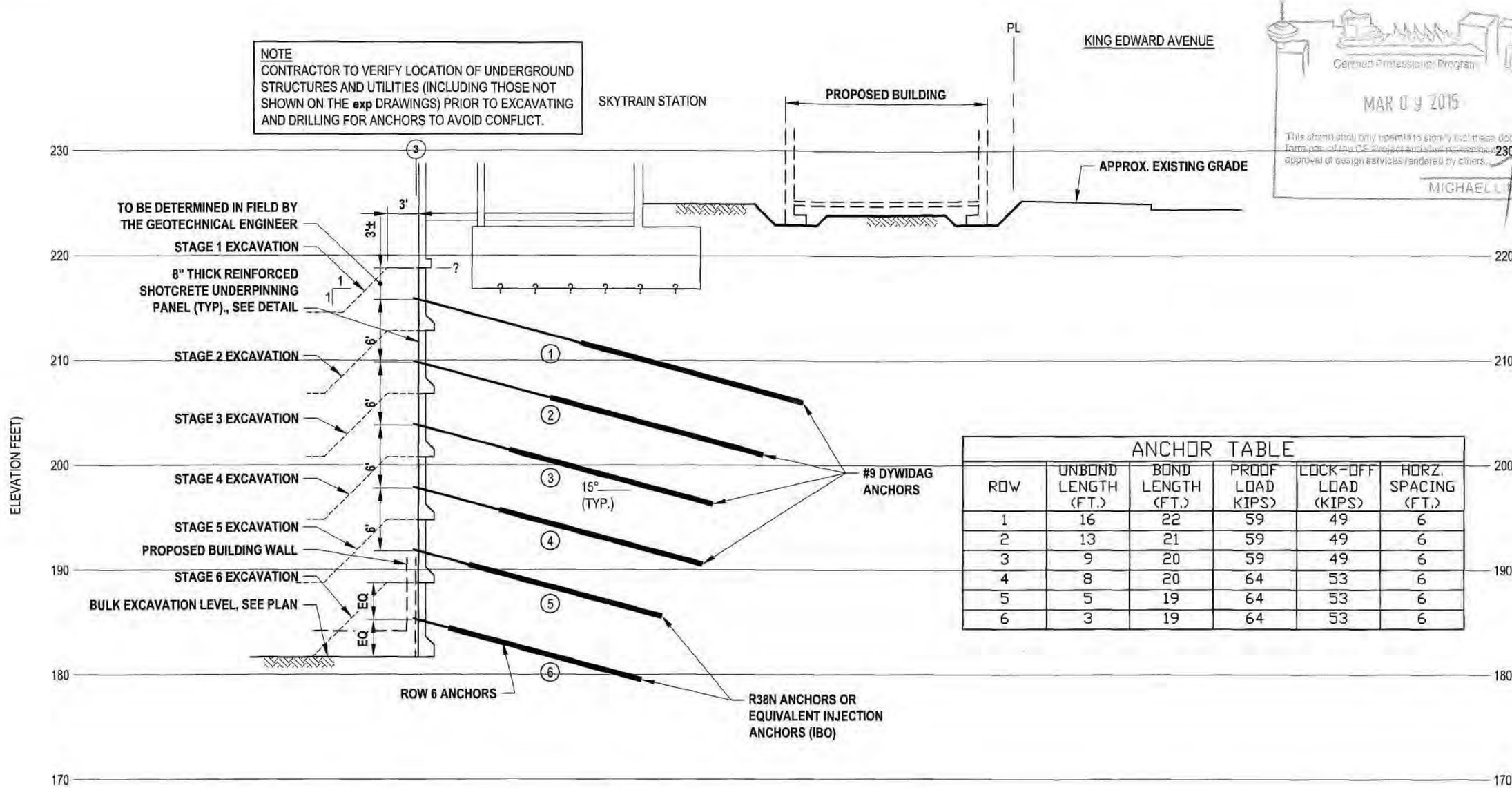
K.S. HUI 24938 PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA

DFTR.	MG
DSGN.	GM
CHK.	KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT	YUANHENG CKE DEVELOPMENTS LTD.
PROJECT	COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.	VAN-00217815-A0
TITLE:	BULK EXCAVATION SHORING SECTION "6"
DATE	2014-05-16
SCALE:	1"=10'
DWG NO.	G7

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	16	22	59	49	6
2	13	21	59	49	6
3	9	20	59	49	6
4	8	20	64	53	6
5	5	19	64	53	6
6	3	19	64	53	6

Geotech Professional Program
MAR 0 9 2015
This stamp shall only be used to signify that these documents form part of the CE Project and client acceptance/approval of design services rendered by others.
MICHAEL LIPTON

SECTION "7"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K.S. HUI 24938

DFTR.	DSGN.	CHK.
MG	GM	KSH

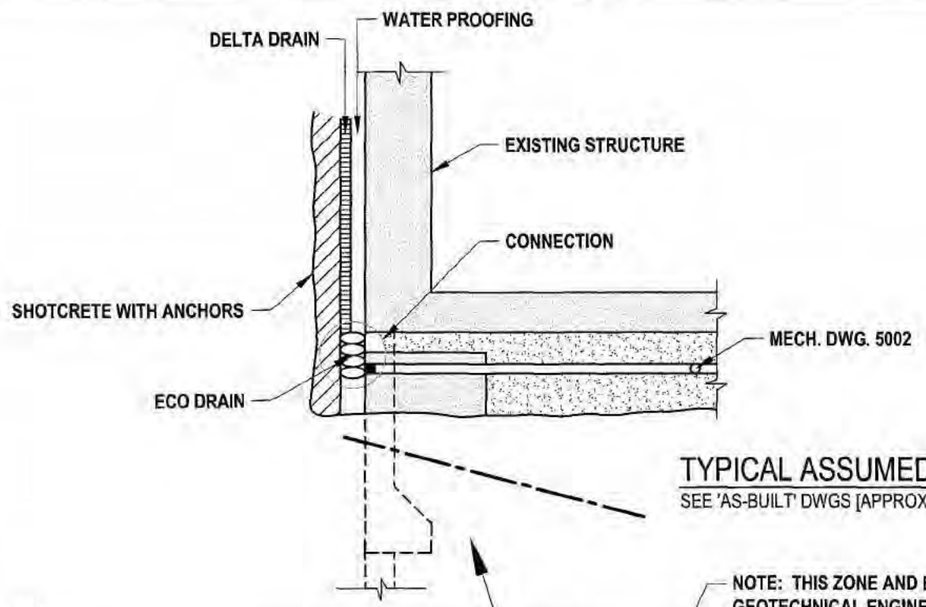
REVISIONS

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

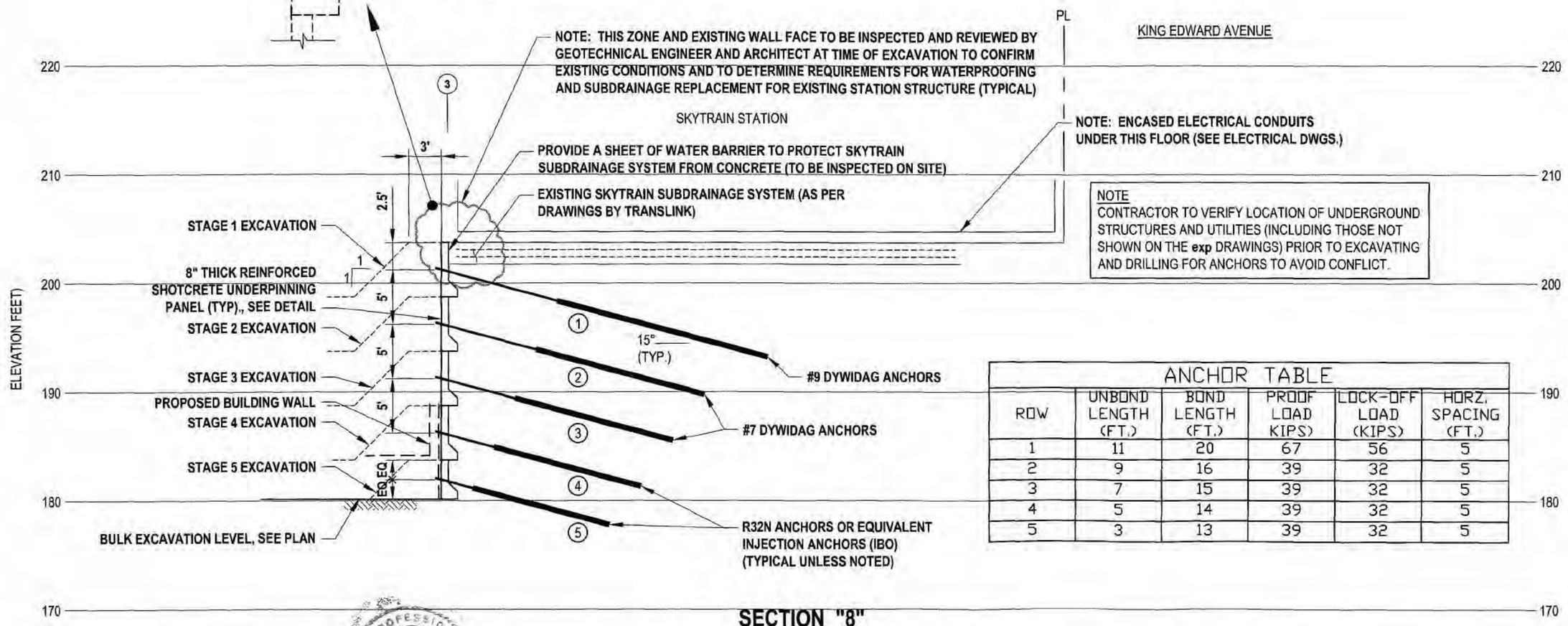
TITLE: BULK EXCAVATION SHORING SECTION "7"

DATE: 2014-05-16 | SCALE: 1"=10' | DWG. NO.: G8



TYPICAL ASSUMED CONDITIONS (NTS)

SEE 'AS-BUILT' DWGS [APPROX.]



ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	11	20	67	56	5
2	9	16	39	32	5
3	7	15	39	32	5
4	5	14	39	32	5
5	3	13	39	32	5

SECTION "8"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

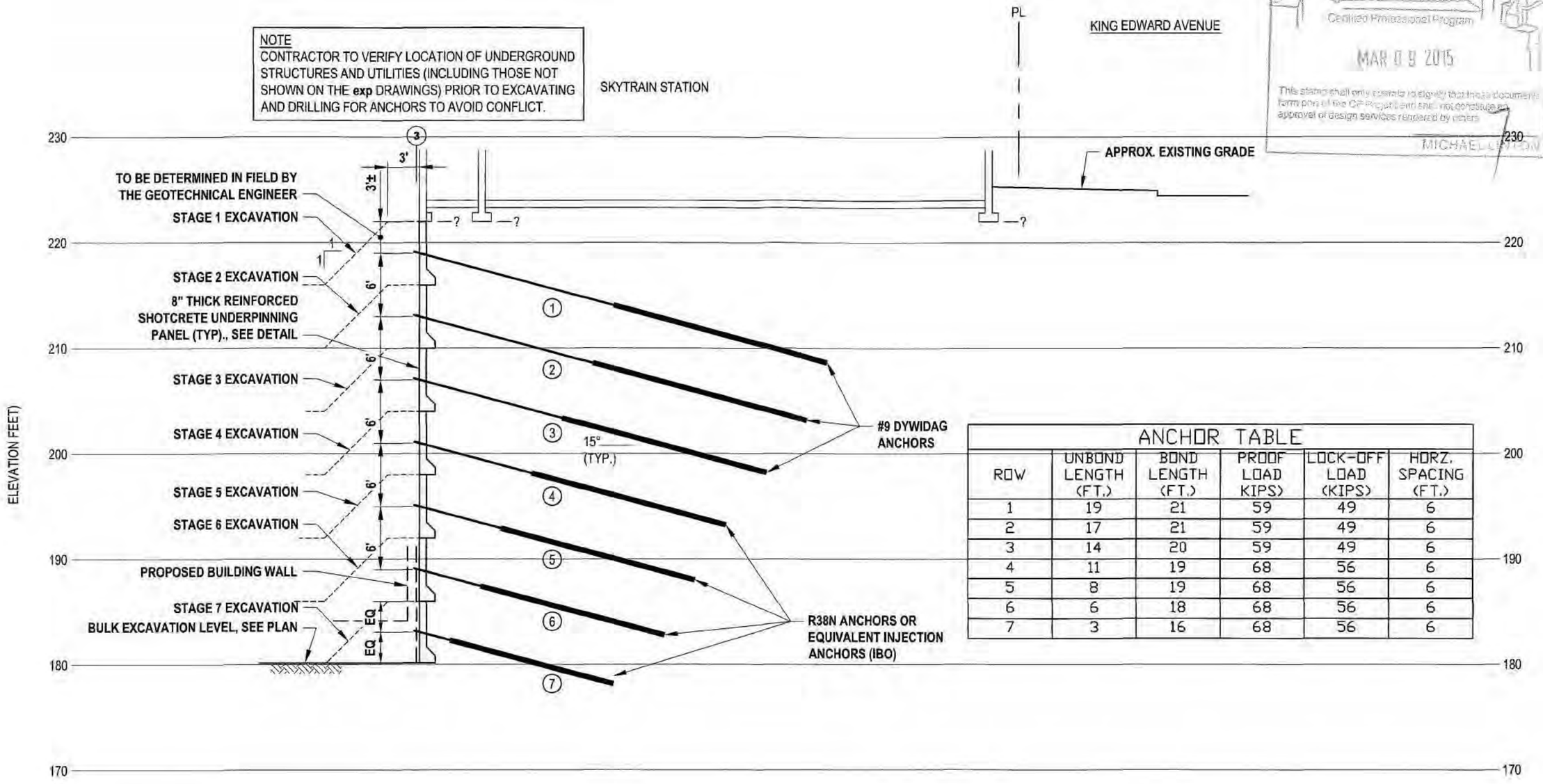
DFTR.	DSGN.	CHK.
MG	GM	KSH

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "8"
DATE: 2014-05-16
SCALE: 1"=10'
DWG NO.: G9

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	19	21	59	49	6
2	17	21	59	49	6
3	14	20	59	49	6
4	11	19	68	56	6
5	8	19	68	56	6
6	6	18	68	56	6
7	3	16	68	56	6

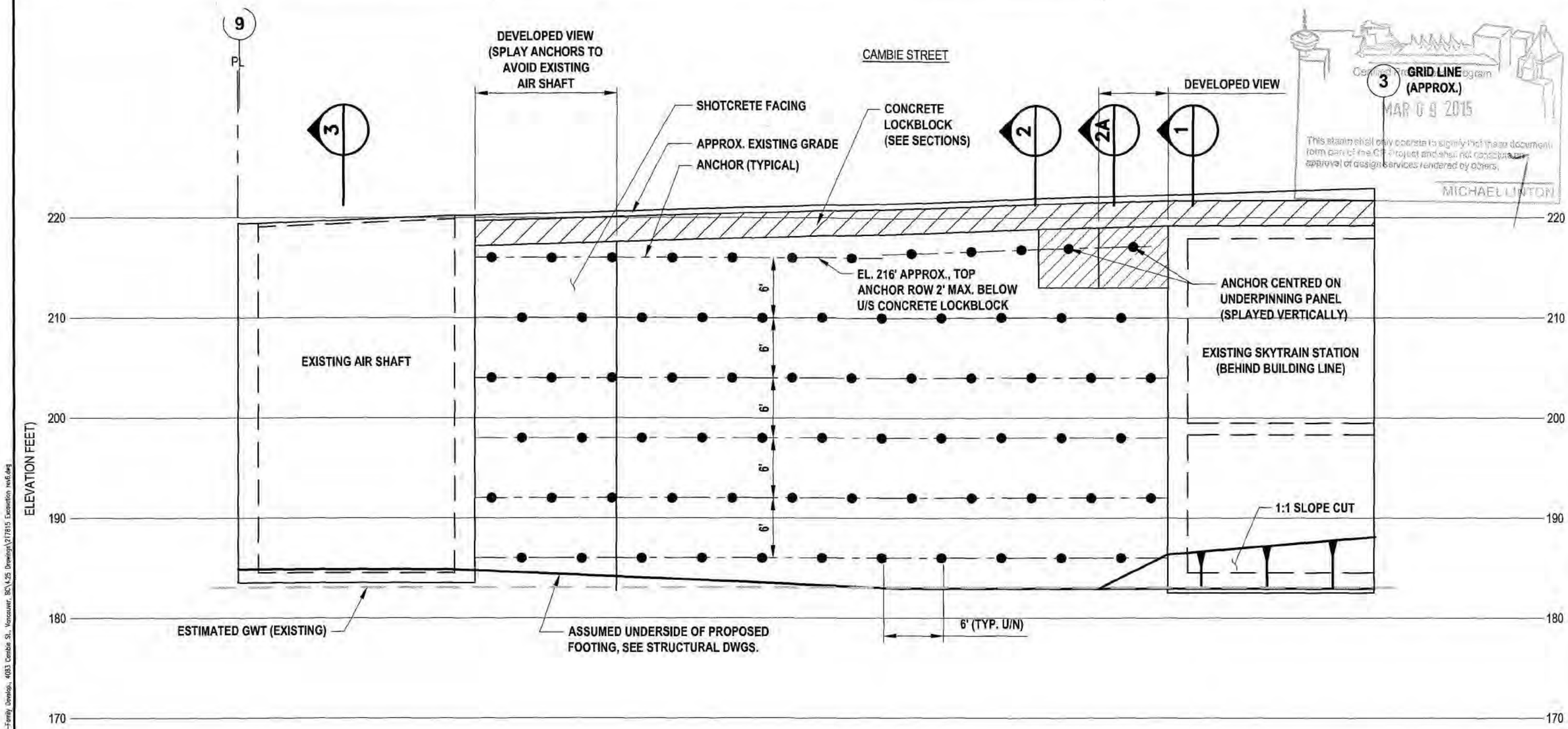
SECTION "9"

Certified Professional Program
MAR 0 9 2015
This stamp shall only operate to signify that these documents form part of the CP project and shall not constitute an approval of design services rendered by others.
MICHAEL LEYTON

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	REVISIONS		
MG	No.	DESCRIPTION	DATE
DSGN.	6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
GM	5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
CHK.	4	ISSUED FOR TENDER	2015-01-30
KSH	3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING SECTION "8"
DATE: 2014-05-16
SCALE: 1:100
DWG NO.: S-302



ELEVATION LOOKING EAST

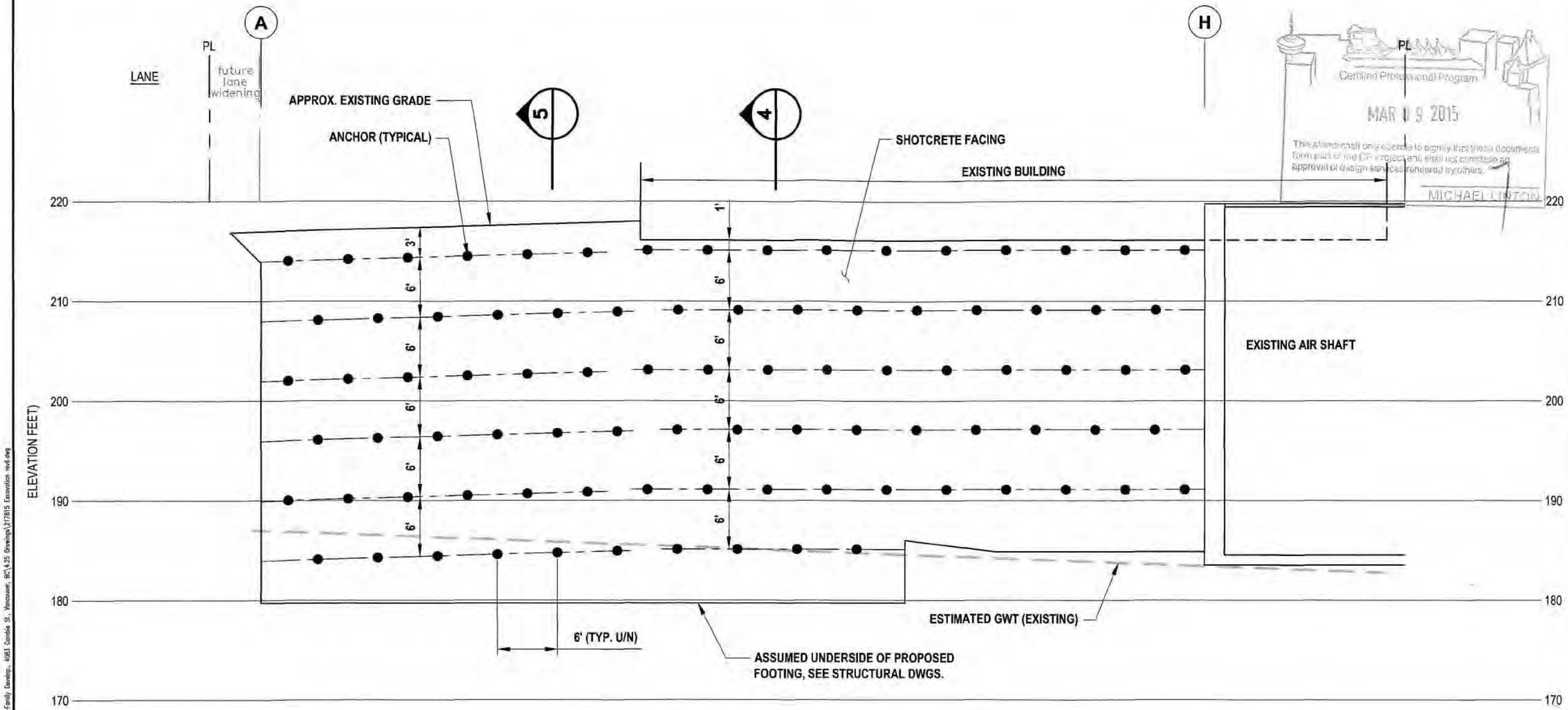
exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.S. HUI 24938

DRTR.	MG
DSGN.	GM
CHK.	KSH

REVISIONS			
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT	YUANHENG CKE DEVELOPMENTS LTD.
PROJECT	COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.	VAN-00217815-A0
TITLE:	BULK EXCAVATION SHORING ELEVATION LOOKING EAST
DATE	2014-05-16
SCALE	1"=10'
DWG. NO.	G11



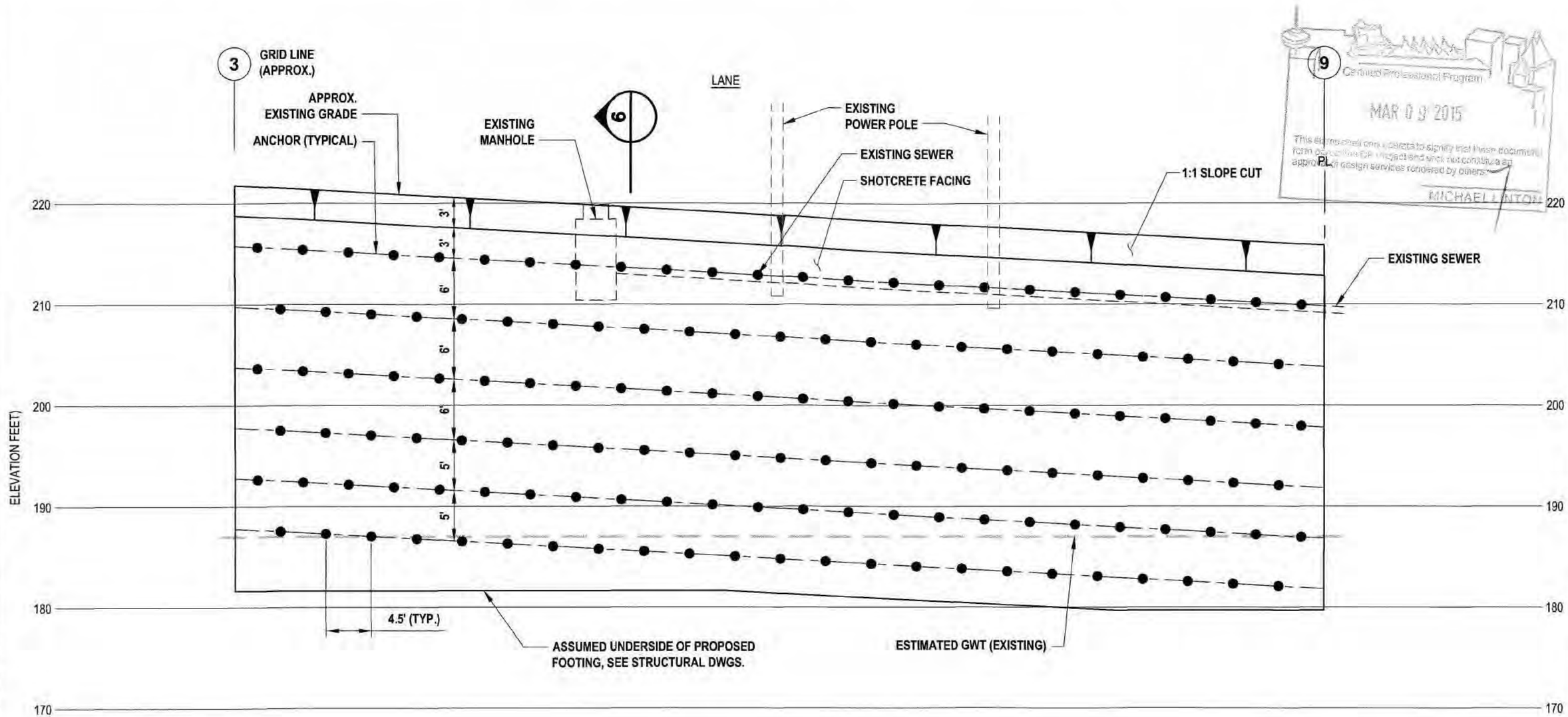
ELEVATION LOOKING NORTH

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	MG
DSGN.	GM
CHK.	KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT	YUANHENG CKE DEVELOPMENTS LTD.
PROJECT	COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.	VAN-00217815-A0
TITLE:	BULK EXCAVATION SHORING ELEVATION LOOKING NORTH
DATE	2014-05-16
SCALE:	1:100
DWG NO.	C12



ELEVATION LOOKING WEST

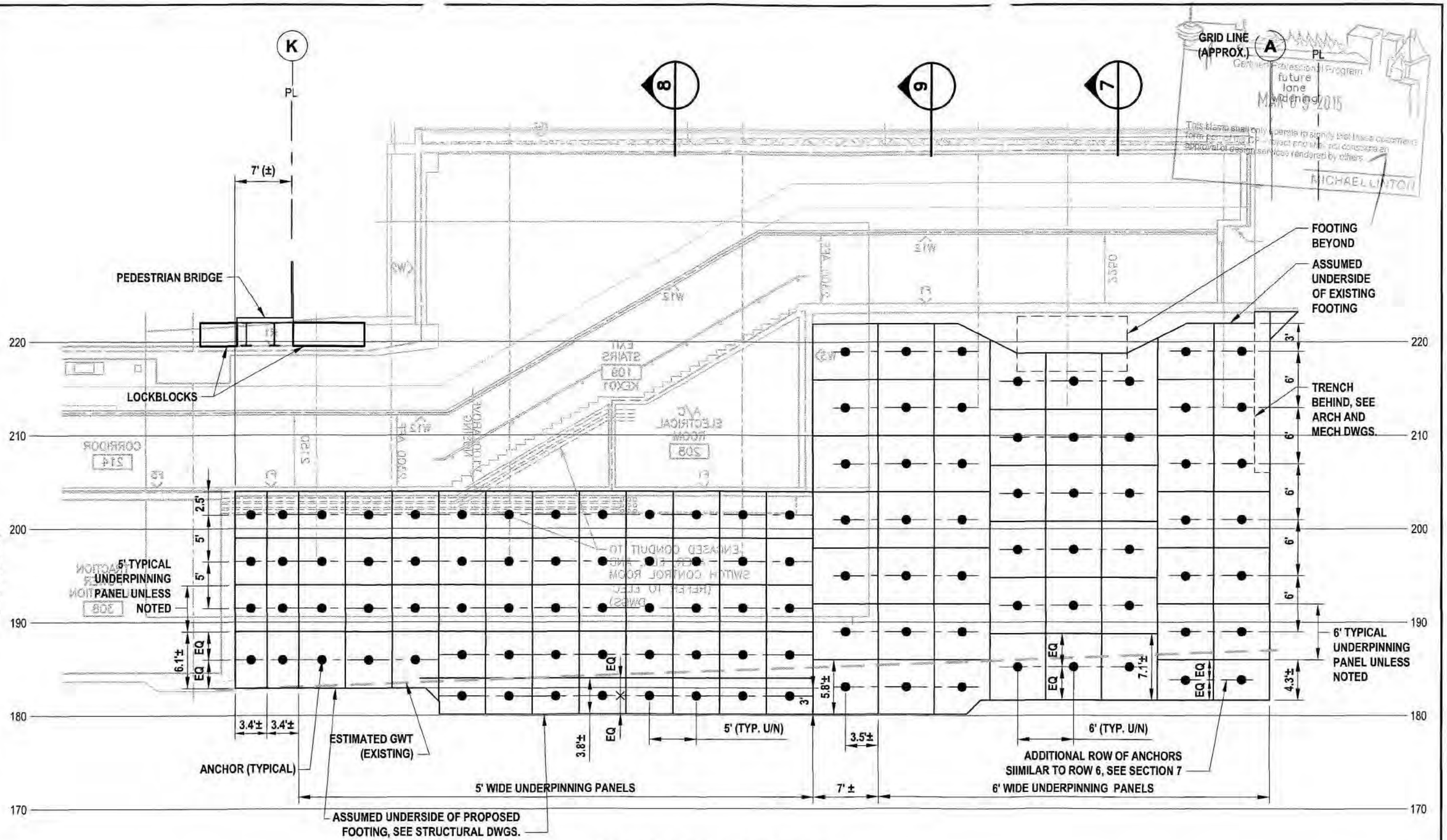
exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.S. HUI 24938

DFTR.	MG
DSGN.	GM
CHK.	KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING WEST
DATE: 2014-05-16
SCALE: 1:100
DWG NO.:



ELEVATION LOOKING SOUTH

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	MG
DSGN.	GM
CHK.	KSH

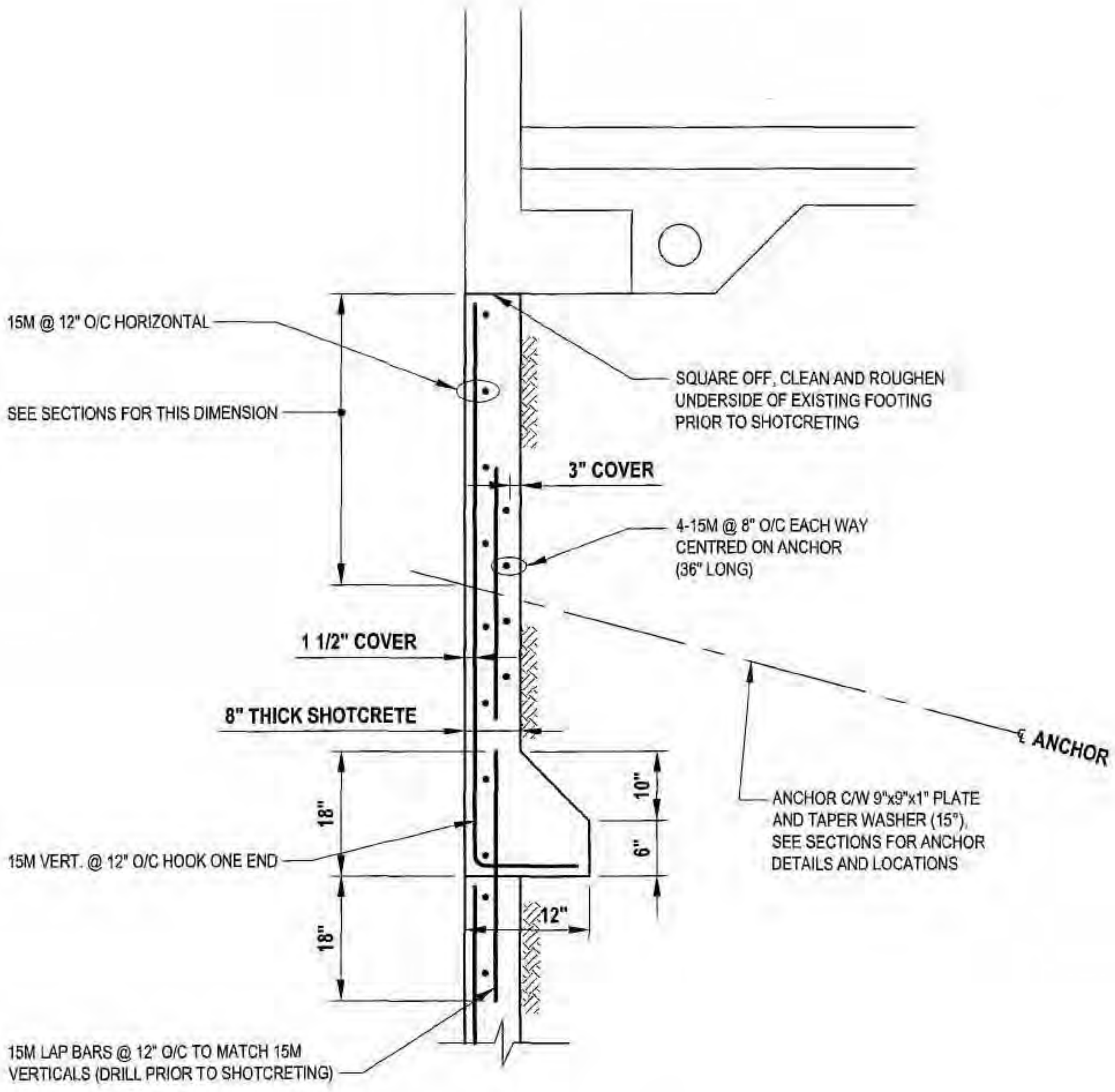
REVISIONS

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

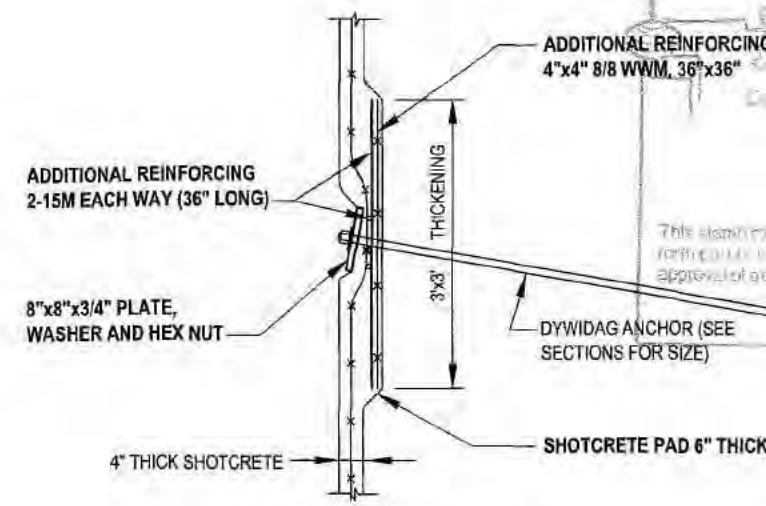
CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING SOUTH

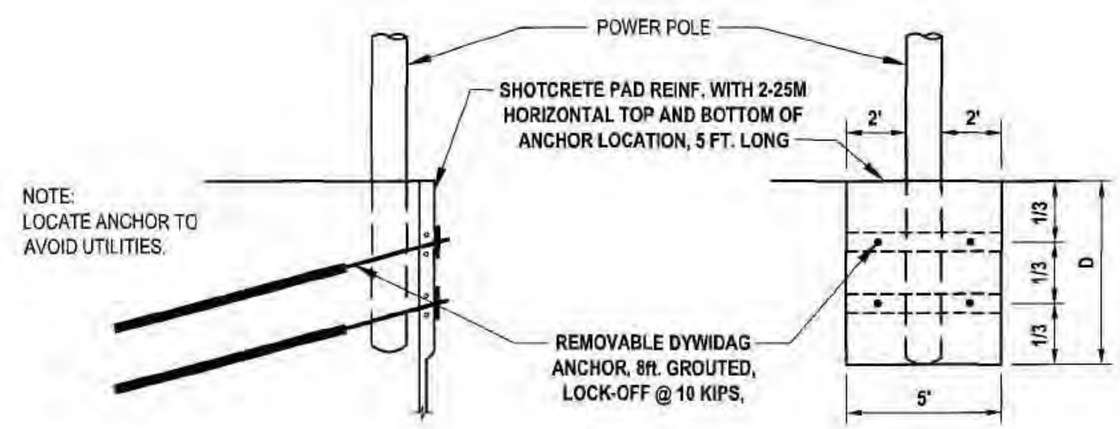
DATE: 2014-05-16
SCALE:
DWG NO.: S17



SHOTCRETE UNDERPINNING DETAIL



SHOTCRETE BEARING PAD SECTION



TYPICAL POWER POLE SUPPORT DETAIL

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.S. HUI 24938

DFTR. MG
DSGN. GM
CHK. KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO. VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING DETAILS
DATE: 2014-05-16
SCALE: NTS
DWG NO. G15

EXCAVATION SHORING SPECIFICATIONS

PART A - INITIAL REQUIREMENTS

1.0 Location of all services to be completed by contractor. Report all discrepancies between actual conditions and excavation drawings to **exp** Services Inc. immediately. Drilling for installation of anchors is not to commence until all service locations have been established and a memo stating such has been forwarded by the contractor to **exp** Services Inc.

2.0 All relevant permits from governing authorities must be in place prior to start of construction.

3.0 All relevant information which may affect the performance of the shoring system must be reported in writing to **exp** Services Inc. prior to start of construction. This includes location of site trailers or storage areas near the edge of the excavation.

4.0 Permission from adjacent property owners must be obtained and written confirmation of such permission forwarded to **exp** Services Inc. at least 2 days prior to commencing work on the adjacent properties.

5.0 Contractors to notify **exp** Services Inc., FortisBC, BC Hydro Electric and Telus in writing at least 3 days prior to start of construction.

6.0 A preconstruction survey of adjacent buildings must be completed prior to excavation. Survey control points to monitor horizontal and vertical movements should be installed in the adjacent roads and on adjacent buildings.

PART B - GENERAL CONSTRUCTION REQUIREMENTS

1.0 The contractor will undertake proper survey control to ensure the excavation shoring system is installed according to the excavation shoring drawings with respect to property lines, building lines, ground surface, and finished grades. Report any dimensional discrepancies to **exp** Services Inc.

2.0 Site to be enclosed by fencing or hoarding prior to start of excavation. Hoarding/fencing to be acceptable to municipal bylaws.

3.0 Where specialized dewatering systems are required, the excavation/shoring contractor work must be undertaken in such a manner and sequence to ensure damage to the system does not occur. Specialized dewatering does not form part of the shoring contract.

4.0 Where excavation shoring is required, the excavation contractor will ensure that adequate equipment is available to carry out the necessary detail excavation. Where detailed excavation is required prior to placement of shotcrete, excavation will be completed at such time to allow completion of the necessary shoring work prior to the end of the working day.

5.0 All interior excavation slopes not shown on the excavation shoring drawings shall be completed in conformance with the WorkSafe BC Occupational Health and Safety Regulations.

6.0 All significant slope or shoring deterioration to be reported to **exp** Services Inc.

7.0 All slope cuts to be protected with 6 mil polyethylene securely fastened unless noted otherwise on drawings.

8.0 The contractor shall maintain the overall responsibility for site safety.

9.0 All blasting must be completed by a certified blaster. Blasting may not occur within 10 feet of adjacent buildings. Notification of blasting must be provided to the excavation engineer 24 hours prior to blasting to allow installation of monitoring equipment. Unless otherwise indicated in the soils report, material which can be removed by excavation or ripping with a Caterpillar 345 excavator or equivalent with a single ripper tooth, with a production rate of at least 10 cubic yards per hour is not considered to require blasting for removal.

PART C - MATERIALS REQUIREMENTS

1.0 SHOTCRETE

Compressive strength requirements are:

- 15 MPa in 24 hours
- 20 MPa in 3 days

2.0 TIE-BACK ANCHORS

- Anchor diameters shown on drawings based on Dywidag Threadbar 517/690 MPa ultimate tensile strength
- Mukusol Threadbar 500 MPa ultimate tensile strength or Dywidag Threadbar 100 ksi ultimate tensile strength are acceptable alternatives with bar diameters corrected for tensile ultimate load capacity
- TITAN 30/16, TITAN 30/11, IBO R32/20 injection anchors to be used where conditions do not allow conventional drilling or where noted on drawings.

3.0 WELDED WIRE MESH

- Minimum yield 400 MPa, size 4: x 4: 8/8 unless noted otherwise. CSA G30.5 M1983.

4.0 REINFORCING

- Minimum yield 400 MPa, CSA G30.12 M197.

5.0 ANCHOR GROUT

- Non-shrinkage cementitious grout or equivalent
- Compressive strength requirements:

20 MPa in 24 hours
35 MPa in 28 days

6.0 DRAINS

- 2" diameter PVC with suitable filter fabric to ensure that no soil transfer occurs with groundwater flow.
- Where shown on drawing 1 ½" diameter slotted (.01") pipes, closed one end placed in minimum 2 ½" diameter holes to be sealed at shotcrete face.

7.0 BEARING PLATES

- Minimum yield 260 MPa CSA G40.21-M 87
- Alternate plates to those shown on the drawings will not be acceptable unless approval has been obtained from **exp** Services Inc.

8.0 STRUCTURAL STEEL

- All structural steel to be G40.21 300 MPa minimum yield.
- Fabrication and erection to CAN3 - S16.1

MAR 0 9 2015

PART D - CONSTRUCTION DETAILS

1.0 ANCHOR INSTALLATION

Specified anchors to be placed in minimum 4" diameter holes. Hole to be thoroughly cleaned by appropriate means prior to placement of grout.
Hole drilling technique required will depend on soil conditions. Percussion rock drill may not be suitable to install holes for soils containing predominantly silt or clay content unless combined with pressure grouting or after grout systems. The contractor should prove that test anchors can be installed using this method that will sustain the required test and lockoff loads prior to installing production anchors. Anchors to be provided with suitable centralizers at 10' o/c to ensure the anchor is completely encircled by grout. Grout to be installed by Tremie grouting from bottom of hole or by pressure grouting. All grout extending into the unbonded portion of anchor must be removed or alternatively a protective sleeve placed over the unbonded length of anchor.

2.0 WELDED WIRE MESH PLACEMENT

All mesh joints must be a minimum overlap of 2 squares. Mesh must be suitably supported from soil face and positioned to provide required cover as shown on the detail drawings.

3.0 REINFORCEMENT PLACEMENT

Reinforcement to overlap a minimum 24 diameters for tension splices and 18 diameters for compression splices with minimum 1.5" of cover unless noted otherwise on drawings.

4.0 SHOTCRETE DRAINS

Drains through the shotcrete to consist of 2" diameter PVC placed every 5' on centre vertically and horizontally to relieve hydrostatic pressure.

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604-874-1245
Fax: 604-874-2358
exp.com

PROFESSIONAL ENGINEER – PROVINCE OF BRITISH COLUMBIA – K.S. HUI 24938

DFTR. MG
DSGN. GM
CHK. KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING NOTES

DATE: 2014-05-16
SCALE: NTS
DWG NO.: 0

5.0 SHOTCRETE PLACEMENT

5.1 GENERAL

Shotcrete thicknesses shown on the detailed drawings are minimum.

Shotcrete to be placed in such a manner that segregation of materials or post placement slumping does not occur. Upward placement of shotcrete for underpinning panels is not acceptable.

All reinforcing and welded mesh to be fully contained in the shotcrete with at least 1 ½" cover in all areas. Removal of defect shotcrete to be at contractor's expense.

5.2 COLD WEATHER CONDITIONS

Special requirements for shotcrete protection will be necessary during cold weather. These include:

AMBIENT NIGHT TIME TEMPERATURES	REQUIREMENTS
Greater than 1°C	No special provisions other than potential sequencing changes to allow additional shotcrete curing times.
-3° to 1°C	Protect fresh shotcrete with thermal blankets for 24 hours
-10 to -3	Provide vented heat to fresh shotcrete for 24 hours
Below -10°C	No shotcreting allowed

In all cases, shotcrete may not be placed on frozen ground.

6.0 TESTING

6.1 Anchors

Anchors shall be tensioned as soon as practicable but no sooner than 24 hours after the construction of the applicable shotcrete panel. Contractor will provide required testing apparatus including recently calibrated jack and ram compatible with the anchor test load, nuts, plates, couplers, wrenches, and tensioning chair, together with personnel to set up and operate the equipment. The required lockoff loads are shown on the excavation drawings.

All anchors will be tested to 1.25 times the lockoff load for 2 minutes. An acceptable performance test occurs where less than 2.5% of the test load is lost over the 2 minute period. Of these anchors, approximately 10% will be proof tested by maintaining 1.25 times the lockoff load for 15 minutes in accordance with PTI manual.

Anchors which fail any of the above tests shall be replaced. A failure rate of 3% of the total anchors installed will be assumed as typical and will be at the contractor's expense. Failure rates in excess of 3% will be investigated to determine the cause of the failures and will form an extra only where soil conditions/groundwater conditions can be proved to be significantly different than those reported in the project soils report.

Lift-off tests to determine long-term performance of the anchors will be carried out on 5% of the anchors except where soil conditions are predominantly clay or silt in which case an allowance of 50% of the anchors should be provided. Retensioning of anchors to required lockoff will be completed following the lift-off test.

Costs of anchor testing to be at contractor's expense.

6.2 Shotcrete

Shotcrete samples placed in 2' x 2' x 4" panels will be provided by the contractor:
A. during the first day shotcrete is used on the site.
B. approximately halfway through the project.
C. when requested by the **exp** Services Inc. personnel.

Contractor shall inform **exp** Services Inc. of sample scheduling. Samples will be suitably protected from construction activity or weather damage. Costs of shotcrete sampling and testing to be at owner's expense.

6.3 Grout

Contractor to provide grout samples:
A. during first day of anchor installation.
B. at halfway point of project.
C. as requested by **exp** Services Inc. personnel.

Costs of sampling and testing to be at owner's expense.

7.0 GROUNDWATER CONTROL

Contractor is required to provide conventional groundwater control including, but not exclusive to, sumps and ditches. Excavation is to proceed in such a manner that the water does not pond at the base of the shotcrete or excavated panels.

Loss of soil from groundwater movement must be controlled by use of filter fabrics, drainage mats and where necessary casing of drill holes or use of alternate drilling technique. Where material is lost behind the shotcrete face, the void must be backfilled using shotcrete, grout, or gravel as directed by the excavation engineer. Where specialized groundwater techniques are required as determined by the excavation engineer, installation of such a system shall be an extra to the shoring contract.

PART E - COMPLETION REQUIREMENTS

1.0 BACKFILL

All backfill types and procedures for placement must meet applicable municipal requirements and recommendations provided in the project soils report. In the absence of a project soils report or municipal requirement, backfill should consist of clean pitrun sand and gravel or river sand with less than 5% passing the No. 200 sieve. The material should be placed in maximum 12" lifts with each lift compacted to a minimum 95% Modified Proctor density (ASTM D1557). Where access is limited, backfill may consist of pea gravel (1/4" nominal size) placed in maximum 2' lifts with each lift compacted using a concrete vibrator with water jetting. Foundation walls must be adequately supported prior to placement of backfill. In-situ compaction testing will be carried out by **exp** Services Inc. personnel.

Special requirements for specific municipalities are outlined below. The list is not exhaustive and requirements can be expected to change during the project duration. The contractor is to determine and ensure his work conforms to the jurisdiction having authority at the specific project location.

Vancouver

A. When the excavation encroaches onto City of Vancouver property or the depth of the excavation below finished grades is greater than or equal to the shortest horizontal distance from the edge of the excavation to the adjacent City property line, all backfilling shall conform to the following:

A.1 For excavations less than 4 feet wide.

Birdseye Material plus Controlled Density Fill

Birdseye Material shall be placed from the bottom of the excavation to a grade below the finished surface grade, determined as follows:

- 1.0' below the finished surface grade, plus an additional depth below this grade determined as the greater of 1.5 times the width of the excavation or 4.0'.

Birdseye gravel shall be confined to its original area of placement using geosynthetic sand bags placed near adjacent sites. Approval from the streets administration branch of the city engineering services department shall be obtained prior to backfilling.

Controlled Density Fill shall be placed above the Birdseye material to no nearer than 1' of finished surface grade. The top 1' of the backfill may be backfilled with Granular Base, or may contain landscaping materials subject to the review and approval of the Site Engineer.

Birdseye must be vibrated into place with immersion vibrators, and must be compacted to at least 90% of Modified Proctor density (ASTM D1557). "End dumping" of birdseye is not an approved method of compaction.

A.2 For excavations wider than 4 feet wide.

Select granular fill with less than 5% passing the no.200 sieve shall be placed for the full depth of the excavation to within 4 feet of finished grade compacted to at least 90% modified proctor density. The top 4 feet shall consist of granular base compacted to at least 95% modified proctor.

B. When the depth of the excavation is less than the shortest horizontal distance from the edge of the excavation to the adjacent City property line, granular backfill material used shall be compacted to the greater of 90% of Modified Proctor density (ASTM D1557) or as indicated in the project soils report.

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DSTR.	MG
DSGN.	GM
CHK.	KSH

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING NOTES
DATE: 2014-05-16
SCALE: NTS
DWG NO.: S17

2.0 BACKFILL MATERIALS

"Birdseye" Material - 2.5mm to 10mm rounded granular aggregate

This material shall be of uniform quality, thoroughly washed free of sand, silt and clay and shall contain no more than 15% non-rounded particles. The particles shall be durable, capable of withstanding the effects of handling, placement and compaction without the production of deleterious fines. The grading limits shall be:

Total Passing	3/8" (9.5mm)	100%
Total Passing	¼ (6.35mm)	60% - 75%
Total Passing	No. 4 (4.75mm)	5% - 50%
Total Passing	No. 8 (2.36mm)	0% - 13%
Total Passing	No. 16 (1.18mm)	0% - 1%

Controlled Density Fill

As per Master Municipal Specifications Section 02236. Controlled Density Fill is a low-strength, high-slump cementitious material. This material is also referred to as "fillcrete", "unshrinkable fill" and "controlled low strength material (CLSM)".
To have maximum unconfined compressive strength of 0.5 MPa, (500Kpa) at 28 days and maximum cement content of 25Kg per m3 with fly ash and water reducing admixtures for initial settlement control. Place material using methods which do not lead to segregation. Inspection and testing of the fill is required by the Engineer.

"Granular Base" - 19mm Minus Crushed Aggregate

As per Master Municipal Specifications Section 02226.2.10. conforming to following gradations:

Sieve Designation		Percent Passing
19mm	100	
12.5mm		75-100
9.5mm		60-90
4.75mm		40-70
2.36mm		27-55
1.18mm		16-42
0.600mm		8-30
0.300mm		5-20
0.075mm		2-8

3.0 BACKFILL TESTING

Sufficient testing of the backfills is required as the site engineer deems necessary so as to be able to provide the Letters of Assurance as described below.

Samples of all fills to be used on the site are to be provided to the engineer to allow tests of gradation for any granular material placed (road base or birdseye and controlled density fill). These samples must be provided prior to delivery of materials to the site and at least 48 hours prior to their use on the project.

Density testing of placed backfill material is required on representative locations of any backfill that was placed on any day when the site engineer or his/her representative did not observe backfilling at the site.

4.0 LETTERS OF ASSURANCE

At the end of the project, the City requires that the site engineer provide an Assurance of "Geotechnical Field Review and Compliance" . Additionally, during the project, an interim letter may be submitted by the site engineer covering only a portion of the excavation backfill in order to facilitate construction of street works such as sidewalks over or adjacent to portions of the backfill.

In both cases, the City requires that the letter must be supported by the following material:

- all daily field review reports
- gradation test results on each type of backfill material used
- batching slips for all controlled density fill material delivered to the site
- density test results on backfill placed on days in which the site engineer (or representative) was not in attendance, accompanied by an explanation of why the engineer (or representative) was not in attendance and a description of what remedial steps were taken to satisfy the site engineer as to the adequacy of the backfill and its compaction where compliance with the job specification had not been attained.

The contractor/owner will take all measures required to ensure this information is provided.

5.0 ANCHOR DETENSIONING AND REMOVAL

Except as noted below all anchors installed on city property within 5' of finished ground surface must be removed and those below 5' detensioned. Alternatively below 5' the anchors may remain tensioned if they are fully grouted after the lockoff load has been applied. Detensioning and removal of anchors must be done concurrently with backfill placement. The backfill should be placed to within 1' of the anchor location prior to its detensioning or removal. In easement area or city right-of-way anchors within 3.3' of any underground services must be removed.

6.0 SHOTCRETE REMOVAL

Except as noted below shotcrete placed within 5' of finished ground surface on city property must be removed. The removal operation must be completed in stages and in such a manner that damage to the adjacent utilities does not occur. Shotcrete placed on easement area or city right-a-way within 3.3' of underground services must be removed.

7.0 NOTIFICATION OF WORK

exp Services Inc. must be notified at least 48 hours prior to placement of backfill, anchor detensioning and removal, and shotcrete removal in order that certification of the work may be provided. Failure of adequate notification may result in the requirement for re-excavation of backfilled areas, loss of damage deposits at the contractors expense, or failure to allow provision of Letters of Completion by the project engineer.

SHORING INSTALLATION STAGING

SECTIONS 1, 2, 3, 5 and 6

1. Excavate to Stage 1
2. Install first row anchors as shown on drawings.
3. Excavate vertically in maximum 2 anchor widths, maintaining adjacent berms.
4. Place required mesh, reinforcement, and shotcrete.
5. Tension anchors as described in section D6.1.
6. Following successful tensioning of anchors, excavate adjacent panels, and repeat steps 4 and 5.
7. Excavate to successive berms, install anchors and repeat steps 3 to 6.

SECTIONS 4, 7, 8 and 9

1. Excavate to Stage 1 berms and install first row anchors as shown on the drawings.
2. Excavate panels 1 anchor width, maintaining at least 3 anchor panels and adjacent berms. Adjacent berm sides at working panels must be maintained near vertical. Temporary shoring for protection of workers may be required.
3. Place required mesh, reinforcement, and shotcrete.
4. Tension anchors as described in specification Section Part D 6.1, at least 24 hours after shotcrete has been placed.
5. Following successful tensioning of anchors, excavate adjacent panel as per Step 2 and repeat Steps 3 and 4.
6. Repeat step 5 until row is complete.
7. Excavate to successive berms, install anchors and repeat steps 2 to 6.

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604-874-1245
Fax: 604-874-2358
exp.com

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.S. HUI 24936

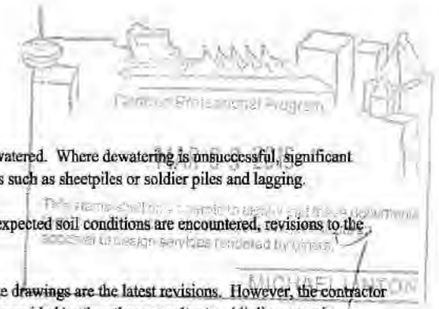
DFTR.	MG
DSGN.	GM
CHK.	KSH

No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING NOTES
DATE: 2014-05-16
SCALE: N.T.S.
DWG NO.: G18

GENERAL NOTES



1.0 DESIGN PARAMETERS

The excavation drawings are based on the following:

A. This shoring design has been based on the assumption that the site can be adequately dewatered. Where dewatering is unsuccessful, significant shoring design revisions should be expected which may include alternate shoring systems such as sheetpiles or soldier piles and lagging.

B. Soil conditions as per soils report by **exp** Services Inc. dated April 11, 2014. Where unexpected soil conditions are encountered, revisions to the excavation drawings may be required.

C. See drawing G1 for reference drawings. All attempts have been made to ensure that these drawings are the latest revisions. However, the contractor should ensure that discrepancies do not exist between the excavation drawings and those provided by the other consultants. All discrepancies or dimension inaccuracies to be reported to **exp** Services Inc. prior to commencement of the work. Contractors using the drawings for quantity take-offs do so at their own risk.

D. Locations of adjacent structures are obtained by site inspections and where possible review of available drawings. We accept no responsibility for the accuracy of this data.

E. Utility data is provided by the appropriate municipality and from the Site Survey Plan. Site inspections to determine location of utilities either shown or not shown on the drawings are the responsibility of the contractor. Information placed on the drawings is to be used as a preliminary guide only. Report any discrepancies between the drawings and actual utility locations. Installation of anchors is not to proceed until discrepancies have been resolved.

2.0 DRAWING REVISIONS

Revisions to shoring installation sequence or shoring details can be made only with written confirmation by **exp** Services Inc. personnel.

3.0 CONTRACTOR EXPERIENCE

exp Services Inc. reserves the right to withdraw their services if in their opinion an excavation/shoring contractor is selected which does not have adequate experience to complete the work in a safe manner.

4.0 PRECONSTRUCTION SURVEYS/MONITORING

It is strongly recommended that preconstruction surveys be completed on adjacent structures in order that deficiencies of these structures can be documented prior to start of construction. Continued monitoring of these buildings by survey control points should be undertaken during construction.

5.0 DRAWING USE

These drawings have been prepared for the exclusive use of the client named on the title page of the Shoring Design package. The design shown indicates minimum requirements based on limited or assumed soil conditions only, with design revisions likely required to suit actual conditions encountered during construction. These drawings must not be used for construction unless the design engineer or his repressntatives monitors installation of the shoring system.

6.0 LEGAL

These design documents are prepared solely for use by the party with whom the design professional entered into a contract. No representations of any kind are made by the design professional to any party with whom the design professional has not entered into contract.

The owner and contractor are responsible for determining and conforming to the appropriate environmental regulations.

7.0 ALLOWANCES

The Contractor should provide allowances in his bid by unit rates for additional shotcrete anchors and installation of 1 1/2" diameter slotted drains.

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — K.S. HUI — 24938

DFTR. MG
DSGN. GM
CHK. KSH

REVISIONS		
No.	DESCRIPTION	DATE
6	RE-ISSUED FOR BUILDING PERMIT	2015-03-05
5	RE-ISSUED FOR TENDER - EAST SIDE REVISED / NOTES ADDED	2015-02-26
4	ISSUED FOR TENDER	2015-01-30
3	ISSUED FOR BUILDING PERMIT	2014-11-04

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING NOTES
DATE: 2014-05-16
SCALE: NTS
DWG NO.: G19

CITY ENGINEERING DEPARTMENT
PROJECTS BRANCH DIVISION

EXCAVATION ONTO CITY PROPERTY

THE ATTACHED PROPOSAL TO CONSTRUCT A TEMPORARY EXCAVATION, FOR CONSTRUCTION PURPOSES, ENCROA
ONTO CITY PROPERTY HAS BEEN RECEIVED. PLEASE REVIEW AND STATE YOUR REQUIREMENTS OR APPROVAL.

DATE: Dec 2

SITE ADDRESS: 4083 Cambie St PLAN NO. _____

LEGAL : _____

PLEASE PROCESS AND FORWARD TO THE FOLLOWING FOR COMMENTS:

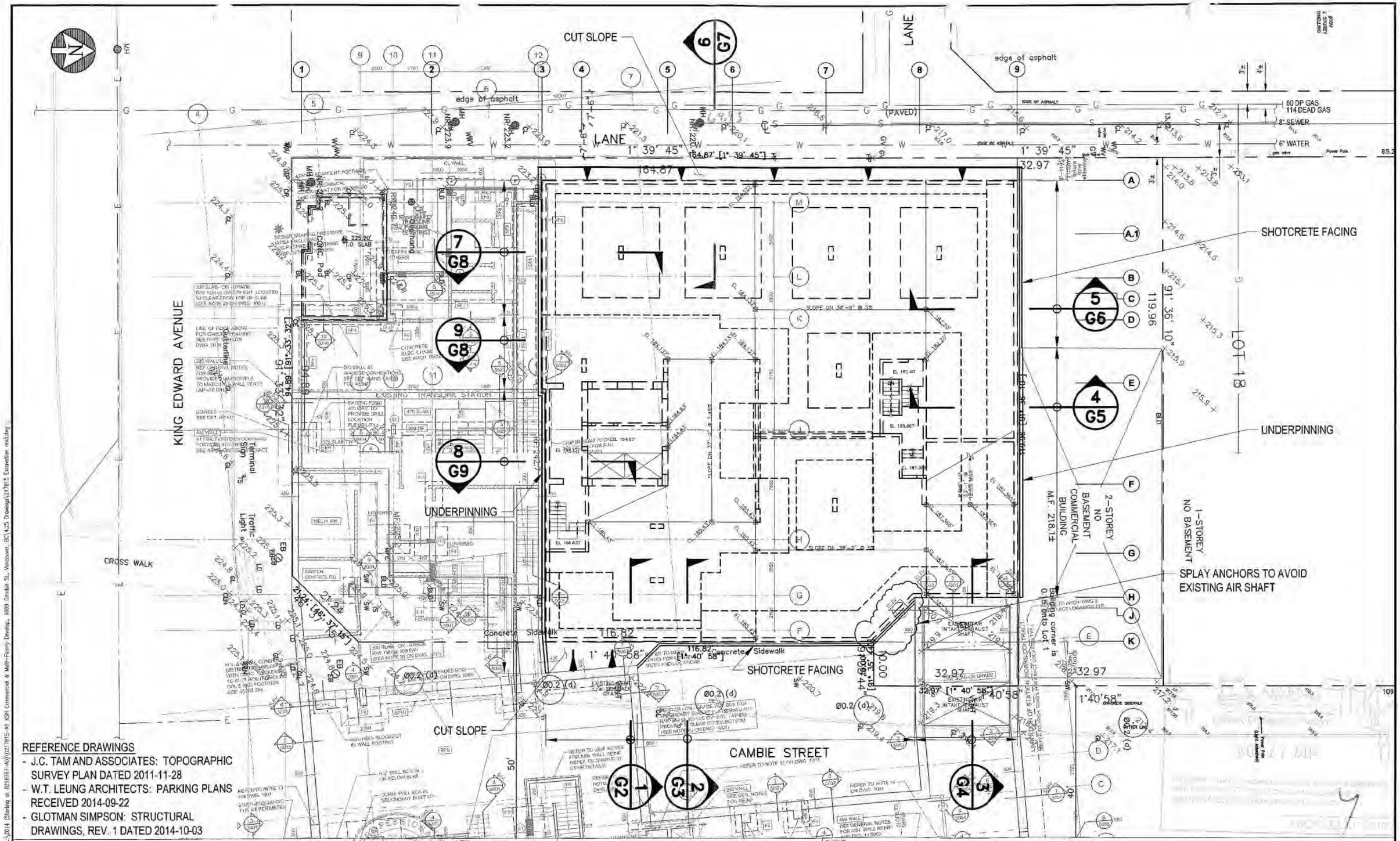
SEWERS: CHECKED BY: JO DATE: Dec 4

Sewer inverts incorrect

Revise and resubmit

UTILITIES: CHECKED BY: _____ DATE: _____

DEVELOPMENT SERVICES: CHECKED BY: _____ DATE: _____ 2



exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

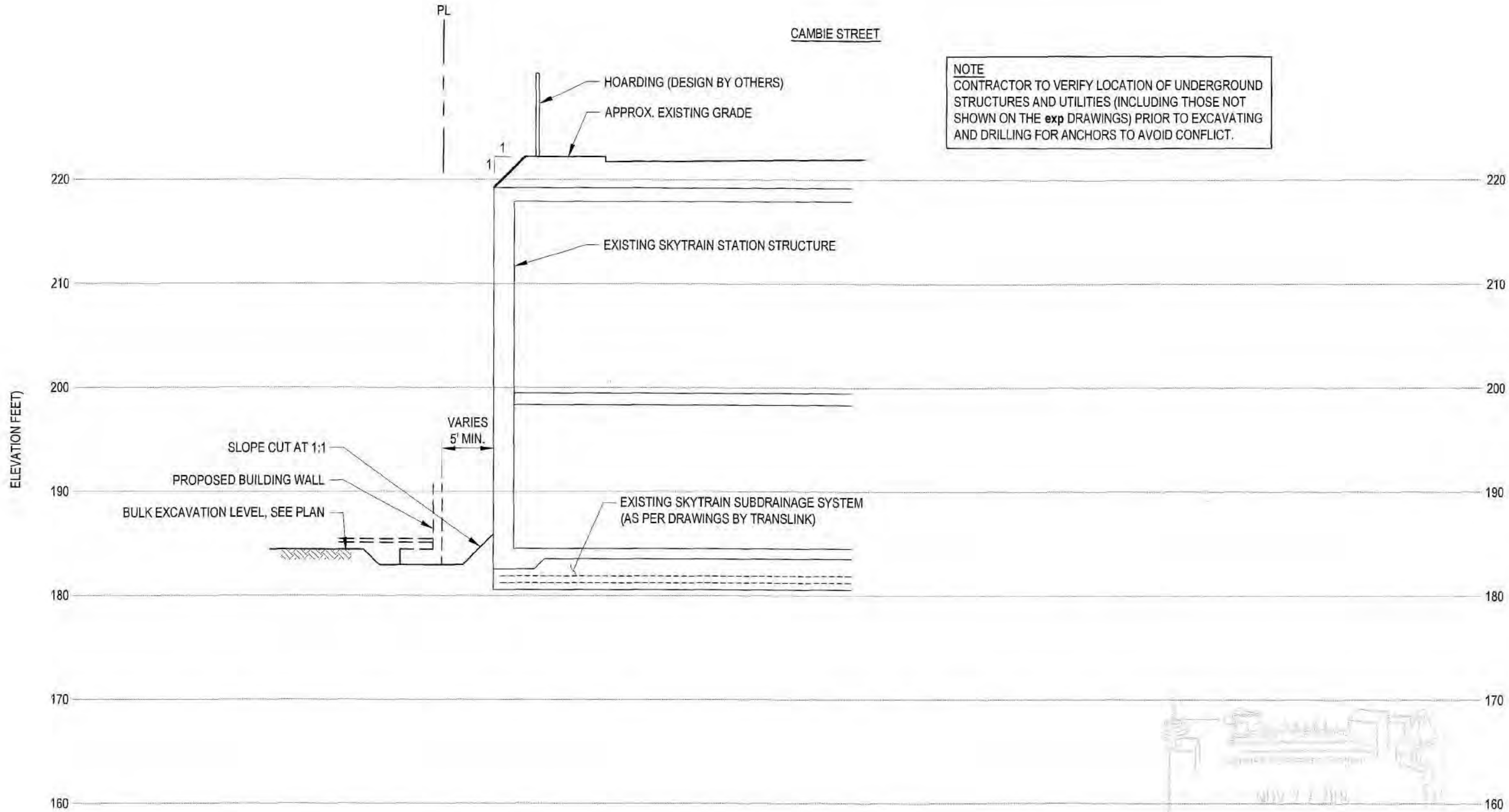
DFTR.	MG
DSGN.	GM
CHK.	KSH

REVISIONS			
NO.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4083 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING PLAN

DATE: 2014-05-16 | SCALE: 1:200 | DWG NO.: G1



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

SECTION "1"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604-874-1245
Fax: 604-874-2358
exp.com

DFTR. MG
DSGN. GM
CHK. KSH

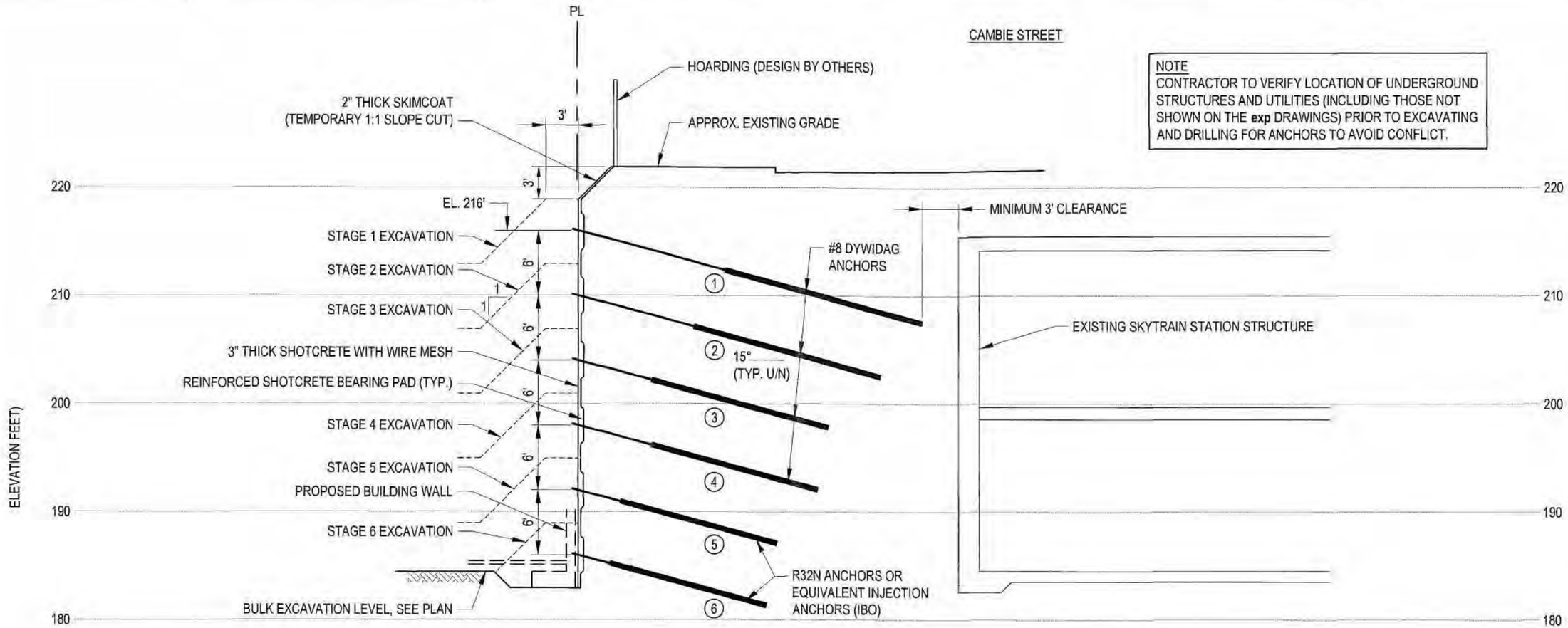
REVISIONS

No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO. VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "1"

DATE: 2014-05-16
SCALE: 1"=10'
DWG. NO. G2



NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.

ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	14	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	4	15	44	37	6
6	3	15	44	37	6

SECTION "2"

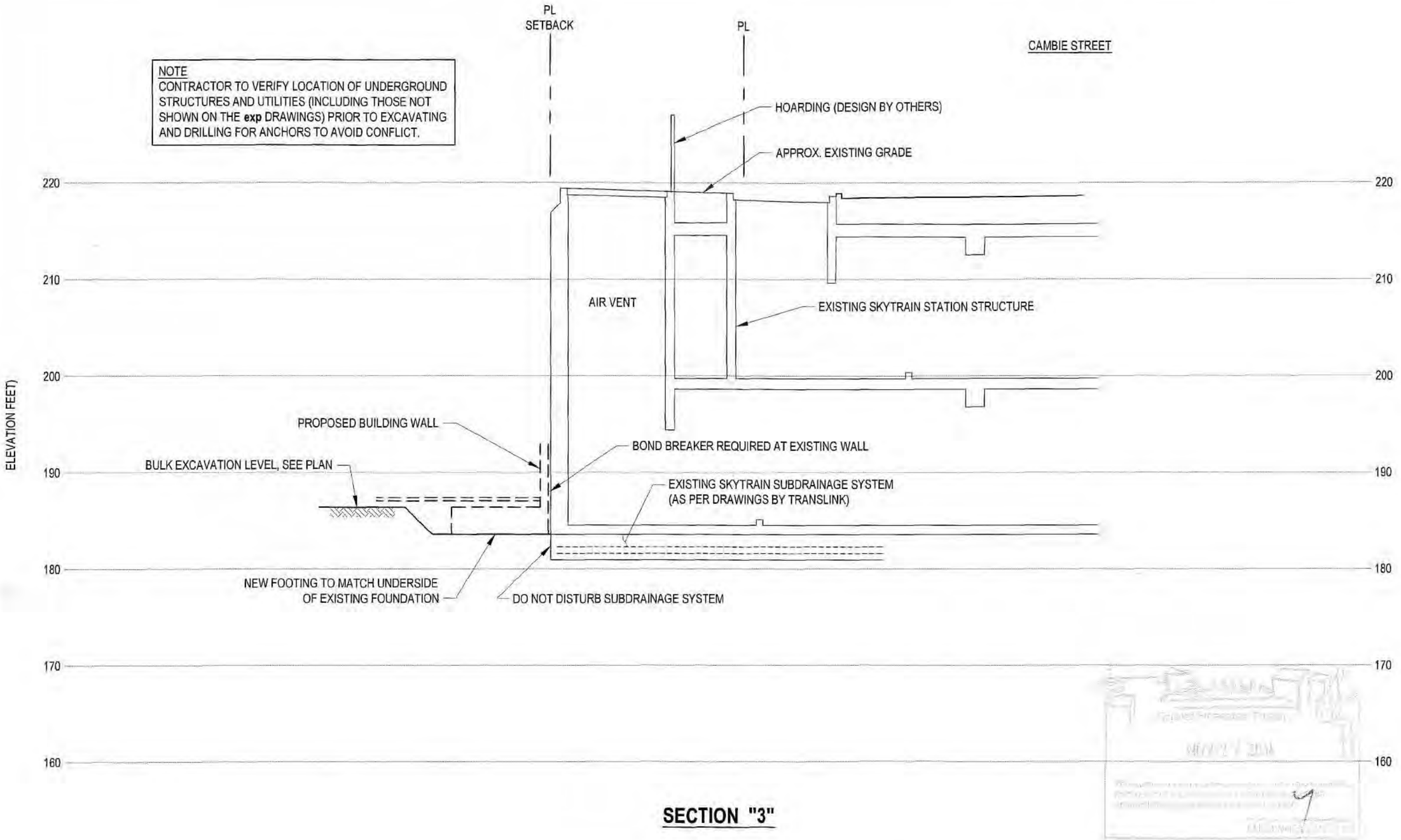
exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	DSGN.	CHK.
MG	GM	KSH

No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0
TITLE: BULK EXCAVATION SHORING SECTION "2"
DATE: 2014-05-16
SCALE: 1 = 10
DWG. NO.:

NOTE
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.



SECTION "3"

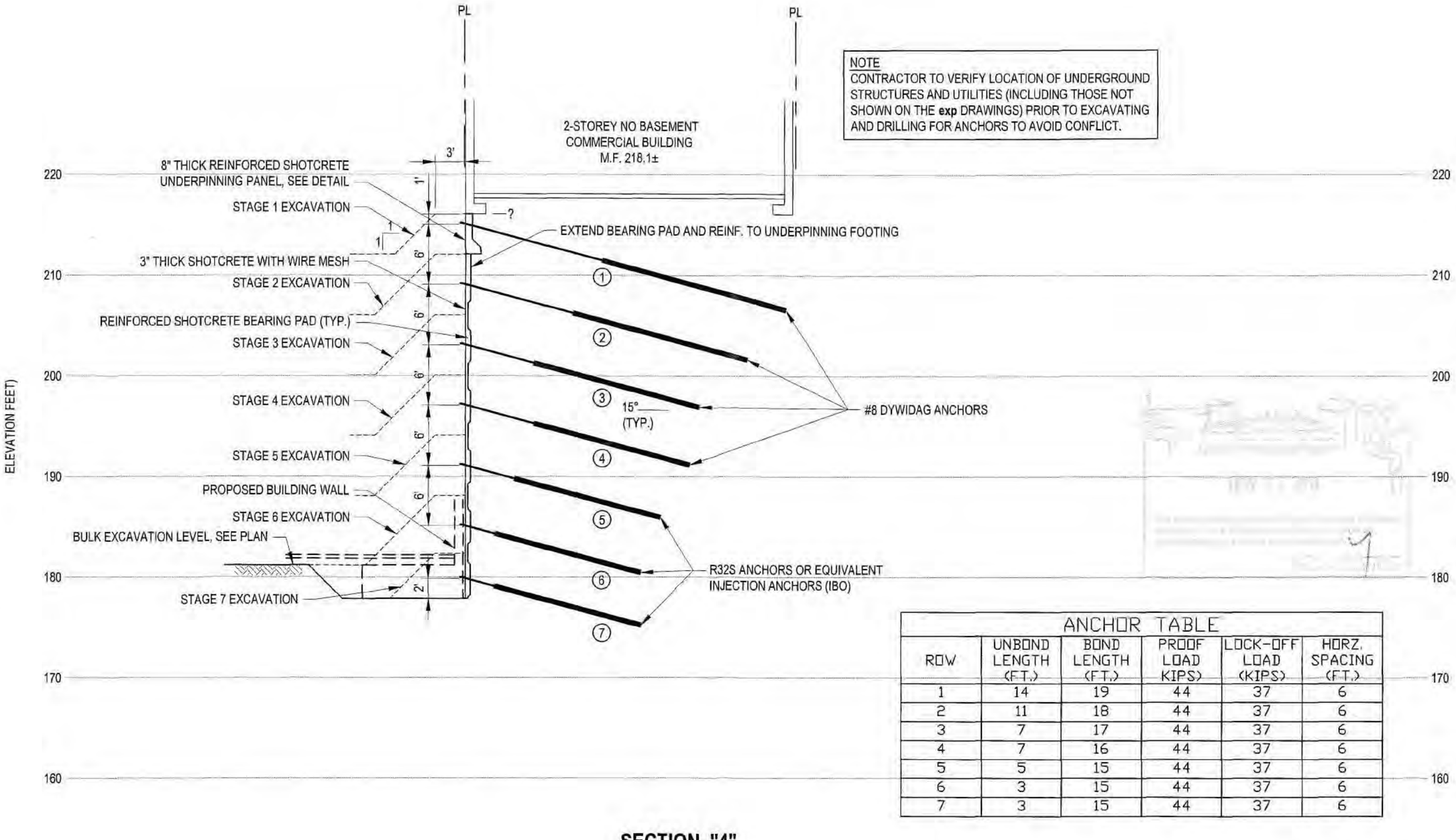
exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	DSGN.	CHK.
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "3"
DATE: 2014-05-16
SCALE: 1:10
DWG. NO.: 34

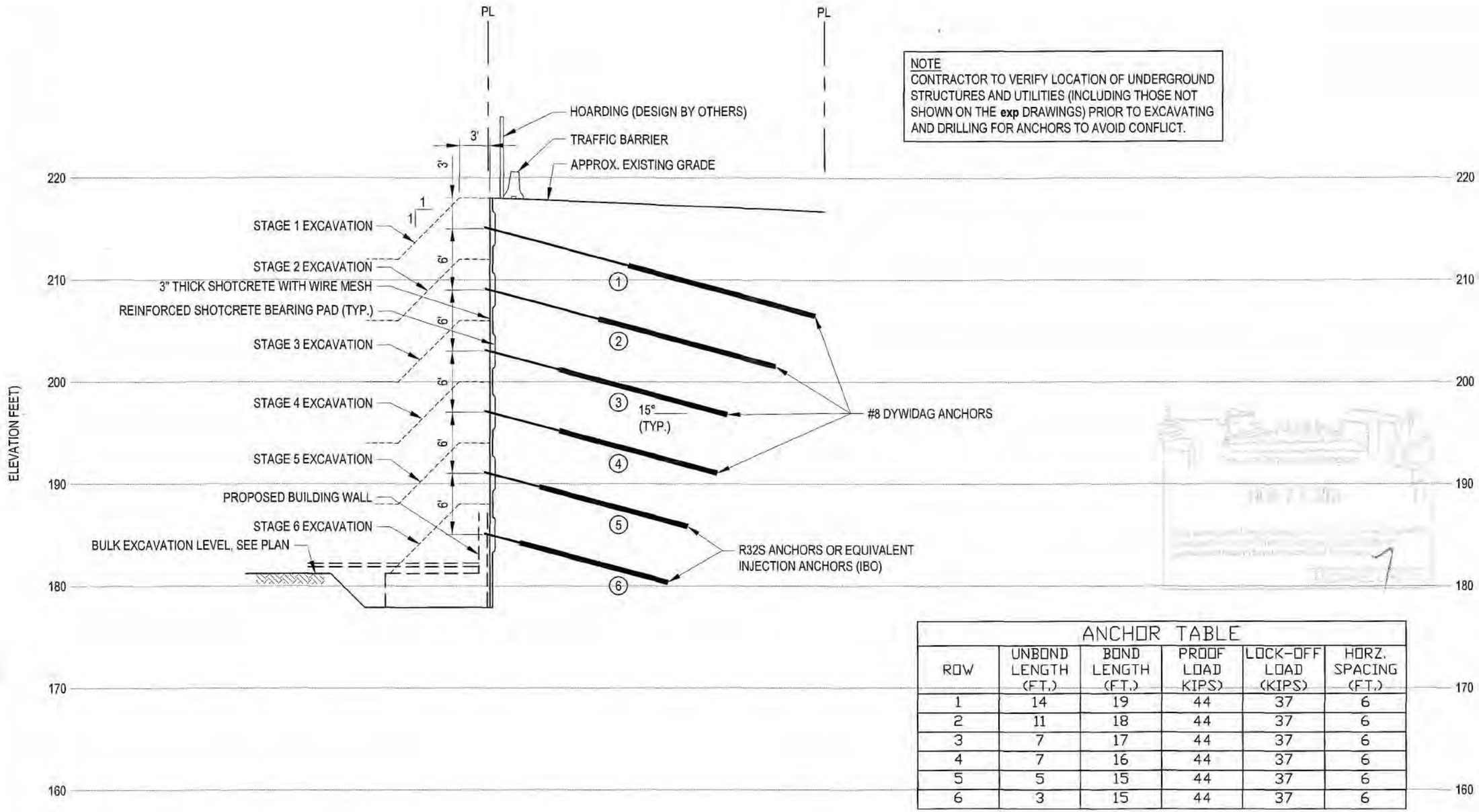


ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	14	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	5	15	44	37	6
6	3	15	44	37	6
7	3	15	44	37	6

SECTION "4"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	REVISIONS			CLIENT	TITLE:
MG	No.	DESCRIPTION	DATE	YUANHENG CKE DEVELOPMENTS LTD.	BULK EXCAVATION SHORING SECTION "4"
DSGN. GM	3	ISSUED FOR BUILDING PERMIT	2014-11-04	PROJECT COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.	
CHK. KSH	2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08	PROJECT NO. VAN-00217815-A0	DATE 2014-05-16 SCALE 1"=10' DWG NO. G5
	1	ISSUED FOR REVIEW	2014-06-22		



ANCHOR TABLE					
ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	14	19	44	37	6
2	11	18	44	37	6
3	7	17	44	37	6
4	7	16	44	37	6
5	5	15	44	37	6
6	3	15	44	37	6

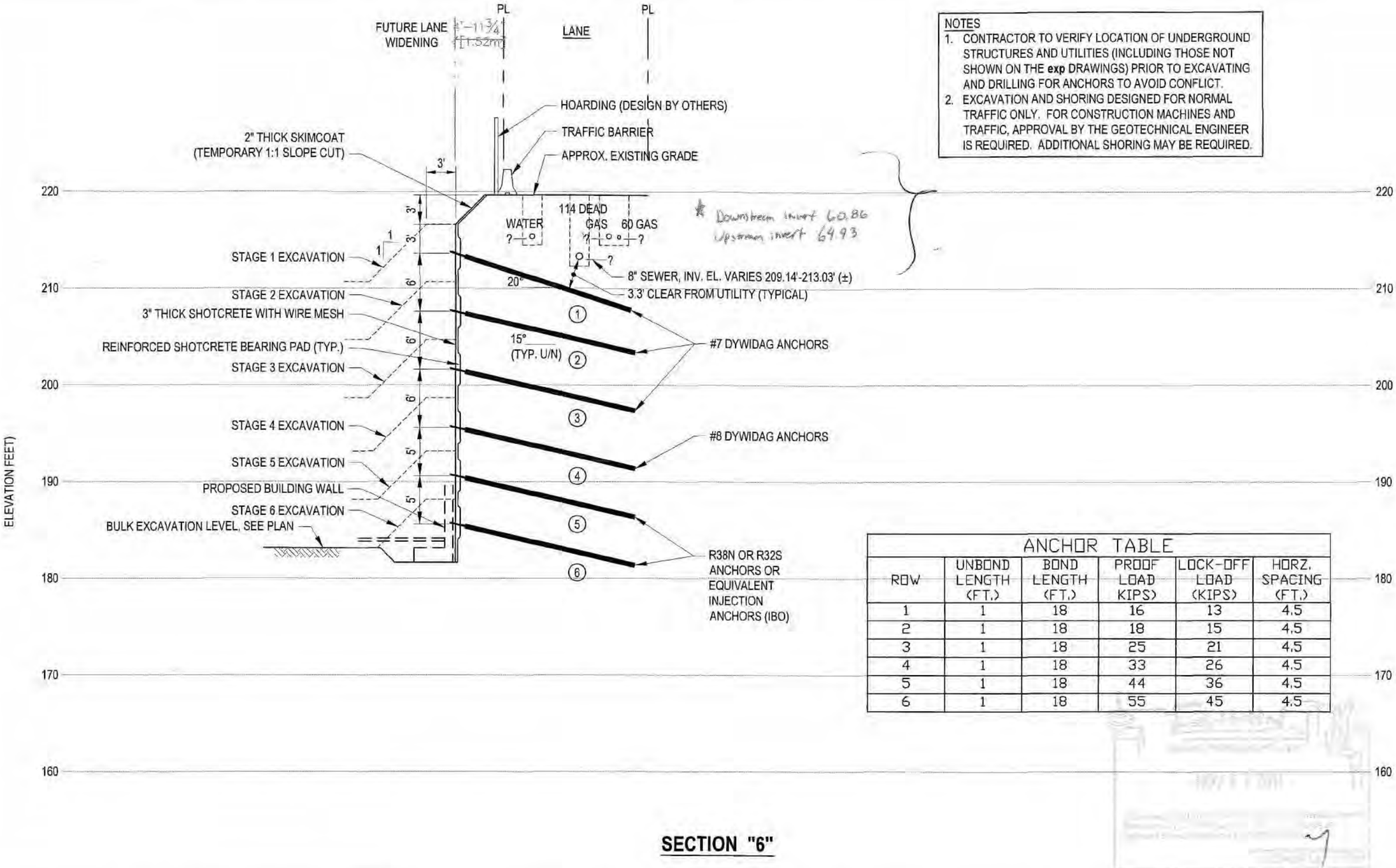
SECTION "5"

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604-874-1245
Fax: 604-874-2358
exp.com

DRTR	REVISIONS		
MG	No	DESCRIPTION	DATE
DSGN	3	ISSUED FOR BUILDING PERMIT	2014-11-04
GM	2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
CHK	1	ISSUED FOR REVIEW	2014-08-22
KSH			

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "5"
DATE: 2014-05-16
SCALE: 1"=10'
DWG NO: G6



NOTES
1. CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES (INCLUDING THOSE NOT SHOWN ON THE **exp** DRAWINGS) PRIOR TO EXCAVATING AND DRILLING FOR ANCHORS TO AVOID CONFLICT.
2. EXCAVATION AND SHORING DESIGNED FOR NORMAL TRAFFIC ONLY. FOR CONSTRUCTION MACHINES AND TRAFFIC, APPROVAL BY THE GEOTECHNICAL ENGINEER IS REQUIRED. ADDITIONAL SHORING MAY BE REQUIRED.

ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	1	18	16	13	4.5
2	1	18	18	15	4.5
3	1	18	25	21	4.5
4	1	18	33	26	4.5
5	1	18	44	36	4.5
6	1	18	55	45	4.5

SECTION "6"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

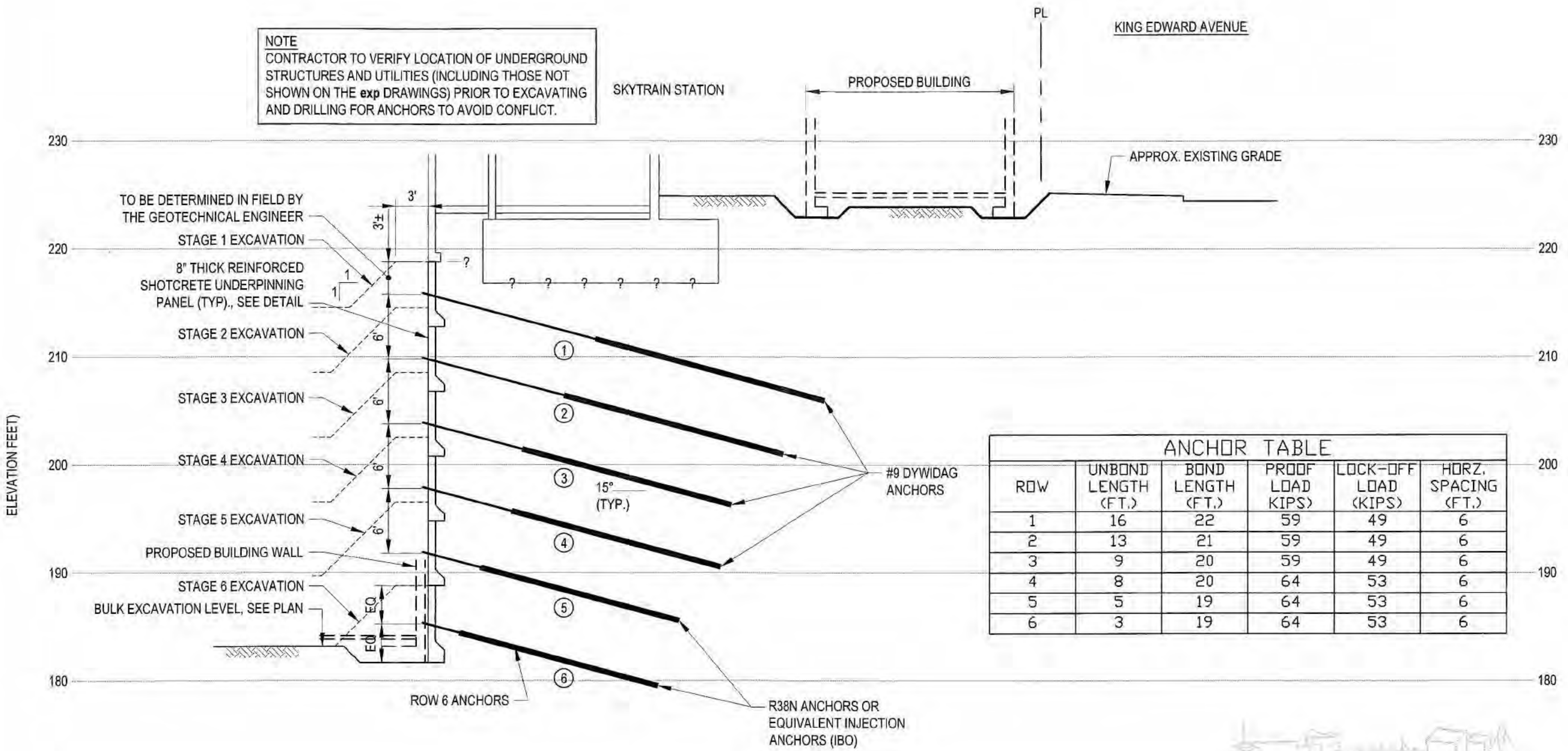
11/4/14

DFTR: MG
DSGN: GM
CHK: KSH

No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "6"
DATE: 2014-05-16
SCALE: 1:100
DWG NO.: S7



ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	16	22	59	49	6
2	13	21	59	49	6
3	9	20	59	49	6
4	8	20	64	53	6
5	5	19	64	53	6
6	3	19	64	53	6

SECTION "7"

NOV 27 2014

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604-874-1245
Fax: 604-874-2358
exp.com

DFTR. MG
DSGN. GM
CHK. KSH

REVISIONS

No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

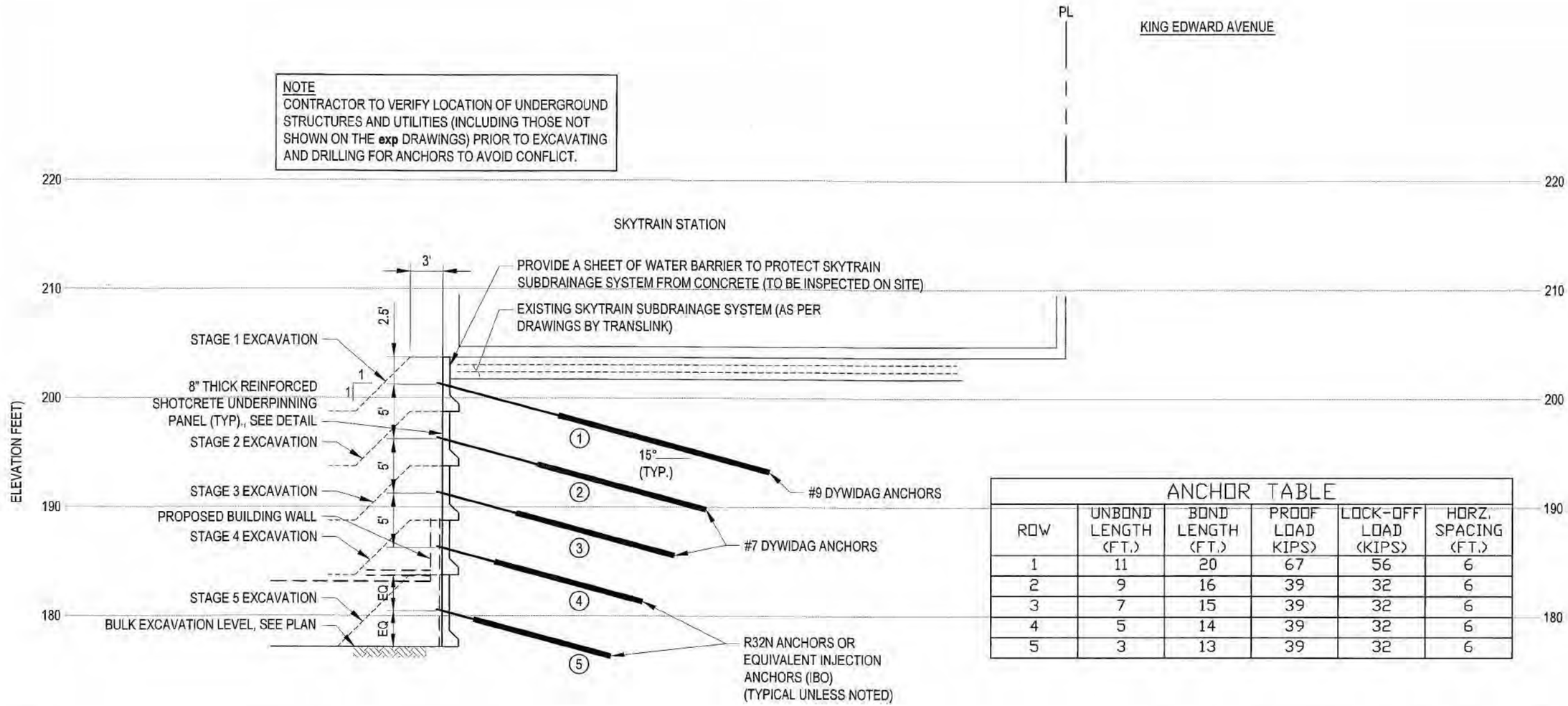
CLIENT: YUANHENG CKE DEVELOPMENTS LTD.

PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.

PROJECT NO. VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "7"

DATE: 2014-05-16



ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	11	20	67	56	6
2	9	16	39	32	6
3	7	15	39	32	6
4	5	14	39	32	6
5	3	13	39	32	6

SECTION "8"

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

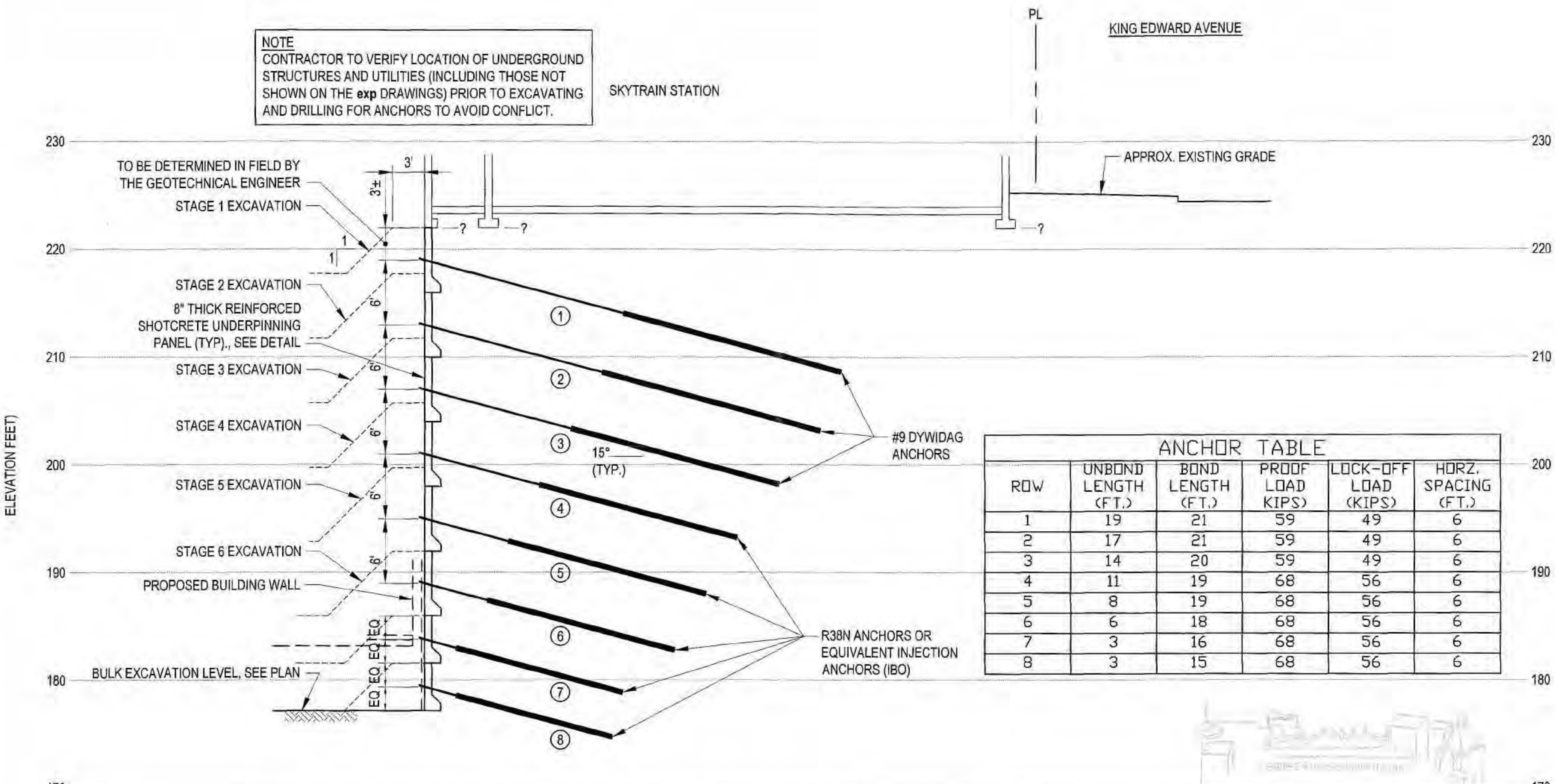
DFTR	DSGN	CHK
MG	GM	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "8"

DATE	SCALE	DWG NO.
2014-05-16	1"=10'	G9



ANCHOR TABLE

ROW	UNBOND LENGTH (FT.)	BOND LENGTH (FT.)	PROOF LOAD KIPS)	LOCK-OFF LOAD (KIPS)	HORZ. SPACING (FT.)
1	19	21	59	49	6
2	17	21	59	49	6
3	14	20	59	49	6
4	11	19	68	56	6
5	8	19	68	56	6
6	6	18	68	56	6
7	3	16	68	56	6
8	3	15	68	56	6

SECTION "9"

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604-874-1245
Fax: 604-874-2358
exp.com

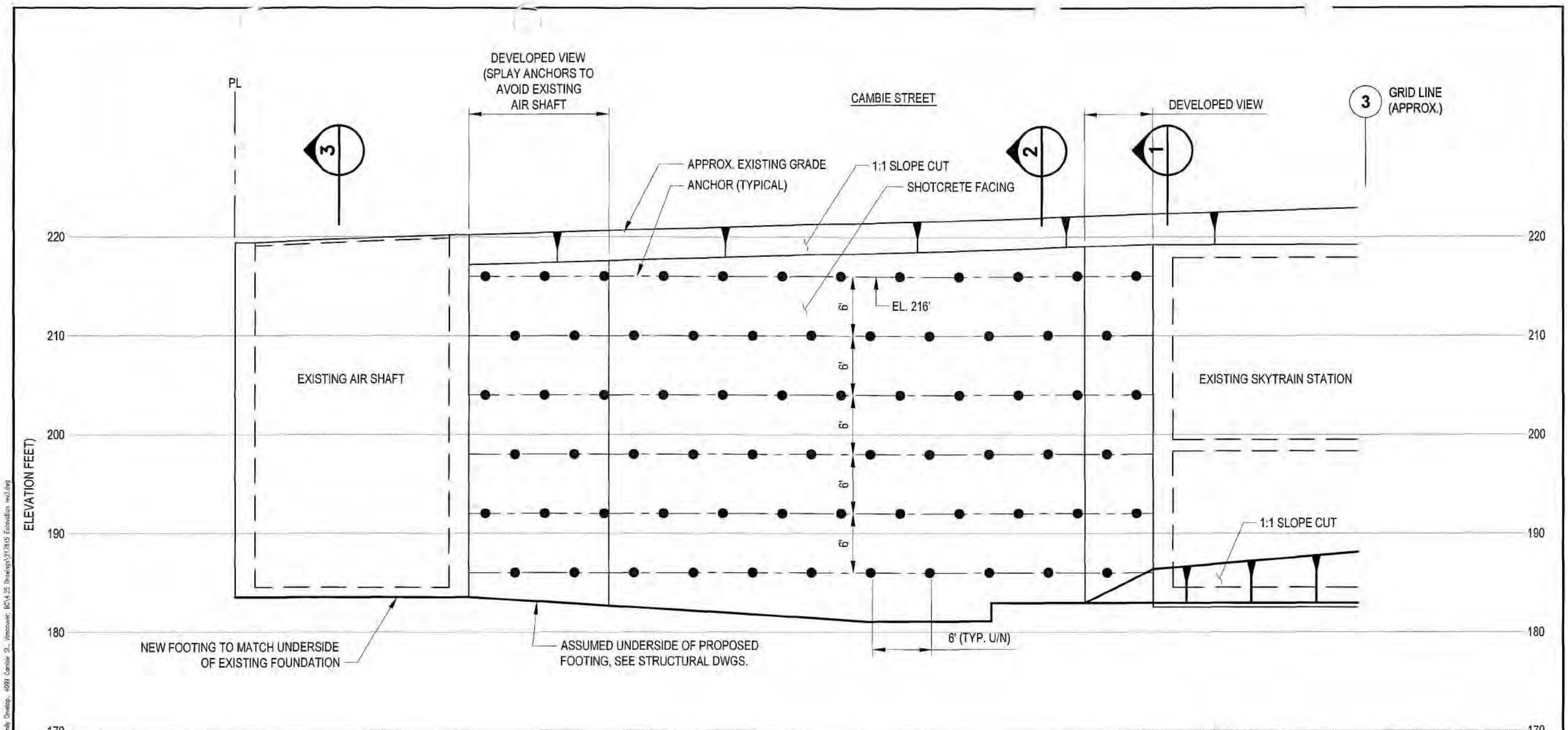
DFTR: MG
DSGN: GM
CHK: KSH

REVISIONS

No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING SECTION "8"
DATE: 2014-05-16
SCALE: 1"=10'
DWG: G10



ELEVATION LOOKING EAST

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

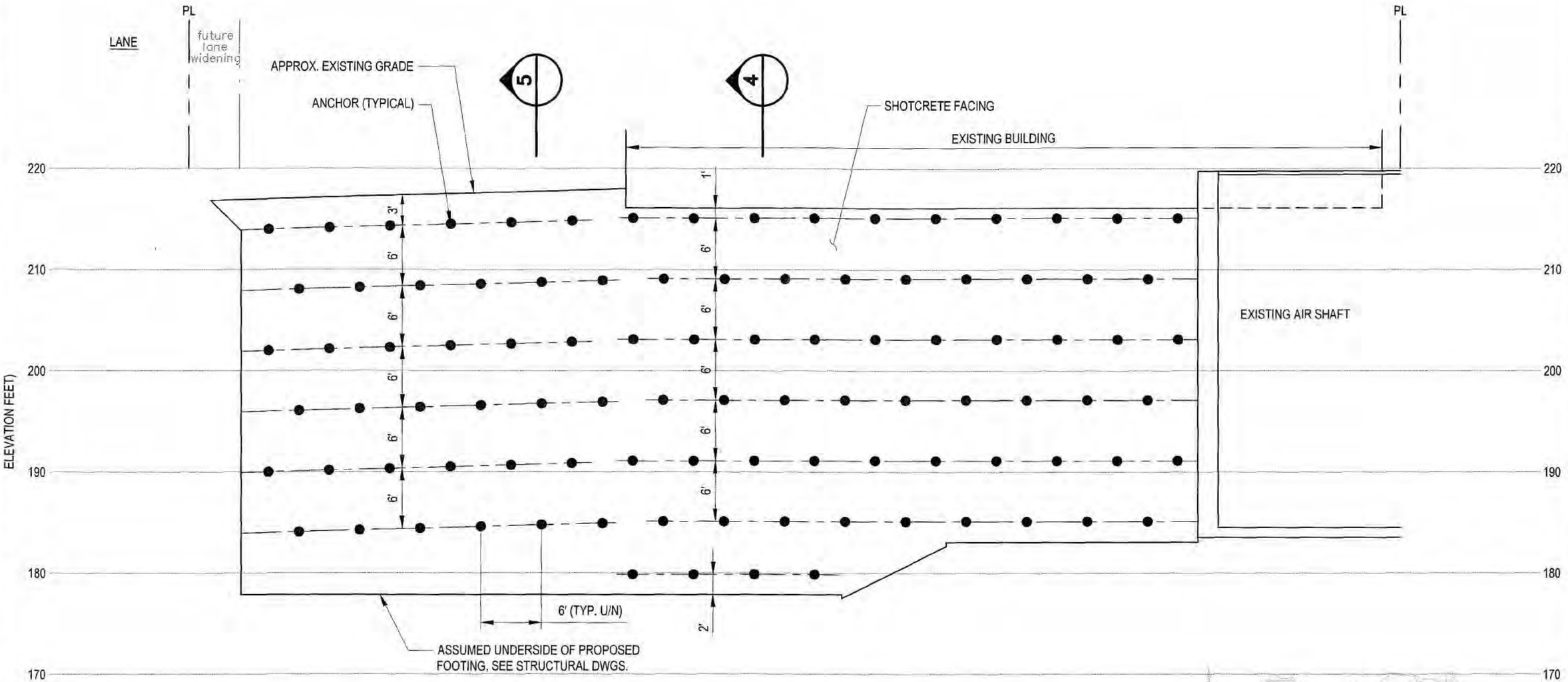
DFTR:	MG
DSGN:	GM
CHK:	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING EAST

DATE: 2014-05-16
SCALE: 1:100
DWG NO.:



ELEVATION LOOKING NORTH

NOV 2 7 2014

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

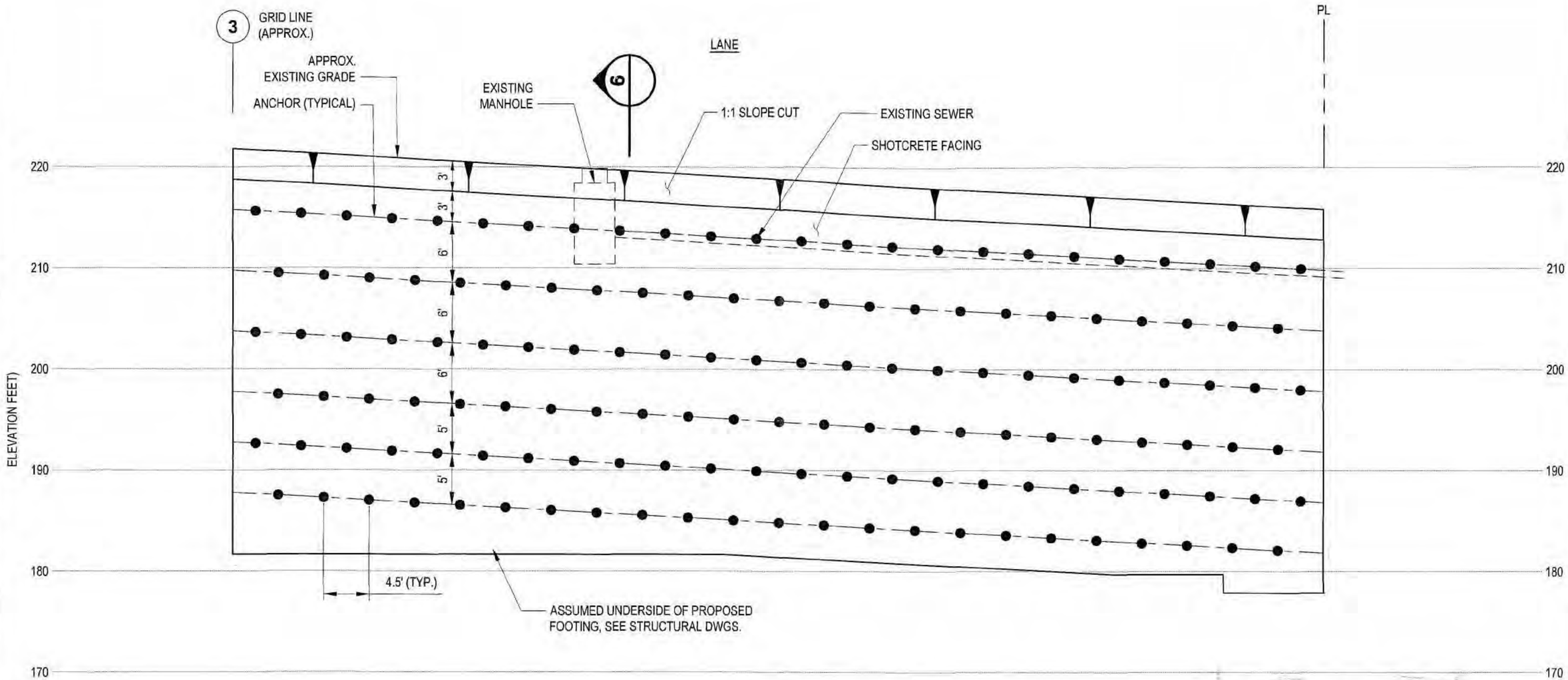
DFTR	MG
DSGN.	GM
CHK.	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING NORTH

DATE: 2014-05-16 | SCALE: 1"=10' | DWG NO.: G12



ELEVATION LOOKING WEST

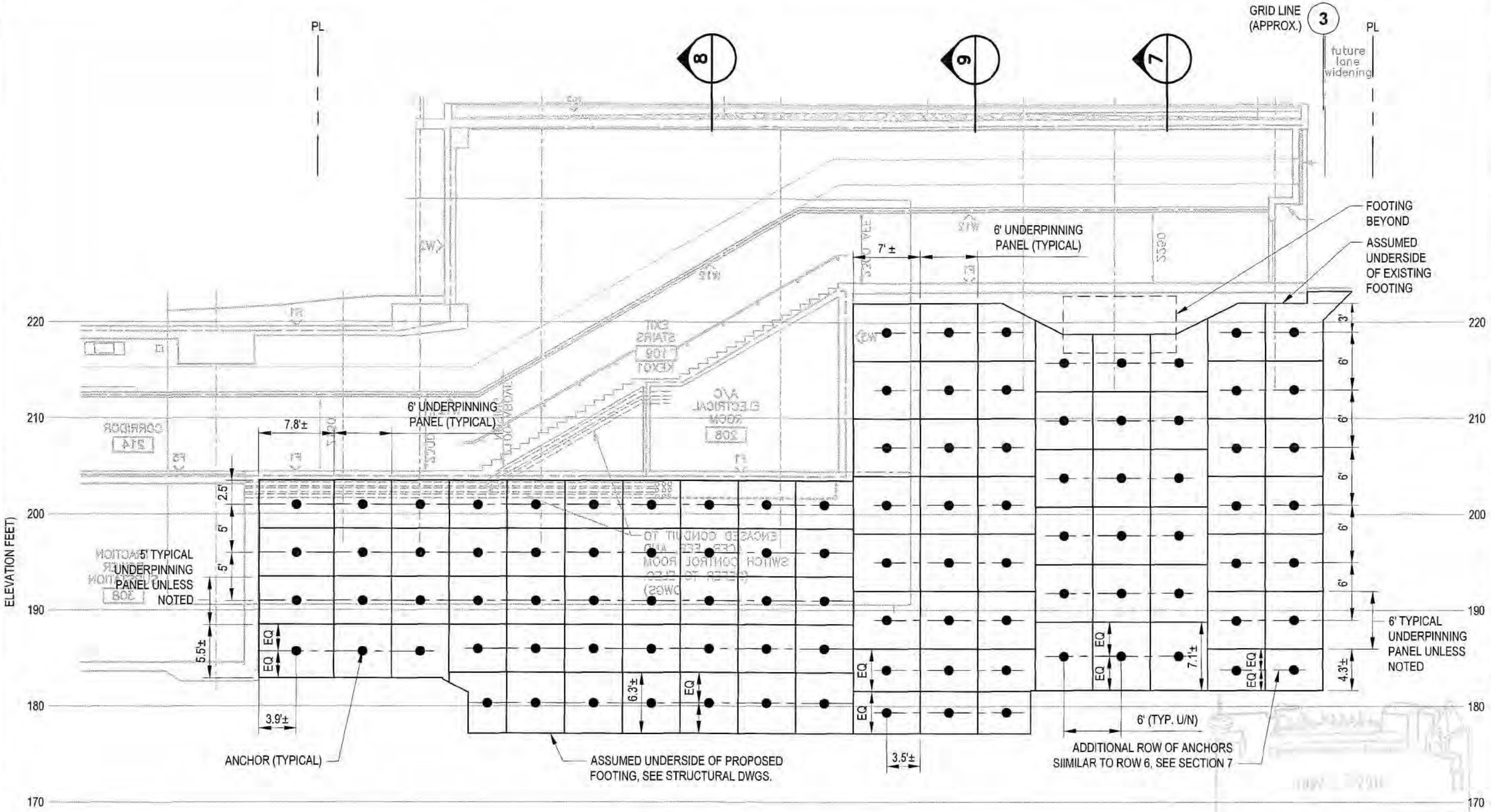
exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	MG
DSGN.	GM
CHK.	KSH

REVISIONS

No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT	YUANHENG CKE DEVELOPMENTS LTD.
PROJECT	COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.	VAN-00217815-A0
TITLE:	BULK EXCAVATION SHORING ELEVATION LOOKING WEST
DATE	2014-05-16
SCALE:	1:100
DWG NO.	G13



ELEVATION LOOKING SOUTH

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

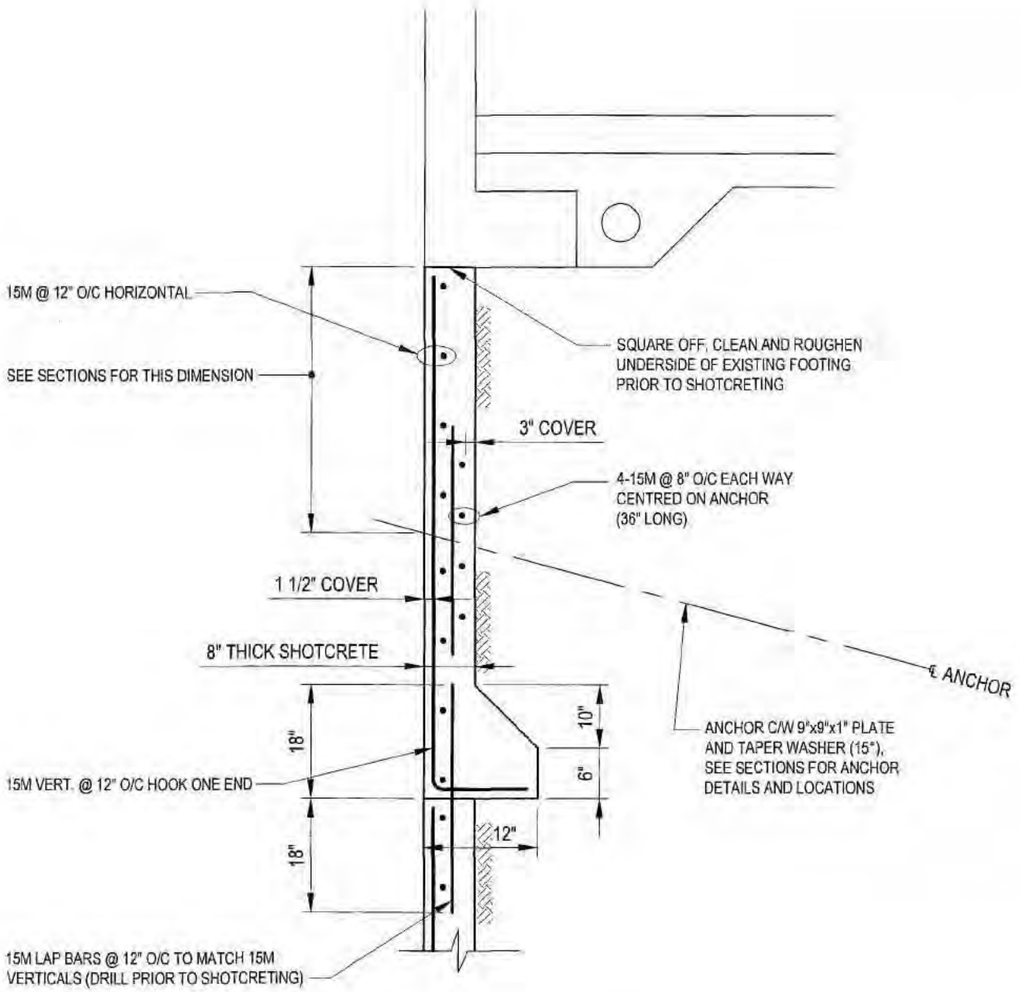
DFTR.	DSGN.	CHK.
MG	GM	KSH

REVISIONS		
NO.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

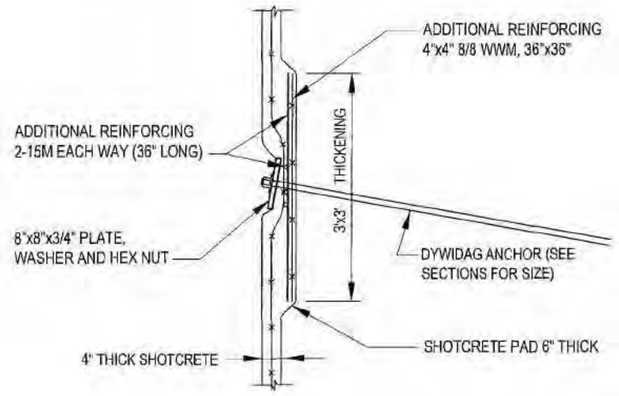
CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING ELEVATION LOOKING SOUTH

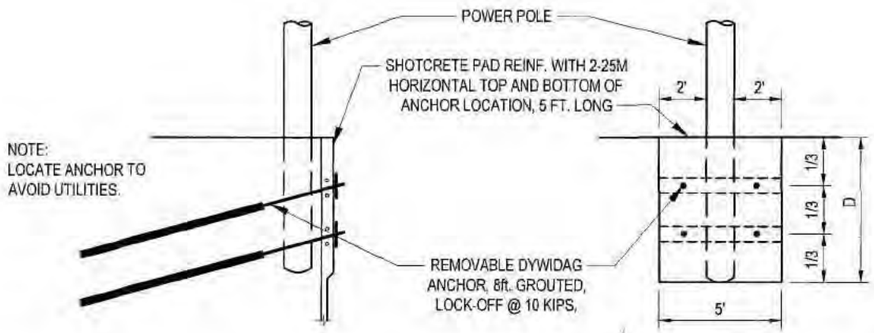
DATE: 2014-05-16 | 1"=10' | G14



SHOTCRETE UNDERPINNING DETAIL



SHOTCRETE BEARING PAD SECTION



TYPICAL POWER POLE SUPPORT DETAIL

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	MG
DSGN.	GM
CHK.	KSH

REVISIONS			
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT	YUANHENG CKE DEVELOPMENTS LTD.
PROJECT	COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.	VAN-00217815-A0
TITLE:	BULK EXCAVATION SHORING DETAILS
DATE	2014-05-16
SCALE:	NTS
DWG NO.	S15

EXCAVATION SHORING SPECIFICATIONS

PART A - INITIAL REQUIREMENTS

1.0 Location of all services to be completed by contractor. Report all discrepancies between actual conditions and excavation drawings to **exp** Services Inc. immediately. Drilling for installation of anchors is not to commence until all service locations have been established and a memo stating such has been forwarded by the contractor to **exp** Services Inc.

2.0 All relevant permits from governing authorities must be in place prior to start of construction.

3.0 All relevant information which may affect the performance of the shoring system must be reported in writing to **exp** Services Inc. prior to start of construction. This includes location of site trailers or storage areas near the edge of the excavation.

4.0 Permission from adjacent property owners must be obtained and written confirmation of such permission forwarded to **exp** Services Inc. at least 2 days prior to commencing work on the adjacent properties.

5.0 Contractors to notify **exp** Services Inc., FortisBC, BC Hydro Electric and Telus in writing at least 3 days prior to start of construction.

6.0 A preconstruction survey of adjacent buildings must be completed prior to excavation. Survey control points to monitor horizontal and vertical movements should be installed in the adjacent roads and on adjacent buildings.

PART B - GENERAL CONSTRUCTION REQUIREMENTS

1.0 The contractor will undertake proper survey control to ensure the excavation shoring system is installed according to the excavation shoring drawings with respect to property lines, building lines, ground surface, and finished grades. Report any dimensional discrepancies to **exp** Services Inc.

2.0 Site to be enclosed by fencing or hoarding prior to start of excavation. Hoarding/fencing to be acceptable to municipal bylaws.

3.0 Where specialized dewatering systems are required, the excavation/shoring contractor work must be undertaken in such a manner and sequence to ensure damage to the system does not occur. Specialized dewatering does not form part of the shoring contract.

4.0 Where excavation shoring is required, the excavation contractor will ensure that adequate equipment is available to carry out the necessary detail excavation. Where detailed excavation is required prior to placement of shotcrete, excavation will be completed at such time to allow completion of the necessary shoring work prior to the end of the working day.

5.0 All interior excavation slopes not shown on the excavation shoring drawings shall be completed in conformance with the WorkSafe BC Occupational Health and Safety Regulations.

6.0 All significant slope or shoring deterioration to be reported to **exp** Services Inc.

7.0 All slope cuts to be protected with 6 mil polyethylene securely fastened unless noted otherwise on drawings.

8.0 The contractor shall maintain the overall responsibility for site safety.

9.0 All blasting must be completed by a certified blaster. Blasting may not occur within 10 feet of adjacent buildings. Notification of blasting must be provided to the excavation engineer 24 hours prior to blasting to allow installation of monitoring equipment. Unless otherwise indicated in the soils report, material which can be removed by excavation or ripping with a Caterpillar 345 excavator or equivalent with a single ripper tooth, with a production rate of at least 10 cubic yards per hour is not considered to require blasting for removal.

PART C - MATERIALS REQUIREMENTS

1.0 SHOTCRETE

Compressive strength requirements are:
- 15 MPa in 24 hours
- 20 MPa in 3 days

2.0 TIE-BACK ANCHORS
- Anchor diameters shown on drawings based on Dywidag Threadbar 517/690 MPa ultimate tensile strength
- Mukusol Threadbar 500 MPa ultimate tensile strength or Dywidag Threadbar 100 ksi ultimate tensile strength are acceptable alternatives with bar diameters corrected for tensile ultimate load capacity
- TITAN 30/16, TITAN 30/11, IBO R32/20 injection anchors to be used where conditions do not allow conventional drilling or where noted on drawings.

3.0 WELDED WIRE MESH
- Minimum yield 400 MPa, size 4: x 4: 8/8 unless noted otherwise. CSA G30.5 M1983.

4.0 REINFORCING
- Minimum yield 400 MPa, CSA G30.12 M197.

5.0 ANCHOR GROUT
- Non-shrinkage cementitious grout or equivalent
- Compressive strength requirements:

20 MPa in 24 hours
35 MPa in 28 days

6.0 DRAINS
- 2" diameter PVC with suitable filter fabric to ensure that no soil transfer occurs with groundwater flow.
- Where shown on drawing 1 ½" diameter slotted (.01") pipes, closed one end placed in minimum 2 ½" diameter holes to be sealed at shotcrete face.

7.0 BEARING PLATES
- Minimum yield 260 MPa CSA G40.21-M 87
- Alternate plates to those shown on the drawings will not be acceptable unless approval has been obtained from **exp** Services Inc.

8.0 STRUCTURAL STEEL
- All structural steel to be G40.21 300 MPa minimum yield.
- Fabrication and erection to CAN3 - S16.1

PART D - CONSTRUCTION DETAILS

1.0 ANCHOR INSTALLATION

Specified anchors to be placed in minimum 4" diameter holes. Hole to be thoroughly cleaned by appropriate means prior to placement of grout.
Hole drilling technique required will depend on soil conditions. Percussion rock drill may not be suitable to install holes for soils containing predominantly silt or clay content unless combined with pressure grouting or after grout systems. The contractor should prove that test anchors can be installed using this method that will sustain the required test and lockoff loads prior to installing production anchors. Anchors to be provided with suitable centralizers at 10' o/c to ensure the anchor is completely encircled by grout. Grout to be installed by Tremie grouting from bottom of hole or by pressure grouting. All grout extending into the unbonded portion of anchor must be removed or alternatively a protective sleeve placed over the unbonded length of anchor.

2.0 WELDED WIRE MESH PLACEMENT

All mesh joints must be a minimum overlap of 2 squares. Mesh must be suitably supported from soil face and positioned to provide required cover as shown on the detail drawings.

3.0 REINFORCEMENT PLACEMENT

Reinforcement to overlap a minimum 24 diameters for tension splices and 18 diameters for compression splices with minimum 1.5" of cover unless noted otherwise on drawings.

4.0 SHOTCRETE DRAINS

Drains through the shotcrete to consist of 2" diameter PVC placed every 5' on centre vertically and horizontally to relieve hydrostatic pressure.

7

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DSTR.	REVISIONS		
MG	No.	DESCRIPTION	DATE
DSGN. GM	3	ISSUED FOR BUILDING PERMIT	2014-11-04
	2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
CHK. KSH	1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING NOTES

DATE: 2014-05-16 | SCALE: NTS | DWG. NO.: S16

5.0 SHOTCRETE PLACEMENT

5.1 GENERAL

Shotcrete thicknesses shown on the detailed drawings are minimum.

Shotcrete to be placed in such a manner that segregation of materials or post placement slumping does not occur. Upward placement of shotcrete for underpinning panels is not acceptable.

All reinforcing and welded mesh to be fully contained in the shotcrete with at least 1 ½" cover in all areas. Removal of defect shotcrete to be at contractor's expense.

5.2 COLD WEATHER CONDITIONS

Special requirements for shotcrete protection will be necessary during cold weather. These include:

AMBIENT NIGHT TIME TEMPERATURES	REQUIREMENTS
Greater than 1°C	No special provisions other than potential sequencing changes to allow additional shotcrete curing times.
-3° to 1°C	Protect fresh shotcrete with thermal blankets for 24 hours
-10 to -3	Provide vented heat to fresh shotcrete for 24 hours
Below -10°C	No shotcreting allowed

In all cases, shotcrete may not be placed on frozen ground.

6.0 TESTING

6.1 Anchors

Anchors shall be tensioned as soon as practicable but no sooner than 24 hours after the construction of the applicable shotcrete panel. Contractor will provide required testing apparatus including recently calibrated jack and ram compatible with the anchor test load, nuts, plates, couplers, wrenches, and tensioning chair, together with personnel to set up and operate the equipment. The required lockoff loads are shown on the excavation drawings.

All anchors will be tested to 1.25 times the lockoff load for 2 minutes. An acceptable performance test occurs where less than 2.5% of the test load is lost over the 2 minute period. Of these anchors, approximately 10% will be proof tested by maintaining 1.25 times the lockoff load for 15 minutes in accordance with PTI manual.

Anchors which fail any of the above tests shall be replaced. A failure rate of 3% of the total anchors installed will be assumed as typical and will be at the contractor's expense. Failure rates in excess of 3% will be investigated to determine the cause of the failures and will form an extra only where soil conditions/groundwater conditions can be proved to be significantly different than those reported in the project soils report.

Lift-off tests to determine long-term performance of the anchors will be carried out on 5% of the anchors except where soil conditions are predominantly clay or silt in which case an allowance of 50% of the anchors should be provided. Retensioning of anchors to required lockoff will be completed following the lift-off test.

Costs of anchor testing to be at contractor's expense.

6.2 Shotcrete

Shotcrete samples placed in 2' x 2' x 4" panels will be provided by the contractor:
A. during the first day shotcrete is used on the site.
B. approximately halfway through the project.
C. when requested by the **exp** Services Inc. personnel.

Contractor shall inform **exp** Services Inc. of sample scheduling. Samples will be suitably protected from construction activity or weather damage. Costs of shotcrete sampling and testing to be at owner's expense.

6.3 Grout

Contractor to provide grout samples:
A. during first day of anchor installation.
B. at halfway point of project.
C. as requested by **exp** Services Inc. personnel.

Costs of sampling and testing to be at owner's expense.

7.0 GROUNDWATER CONTROL

Contractor is required to provide conventional groundwater control including, but not exclusive to, sumps and ditches. Excavation is to proceed in such a manner that the water does not pond at the base of the shotcrete or excavated panels.

Loss of soil from groundwater movement must be controlled by use of filter fabrics, drainage mats and where necessary casing of drill holes or use of alternate drilling technique. Where material is lost behind the shotcrete face, the void must be backfilled using shotcrete, grout, or gravel as directed by the excavation engineer. Where specialized groundwater techniques are required as determined by the excavation engineer, installation of such a system shall be an extra to the shoring contract.

PART E - COMPLETION REQUIREMENTS

1.0 BACKFILL

All backfill types and procedures for placement must meet applicable municipal requirements and recommendations provided in the project soils report. In the absence of a project soils report or municipal requirement, backfill should consist of clean pitrun sand and gravel or river sand with less than 5% passing the No. 200 sieve. The material should be placed in maximum 12" lifts with each lift compacted to a minimum 95% Modified Proctor density (ASTM D1557). Where access is limited, backfill may consist of pea gravel (1/4" nominal size) placed in maximum 2' lifts with each lift compacted using a concrete vibrator with water jetting. Foundation walls must be adequately supported prior to placement of backfill. In-situ compaction testing will be carried out by **exp** Services Inc. personnel.

Special requirements for specific municipalities are outlined below. The list is not exhaustive and requirements can be expected to change during the project duration. The contractor is to determine and ensure his work conforms to the jurisdiction having authority at the specific project location.

Vancouver

A. When the excavation encroaches onto City of Vancouver property or the depth of the excavation below finished grades is greater than or equal to the shortest horizontal distance from the edge of the excavation to the adjacent City property line, all backfilling shall conform to the following:

A.1 For excavations less than 4 feet wide.

Birdseye Material plus Controlled Density Fill

Birdseye Material shall be placed from the bottom of the excavation to a grade below the finished surface grade, determined as follows:

- 1.0' below the finished surface grade, plus an additional depth below this grade determined as the greater of 1.5 times the width of the excavation or 4.0'.

Birdseye gravel shall be confined to its original area of placement using geosynthetic sand bags placed near adjacent sites. Approval from the streets administration branch of the city engineering services department shall be obtained prior to backfilling.

Controlled Density Fill shall be placed above the Birdseye material to no nearer than 1' of finished surface grade. The top 1' of the backfill may be backfilled with Granular Base, or may contain landscaping materials subject to the review and approval of the Site Engineer.

Birdseye must be vibrated into place with immersion vibrators, and must be compacted to at least 90% of Modified Proctor density (ASTM D1557). "End dumping" of birdseye is not an approved method of compaction.

A.2 For excavations wider than 4 feet wide.

Select granular fill with less than 5% passing the no.200 sieve shall be placed for the full depth of the excavation to within 4 feet of finished grade compacted to at least 90% modified proctor density. The top 4 feet shall consist of granular base compacted to at least 95% modified proctor.

B. When the depth of the excavation is less than the shortest horizontal distance from the edge of the excavation to the adjacent City property line, granular backfill material used shall be compacted to the greater of 90% of Modified Proctor density (ASTM D1557) or as indicated in the project soils report.

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5C 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DETR.	REVISIONS		
MG	NO.	DESCRIPTION	DATE
DSGN.	3	ISSUED FOR BUILDING PERMIT	2014-11-04
GM	2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
CHK.	1	ISSUED FOR REVIEW	2014-08-22
KSH			

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING NOTES

DATE: 2014-05-16 | SCALE: NTS | DWG. NO.: S17

2.0 BACKFILL MATERIALS

"Birdseye" Material - 2.5mm to 10mm rounded granular aggregate

This material shall be of uniform quality, thoroughly washed free of sand, silt and clay and shall contain no more than 15% non-rounded particles. The particles shall be durable, capable of withstanding the effects of handling, placement and compaction without the production of deleterious fines. The grading limits shall be:

Total Passing	3/8" (9.5mm)	100%
Total Passing	¼ (6.35mm)	60% - 75%
Total Passing	No. 4 (4.75mm)	5% - 50%
Total Passing	No. 8 (2.36mm)	0% - 13%
Total Passing	No. 16 (1.18mm)	0% - 1%

Controlled Density Fill

As per Master Municipal Specifications Section 02236, Controlled Density Fill is a low-strength, high-slump cementitious material. This material is also referred to as "fillcrete", "unshrinkable fill" and "controlled low strength material (CLSM)".
To have maximum unconfined compressive strength of 0.5 MPa, (500Kpa) at 28 days and maximum cement content of 25Kg per m3 with fly ash and water reducing admixtures for initial settlement control. Place material using methods which do not lead to segregation. Inspection and testing of the fill is required by the Engineer.

"Granular Base" - 19mm Minus Crushed Aggregate

As per Master Municipal Specifications Section 02226.2.10. conforming to following gradations:

Sieve Designation	Percent Passing
19mm	100
12.5mm	75-100
9.5mm	60-90
4.75mm	40-70
2.36mm	27-55
1.18mm	16-42
0.600mm	8-30
0.300mm	5-20
0.075mm	2-8

3.0 BACKFILL TESTING

Sufficient testing of the backfills is required as the site engineer deems necessary so as to be able to provide the Letters of Assurance as described below.

Samples of all fills to be used on the site are to be provided to the engineer to allow tests of gradation for any granular material placed (road base or birdseye and controlled density fill). These samples must be provided prior to delivery of materials to the site and at least 48 hours prior to their use on the project.

Density testing of placed backfill material is required on representative locations of any backfill that was placed on any day when the site engineer or his/her representative did not observe backfilling at the site.

4.0 LETTERS OF ASSURANCE

At the end of the project, the City requires that the site engineer provide an Assurance of "Geotechnical Field Review and Compliance" . Additionally, during the project, an interim letter may be submitted by the site engineer covering only a portion of the excavation backfill in order to facilitate construction of street works such as sidewalks over or adjacent to portions of the backfill.

In both cases, the City requires that the letter must be supported by the following material:

- all daily field review reports
- gradation test results on each type of backfill material used
- batching slips for all controlled density fill material delivered to the site
- density test results on backfill placed on days in which the site engineer (or representative) was not in attendance, accompanied by an explanation of why the engineer (or representative) was not in attendance and a description of what remedial steps were taken to satisfy the site engineer as to the adequacy of the backfill and its compaction where compliance with the job specification had not been attained.

The contractor/owner will take all measures required to ensure this information is provided.

5.0 ANCHOR DETENSIONING AND REMOVAL

Except as noted below all anchors installed on city property within 5' of finished ground surface must be removed and those below 5' detensioned. Alternatively below 5' the anchors may remain tensioned if they are fully grouted after the lockoff load has been applied. Detensioning and removal of anchors must be done concurrently with backfill placement. The backfill should be placed to within 1' of the anchor location prior to its detensioning or removal. In easement area or city right-of-way anchors within 3.3' of any underground services must be removed.

6.0 SHOTCRETE REMOVAL

Except as noted below shotcrete placed within 5' of finished ground surface on city property must be removed. The removal operation must be completed in stages and in such a manner that damage to the adjacent utilities does not occur. Shotcrete placed on easement area or city right-a-way within 3.3' of underground services must be removed.

7.0 NOTIFICATION OF WORK

exp Services Inc. must be notified at least 48 hours prior to placement of backfill, anchor detensioning and removal, and shotcrete removal in order that certification of the work may be provided. Failure of adequate notification may result in the requirement for re-excavation of backfilled areas, loss of damage deposits at the contractors expense, or failure to allow provision of Letters of Completion by the project engineer.

SHORING INSTALLATION STAGING

SECTIONS 1, 2, 3, 5 and 6

1. Excavate to Stage 1
2. Install first row anchors as shown on drawings.
3. Excavate vertically in maximum 2 anchor widths, maintaining adjacent berms.
4. Place required mesh, reinforcement, and shotcrete.
5. Tension anchors as described in section D6.1.
6. Following successful tensioning of anchors, excavate adjacent panels, and repeat steps 4 and 5.
7. Excavate to successive berms, install anchors and repeat steps 3 to 6.

SECTIONS 4, 7, 8 and 9

1. Excavate to Stage 1 berms and install first row anchors as shown on the drawings.
2. Excavate panels 1 anchor width, maintaining at least 3 anchor panels and adjacent berms. Adjacent berm sides at working panels must be maintained near vertical. Temporary shoring for protection of workers may be required.
3. Place required mesh, reinforcement, and shotcrete.
4. Tension anchors as described in specification Section Part D 6.1, at least 24 hours after shotcrete has been placed.
5. Following successful tensioning of anchors, excavate adjacent panel as per Step 2 and repeat Steps 3 and 4.
6. Repeat step 5 until row is complete.
7. Excavate to successive berms, install anchors and repeat steps 2 to 6.

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	MG
DSGN.	GM
CHK.	KSH

No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.
PROJECT: COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO.: VAN-00217815-A0

TITLE: BULK EXCAVATION SHORING NOTES

DATE: 2014-05-16
SCALE: NTS
DWG NO.:

GENERAL NOTES

1.0 DESIGN PARAMETERS

The excavation drawings are based on the following:

A. This shoring design has been based on the assumption that the site can be adequately dewatered. Where dewatering is unsuccesstul, significant shoring design revisions should be expected which may include alternate shoring systems such as sheetpiles or soldier piles and lagging.

B. Soil conditions as per soils report by **exp** Services Inc. dated April 11, 2014. Where unexpected soil conditions are encountered, revisions to the excavation drawings may be required.

C. See drawing G1 for reference drawings. All attempts have been made to ensure that these drawings are the latest revisions. However, the contractor should ensure that discrepancies do not exist between the excavation drawings and those provided by the other consultants. All discrepancies or dimension inaccuracies to be reported to **exp** Services Inc. prior to commencement of the work. Contractors using the drawings for quantity take-offs do so at their own risk.

D. Locations of adjacent structures are obtained by site inspections and where possible review of available drawings. We accept no responsibility for the accuracy of this data.

E. Utility data is provided by the appropriate municipality and from the Site Survey Plan. Site inspections to determine location of utilities either shown or not shown on the drawings is the responsibility of the contractor. Information placed on the drawings is to be used as a preliminary guide only. Report any discrepancies between the drawings and actual utility locations. Installation of anchors is not to proceed until discrepancies have been resolved.

2.0 DRAWING REVISIONS

Revisions to shoring installation sequence or shoring details can be made only with written confirmation by **exp** Services Inc. personnel.

3.0 CONTRACTOR EXPERIENCE

exp Services Inc. reserves the right to withdraw their services if in their opinion an excavation/shoring contractor is selected which does not have adequate experience to complete the work in a safe manner.

4.0 PRECONSTRUCTION SURVEYS/MONITORING

It is strongly recommended that preconstruction surveys be completed on adjacent structures in order that deficiencies of these structures can be documented prior to start of construction. Continued monitoring of these buildings by survey control points should be undertaken during construction.

5.0 DRAWING USE

These drawings have been prepared for the exclusive use of the client named on the title page of the Shoring Design package. The design shown indicates minimum requirements based on limited or assumed soil conditions only, with design revisions likely required to suit actual conditions encountered during construction. These drawings must not be used for construction unless the design engineer or his repressntatives monitors installation of the shoring system.

6.0 LEGAL

These design documents are prepared solely for use by the party with whom the design professional entered into a contract. No representations of any kind are made by the design professional to any party with whom the design professional has not entered into contract.

The owner and contractor are responsible for determining and conforming to the appropriate environmental regulations.

7.0 ALLOWANCES

The Contractor should provide allowances in his bid by unit rates for additional anchors and installation of 1 1/2" diameter slotted drains.

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR:	MG
DSGN:	GM
CHK:	KSH

REVISIONS		
No.	DESCRIPTION	DATE
3	ISSUED FOR BUILDING PERMIT	2014-11-04
2	REVISED TO CURRENT ARCHITECTURAL PARKING PLANS	2014-10-08
1	ISSUED FOR REVIEW	2014-08-22

CLIENT	YUANHENG CKE DEVELOPMENTS LTD.
PROJECT	COMMERCIAL & MULTI-FAMILY RESIDENTIAL DEVELOPMENT, 4099 CAMBIE, VANCOUVER, B.C.
PROJECT NO	VAN-00217815-A0
TITLE	BULK EXCAVATION SHORING NOTES
DATE	2014-05-16
SCALE	NTS
DRAWING NO	G19

Michael Linton

From: Konning Tam <konning@wtleungarch.com>
Sent: April 7, 2015 10:20 AM
To: Michael Linton
Subject: Fwd: Commercial - DIGSHAW Locate Request VANAS-6356-3594-1702

Hi Michael,

Please see below from exp & Shaw, advising that Shaw has no underground utilities at the project location and that we have clearance to proceed.

Regards,

Konning

Begin forwarded message:

From: Ulysses Yeh <Ulysses.Yeh@exp.com>
Subject: FW: Commercial - DIGSHAW Locate Request VANAS-6356-3594-1702
Date: 6 April, 2015 11:24:22 AM PDT
To: Konning Tam <konning@wtleungarch.com>
Cc: Kai-Sing Hui <kai-sing.hui@exp.com>, Diane McCulloch <Diane.McCulloch@exp.com>

Hello Konning,

Please see the email below from Shaw regarding utility clearance.

Regards,

Ulysses Yeh, M.Eng., P.Eng.
Geotechnical Engineer
exp Services Inc.
t: 604.874.1245, x 4639 | m: 778.927.9952 | e: ulysses.yeh@exp.com
275-3001 Wayburne Drive
Burnaby, BC V5G 4W3
CANADA

From: Thomas Godley [mailto:Thomas.Godley@sjrb.ca]
Sent: Monday, April 06, 2015 11:20 AM
To: Kai-Sing Hui; Ulysses Yeh
Subject: Commercial - DIGSHAW Locate Request VANAS-6356-3594-1702

Hi there,

In response to your original request:

Shaw does not have any U/G cable facilities in our own structure at this site location. You are cleared to proceed with your work.

The online form is the best way to contact, Jim Narayan is not with the locate team. Commercial MDU stands for Commercial Multi Dwelling Unit

Thanks

This email is intended to be guide only. Any costs that arise from damages caused by excavating will be responsibility of the digger.

-----Original Message-----
From: digshawvan@sjrb.ca [mailto:digshawvan@sjrb.ca]
Sent: Thursday, April 02, 2015 10:57 AM
To: Digshaw - Vancouver
Subject: Commercial - DIGSHAW Locate Request VANAS-6356-3594-1702

DIGSHAW Reference Number: VANAS-6356-3594-1702
Company Name: exp Services Inc.
Contact Name: Diane McCulloch
Contact Phone Number: (604) 709-4612
Alternate Contact Name: Ulysses Yeh, P.Eng.
Alternate Contact Num: (604) 874-1245
Email Address Copied: diane.mccullodh@exp.com
Fax Number:
Emergency: NO
One Call Ticket:
Date of Excavation: 04/09/2015
Preferred Locate Date: 04/09/2015
Time: 9:00 AM
Area: Vancouver
Province: BC-Lower Mainland
Address: 4083 Cambie Street
Address Type: Commercial
Area of Excavation

Property Address: 4083 Cambie Street

Primary contractor:
Description of site and comments:
Fyi, please IGNORE the Excavation date and time noted on this form and I do not know what "Commercial MDU" stands for. This is not ideal forum that we wish to advise of utility clearance requests - email would be preferable and I did have Jim Narayan as the email contact; however, email to him bounced (no longer with Shaw?).

I've attached our excavation shoring design drawings (B &W only, as website only takes up to 10MB files (original Pdf was 16MB w/colour) for the above-mentioned site for your review and comment. The drawings attached provide details with regards to the proposed extent of the shoring system. Note: Our drawings do not show any existing Shaw utilities and nor did BC One Call, however, the City of Vancouver, believes there are and is holding permit approval. Please advise if any conflicts with existing Shaw utilities may occur from installation of the proposed shoring system or if any additional utility information is available for the location specified on the drawings.

Exp Services Inc. has been retained to provide excavation shoring design and applicable Letters of Assurance. In

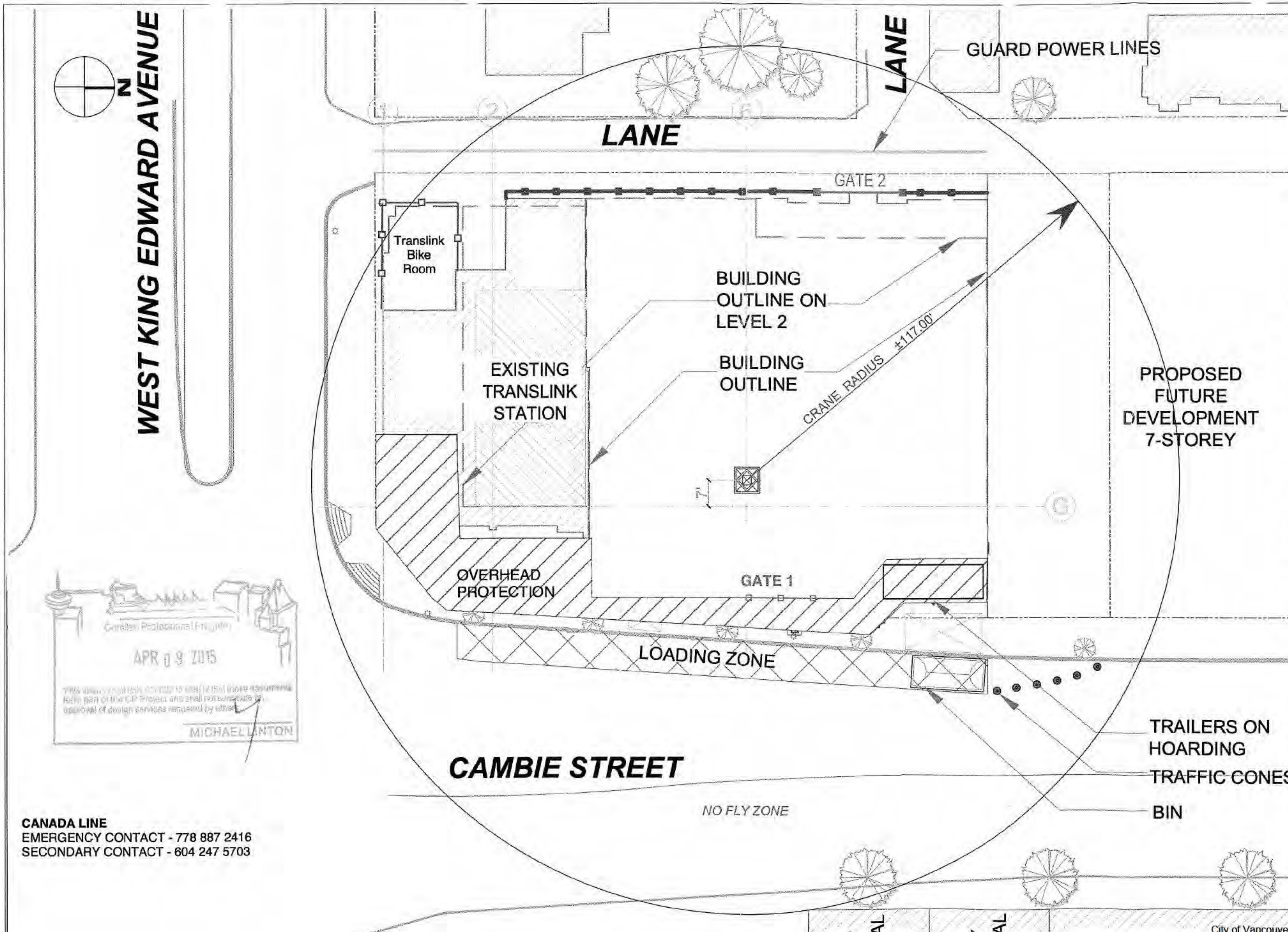
addition, exp has been given the authority by the owner to provide field reviews and the authority to stop or re-direct work when necessary. Field reviews will be completed as necessary to ascertain that the work substantially conforms to the excavation shoring drawings.

Should you have any questions regarding the attached, please feel free to contact Kai-Sing Hui, P.Eng. (kai-sing.hui@exp.com) or Ulysses Yeh, P.Eng., (ulysses.yeh@exp.com).

Your prompt attention to this matter would be greatly appreciated as CoV is holding building permit process until we hear from you.

Thank you,

W.T. Leung Architects, Inc.
300 - 973 West Broadway
Vancouver, BC V5Z 1K3
Tel (604) 736-9711
Fax (604) 736-7991



ITC
Quality Counts

4099 CAMBIE

4099 CAMBIE STREET
VANCOUVER, BC
FOR:

YUANHENG

SITE SAFETY PLAN

SITE PHONE	604-
SITE FAX	604-
AMBULANCE	911
FIRE	911
POLICE	911
BC HYDRO	1-888-769-3766
TERASEN GAS	1-800-663-9911
VANCOUVER CITY HALL	604-873-7011
POISON CONTROL	604-682-5050
SEWER EMERG.	604-326-4680
WATER EMERG.	604-326-4800
WEEKEND	604-326-4650
GENERAL CONTRACTOR: ITC GROUP OF COMPANIES	604-685-0111
WORKSAFE BC	604-276-3100
AFTER HOURS & WEEKENDS	604-273-7711
CONSTRUCTION SAFETY OFFICER	

LEGEND

- CONSTRUCTION FENCE
- TRUCK TRAFFIC FLOW
- LOADING / STAGING ZONE
- HOARDING
- NO FLY ZONE
- SITE PARKING
- FIRST AID
- FIRE HYDRANT
- MARSHALLING AREA
- E TEMP. ELECTRICAL SHACK
- FIRE EXTINGUISHER
- AIR HORN
- EYE WASH
- TRAFFIC CONTROL PERSON
- HOIST MAN HOIST

DATE: MARCH [illegible]

CFT Engineering Inc.

#200 - 1901 Rosser Avenue
Burnaby, BC
V5C 6R6
Ph: (604) 684-2384
Fax: (604) 684-2402
e-mail: cft@cftengineering.com

TRANSMITTAL

TO: **Mr. Al Reese**
Street Construction Branch, Engineering Department
City of Vancouver
5th Floor, 507 West Broadway
Vancouver, BC V5Z 0B4

cc: **Konning Tam** **(Via Email)**
WT Leung Architects konning@wtleungarch.com

FROM: **Michael Linton**

DATE: **November 27, 2014**

RE: **Engineering Clearance for Excavation and Shoring Only**
4083 Cambie Street, Vancouver, BU 463163

PROJECT #: C7002

Please find attached documentation required by the Engineering Department in support of an excavation permit application for this project. The following information has been included with this package.

1. Schedules B-1 and B-2 from geotechnical consultant.
2. Application for permit to use City property form.
3. Two sets of excavation and shoring drawings.
4. Construction Safety Plan. **(Forthcoming)**
5. The owner/contractor insurance confirmation form.
6. Mechanical Site Plan showing size and location of Service Connections (Second plan will be forwarded to Cheryl Moore in Sewers Branch).

Once you have had an opportunity to review this information, we would appreciate receiving a summary of the required Engineering fees and deposits.

If you have any question or require further information, please contact our office. Thank you for your assistance.

Regards,

Michael Linton, P.Eng., CP

ML/rm C7002_T03

SCHEDULE B-1

Forming Part of Subsection 2.2.7, Div. C of the Vancouver Building By-law

BU 463 163
Building Permit No.[1]

ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW

Notes: (i) This letter must be submitted along with Schedule B-2 before issuance of a *building permit*. A separate letter must be submitted by each *registered professional*.
(ii) This letter is endorsed by: Architectural Institute of B.C., Association of Professional Engineers and Geoscientists of B.C., Building Officials' Association of B.C., and Union of B.C. Municipalities.
(iii) In this letter the words in italics have the same meaning as in the Vancouver Building By-law.

To: *The Chief Building Official*

Re: Commercial & Multi-Family Residential Development
Name of Project (Print)
4083 Cambie, Vancouver, BC
Address of Project (Print)
Parcel 1 Plan BCP37294 Block 660 District Lot 526 NWD.
Legal Description of Project (Print)

The undersigned hereby gives assurance that the design of the
(Initial those of the items listed below that apply to this *registered professional*.
All the disciplines will not necessarily be employed on every project.)

- ARCHITECTURAL
- STRUCTURAL
- MECHANICAL
- PLUMBING
- FIRE SUPPRESSION SYSTEMS
- ELECTRICAL
- GEOTECHNICAL — temporary
- GEOTECHNICAL — permanent

PROFESSIONAL ENGINEER PROVINCE OF B.C. K.S. HUI 11/18/14

(Professional's Seal and Signature)

November 18, 2014
Date

components of the plans and supporting documents prepared by this *registered professional* in support of the application for the *building permit* as outlined on the attached Schedule B-2 substantially comply with the Vancouver Building By-law and other applicable enactments respecting safety except for *construction* safety aspects.

The undersigned hereby undertakes to be responsible for *field reviews* of the above referenced components during *construction* as indicated on the attached "SUMMARY OF DESIGN AND FIELD REVIEW REQUIREMENTS" (SCHEDULE B-2).

NOV 27 2014

CRP's Initials

[1] For Building Official's use only

Schedule B-1 - *Continued*

BU 463 163
Building Permit No.[1]

4083 Cambie, Vancouver, BC
Project Address

Geotechnical
Discipline

The undersigned also undertakes to notify the *Chief Building Official* in writing as soon as possible if the undersigned's contract for *field review* is terminated at any time during *construction*.

I certify that I am a *registered professional* as defined in the Vancouver Building By-law.

Kai-Sing Hui, P.Eng.
Registered Professional's Name (Print)

275 - 3001 Wayburne Drive
Address (Print)

Burnaby, British Columbia V5G 4W3

604-874-1245
Phone No.

(Professional's Seal and Signature)

November 18, 2014
Date

(If the *Registered Professional* is a member of a firm, complete the following.)

I am a member of the firm exp Services Inc.
and I sign this letter on behalf of the firm. (Print name of firm)

Note: The above letter must be signed by a *registered professional*. The Vancouver Building By-law defines a *registered professional* to mean

(a) a person who is registered or licensed to practise as an architect under the Architects Act, or
(b) a person who is registered or licensed to practise as a professional engineer under the Engineers and Geoscientists Act.

CRP's Initials

[1] For Building Official's use only

SCHEDULE B-2

Forming Part of Subsection 2.2.7, Division C of the Vancouver Building By-law

BU 463163
Building Permit No.[1]

SUMMARY OF DESIGN AND FIELD REVIEW REQUIREMENTS

Notes: (i) This letter must be submitted along with Schedule B-1 before issuance of a *building permit*.
(ii) This letter is endorsed by: Architectural Institute of B.C., Association of Professional Engineers and Geoscientists of B.C., Building Officials' Association of B.C., and Union of B.C. Municipalities.
(iii) In this letter the words in italics have the same meaning as in the Vancouver Building By-law.

Registered Professional's Name (Print) Kai-Sing Hui, P.Eng.

Name of Project (Print) Commercial & Multi-Family Residential Development

Address of Project (Print) 4083 Cambie, Vancouver, BC

(Initial applicable discipline below and cross out and initial only those items not applicable to the project.)

ARCHITECTURAL

1.1 Fire resisting assemblies
1.2 *Fire separations* and their continuity
1.3 *Closures*, including tightness and operation
1.4 Egress systems, including *access to exit* within *suites* and *floor areas*
1.5 Performance and physical safety features (guardrails, handrails, etc.)
1.6 Structural capacity of architectural components, including anchorage and seismic restraint
1.7 Sound control
1.8 Landscaping, screening and site grading
1.9 Provisions for fire fighting access
1.10 *Access* requirements for *persons with disabilities*
1.11 Elevating devices
1.12 Functional testing of architecturally related fire emergency systems and devices
1.13 Development Permit and conditions therein
1.14 Interior signage, including acceptable materials, dimensions and locations
1.15 Review of all applicable shop drawings
1.16 Interior and exterior finishes
1.17 Dampproofing and/or waterproofing of walls and slabs below *grade*
1.18 Roofing and flashings
1.19 Wall cladding systems
1.20 Thermal insulation systems, including condensation control and cavity ventilation
1.21 Exterior glazing
1.22 Integration of building envelope components
1.23 Environmental separation requirements (Part 5)

NOV 27 2014

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA KAI SING HUI 29931

11/18/14

(Professional's Seal and Signature)

November 18, 2014
Date

STRUCTURAL

2.1 Structural capacity of structural components of the *building*, including anchorage and seismic restraint
2.2 Structural aspects of *deep foundations*
2.3 Review of all applicable shop drawings
2.4 Structural aspects of unbonded post-tensioned concrete design and construction
2.5 Verification of the satisfactory completion of an in-house check of the structural design
2.6 Verification of the satisfactory completion of an independent Concept Review, including a general overview of the design calculations

MECHANICAL

3.1 HVAC systems and devices, including high *building* requirements where applicable
3.2 *Fire dampers* at required *fire separations*
3.3 Continuity of *fire separations* at HVAC penetrations
3.4 Functional testing of mechanically related fire emergency systems and devices
3.5 Maintenance manuals for mechanical systems
3.6 Structural capacity of mechanical components, including anchorage and seismic restraint
3.7 Review of all applicable shop drawings

[1] *For Building Official's use only*

CRP's Initials

Schedule B-2 - *Continued*

BU 463 165
Building Permit No.[1]

Address of Project (Print) 4083 Cambie, Vancouver, BC

Registered Professional's Name (Print) Kai-Sing Hui, P.Eng.

_____ PLUMBING

4.1 Roof *drainage systems*
4.2 Site and foundation *drainage systems*
4.3 *Plumbing systems* and devices
4.4 Continuity of *fire separations* at plumbing penetrations
4.5 Functional testing of plumbing related fire emergency systems and devices
4.6 Maintenance manuals for *plumbing systems*
4.7 Structural capacity of plumbing components, including anchorage and seismic restraint
4.8 Review of all applicable shop drawings

_____ FIRE SUPPRESSION SYSTEMS

5.1 Suppression system classification for type of *occupancy*
5.2 Design coverage, including concealed or special areas
5.3 Compatibility and location of electrical supervision, ancillary alarm and control devices
5.4 Evaluation of the capacity of city (municipal) water supply versus system demands and domestic demand, including pumping devices where necessary
5.5 Qualification of welder, quality of welds and material
5.6 Review of all applicable shop drawings
5.7 Acceptance testing for "Contractor's Material and Test Certificate" as per NFPA Standards
5.8 Maintenance program and manual for suppression systems
5.9 Structural capacity of sprinkler components, including anchorage and seismic restraint
5.10 For partial systems — confirm sprinklers are installed in all areas where required
5.11 Fire Department connections and hydrant locations
5.12 Fire hose standpipes
5.13 Functional testing of fire suppression systems and devices

_____ ELECTRICAL

6.1 Electrical systems and devices, including high building requirements where applicable
6.2 Continuity of *fire separations* at electrical penetrations
6.3 Functional testing of electrical related fire emergency systems and devices
6.4 Electrical systems and devices maintenance manuals
6.5 Structural capacity of electrical components, including anchorage and seismic restraint
6.6 Clearances from *buildings* of all electrical utility equipment
6.7 Fire protection of wiring for emergency systems
6.8 Review of all applicable shop drawings

GEOTECHNICAL — Temporary

7.1 *Excavation*
7.2 Shoring
7.3 Underpinning
7.4 Temporary construction dewatering

GEOTECHNICAL — Permanent

8.1 Bearing capacity of the soil
8.2 Geotechnical aspects of *deep foundations*
8.3 Compaction of engineered fill
8.4 Structural considerations of soil, including slope stability and seismic loading
8.5 Backfill
8.6 Permanent dewatering
8.7 Permanent underpinning

(Professional's Seal and Signature)

November 18, 2014
Date

CRP's Initials

[1] For Building Official's use only

Eng. 475-MLH-84

TO: CITY ENGINEER
ENGINEERING DEPARTMENT
CITY OF VANCOUVER

JA
JA
BA

APPLICATION FOR **PERMITS TO USE CITY PROPERTY**

DATE OF APPLICATION: MARCH 31, 2015

ADDRESS: 4083 CAMBIE ST.

LEGAL DESCRIPTION: PARCEL 1 PLAN BCP37294 BLK 660 DL 526 NWD

OWNER: YUANHENG CKE STATION DEVELOPMENTS LTD.
ADDRESS: 2/F, 1236 W. BROADWAY VANCOUVER, BC V6H 1G6 PHONE (604) 909-6860

NATURE OF DEVELOPMENT: COMMERCIAL + MULTI-FAMILY RESIDENTIAL

GENERAL CONTRACTOR: ITC RESIDENTIAL (604) 685-0111
ADDRESS: #800 - 564 BEATTY ST., VANCOUVER, BC.

ARCHITECT: W.T. LEUNG ARCHITECTS, INC.
ADDRESS: #300-973 W. BROADWAY VANCOUVER, BC V5Z 1K3 PHONE (604) 736-9711

PROFESSIONAL ENGINEER
ADDRESS PHONE

PROPOSED USE OF CITY PROPERTY

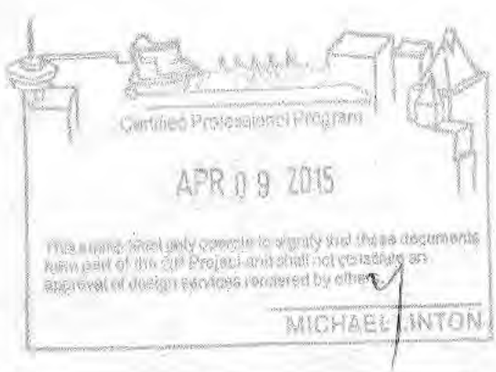
(✓ WHERE APPLICABLE)

- ☒ EXCAVATE ____ DEPTH
- ☒ SLOPE EXCAVATION
- ☒ INSTALL ANCHORS
- ☒ INSTALL SHORING
- ☒ FENCING
- ☒ TEMPORARY ACCESS
- ☒ BACKFILLING
- ☐ PAVEMENT RESTORATION
- ☒ SIDEWALK RESTORATION
- ☒ PERMANENT ENCROACHMENT
  - ☒ CANOPY* ☐ AWNING*
  - ☐ OTHER ____ SPECIFY

* STRUCTURES MUST BE FULLY DEMOUNTABLE AND COMPLY WITH THE VANCOUVER CITY BUILDING BYLAW.

SKETCH OF CITY PROPERTY USE

SECTION	PLAN
REFER TO ATTACHED GEOTECH AND ARCHITECTURAL DRAWINGS: GEOTECH: SHORING + EXCAVATION ARCH: CANOPY @ W. KING EDWARD NO PERMANENT ENCROACHMENT IN THE EXCAVATION & SHORING STAGE.	REFER TO ATTACHED GEOTECH AND ARCHITECTURAL DRAWINGS: GEOTECH: SHORING + EXCAVATION ARCH: CANOPY @ W. KING EDWARD



I HEREBY MAKE APPLICATION FOR THE FOLLOWING PERMIT(S):

- ☐ **TEMPORARY CROSSING PERMIT** — TO CROSS THE CITY BOULEVARD ON A TEMPORARY BASIS TO SERVE THE ABOVE PROPERTY.
- ☒ **PERMIT TO WORK ON CITY STREETS** — TO WORK ON THE SURFACE OF CITY PROPERTY AT THE ABOVE LOCATION.
- ☒ **STREET ENCROACHMENT PERMIT** — TO CONSTRUCT A PERMANENT ENCROACHMENT ON CITY PROPERTY PURSUANT TO THE ENCROACHMENT BYLAW.
- ☒ **STREET EXCAVATION PERMIT** — TO CONSTRUCT A TEMPORARY EXCAVATION ENCROACHING ONTO CITY PROPERTY. — COMPLETE OTHER SIDE

YUANHENG CKE STATION DEVELOPMENTS, LTD.
NAME OF OWNER (PLEASE PRINT)

SIGNATURE OF OWNER

In consideration of the granting of the Permit or Permits applied for as indicated on the reverse side hereof, I hereby agree to indemnify and save harmless the City of Vancouver, its servants, agents and employees of and from all manner of actions, causes of action, suits, contracts, claims, demands, damages, liabilities, judgements, costs and expenses of whatsoever kind, which may in any manner accrue or arise against the said City, its servants, agents and employees in consequence of or incidental to the granting of the permit or permits applied for or the carrying out of the work authorized thereby irrespective of when or by whom such work is carried out. I further agree to pay the cost of repairing any damage to City property (including but not limited to, sewers, watermains, street surfaces and sub-surfaces, sidewalks, electrical installations, or traffic devices) or the property of any utility company, which damage is, in the opinion of the City Engineer or his representative, caused by the operations in respect of which the permit or permits herein are applied for. I further agree to conform to all requirements of all Municipal, Provincial or Federal laws in force within City of Vancouver from time to time including, but not limited to, all By-laws of the City of Vancouver.

If the Permit or Permits applied for include a permit to excavate on or into City property, I agree to locate and protect all utilities contained in the said property.

I have been informed that while the Engineering Department of the City will on request pass on information it has concerning the location of utilities it does not in any manner guarantee the accuracy of such information and shall not be liable for any loss or damage resulting from the inaccuracy of such information whether such inaccuracy results from negligence or otherwise howsoever.

WING TING LEUNG
Witness

Owner

300 - 973 W. BROADWAY
Address VANCOUVER, B.C. V5Z-1K3

ARCHITECT.
Occupation

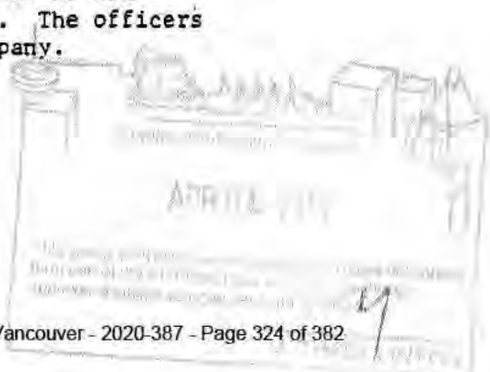
The Corporate Seal of _____

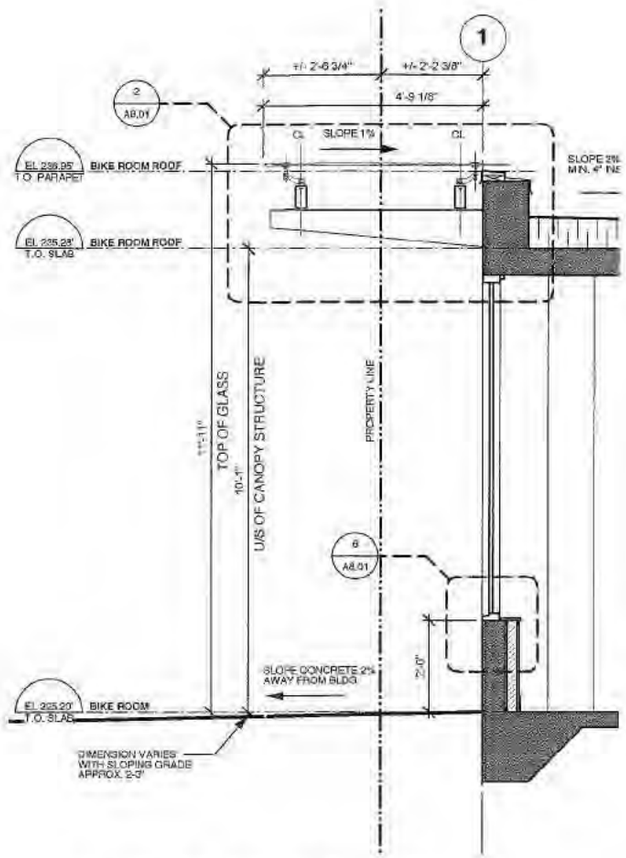
_____ was hereunto affixed in the presence of:

_____

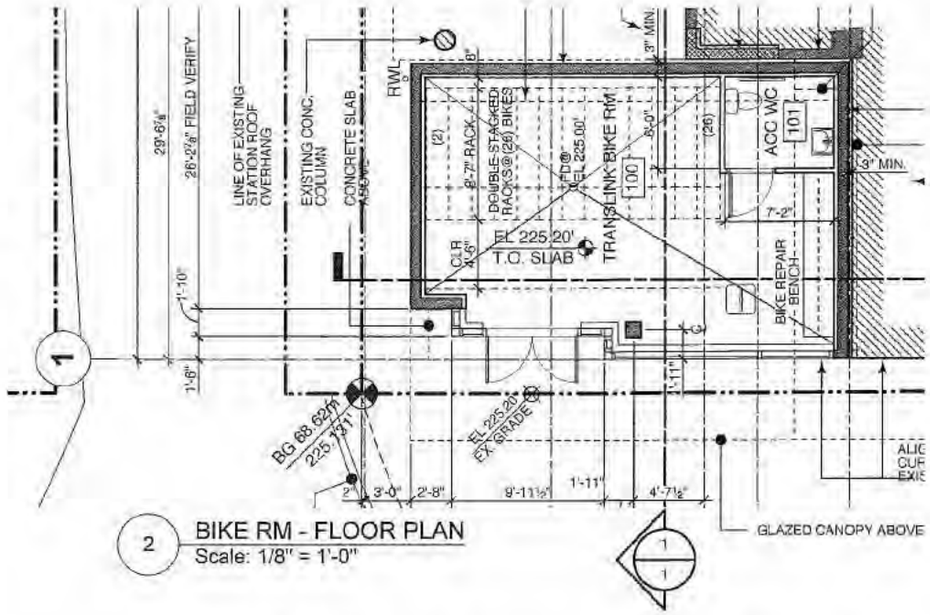
_____

The above must be signed personally by the Owner and not by an agent or employee of the Owner. The Signature must be witnessed. If the Owner is a company the corporate seal of the company must be affixed to the document in the presence of its duly authorized officers. The officers must also sign, setting forth their positions in the company.

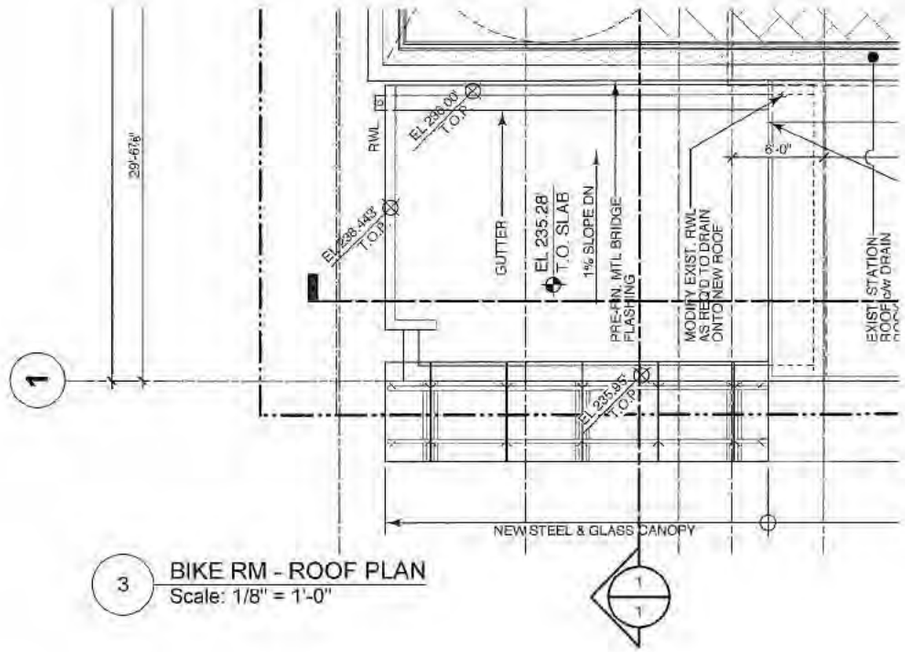




1 BIKE RM - WALL SECTION
Scale: 3/8" = 1'-0"



2 BIKE RM - FLOOR PLAN
Scale: 1/8" = 1'-0"



3 BIKE RM - ROOF PLAN
Scale: 1/8" = 1'-0"

W.T. LEUNG
ARCHITECTS
INC.

Suite 300, 873 West Broadway,
Vancouver,British Columbia,
Canada V5Z 1K3
Telephone 604 736-9711

ISSUED

SCALE N/A

NORTH

PROJECT

**4083 CAMBIE ST.
VANCOUVER, B.C.**

DRAWING TITLE

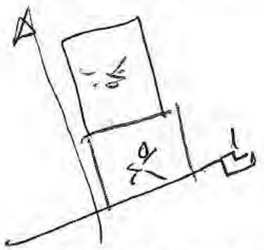
BIKE ROOM CANOPY

JOB NO.	11-22
DRAWN	NM
DATE	NOVEMBER 14 2014
CHECKED	

DRAWING NO.

SK-01

Staff VanMap



B

64.93

76.4 – 200 C CONC 5.32%

59.55

60.86

1.8

SUMP

1.5

150 – 2.1 – 1940

150 – 1.5 – 1947

1.2

G 61.63.00

39.1 – 200 ST PVC 3.53%

150 – 2.4 – 1945

4099

1

4033

19

18

4005

17

16

12

13

3985

2007

62.38

W 4TH AV

CAMBIE ST

THE CITY OF VANCOUVER ASSUMES NO RESPONSIBILITY FOR THE CORRECTNESS OF THE EXISTING UTILITY INFORMATION SHOWN. ORTHOPHOTOS MAY NOT BE IN ALIGNMENT WITH PROPERTY LINES OR UTILITIES AND MAY DIFFER FROM FIELD.

MH LID ELEVATION
G 27.53
DIAMETER
TYPE: C=COMBINED SAN=SANITARY STM=STORM
DOWNSTREAM PIPE INVERT
26.12
81.7 – 200 C VC 5.02%
25.11
G 26.44
UPSTREAM PIPE INVERT
LENGTH
GRADE
MATERIAL
MH LID ELEVATION

SEWERS & DRAINAGE DESIGN BRANCH

ALL DIMENSIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.

ENGINEERING SERVICES - CITY OF VANCOUVER

750 E HASTINGS

SCALE: 1:250

DATEMARCH 14, 2014

DRAWING NAME:
4083_Cambie.dwg

FILE: F:\FORIVE\Utility Check CAD Dowings\2014\ANCHOR RODS\4083_Cambie\4083_Cambie.dwg
PLOTTED: Thursday, December 04, 2014 7:16:16 AM

SCHEDULE C-B

Forming Part of Subsection 2.2.7, Division C of the Building By-law

Building Permit BP-2016-03679

ASSURANCE OF PROFESSIONAL FIELD REVIEW AND COMPLIANCE

Notes: (i) This letter must be submitted after completion of the project but prior to final inspection by the *Chief Building Official*. A separate letter must be submitted by each *registered professional of record*.
(ii) This letter is endorsed by: Architectural Institute of B.C., Association of Professional Engineers and Geoscientists of B.C.
(iii) In this letter the words in italics have the same meaning as in the Building By-law.

To: *The Chief Building Official*

Re: Geotechnical
Discipline (e.g. Architectural, etc.) (Print)
Residential Development
Name of Project (Print)
523 West King Edward, Vancouver BC
Address of Project (Print)
Lot 25, 26 & 27, All of Block 660, District Lot 586, NWD Plan 2976
Legal Description of Project (Print)

(Each *registered professional* of *record* shall complete the following:)
Matt J. Kokan, P. Eng.
Name (Print)
1779 West 75th Avenue
Address (Print)
Vancouver, B.C. V6P 6P2
604-439-0922
Phone No.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. J. KOKAN # 21364
(Professional's Seal and Signature)

October 24, 2018
Date

I hereby give assurance that

(a) I have fulfilled my obligations for *field review* as outlined in Subsection 2.2.7, Division C of the Building By-law and in the previously submitted Schedule B, "ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW, and
(b) those components of the project opposite my initials in Schedule B substantially comply in all material respects with
  (i) the applicable requirements of the Building By-law and other applicable enactments respecting safety, not including construction safety aspects, and
  (ii) the plans and supporting documents submitted in support of the application for the *building* permit,
(c) I am a *registered professional of record* as defined in the Building By-law.

(If the *registered professional of record* is a member of a firm, complete the following:)

I am a member of the firm GeoPacific Consultants Ltd.
and I sign this letter on behalf of the firm. (Print name of firm)

Note: The above letter must be signed by a *registered professional of record*, who is a *registered professional*. The Building By-law defines a *registered professional* to mean
(a) a person who is registered or licensed to practise as an architect under the Architects Act, or
(b) a person who is registered or licensed to practise as a professional engineer under the Engineers and Geoscientists Act.

CRP's Initials

Certified Professional Program
MAR 18 2019
1 of 1
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL MESZAROS

SCHEDULE C-B

Forming Part of Subsection 2.2.7, Division C of the Building By-law

Building Permit BP - 2016-03679

ASSURANCE OF PROFESSIONAL FIELD REVIEW AND COMPLIANCE

Notes: (i) This letter must be submitted after completion of the project but prior to final inspection by the *Chief Building Official*. A separate letter must be submitted by each *registered professional of record*.
(ii) This letter is endorsed by: Architectural Institute of B.C., Association of Professional Engineers and Geoscientists of B.C.
(iii) In this letter the words in italics have the same meaning as in the Building By-law.

To: *The Chief Building Official*

Re: Geotechnical
Discipline (e.g. Architectural, etc.) (Print)
Residential Development
Name of Project (Print)
523 West King Edward, Vancouver BC
Address of Project (Print)
Lot 25, 26 & 27, All of Block 660, District Lot 586, NWD Plan 2976
Legal Description of Project (Print)

(Each *registered professional* of *record* shall complete the following:)
Matt J. Kokan, P. Eng.
Name (Print)
1779 West 75th Avenue
Address (Print)
Vancouver, B.C. V6P 6P2
604-439-0922
Phone No.

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. J. KOKAN # 21364
(Professional's Seal and Signature)

October 24, 2018
Date

I hereby give assurance that

(a) I have fulfilled my obligations for *field review* as outlined in Subsection 2.2.7, Division C of the Building By-law and in the previously submitted Schedule B, "ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW, and
(b) those components of the project opposite my initials in Schedule B substantially comply in all material respects with
  (i) the applicable requirements of the Building By-law and other applicable enactments respecting safety, not including construction safety aspects, and
  (ii) the plans and supporting documents submitted in support of the application for the *building* permit,
(c) I am a *registered professional of record* as defined in the Building By-law.

(If the *registered professional of record* is a member of a firm, complete the following:)

I am a member of the firm GeoPacific Consultants Ltd.
and I sign this letter on behalf of the firm. (Print name of firm)

Note: The above letter must be signed by a *registered professional of record*, who is a *registered professional*. The Building By-law defines a *registered professional* to mean
(a) a person who is registered or licensed to practise as an architect under the Architects Act, or
(b) a person who is registered or licensed to practise as a professional engineer under the Engineers and Geoscientists Act.

CRP's Initials

Certified Professional Program
MAR 18 2019
1 of 1
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL MESZAROS

SCHEDULE C-B

Forming Part of Subsection 2.2.7, Division C of the Building By-law

Building Permit BP - 2016-03679

ASSURANCE OF PROFESSIONAL FIELD REVIEW AND COMPLIANCE

Notes: (i) This letter must be submitted after completion of the project but prior to final inspection by the *Chief Building Official*. A separate letter must be submitted by each *registered professional of record*.
(ii) This letter is endorsed by: Architectural Institute of B.C., Association of Professional Engineers and Geoscientists of B.C.
(iii) In this letter the words in italics have the same meaning as in the Building By-law.

To: *The Chief Building Official*

Re: Geotechnical
Discipline (e.g. Architectural, etc.) (Print)
Residential Development
Name of Project (Print)
523 West King Edward, Vancouver BC
Address of Project (Print)
Lot 25, 26 & 27, All of Block 660, District Lot 586, NWD Plan 2976
Legal Description of Project (Print)

(Each *registered professional* of *record* shall complete the following:)
Matt J. Kokan, P. Eng.
Name (Print)
1779 West 75th Avenue
Address (Print)
Vancouver, B.C. V6P 6P2
604-439-0922
Phone No.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
M. J. KOKAN
21364
(Professional's Seal and Signature)

October 24, 2018
Date

I hereby give assurance that

(a) I have fulfilled my obligations for *field review* as outlined in Subsection 2.2.7, Division C of the Building By-law and in the previously submitted Schedule B, "ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW, and
(b) those components of the project opposite my initials in Schedule B substantially comply in all material respects with
  (i) the applicable requirements of the Building By-law and other applicable enactments respecting safety, not including construction safety aspects, and
  (ii) the plans and supporting documents submitted in support of the application for the *building* permit,
(c) I am a *registered professional of record* as defined in the Building By-law.

(If the *registered professional of record* is a member of a firm, complete the following:)

I am a member of the firm GeoPacific Consultants Ltd.
and I sign this letter on behalf of the firm. (Print name of firm)

Note: The above letter must be signed by a *registered professional of record*, who is a *registered professional*. The Building By-law defines a *registered professional* to mean
(a) a person who is registered or licensed to practise as an architect under the Architects Act, or
(b) a person who is registered or licensed to practise as a professional engineer under the Engineers and Geoscientists Act.

Certified Professional Program
MAR 18 2019
1 of 1
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL MESZAROS

CRP's Initials

SCHEDULE C-B

Forming Part of Subsection 2.2.7, Division C of the Building By-law

Building Permit BP - 2016-03679

ASSURANCE OF PROFESSIONAL FIELD REVIEW AND COMPLIANCE

Notes: (i) This letter must be submitted after completion of the project but prior to final inspection by the *Chief Building Official*. A separate letter must be submitted by each *registered professional of record*.
(ii) This letter is endorsed by: Architectural Institute of B.C., Association of Professional Engineers and Geoscientists of B.C.
(iii) In this letter the words in italics have the same meaning as in the Building By-law.

To: *The Chief Building Official*

Re: Geotechnical
Discipline (e.g. Architectural, etc.) (Print)

Residential Development
Name of Project (Print)

523 West King Edward, Vancouver BC
Address of Project (Print)

Lot 25, 26 & 27, All of Block 660, District Lot 586, NWD Plan 2976
Legal Description of Project (Print)

(Each *registered professional* of *record* shall complete the following:)

Matt J. Kokan, P. Eng.
Name (Print)

1779 West 75th Avenue
Address (Print)

Vancouver, B.C. V6P 6P2

604-439-0922
Phone No.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
M. J. KOKAN
21364
(Professional's Seal and Signature)

October 24, 2018
Date

I hereby give assurance that

(a) I have fulfilled my obligations for *field review* as outlined in Subsection 2.2.7, Division C of the Building By-law and in the previously submitted Schedule B, "ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW, and
(b) those components of the project opposite my initials in Schedule B substantially comply in all material respects with
  (i) the applicable requirements of the Building By-law and other applicable enactments respecting safety, not including construction safety aspects, and
  (ii) the plans and supporting documents submitted in support of the application for the *building* permit,
(c) I am a *registered professional of record* as defined in the Building By-law.

(If the *registered professional of record* is a member of a firm, complete the following:)

I am a member of the firm GeoPacific Consultants Ltd.
and I sign this letter on behalf of the firm. (Print name of firm)

Note: The above letter must be signed by a *registered professional of record*, who is a *registered professional*. The Building By-law defines a *registered professional* to mean
(a) a person who is registered or licensed to practise as an architect under the Architects Act, or
(b) a person who is registered or licensed to practise as a professional engineer under the Engineers and Geoscientists Act.

Certified Professional Program
MAR 18 2019
1 of 1
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL MESZAROS

CRP's Initials

SCHEDULE B-1

Forming Part of Subsection 2.2.7. Div. C of the Vancouver Building By-law

BU 463 163
Building Permit No.[1]

ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW

Notes: (i) This letter must be submitted along with Schedule B-2 before issuance of a *building permit*. A separate letter must be submitted by each *registered professional*.
(ii) This letter is endorsed by: Architectural Institute of B.C., Association of Professional Engineers and Geoscientists of B.C., Building Officials' Association of B.C., and Union of B.C. Municipalities.
(iii) In this letter the words in italics have the same meaning as in the Vancouver Building By-law.

To: *The Chief Building Official*

Re: Commercial & Multi-Family Residential Development
Name of Project (Print)
4083 Cambie, Vancouver, BC
Address of Project (Print)
Parcel 1 Plan BCP37294 Block 660 District Lot 526 NWD.
Legal Description of Project (Print)

The undersigned hereby gives assurance that the design of the
(Initial those of the items listed below that apply to this *registered professional*.
All the disciplines will not necessarily be employed on every project.)

- ARCHITECTURAL
- STRUCTURAL
- MECHANICAL
- PLUMBING
- FIRE SUPPRESSION SYSTEMS
- ELECTRICAL
- GEOTECHNICAL — temporary
- GEOTECHNICAL — permanent

PROFESSIONAL ENGINEER
K.S. HUI
24938
ENGINEERING
11/18/14

(Professional's Seal and Signature)

November 18, 2014
Date

components of the plans and supporting documents prepared by this *registered professional* in support of the application for the *building permit* as outlined on the attached Schedule B-2 substantially comply with the Vancouver Building By-law and other applicable enactments respecting safety except for *construction* safety aspects.

The undersigned hereby undertakes to be responsible for *field reviews* of the above referenced components during *construction* as indicated on the attached "SUMMARY OF DESIGN AND FIELD REVIEW REQUIREMENTS" (SCHEDULE B-2).

Certified Professional Program
NOV 27 2014
This stamp shall only confirm signify that the documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL LINTON

CRP's Initials

[1] For Building Official's use only

Schedule B-1 - *Continued*

BU 463 163
Building Permit No.[1]

4083 Cambie, Vancouver, BC
Project Address

Geotechnical
Discipline

The undersigned also undertakes to notify the *Chief Building Official* in writing as soon as possible if the undersigned's contract for *field review* is terminated at any time during *construction*.

I certify that I am a *registered professional* as defined in the Vancouver Building By-law.

Kai-Sing Hui, P.Eng.
Registered Professional's Name (Print)

275 - 3001 Wayburne Drive
Address (Print)

Burnaby, British Columbia V5G 4W3

604-874-1245
Phone No.

(Professional's Seal and Signature)

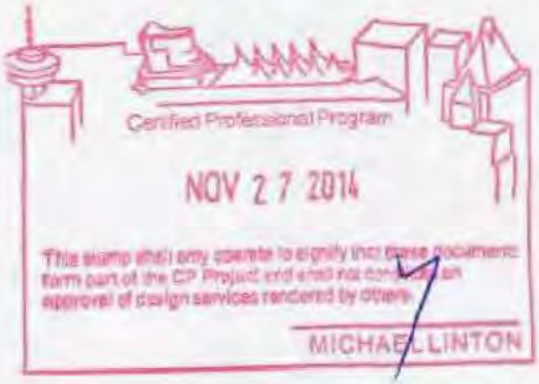
November 18, 2014
Date

(If the *Registered Professional* is a member of a firm, complete the following.)

I am a member of the firm exp Services Inc.
and I sign this letter on behalf of the firm (Print name of firm)

Note: The above letter must be signed by a *registered professional*. The Vancouver Building By-law defines a *registered professional* to mean

(a) a person who is registered or licensed to practise as an architect under the Architects Act, or
(b) a person who is registered or licensed to practise as a professional engineer under the Engineers and Geoscientists Act.



CRP's Initials

[1] For Building Official's use only

SCHEDULE B-2

Forming Part of Subsection 2.2.7. Division C of the Vancouver Building By-law

BU 463 163
Building Permit No.[1]

SUMMARY OF DESIGN AND FIELD REVIEW REQUIREMENTS

Notes: (i) This letter must be submitted along with Schedule B-1 before issuance of a *building permit*.
(ii) This letter is endorsed by: Architectural Institute of B.C., Association of Professional Engineers and Geoscientists of B.C., Building Officials' Association of B.C., and Union of B.C. Municipalities.
(iii) In this letter the words in italics have the same meaning as in the Vancouver Building By-law.

Registered Professional's Name (Print) Kai-Sing Hui, P.Eng.

Name of Project (Print) Commercial & Multi-Family Residential Development

Address of Project (Print) 4083 Cambie, Vancouver, BC

(Initial applicable discipline below and cross out and initial only those items not applicable to the project.)

Certified Professional Program

NOV 27 2014

This stamp is to indicate receipt only and does not signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.

MICHAEL LINTON

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K.S. HUI 24508 ENGINEERING

18/11/2014

(Professional's Seal and Signature)

November 18, 2014
Date

ARCHITECTURAL

1.1 Fire resisting assemblies
1.2 *Fire separations* and their continuity
1.3 *Closures*, including tightness and operation
1.4 Egress systems, including *access to exit* within *suites* and *floor areas*
1.5 Performance and physical safety features (guardrails, handrails, etc.)
1.6 Structural capacity of architectural components, including anchorage and seismic restraint
1.7 Sound control
1.8 Landscaping, screening and site grading
1.9 Provisions for fire fighting access
1.10 *Access* requirements for *persons with disabilities*
1.11 Elevating devices
1.12 Functional testing of architecturally related fire emergency systems and devices
1.13 Development Permit and conditions therein
1.14 Interior signage, including acceptable materials, dimensions and locations
1.15 Review of all applicable shop drawings
1.16 Interior and exterior finishes
1.17 Dampproofing and/or waterproofing of walls and slabs below *grade*
1.18 Roofing and flashings
1.19 Wall cladding systems
1.20 Thermal insulation systems, including condensation control and cavity ventilation
1.21 Exterior glazing
1.22 Integration of building envelope components
1.23 Environmental separation requirements (Part 5)

STRUCTURAL

2.1 Structural capacity of structural components of the *building*, including anchorage and seismic restraint
2.2 Structural aspects of *deep foundations*
2.3 Review of all applicable shop drawings
2.4 Structural aspects of unbonded post-tensioned concrete design and construction
2.5 Verification of the satisfactory completion of an in-house check of the structural design
2.6 Verification of the satisfactory completion of an independent Concept Review, including a general overview of the design calculations

MECHANICAL

3.1 HVAC systems and devices, including high *building* requirements where applicable
3.2 *Fire dampers* at required *fire separations*
3.3 Continuity of *fire separations* at HVAC penetrations
3.4 Functional testing of mechanically related fire emergency systems and devices
3.5 Maintenance manuals for mechanical systems
3.6 Structural capacity of mechanical components, including anchorage and seismic restraint
3.7 Review of all applicable shop drawings

[1] *For Building Official's use only*

CRP's Initials

Schedule B-2 - *Continued*

BU 463 163
Building Permit No.[1]

Address of Project (Print) 4083 Cambie, Vancouver, BC

Registered Professional's Name (Print) Kai-Sing Hui, P.Eng.

PLUMBING

4.1 Roof *drainage systems*
4.2 Site and foundation *drainage systems*
4.3 *Plumbing systems* and devices
4.4 Continuity of *fire separations* at plumbing penetrations
4.5 Functional testing of plumbing related fire emergency systems and devices
4.6 Maintenance manuals for *plumbing systems*
4.7 Structural capacity of plumbing components, including anchorage and seismic restraint
4.8 Review of all applicable shop drawings

FIRE SUPPRESSION SYSTEMS

5.1 Suppression system classification for type of *occupancy*
5.2 Design coverage, including concealed or special areas
5.3 Compatibility and location of electrical supervision, ancillary alarm and control devices
5.4 Evaluation of the capacity of city (municipal) water supply versus system demands and domestic demand, including pumping devices where necessary
5.5 Qualification of welder, quality of welds and material
5.6 Review of all applicable shop drawings
5.7 Acceptance testing for "Contractor's Material and Test Certificate" as per NFPA Standards
5.8 Maintenance program and manual for suppression systems
5.9 Structural capacity of sprinkler components, including anchorage and seismic restraint
5.10 For partial systems — confirm sprinklers are installed in all areas where required
5.11 Fire Department connections and hydrant locations
5.12 Fire hose standpipes
5.13 Functional testing of fire suppression systems and devices

ELECTRICAL

6.1 Electrical systems and devices, including high building requirements where applicable
6.2 Continuity of *fire separations* at electrical penetrations
6.3 Functional testing of electrical related fire emergency systems and devices
6.4 Electrical systems and devices maintenance manuals
6.5 Structural capacity of electrical components, including anchorage and seismic restraint
6.6 Clearances from *buildings* of all electrical utility equipment
6.7 Fire protection of wiring for emergency systems
6.8 Review of all applicable shop drawings

GEOTECHNICAL — Temporary

7.1 *Excavation*
7.2 Shoring
7.3 Underpinning
7.4 Temporary construction dewatering

GEOTECHNICAL — Permanent

8.1 Bearing capacity of the soil
8.2 Geotechnical aspects of *deep foundations*
8.3 Compaction of engineered fill
8.4 Structural considerations of soil, including slope stability and seismic loading
8.5 Backfill
8.6 Permanent dewatering
8.7 Permanent underpinning

PROFESSIONAL ENGINEER K.S. HUI 24[illegible] ENGINEER

(Professional's Seal and Signature)

November 18, 2014
Date

CRP's Initials

Certified Professional Program

NOV 27 2014

This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.

MICHAEL LINTON

[1] For Building Official's use only

BU 463163

CFT Engineering Inc.

#800-1901 Rosser Avenue
Burnaby, B.C. V5C 6R6
Office: (604) 684-2384 (CFTI)
Fax: (604) 684-2402
cft@cftengineering.com

April 27, 2015

Mr. Kevin Lau
Building Code Engineer
City of Vancouver
515 West 10th Avenue
Vancouver, BC V5Z 4A8

Dear Mr. Lau:

Re: Additional Submission Documents for Excavation/Shoring Permit
4083 Cambie Street
Vancouver, BC
BU 463163

Kevin,

In correspondence further to our permit intake meeting and your email of March 3, 2015, which is attached for reference. At this time the development permit for this project has been issued and clearance from Translink is imminent. Therefore, the remainder of the outstanding fees and deposits will be paid today and it is requested that the excavation and shoring permit be issued as soon as possible.

This correspondence addresses each of the items in order of your email and includes additional our revised documentation as discussed.

1. Mezzanine Configuration – It is understood that the proposed mezzanine configuration is considered to meet the requirements of the Vancouver Building By-Law.

2. Green Roof – A generic alternative solution will be proposed for the green roof. This will be deferred until the full building permit phase.

3. Roof Hatch Details – Please find attached details for the proposed roof hatches including a plan and section. These will be further detailed as the project progresses and full building permit application is submitted.

4. Exhaust Duct for Commercial Cooking – Attached is sketch M-05 from the mechanical consultant showing the proposed routing for a future commercial cooking exhaust duct. The duct work is located between GL8 and 9 between A and E. The louvre will be installed now and the duct work will be installed if there is a restaurant T.I. This routing will be illustrated on the mechanical drawings submitted for building permit application.

5. DP Confirmation Letter – Please find attached a new DP confirmation letter from the architect. A copy has been sent directly to Mr. John Greer by email.

6. 7. Building Code Data Sheet – Please find attached an updated building code data sheet with the geotechnical fields completed and F3 occupancy classification indicated. An electronic copy will be forwarded by email.

8. Excavation and Shoring Drawings – Please find attached two new copies of the excavation and shoring drawings. There have been changed as requested by the engineering department and therefore these drawings are intended to replace those originally submitted. Included with the drawings is the drawing list forms for phased construction, updated for the new drawings.

9. Erosion and Sediment Control Drawings – The erosion and sediment control drawings stamped by the environmental branch were included with the submission package. Please advise if they cannot be located.

10. ASHRAE 90.1 Submission– The complete ASHRAE package will be submitted with or prior to the full building permit application.

11a. Alterations to Translink Station – It has been confirmed that a separate building permit application will be made for the proposed modifications to the transit station which will consist primarily of the exterior facade next to the new bike room.

11b. Firefighters Elevator – A firefighters elevator is required and will be provided. The firefighters elevator will be E2 (on the east) and will be clear on the drawings submitted for full building permit application.

11c. Vista Switchgear and Cable Pit – Please find attached correspondence from the electrical consultant discussing the vista switch and it's intended service.

11d. Fire Separation of Commercial Lobby – The commercial lobby will be separated from the adjacent suite by a two hour fire separation. This will be updated on the code compliance drawings to be submitted with the full permit applications as confirmed by the Architect.

At this stage we have received a number of departmental clearances. If you would please give us an update on those which remain outstanding we will continue to follow up.

Thank you for your assistance and please do not hesitate to contact me if you have any questions or comments.

Regards,

Michael Linton, P.Eng., CP

ML/km

C7002.01_L02

BU 463163

November 18, 2014 Reference No. VAN-00217815-A0

Yuanheng CKE Developments Ltd.
2nd Floor - 1236 West Broadway
Vancouver, BC V6H 1G6

Attention: Grant Lin

Re: Geotechnical Assessment Report
Proposed Commercial and Residential Development
4083 Cambie Street, Vancouver, BC

Dear Sir:

1.0 INTRODUCTION

As requested, **exp** Services Inc. (**exp**) has completed a geotechnical assessment for the above-referenced project. The objective of the assessment was to characterize the subsurface conditions at the site and provide general geotechnical engineering design recommendations for the proposed commercial and residential development.

The scope of service followed in this report generally conforms to **exp**'s proposal dated January 15, 2014. It should be noted that the assessment of environmental aspects of the site is beyond the scope of this report.

This report supersedes our previous geotechnical assessment report issued for this project dated April 11, 2014.

2.0 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The project site is located at the northwest corner of the intersection between West King Edward Avenue and Cambie Street. It is approximately rectangular in shape, bound by Cambie Street to the east, a TransLink Station (King Edward Station) to the south, a lane to the west, and small commercial buildings to the north. The site generally slopes downward towards north. The site is currently vacant and generally covered with gravel fill.

The King Edward Station is a one-storey structure with two levels below ground. Adjacent to the east side of the site, the *Canada Line* travels below Cambie Street in the north-south direction.

The proposed development is anticipated to consist of an 8-storey commercial/residential mid-rise building with commercial space on the main and mezzanine floors and seven floors of residential units. Previous development plans included 4 levels of underground parking, but have been revised to 3 levels. The architectural design of the proposed structure is to mass with the Station building, but will be structurally independent.

Based on available architectural drawings provided to us, the slab elevation of the lowest parkade level P3 is established at about El. 56m. The underground parking structure is expected to require an excavation of approximately 13 to 15m below existing ground surface elevations.

3.0 SITE EXPLORATION

The site exploration conducted by **exp** on March 25, 2014 consisted of five (5) test holes. Test hole BH14-01 was advanced using sonic drilling to a depth of approximately 19.8m. Test holes AH14-02 to AH14-05 were advanced using solid stem augers to depths of approximately 3m to 6m below existing site grades. Dynamic Cone Penetration Tests (DCPT) conducted at test hole AH14-02 recorded greater than 50 blows/0.3m where the test was terminated at depth of approximately 1.8m. A standpipe piezometer was installed in BH14-01, which was screened from depths of about 16.2m to 19.2m. Subsequently on June 12, 2014, test hole BH14-02 was advanced using sonic drilling to a depth of approximately 21.3m. A standpipe piezometer was installed in BH14-02, which was screened from depths of about 12.2m to 21.3m.

The subsurface conditions encountered during the field exploration were logged by field staffs from **exp**. Representative samples of the encountered soils were collected and returned to the laboratory for further visual classification, grain size analyses and moisture content determination. The approximate locations of the test holes are shown on the attached Figure 1, Testhole Location Plan. The soil descriptions, including results from the moisture content determination, are shown on the attached test hole logs.

It should be noted that the test holes indicated subsurface conditions at discrete test hole locations. The precision of the subsurface conditions indicated depends on the methods used, frequency of sampling and the uniformity of the subsurface conditions. The spacing of the test holes, frequency of sampling and the method of exploration have been selected to meet the needs of the project within constraints of the budget and schedule. The subsurface conditions may vary between the test hole locations and below the depths explored.

4.0 SUBSURFACE CONDITIONS

Based on our review of the available subsurface information, we expect that a generalized stratigraphy can be assumed as follows:

FILL

Sandy gravel fill was encountered at ground surface, generally about 0.3m thick. Fill was approximately 0.8m thick at BH14-02.

SILTY SAND TO SANDY SILT

Below the sandy gravel fill, dense to very dense silty sand to sandy silt materials were encountered, which generally extended to depths of approximately 3m to 5.2m.

GRAVELLY SAND TO SAND (grey)

Test holes AH14-03 and AH14-04 encountered dense to very dense gravelly sand to sand at about 3m below grade, which extended to depths of about 5.2m to 6.1m where the test holes were terminated. Test hole BH14-02 encountered sand and gravel to sand at depths of 3.7m to 4.6m below grade.

SILT TO SANDY SILT (grey)

Test hole BH14-01 encountered grey, hard silt at about 4.6m below grade, which extended to a depth of about 7m. Interlayered grey, dense to very dense sand to sandy silt materials were encountered at

depths of about 7m to 9.1m. Test hole BH14-02 encountered grey, hard silt at about 4.6m below grade, which extended to a depth of about 8m.

AH14-05 encountered very stiff to hard silt at about 1.5m below grade, which extended to 3m depth where the test hole was terminated.

SAND TO SILTY SAND (light brown)

Light brown, dense to very dense sand to silty sand was encountered in BH14-01at about 9.1m below grade, extending to about 14m depth. A layer of light brown, dense to very dense sand and gravel, some silt deposit was encountered between depths of 13m and 14m. At BH14-02, a layer of brown very dense sand and gravel to sand was encountered between depths of 16.5m to 18.1m.

SANDY SILT TO SILTY SAND (grey)

Generally grey, very dense to hard sandy silt to silty sand was encountered at about 14m below grade, extending to depth of approximately 19.8m to 21.3m where the test holes BH14-01 and BH14-02 were terminated. Grey, dense to very dense sand to gravelly sand was encountered between depths of 14.3m to 16.8m. Note that the records provided indicated that the original groundwater was at about 3m depth before the construction of the transit tunnel to the east of the site.

No groundwater was encountered in AH14-02 to AH14-05 at the time of drilling. Standpipe installed in test hole BH14-01 measured groundwater level at 11.5m depth about one (1) hour after drilling, at 11.5m depth on April 1, 2014 and at about 11.4m depth on June 27, 2014. At test hole BH14-02, groundwater in the standpipe was measured at about 8m depth after drilling and at about 10m depth on June 27, 2014.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General

Based on the available subsurface information, the subject site is generally suitable for the proposed development from a geotechnical engineering perspective. Specific recommendations for foundation design are presented in the following subsections.

The main issue for the design of the underground parkade, building foundations and underpinning of adjacent structures for this project is groundwater. It is understood that during construction of the adjacent King Edward Station, groundwater seepage caused difficulty in shoring construction in the underlying granular soils. Dewatering will be required to lower the groundwater to below the proposed foundation elevation, in which case the temporary excavation can consist of conventional shotcrete and anchor shoring. However, if groundwater cannot be efficiently lowered to the required elevation, then alternative solutions will need to be assessed.

Temporary excavation support will be required for the King Edward Station, adjacent lane to the west, and existing development to the north. Encroachment agreements from TransLink, City of Vancouver and the north neighbour will be required.

5.2 Building Foundations

At the proposed foundation depth of about El. 54m (13.5m depth), the foundations will be below the groundwater levels encountered at about El. 56m (11.5m depth) and El. 57m (10m depth) in BH14-01 and BH14-02, respectively. Using conventional spread and strip footings, the permanent foundation

drainage system will likely require steady draining of groundwater. Alternatively, a raft slab with "tanked" (sealed against water seepage) foundation walls to above the groundwater level can be considered to reduced groundwater drainage. The following foundation options can be considered for the proposed development:

1. Spread and strip footings with foundation subdrainage
2. Raft slab with "tanked" foundation walls

The native very dense sand is expected at the proposed footings to be located at about El. 54m (13.5m depth), which is considered a suitable subgrade for both foundation options. The foundation subgrade is assumed to be below permanent groundwater level.

The exposed subgrade should be reviewed as soon as practical after excavation to confirm the recommended bearing resistance. No loose, disturbed or sloughed materials should be allowed on the footing subgrade. Over-excavation of disturbed or loosened materials within the bearing surface may be required as directed by the Geotechnical Engineer.

A layer of blinding concrete of typically 50 mm thick should be placed on the exposed subgrade promptly following excavation (i.e., within the same working day).

5.2.1 Spread and Strip Footings

Spread and strip footings placed on the native very dense sand soil may be designed using the following:

- Spread footings with width of 1m or more may be designed using Serviceability Limit State (SLS) bearing resistance of 240 kPa. Factored ultimate bearing resistance (ULS) may be taken as 480 kPa. Minimum spread footing width should be 1m.
- Strip footings with width of more than 0.6m may be designed using SLS bearing resistance of 240 kPa. Factored ULS may be taken as 480 kPa. Minimum strip footing width should be 0.6m.

For confinement purposes, the underside of footings should be placed at least 0.45m below finished grades or top of slab elevations, whichever is deeper.

Using the recommended SLS bearing resistance, it is estimated that the long-term total settlement would be less than approximately 25mm for footings designed and built as described above. Anticipated differential settlement would be less than approximately 20mm over a horizontal distance of 10m.

Footings founded at different elevations should be positioned such that the lower footing should be located beyond/below a 2H:1V (Horizontal:Vertical) projection from the bottom of the upper footing.

Footings should be positioned below a line that is projected up at a 2H:1V slope from the toe of an adjacent excavation. Sumps and other below ground installations should likewise be setback from the footings for stability purposes. The underside elevation of a footing can be placed at the same elevation as the top of an adjacent footing if the lower footing is poured neat against near vertical undisturbed competent soils on all sides.

5.2.2 Raft Slab

The proposed buildings can be constructed on raft type foundation on the very dense sand subgrade. For preliminary raft design, a subgrade modulus k = 25,000 kN/m^3 can be used. The raft foundation may be designed using an average allowable contact pressure of 380 kPa, and maximum allowable contact pressure of 480 kPa. Under ultimate limit state (ULS), the design pressures may be increased by 50%.

Based on preliminary loads provided, the estimated maximum settlement of up to 25mm would occur at the building core (central north portion of the building), with the remaining foundation settlement of less than 25mm. It is estimated that settlement pattern resembling a "dish" shape may occur at the building core, causing differential settlements of up to 1:460 at the transition areas.

The raft slab will be located below the groundwater level. As such, tanking of the raft slab and foundation walls is recommended. Tanking details including waterproofing would be provided by others.

5.3 Slab-on-Grade

If a pumping system is to be installed, (i.e., no tanking) a drainage layer consisting of a minimum 150mm thick of well-compacted 19mm clear crushed gravel should be placed below the slab-on-grade. The drainage layer should be hydraulically connected to the perimeter drains as required. The anticipated volume of water to be disposed by the perimeter drains should be evaluated by a hydrogeologist, which may impact the drainage design.

In-place density testing should be completed on all underslab fills to confirm that all fill placed below the building has been compacted to a minimum of 95 % of the material's Modified Proctor Maximum Dry Density (MPMDD) per ASTM D 1557. The Geotechnical Engineer should review the subgrade prior to fill placement.

5.4 Structural Fill

Structural fill required for grade reinstatement below slabs and exterior grades should consist of free-draining structural granular backfill, such as, 75mm minus pit-run sand and gravel or clean sand with less than 5 % fines content (particles passing the 0.075mm sieve size). The final selection of structural fill type by the contractor should be based on weather conditions and the ability for the material to meet compaction requirements at the time of placement.

The structural fill should be placed in maximum 300mm thick lifts with each lift compacted to at least 95 % of the material's MPMDD. A representative from **exp** should observe the stripped subgrade prior to structural fill placement and perform a representative number of in-place density tests.

The native silty sand to sandy silt soils are not expected to be suitable for re-use as structural fill as the soil contains significant fines content. The re-use of on-site granular materials as structural fill can be reviewed during construction.

5.5 Building Foundation Drainage

A drainage system is recommended under the parkade/raft and around the perimeter basement walls leading to a suitable discharge location. Where the perimeter drains are located on the exterior of the building, the drains should be surrounded with minimum 150mm of 19mm clear crushed gravel, which in turn should be surrounded with minimum 150mm of birdseye gravel as filter. The remaining backfill should consist of free draining structural fill.

Where one-sided forms are used, the perimeter drain may be placed on the interior of the building and surrounded with a minimum 150mm of 19mm clear crushed gravel. In this case, in the absence of direction by the building envelope consultant, a synthetic flat drainage mat should be placed directly against the anchored shotcrete temporary excavation to collect groundwater and direct the water to the perimeter drainage system via the through-wall weep holes. The through-wall weep holes should be 75mm diameter, spaced at maximum 2.5m on-centre. Waterproofing and damp-proofing details should be provided by others.

The invert level of the foundation drainage pipe should be located at least 200mm below the underside of the slab-on-grade elevation but not below adjacent footings or 300mm below the top of the upper extent of the tanked foundation level. Footing drains should also be placed at the high side of the foundation wall when the slabs are stepped.

The roof drainage system should be separate from the perimeter footing drains. Finished surface grades adjacent to the proposed buildings should be sloped away from the buildings to direct surface water flow to suitable catch basins for storm water disposal.

5.6 Temporary Excavation, Shoring and Underpinning

The proposed 3-level of underground parkade is anticipated to require an excavation depth to about El. 54m (13.5m depth). As the outline of the proposed underground structure is generally adjacent to the property lines, it is expected that excavation shoring supports will be required. Based on the current test hole information, conventional shotcrete and anchor shoring is considered feasible. Depending upon the actual location of the utilities and quality of backfill materials as well as groundwater seepage conditions, longer/closer-spaced anchors may be needed for conventional shotcrete and anchor system. The shoring requirement would be assessed in greater detail as part of a formal excavation and shoring design with potential modifications during construction.

It is anticipated that conventional excavation equipment can be used to excavate soils as encountered in the test hole at the site. Experience has shown that some ripping of hard zones may be required. In addition, large boulders may be encountered which may require splitting and/or blasting for removal.

It is likely that removal of soil anchors that were installed during the construction of the King Edward Station will be required.

Detailed temporary excavation shoring design recommendations using shotcrete and soil anchors will be provided separately.

5.6.1 Encroachment due to Shoring

Conventional shotcrete and anchor shoring along the adjacent City of Vancouver lane, TransLink property and private property will require encroachment authorization from the relevant parties prior to the commencement of the work.

Design drawings for all adjacent neighbouring developments should be provided to us in order to evaluate the appropriate shoring design recommendations.

5.6.2 King Edward Station

The King Edward Station varies from at-grade construction to one level below ground to the south of the subject site. To the east of the subject site, the King Edward Station/Canada Line generally extends two levels below ground.

The proposed 3-level underground parkade is anticipated to require foundations up to 14m below King Edward Station's upper level footings (south side of property). Surcharge loads on the proposed foundation walls will need to be considered if the walls are within a 1H:1V influence line projected downward from the underside of the Station's footings.

5.6.3 Neighbouring Property to the North (4033 Cambie Street)

The neighbouring property to the North is currently developed with 1-storey low-rise commercial building with at grade parking area. It is anticipated that the existing building does not have underground levels. Temporary underpinning of the existing building and parking area will be required to construct the 3-level underground structure on the subject site. The surcharge load of the neighbouring building should be incorporated into the foundation wall design.

5.6.4 Dewatering During Construction

Based on available information from BH14-01 and BH14-02, groundwater level at the site is at about El. 56m (11.5m depth) to El. 57m (10m depth) below current site grades. The foundation of the proposed development is anticipated to be at approximately El. 54m (13.5m depth). As such, dewatering will be required to lower the groundwater to below the proposed foundation elevation. Sufficient dewatering of the site should be conducted, since it is understood that during construction of the adjacent King Edward Station, groundwater seepage caused difficulty in shoring construction in the underlying granular soils. Prior to excavation, a dewatering system design should be prepared by a hydrogeologist and/or specialist dewatering contractor. Well pumping tests may be considered to optimize the dewatering system design.

5.7 Lateral Earth Pressures

Lateral earth pressure diagrams for the foundation wall design are provided in the attached Figure 2. The lateral earth pressure diagrams assumed the following:

- Full permanent subdrainage to lowest parkade level is provided such that no hydrostatic pressure can develop against the foundation walls.
- One-sided forms will be used to construct the foundation walls.

Surcharge loads from adjacent properties should be incorporated into the foundation wall design as discussed in Section 5.6.

If one-sided forms are not used and backfill will be placed against the foundation wall, the lateral pressure recommendations will need to be revised.

5.8 Waterproofed Raft Slab and Foundation Walls

For "tanked"/waterproofed raft slab and foundation walls, hydrostatic pressure will need to be considered in the lateral earth pressure. The hydrostatic pressure can be taken as triangular distribution at 9.8 kN/m^3 times H, where H is the height of the "tanked" foundation wall.

Initial design could consider groundwater level (rising from east to west – see attached Sketch GX-2 revised) as existing groundwater level +0.6m (approx.) higher for estimated seasonal changes.

Recommendation above assumes that the level of the lower Transit Station underdrainage system never changes or fails. Note that in the event of their drainage system failure, the groundwater could rise to the original area groundwater level indicated to be at approximately El. 64.7m (212 ft.). For this case, it may be prudent to install a groundwater relief system to relieve groundwater pressure by flooding the lower parkade basement levels P2/P3 using, for example, "goose neck" drains and a drain gravel layer under the "tanked" floor.

5.9 Seismic Considerations

The seismic design requirements for the building structures are outlined in City of Vancouver Building By-Law 2007 (VBBL2007), which incorporates a design earthquake of 2% probability of exceedance in 50 years. Appropriate design and construction details should be incorporated into the proposed seismic upgrading, consistent with the earthquake-resistant design requirements.

The 5% damped firm ground acceleration response spectrum for the subject site has been obtained from the interactive website maintained by the Geological Survey of Canada, and is summarized in the following Table 3:

Response Spectrum for 5% Damping at Firm Ground
Interpolated for Site (2% Probability of Exceedance in 50 years)

Period (seconds)	S_a (g)
0.2	0.93
0.5	0.64
1.0	0.33
2.0	0.17
PGA	0.46

VBBL2007 Tables 4.1.8.4.A, B and C provide guidelines for classification of sites ("Site Class"), and the Foundation Factors F_a and F_v, respectively. Site Class can be determined using "average" shear wave velocity, SPT N value or undrained shear strength in the top 30m of soils. Based on the geotechnical exploration, the site is classified as "Site Class C". The corresponding short period foundation factor would be $F_a = 1.0$, and the long period foundation factor would be $F_v = 1.0$.

The subsoil underlying the subject site is not considered be susceptible to liquefaction under the design earthquake condition.

6.0 FIELD AND OFFICE REVIEWS

The final design drawings for this project should be provided to us when available in order to confirm the recommendations contained in this report are followed and provide additional comments as deemed appropriate.

Geotechnical field reviews will be required to document that the recommendations of the geotechnical report are followed. Advanced notice of at least 48 hours should be provided to allow for scheduling of

field reviews. It is considered that geotechnical field reviews will be needed to address the following issues during construction:

- Review of shoring/underpinning installation and testing;
- Review of site dewatering;
- Review of footing subgrades;
- Review of underslab fill materials and compaction;
- Review of structural fill gradation and compaction.

7.0 CLOSURE

Please note that this report was prepared based on the information provided by the client and our understanding of the proposed development as described in Section 2.0 above. If the development plans change or if during construction the soil conditions are noted to be different than those described in this report, **exp** should be notified immediately, and the recommendations on the geotechnical aspects of the proposed development should be reviewed.

Also note that this report was prepared for the exclusive use of our client, Yuanheng CKE Developments Ltd., and their designated agents, and may not be used by other parties without written consent of **exp**. The City of Vancouver may use this report for the purpose of the development permitting process. A copy of our "Interpretation & Use of Study and Report" is enclosed. These instructions form an integral part of this report and must be included with any copies of this report.

Contractors should make their own assessment of subsurface conditions and select the construction means and methods most appropriate to the site conditions. This geotechnical report should not be included in contract specifications without suitable qualifications and prior review by **exp** Services Inc. However, the geotechnical report may be used as an attachment to contract specifications, for information purposes only.

We trust that this report meets your present requirements. Please call if you have any questions, or require further assistance.

Sincerely,

exp Services Inc.

PROFESSIONAL ENGINEER
PROVINCE OF
K.S. HUI
24936

Ulysses Yeh, M.Eng., P.Eng.
Geotechnical Engineer

Kai-Sing Hui, P.Eng.
Manager, Geotechnical Discipline

Enclosures: Interpretation & Use of Study and Report
Figure 1 – Testhole Location Plan
Figure 2 – Lateral Earth Pressure Diagrams
Sketch GX-2 Revised – E-W Subsoil Profile
Appendix A – Test Hole Logs

INTERPRETATION & USE OF STUDY AND REPORT

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering consulting practices in this area. No other warranty, expressed or implied, is made. Engineering studies and reports do not include environmental consulting unless specifically stated in the engineering report.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF THE REPORT

The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document are only valid to the extent that there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT. WE WILL CONSENT TO ANY REASONABLE REQUEST BY THE CLIENT TO APPROVE THE USE OF THIS REPORT BY OTHER PARTIES AS "APPROVED USERS". The contents of the Report remain our copyright property and we authorise only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of the Report by those parties. The Client and Approved Users may not give, lend, sell or otherwise make the Report, or any portion thereof, available to any party without our written permission. Any use which a third party makes of the Report, or any portion of the Report, are the sole responsibility of such third parties. We accept no responsibility for damages suffered by any third party resulting from unauthorised use of the Report.

5. INTERPRETATION OF THE REPORT

a. Nature and Exactness of Descriptions: Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations, or building envelope descriptions, utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarising such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of, and accept, this risk. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b. Reliance on Provided information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.

c. To avoid misunderstandings, **exp** Services Inc. (**exp**) should be retained to work with the other design professionals to explain relevant engineering findings and to review their plans, drawings, and specifications relative to engineering issues pertaining to consulting services provided by **exp**. Further, **exp** should be retained to provide field reviews during the construction, consistent with building codes guidelines and generally accepted practices. Where applicable, the field services recommended for the project are the minimum necessary to ascertain that the Contractor's work is being carried out in general conformity with **exp**'s recommendations. Any reduction from the level of services normally recommended will result in **exp** providing qualified opinions regarding adequacy of the work.

6.0 ALTERNATE REPORT FORMAT

When **exp** submits both electronic file and hard copies of reports, drawings and other documents and deliverables (**exp**'s instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by **exp** shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by **exp** shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of **exp**'s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except **exp**. The Client warrants that **exp**'s instruments of professional service will be used only and exactly as submitted by **exp**.

The Client recognizes and agrees that electronic files submitted by **exp** have been prepared and submitted using specific software and hardware systems. **Exp** makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

INTERPRETATION & USE OF STUDY AND REPORT

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering consulting practices in this area. No other warranty, expressed or implied, is made. Engineering studies and reports do not include environmental consulting unless specifically stated in the engineering report.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF THE REPORT

The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document are only valid to the extent that there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT. WE WILL CONSENT TO ANY REASONABLE REQUEST BY THE CLIENT TO APPROVE THE USE OF THIS REPORT BY OTHER PARTIES AS "APPROVED USERS". The contents of the Report remain our copyright property and we authorise only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of the Report by those parties. The Client and Approved Users may not give, lend, sell or otherwise make the Report, or any portion thereof, available to any party without our written permission. Any use which a third party makes of the Report, or any portion of the Report, are the sole responsibility of such third parties. We accept no responsibility for damages suffered by any third party resulting from unauthorised use of the Report.

5. INTERPRETATION OF THE REPORT

a. Nature and Exactness of Descriptions: Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations, or building envelope descriptions, utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarising such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of, and accept, this risk. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b. Reliance on Provided information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.

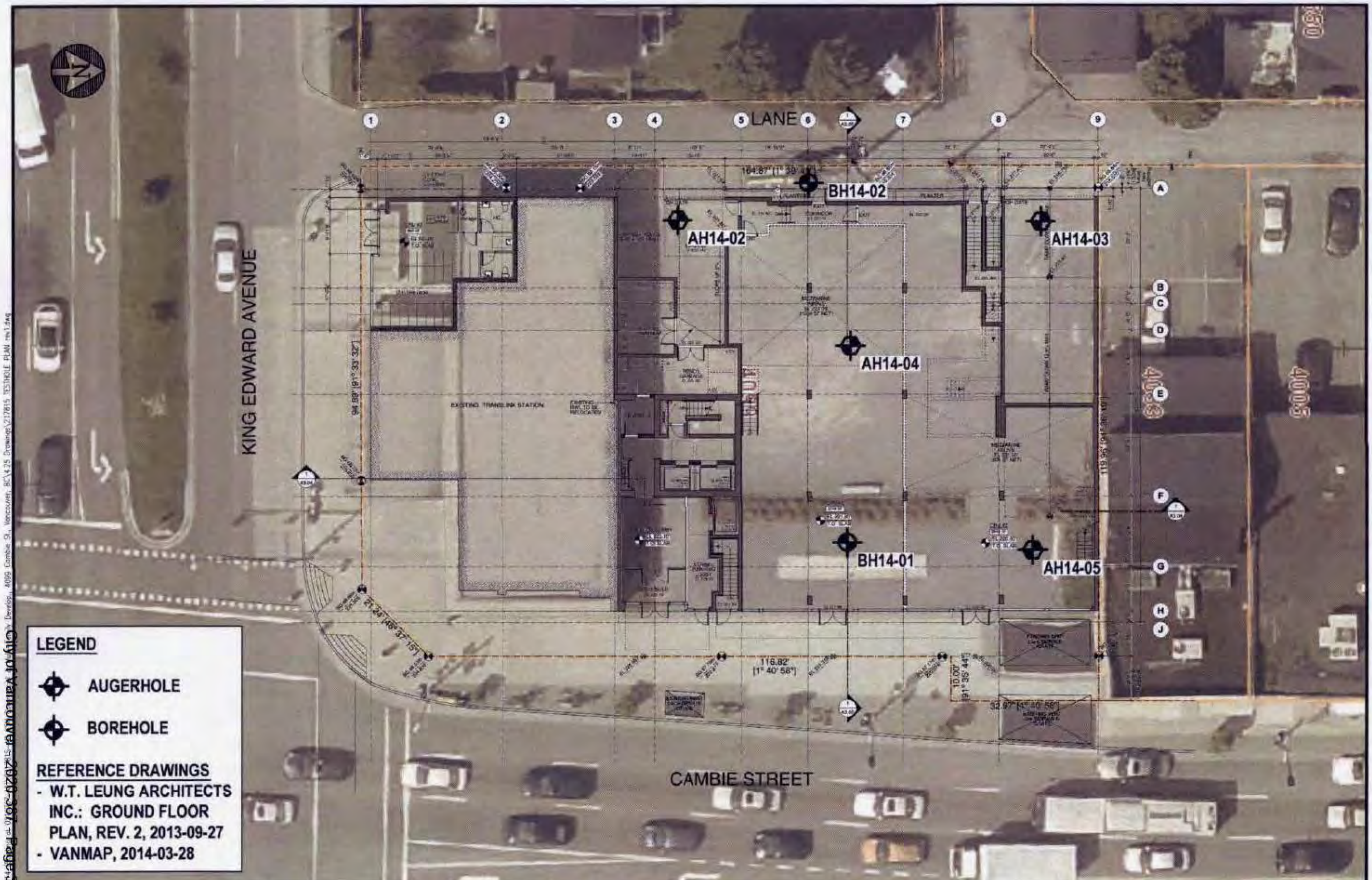
c. To avoid misunderstandings, **exp** Services Inc. (**exp**) should be retained to work with the other design professionals to explain relevant engineering findings and to review their plans, drawings, and specifications relative to engineering issues pertaining to consulting services provided by **exp**. Further, **exp** should be retained to provide field reviews during the construction, consistent with building codes guidelines and generally accepted practices. Where applicable, the field services recommended for the project are the minimum necessary to ascertain that the Contractor's work is being carried out in general conformity with **exp**'s recommendations. Any reduction from the level of services normally recommended will result in **exp** providing qualified opinions regarding adequacy of the work.

6.0 ALTERNATE REPORT FORMAT

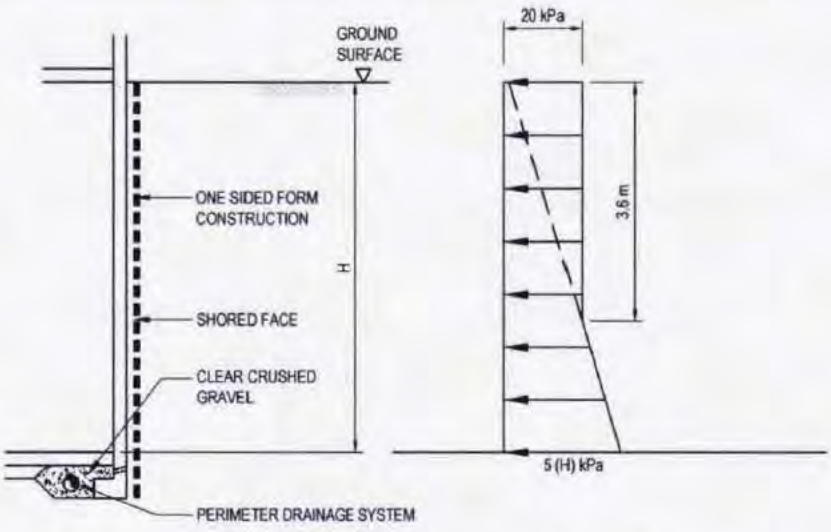
When **exp** submits both electronic file and hard copies of reports, drawings and other documents and deliverables (**exp**'s instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by **exp** shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by **exp** shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of **exp**'s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except **exp**. The Client warrants that **exp**'s instruments of professional service will be used only and exactly as submitted by **exp**.

The Client recognizes and agrees that electronic files submitted by **exp** have been prepared and submitted using specific software and hardware systems. **Exp** makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.



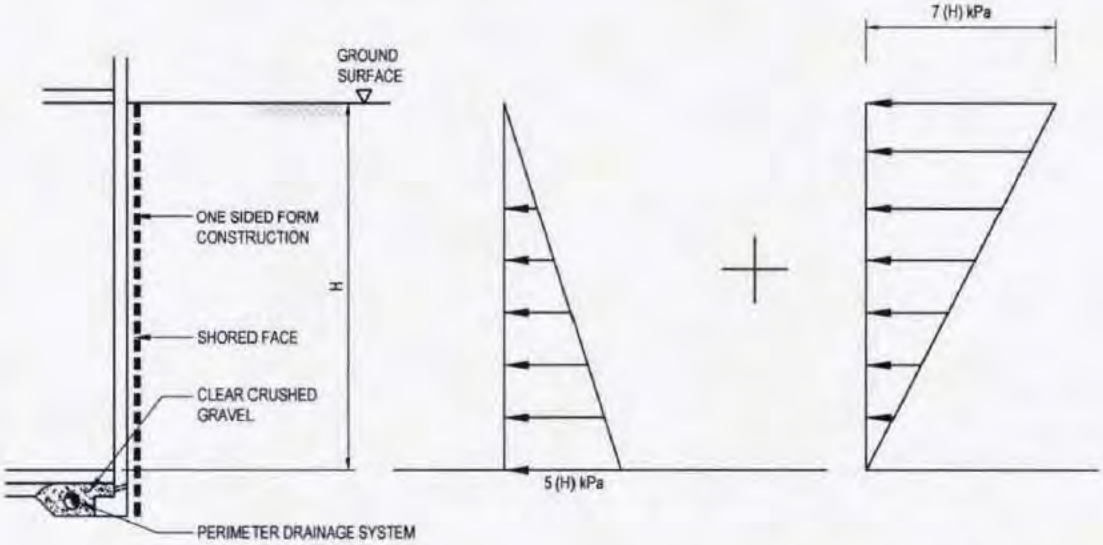
exp Services Inc. 275-3001 Wayburne Drive Burnaby, British Columbia V5G 4W3 Telephone: 604-874-1245 Fax: 604-874-2358 exp.com	CLIENT YUANHENG CKE DEVELOPMENTS LTD. PROJECT Commercial & Multi-Family Residential Development 4099 Cambie Street, Vancouver, B.C.				TITLE: TESTHOLE LOCATION PLAN		
	PROJECT NO. VAN-00217815-A0	DFTR MG	DSGN UY	CHK. KSH	DATE 2014-03-28	SCALE 1"=30'	DWG NO. FIGURE 1



TYPICAL FOUNDATION WALL

STATIC LOAD
-CANNOT BE LESS THAN 20 kPa

CASE 1: STATIC



TYPICAL FOUNDATION WALL

"STATIC" COMPONENT

"SEISMIC" COMPONENT

CASE 2: STATIC + SEISMIC

NOTES:

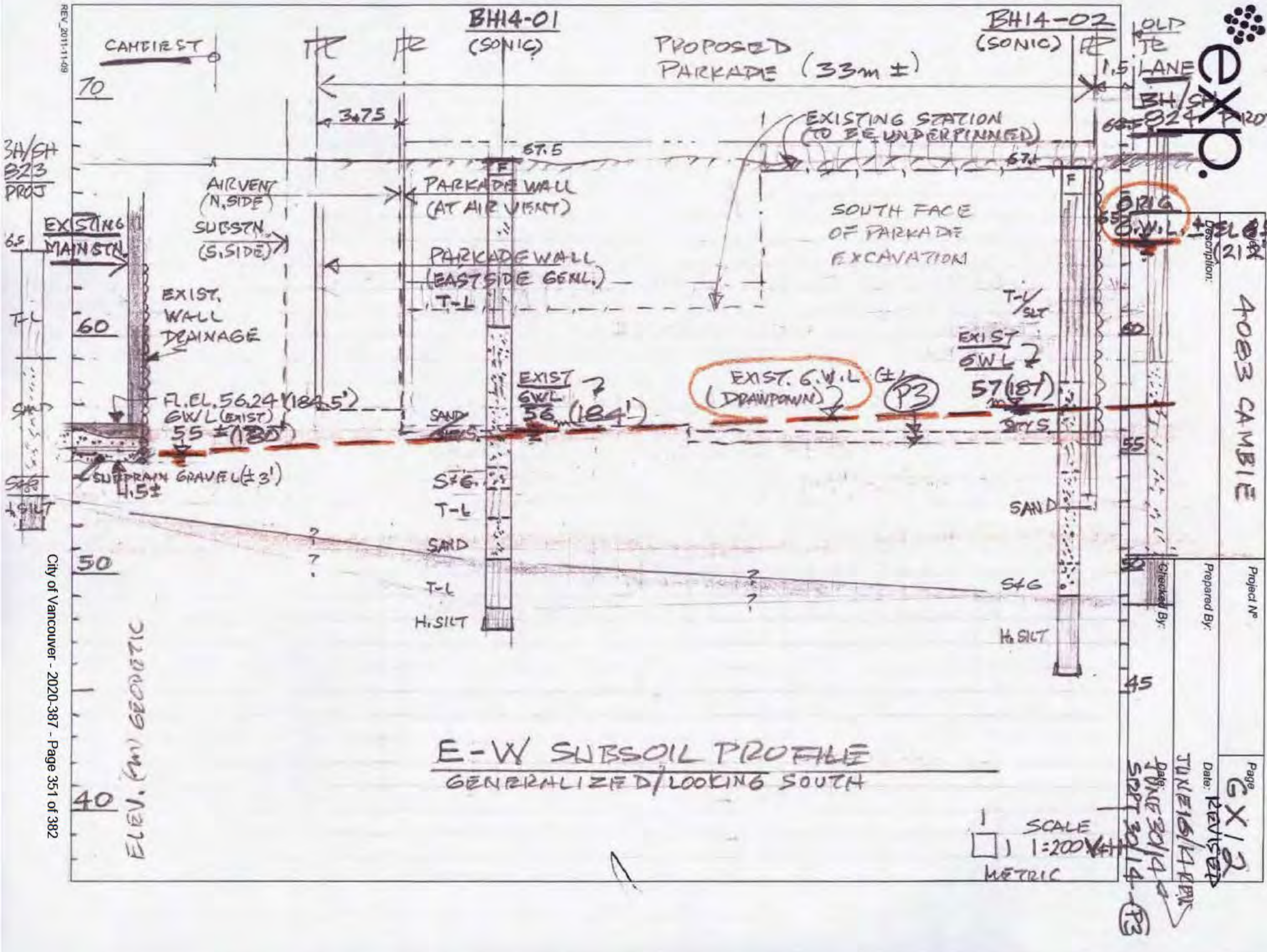
- ALL METRIC UNITS IN (m) AND (kPa)
- ABOVE SKETCHES ARE NOT TO SCALE
- ASSUMED DRAINAGE PROVIDED, SUCH THAT HYDROSTATIC PRESSURE DOES NOT DEVELOP AGAINST FOUNDATION WALL
- ALL LOADS ARE UNFACTORED
- SURCHARGE PRESSURE DUE TO LIVE LOAD, ADJOINING STRUCTURES, ETC. TO BE INCLUDED WHERE APPLICABLE

ASSUMPTIONS:

- TOP OF WALL FREE TO ROTATE 0.2% OF WALL HEIGHT
- NO HYDROSTATIC PRESSURE BUILD-UP BEHIND WALL
- PEAK HORIZONTAL GROUND ACCELERATION (1 IN 2475 YEARS) = 0.46g

exp.

CLIENT: YUANHENG CKE DEVELOPMENTS LTD.				TITLE: LATERAL EARTH PRESSURE DIAGRAMS		
PROJECT: Commercial & Multi-Family Residential Development 4083 Cambie Street, Vancouver, B.C.						
PROJECT NO: VAN-00217815-A0	DFTR: MG	DSGN: UY	CHK: KSH	DATE: 2014.04.09	SCALE: NTS	DWG NO: FIGURE 2



Appendix A

Test Hole Logs

exp Services Inc.
275-3001 Wayburne Drive,
Burnaby, BC V5G 4W3
Telephone: +1.604.874.1245

RECORD OF AUGERHOLE : AH14-02

CLIENT Yuanheng CKE Developments Ltd.
PROJECT NUMBER VAN-00217815-A0
DRILLING DATE 2014-03-25
DRILLING CONTRACTOR Downrite Drilling Ltd.
DRILLING METHOD Solid Stem Auger
LOGGED BY SF **CHECKED BY** UY

PROJECT NAME Commercial & Multi-Family Development
PROJECT LOCATION 4083 Cambie Street
AUGERHOLE LOCATION ZONE: N: E:
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** —
▼ **AFTER DRILLING** —

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL 20 40 60 80
		SANDY GRAVEL, trace to some silt, grey, damp, (compact) (FILL)		S1	AU			16
		SANDY SILT, brown to grey, damp, (dense)	0.3					
1		SILTY SAND to SAND, some silt, trace gravel, light brown, damp, (dense to very dense)	0.6	S2	AU			11
				S3	AU			10
2		SANDY SILT, trace gravel, grey, damp, (very dense)	1.8					
3				S5	AU			9
		SILTY SAND, trace gravel, grey, damp, (very dense)	3.0					
4				S4	AU			6
				S6	AU			12
5				S7	AU			8

Refusal at 5.2m.

exp Services Inc.
275-3001 Wayburne Drive,
Burnaby, BC V5G 4W3
Telephone: +1.604.874.1245

RECORD OF AUGERHOLE : AH14-03

CLIENT Yuanheng CKE Developments Ltd.
PROJECT NUMBER VAN-00217815-A0
DRILLING DATE 2014-03-25
DRILLING CONTRACTOR Downrite Drilling Ltd.
DRILLING METHOD Solid Stem Auger
LOGGED BY SF **CHECKED BY** UY

PROJECT NAME Commercial & Multi-Family Development
PROJECT LOCATION 4083 Cambie Street
AUGERHOLE LOCATION ZONE: N: E:
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** —
▼ **AFTER DRILLING** —

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL
		SANDY GRAVEL, trace to some silt, grey, damp, (compact to dense) (FILL)		S1	AU			19
		SANDY SILT to SILTY SAND, trace gravel, brown to grey, damp, (compact to dense)	0.3	S2	AU			14
1		SAND, trace silt, brown, damp, (compact)	0.9	S3	AU			14
		SANDY SILT to SILT, some sand, some gravel, grey, damp, (dense to very dense) gravel is angular to sub-angular	1.2	S4	AU			19
2				S5	AU			9
3				S6	AU			9
		SAND, some gravel , some silt, grey, damp, (dense to very dense)	3.0	S7	AU			7
4		-some gravel to gravelly from 3m to 4.5m						
5								
6								

Bottom of hole at 6.1m.

EXP GEO W/O P.P 0217815-A0.GPJ EXP STD.GDT 14-11-03

exp Services Inc.
275-3001 Wayburne Drive,
Burnaby, BC V5G 4W3
Telephone: +1.604.874.1245

RECORD OF AUGERHOLE : AH14-04

CLIENT Yuanheng CKE Developments Ltd.
PROJECT NUMBER VAN-00217815-A0
DRILLING DATE 2014-03-25
DRILLING CONTRACTOR Downrite Drilling Ltd.
DRILLING METHOD Solid Stem Auger
LOGGED BY SF **CHECKED BY** UY

PROJECT NAME Commercial & Multi-Family Development
PROJECT LOCATION 4083 Cambie Street
AUGERHOLE LOCATION ZONE: N: E:
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** —
▼ **AFTER DRILLING** —

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL 20 40 60 80
		SANDY GRAVEL, trace to some silt, grey, damp, (compact to dense) (FILL)						
1		GRAVELLY SANDY SILT to GRAVELLY SILTY SAND, brown, damp, (compact)	0.3	S1				9
		SAND, some silt, some gravel, brown, damp, (compact to dense)	1.5					
2		SILTY SAND, some gravel, grey, damp, (dense to very dense)	1.8	S2				6
				S3				9
3								
		GRAVELLY SAND to SAND, some gravel, some silt, grey, damp, (dense to very dense)	3.0	S4				6
4								
				S5				9
5								
				S6				10

Refusal at 5.5m.

exp Services Inc.
275-3001 Wayburne Drive,
Burnaby, BC V5G 4W3
Telephone: +1.604.874.1245

RECORD OF AUGERHOLE : AH14-05

CLIENT Yuanheng CKE Developments Ltd.
PROJECT NAME Commercial & Multi-Family Development
PROJECT NUMBER VAN-00217815-A0
PROJECT LOCATION 4083 Cambie Street
DRILLING DATE 2014-03-25
AUGERHOLE LOCATION ZONE: N: E:
DRILLING CONTRACTOR Downrite Drilling Ltd.
ELEVATION
DRILLING METHOD Solid Stem Auger
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** --
▼ **AFTER DRILLING** --
LOGGED BY SF **CHECKED BY** UY

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m ↘ (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		SANDY GRAVEL, trace to some silt, grey, damp, (compact to dense) (FILL)						
		SILTY SAND to SANDY SILT, trace gravel, brown to grey, damp, (compact)	0.3	S1	AU			18
1				S2	AU			14
		SILT, some sand, trace gravel, grey, damp, (very stiff to hard)	1.5					
2								
3				S3	AU			18

Bottom of hole at 3.0m.

exp Services Inc.
275-3001 Wayburne Drive,
Burnaby, BC V5G 4W3
Telephone: +1.604.874.1245

RECORD OF BOREHOLE : BH14-01

CLIENT Yuanheng CKE Developments Ltd.
PROJECT NUMBER VAN-00217815-A0
DRILLING DATE 2014-03-25
DRILLING CONTRACTOR Downrite Drilling Ltd.
DRILLING METHOD Sonic
LOGGED BY PDL **CHECKED BY** UY

PROJECT NAME Commercial & Multi-Family Development
PROJECT LOCATION 4083 Cambie Street
BOREHOLE LOCATION ZONE:10 N: 5455194 E: 491578
ELEVATION 67.50 m (Approximate)
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** —
▼ **AFTER DRILLING** 11.5m 2014-06-12

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT N VALUE BLOWS/0.3m / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) / PLASTIC & LIQUID LIMIT MOISTURE CONTENT	WELL DIAGRAM
		SANDY GRAVEL, trace to some silt, grey, damp, (compact) (FILL)	67.2						Casing Top Elev: (m)
		SILTY SAND to SANDY SILT, brown to grey, damp, (compact to dense)	0.3						Casing Type: 50mm PVC
1			66.3	S1	SC			14	
				S2	SC			6	
		SILTY SAND, some gravel, light brown, damp, (very dense) sand is fine grained (TILL-LIKE?)	1.2						
2				SP1	SPT	67	▲ 57		
			64.9	S3	SC			11	
		SILTY SAND to SANDY SILT, some gravel, grey, damp, (very dense) sand is fine grained (TILL-LIKE)	2.6	S4	SC			7	
3				S5	SC			8	- Bentonite Seal
				SP2	SPT	0	53 blows in 75mm		
				S6	SC			8	
4			62.9	S7	SC			5	
		SILT, some sand, trace gravel, grey, damp, (hard) sand is fine grained, gravel is fine to medium grained and sub-rounded (TILL-LIKE)	4.6	SP3	SPT	31	53 blows in 115mm		
5				S8	SC			9	
				S9	SC			16	
6				SP4	SPT	100	22/51 blows in 100mm		
				S10	SC			19	
7			60.5						
		SAND, some gravel, trace to some silt, light brown, moist, (very dense)	7.0	S11	SC			5	
			59.9						
		SANDY SILT, trace to some gravel, grey, damp, (hard) sand is ne to medium grained, (TILL-LIKE)	7.6	SP5	SPT	100	47/51 blows in 125mm	11	
8				S12	SC				
			59.3						
		SAND, trace to some silt, light brown, damp, (dense to very dense) medium to coarse grained	8.2	S13	SC			10	- 50mm PVC pipe
			58.8						
		SILT, some sand to sandy, trace to some gravel, light brown, damp, (hard) sand is fine grained (TILL-LIKE)	8.7	S14	SC			6	
9			58.4						
			9.1						

(Continued Next Page)

exp Services Inc.
275-3001 Wayburne Drive,
Burnaby, BC V5G 4W3
Telephone: +1.604.874.1245

RECORD OF BOREHOLE : BH14-01

CLIENT Yuanheng CKE Developments Ltd.
PROJECT NUMBER VAN-00217815-A0
DRILLING DATE 2014-03-25
DRILLING CONTRACTOR Downrite Drilling Ltd.
DRILLING METHOD Sonic
LOGGED BY PDL **CHECKED BY** UY

PROJECT NAME Commercial & Multi-Family Development.
PROJECT LOCATION 4083 Cambie Street
BOREHOLE LOCATION ZONE:10 N: 5455194 E: 491578
ELEVATION 67.50 m (Approximate)
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** —
▼ **AFTER DRILLING** 11.5m 2014-06-12

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	TYPE	RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL	WELL DIAGRAM Casing Top Elev: (m) Casing Type: 50mm PVC
10		SAND, some silt, trace gravel, light brown, moist, (very dense) sand is medium to coarse grained *(continued)*		SP6	SPT	100	21/45/50 blows in 75mm	9	
				S15	SC				
			57.1					3	
		SILTY SAND, trace to some gravel, light brown, damp, (dense to very dense) sand is well-graded	10.4	S16	SC			12	
11				S17	SC				
			56.2					6 11	
		SAND, some gravel, trace silt, light brown, moist, (dense to very dense) medium to coarse grained	11.3	S18	SC				▼
12			55.5					15	
		SILTY SAND, some gravel to gravelly, light brown, moist, (very dense) sand is fine to coarse grained	12.0	S19	SC				
				SP7	SPT	100	19/42/50 blows in 125mm	10	
				S20	SC				
13			54.5						
		SAND & GRAVEL, some silt, light brown, damp, (dense to very dense) gravel is fine to medium grained -loss of circulation from 13m to 14m	13.0	S21	SC			5 11	
14			53.5	S22	SC			13	
		SILT, some sand to sandy, trace gravel, grey, damp, (hard) sand is fine grained (TILL-LIKE)	14.0	S23	SC			19	
15				S24	SC			13	
			52.3						
		SAND, some silt, trace gravel, grey, damp, (dense to very dense) sand is medium to coarse grained	15.2	SP8	SPT	100	45/51 blows in 140mm	12	
16				S25	AU				
			50.7					11	
17		SILTY SAND to SANDY SILT, trace gravel, grey, damp, (very dense) sand is fine grained (TILL-LIKE)	16.8	S26	SC			12	Sand filter pack
			50.1	S27	GB				
		SANDY SILTY GRAVEL, grey, damp, (very dense) sand is medium to coarse	17.4	S28	BLK			7	Slotted screen section
18			49.5					5	
		SANDY SILT, some gravel, grey, damp, (hard) sand is fine grained, gravel is fine to medium grained, (TILL-LIKE)	18.0	S29	SC				
				S30	OC			8	

(Continued Next Page)

exp Services Inc.
275-3001 Wayburne Drive,
Burnaby, BC V5G 4W3
Telephone: +1.604.874.1245

RECORD OF BOREHOLE : BH14-01

CLIENT Yuanheng CKE Developments Ltd.
PROJECT NUMBER VAN-00217815-A0
DRILLING DATE 2014-03-25
DRILLING CONTRACTOR Downrite Drilling Ltd.
DRILLING METHOD Sonic
LOGGED BY PDL **CHECKED BY** UY

PROJECT NAME Commercial & Multi-Family Development
PROJECT LOCATION 4083 Cambie Street
BOREHOLE LOCATION ZONE:10 N: 5455194 E: 491578
ELEVATION 67.50 m (Approximate)
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** —
▼ **AFTER DRILLING** 11.5m 2014-06-12

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL	WELL DIAGRAM
19			48.5				20 40 60 80	20 40 60 80	Casing Top Elev: (m) Casing Type: 50mm PVC
		SILT, trace to some sand, trace gravel, grey, damp, (hard) (TILL-LIKE)	19.1	S31	SC			19	
				S32	SC			21	
			47.7						

Refusal at 19.8m.

exp Services Inc.
275-3001 Wayburne Drive,
Burnaby, BC V5G 4W3
Telephone: +1.604.874.1245

RECORD OF BOREHOLE : BH14-02

CLIENT Yuanheng CKE Developments Ltd.
PROJECT NUMBER VAN-00217815-A0
DRILLING DATE 2014-06-12
DRILLING CONTRACTOR Downrite Drilling Ltd.
DRILLING METHOD Sonic
LOGGED BY SCD **CHECKED BY** GM

PROJECT NAME Commercial & Multi-Family Development
PROJECT LOCATION 4083 Cambie Street
BOREHOLE LOCATION ZONE:10 N: 5455189 E: 491556
ELEVATION 67.10 m (Approximate)
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** 8.1m
▼ **AFTER DRILLING** —

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	FINES CONTENT (%) □ 20 40 60 80 / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL 20 40 60 80	WELL DIAGRAM
		GRAVEL, some sand, trace silt, bluish grey, damp, (compact), gravel is angular, (FILL)	66.9	S01	SC				Casing Top Elev: 67.8 (m) Casing Type: 50mm PVC
		GRAVELLY SAND AND SILT, brown, moist, (compact), gravel is angular, (FILL)	0.2						
			66.3	S02	SC			8	
1		CLAYEY SILT, mottled rusty and grey, damp, (hard)	0.8	S03	SC			14	
			66.1						
		SILT, some gravel, occasional cobbles, grey, damp, (hard), gravel and cobbles are rounded to sub-angular	1.0	S04	SC			8	
2			65.1						
		SAND, trace silt, brown, damp, (very dense), sand is medium to fine grained	2.0 64.8	S05	SC				
		SILT, trace gravel, occasional cobbles, grey, damp, (hard), gravel and cobbles are sub-rounded to angular	2.3						
3				S06	SC			10	
			63.4						
		SAND AND GRAVEL, grey, damp, (very dense), sand is coarse grained, gravel is sub-angular to sub-rounded	3.7						
4				S07	SC				
			62.8						
		SAND, trace gravel, grey, damp, (very dense), sand is medium grained, gravel is sub-angular to sub-rounded	4.3 62.5	S08	SC				
		SILT, trace sand, trace gravel, frequent cobbles, grey, damp, (hard), gravel and cobbles are sub-rounded to angular	4.6						
5									
				S09	SC			8	
6									← Bentonite Seal
7									
				S10	SC			7	
8	▽		59.0						
		GRAVELLY SAND, grey, damp, (very dense), gravel is sub-angular to sub-rounded	8.1						
				S11	SC				
9			58.0						
			9.1	S12	SC			10	

(Continued Next Page)

exp Services Inc.
275-3001 Wayburne Drive,
Burnaby, BC V5G 4W3
Telephone: +1.604.874.1245

RECORD OF BOREHOLE : BH14-02

CLIENT Yuanheng CKE Developments Ltd.
PROJECT NUMBER VAN-00217815-A0
DRILLING DATE 2014-06-12
DRILLING CONTRACTOR Downrite Drilling Ltd.
DRILLING METHOD Sonic
LOGGED BY SCD **CHECKED BY** GM

PROJECT NAME Commercial & Multi-Family Development
PROJECT LOCATION 4083 Cambie Street
BOREHOLE LOCATION ZONE:10 N: 5455189 E: 491556
ELEVATION 67.10 m (Approximate)
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** 8.1m
▽ **AFTER DRILLING** —

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)	WELL DIAGRAM
10		SILTY SAND AND GRAVEL, grey, damp, (very dense), sand is coarse grained, gravel is sub-rounded to sub-angular *(continued)*	57.5 / 9.6						Casing Top Elev: 67.8 (m) Casing Type: 50mm PVC
		SAND, trace gravel, trace silt, grey, moist, (very dense), sand is medium to fine grained, gravel is fine grained and sub-angular to sub-rounded	56.3	S13	SC				
11		SAND, some gravel, trace silt, grey, moist, (very dense), sand is coarse grained and angular, gravel is fine to medium grained and sub-rounded to sub-angular	10.8 / 55.5	S14	SC				
12		SILTY SAND, trace gravel, occasional cobbles, grey, damp, (very dense), sand is medium to fine grained, gravel is fine grained and angular	11.6 / 54.9	S15	SC			11	
		SILT, some sand, trace gravel, grey, damp, (hard), gravel is sub-rounded to sub-angular	12.2 / 54.3	S16	SC			18	
13		SAND, some gravel, trace silt, grey, damp, (very dense), sand is medium to fine grained, gravel is angular to sub-rounded	12.8	S17	SC				
14			52.8						
		GRAVELLY SAND, grey, damp, (dense), sand is coarse grained and angular, gravel is sub-rounded to angular	14.3						
15				S18	SC				
16			50.6						
		SAND AND GRAVEL, trace to some silt, reddish brown, moist, (very dense), gravel is sub-rounded to sub-angular	16.5 / 50.0	S19	SC			8	→ Sand filter pack → Slotted screen section
17		GRAVELLY SAND, trace silt, occasional cobbles, reddish brown, moist, (very dense), sand is coarse to medium grained, gravel is sub-rounded to angular	17.1 / 49.4	S20	SC			8	
		SAND, trace silt, brown, moist, (very dense), sand is medium to fine grained	17.7 / 49.0	S21	SC				
18		SILT, trace sand, trace gravel, grey, damp, (hard), gravel is sub-rounded to sub-angular	18.1						

(Continued Next Page)

exp Services Inc.
275-3001 Wayburne Drive,
Burnaby, BC V5G 4W3
Telephone: +1.604.874.1245

RECORD OF BOREHOLE : BH14-02

CLIENT Yuanheng CKE Developments Ltd.
PROJECT NUMBER VAN-00217815-A0
DRILLING DATE 2014-06-12
DRILLING CONTRACTOR Downrite Drilling Ltd.
DRILLING METHOD Sonic
LOGGED BY SCD **CHECKED BY** GM

PROJECT NAME Commercial & Multi-Family Development
PROJECT LOCATION 4083 Cambie Street
BOREHOLE LOCATION ZONE:10 N: 5455189 E: 491556
ELEVATION 67.10 m (Approximate)
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** 8.1m
▼ **AFTER DRILLING** —

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)	WELL DIAGRAM
19		SILT, trace sand, trace gravel, grey, damp, (hard), gravel is sub-rounded to sub-angular *(continued)*		S22	SC			18	Casing Top Elev: 67.8 (m) Casing Type: 50mm PVC
			47.4						
		SILT, grey, moist, (hard)	19.7						
20									
				S23	SC			22	
21									
			45.8						

Bottom of hole at 21.3m.

CITY OF VANCOUVER

FILE

PLANNING AND DEVELOPMENT SERVICES - Building Review Branch

Certified Professional Program - Authorized Staged Construction Form

Name of CP: Michael Linton
Address: 4050 Ash Street
Stage No: 1
Building Permit #: BU 464 685
PC-BB Engineer: Barrie Smith

This Building Permit has been issued for staged construction under the Certified Professional Program. Construction is authorized to proceed only to the extend of the work as described below and shown on the drawings processed by the City. All work shall be carried out in accordance with the drawings submitted and accepted for building permit as itemized on the attached list.

BU 464685

Extent of work: STAGE 1:

Excavation and Shoring

RECEIVED
CITY OF VANCOUVER
MAY 12 2015
COMMUNITY SERVICES
PLANNING & DEVELOPMENT SERVICES

Authorized by: B Smith (PC-BB Engineer)
Date: 2015/06/25 (YYYY-MM-DD)

Commitment by Certified Professional:

"I acknowledge that this permit is issued for staged construction under the Certified Professional Program. I undertake to assure that construction on the project site will not proceed beyond the scope of work as described on this form and as illustrated on the drawings itemized on the attached "Authorized Staged Construction Drawing List". I undertake that the drawings released by the City for this stage of construction will be maintained on site for reference and review by City Inspectors. I undertake to inform the City promptly if work proceeds on site beyond the scope of work authorized in this document."

Signed: [signature]
Date: May 11/15

Cc: CP
CRP
DBI
DOMINO

CP Stamp:

Certified Professional Program
MAY 06 2015
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL LINTON

BUILDING BY-LAW 2014 – CITY OF VANCOUVER

SCHEDULE B

Forming Part of Subsection 2.2.7. Div. C of the Building By-law

BU 464 685
Building Permit No.

ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW

Notes: (i) This letter must be submitted prior to the commencement of *construction* activities of the components identified below. A separate letter must be submitted by each *registered professional of record*.
(ii) This letter is endorsed by: Architectural Institute of B.C., Association of Professional Engineers and Geoscientists of B.C.
(iii) In this letter the words in italics have the same meaning as in the Building By-law.

Certified Professional Program
MAY 11 2015
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL LINTON

To: *The Chief Building Official*

Re: King Edward Green - Townhouses
Name of Project (Print)
4050 Ash Street, Vancouver, BC
Address of Project (Print)
Lot A, Block 660, District Lot 526, Group 1, New Westminster District, Plan 2976
Legal Description of Project (Print)

The undersigned hereby gives assurance that the design of the
(Initial those of the items listed below that apply to this *registered professional of record*. All the disciplines will not necessarily be employed on every project.)

	ARCHITECTURAL
	STRUCTURAL
	MECHANICAL
	PLUMBING
	FIRE SUPPRESSION SYSTEMS
	ELECTRICAL
	GEOTECHNICAL — temporary
	GEOTECHNICAL — permanent

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
K.S. HUI
24938

(Professional's Seal and Signature)

April 2, 2015
Date

components of the plans and supporting documents prepared by this *registered professional* in support of the application for the *building permit* as outlined below substantially comply with the Building By-law and other applicable enactments respecting safety except for *construction* safety aspects.

The undersigned hereby undertakes to be responsible for *field reviews* of the above referenced components during *construction* as indicated on the "SUMMARY OF DESIGN AND FIELD REVIEW REQUIREMENTS" below.

RECEIVED
CITY OF VANCOUVER
MAY 12 2015
COMMUNITY SERVICES
PLANNING & DEVELOPMENT SERVICES

CRP's Initials

Schedule B - *Continued*

BU 464685
Building Permit No.

4050 Ash Street, Vancouver, BC
Project Address

Geotechnical
Discipline

The undersigned also undertakes to notify the *Chief Building Official* in writing as soon as possible if the undersigned's contract for *field review* is terminated at any time during *construction*.

I certify that I am a *registered professional* as defined in the Building By-law.

Kai-Sing Hui, P.Eng.
Registered Professional's Name (Print)

275 - 3001 Wayburne Drive, Burnaby, BC V5G 4W3
Address (Print)

604.874.1245
Phone No.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K.S. HUI 24938

(Professional's Seal and Signature)

April 2, 2015
Date

(If the *Registered Professional of Record* is a member of a firm, complete the following.)

I am a member of the firm exp Services Inc.
and I sign this letter on behalf of the firm (Print name of firm)

Note: The above letter must be signed by a *registered professional of record*, who is a *registered professional*. The Building By-law defines a *registered professional* to mean

(a) a person who is registered or licensed to practise as an architect under the Architects Act, or
(b) a person who is registered or licensed to practise as a professional engineer under the Engineers and Geoscientists Act.

Certified Professional Program
MAY 1 1 2015
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL LINTON

CRP's Initials

Schedule B - *Continued*

BU 464 685
Building Permit No.

4050 Ash Street, Vancouver, BC
Project Address

Geotechnical
Discipline

SUMMARY OF DESIGN AND FIELD REVIEW REQUIREMENTS

(Initial applicable discipline below and cross out and initial only those items not applicable to the project.)

ARCHITECTURAL

1.1 Fire resisting assemblies
1.2 *Fire separations* and their continuity
1.3 *Closures*, including tightness and operation
1.4 Egress systems, including *access to exit* within *suites* and *floor areas*
1.5 Performance and physical safety features (guardrails, handrails, etc.)
1.6 Structural capacity of architectural components, including anchorage and seismic restraint
1.7 Sound control
1.8 Landscaping, screening and site grading
1.9 Provisions for firefighting access
1.10 *Access* requirements for *persons with disabilities*
1.11 Elevating devices
1.12 Functional testing of architecturally related fire emergency systems and devices
1.13 Development Permit and conditions therein
1.14 Interior signage, including acceptable materials, dimensions and locations
1.15 Review of all applicable shop drawings
1.16 Interior and exterior finishes
1.17 Dampproofing and/or waterproofing of walls and slabs below *grade*
1.18 Roofing and flashings
1.19 Wall cladding systems
1.20 Condensation control and cavity ventilation
1.21 Exterior glazing
1.22 Integration of building envelope components
1.23 Environmental separation requirements (Part 5)
1.24 Building envelope, Part 10 requirements

PROFESSIONAL ENGINEER
PROVINCE OF
K.S. HUI
24938

(Professional's Seal and Signature)

April 2, 2015
Date

STRUCTURAL

2.1 Structural capacity of structural components of the *building*, including anchorage and seismic restraint
2.2 Structural aspects of *deep foundations*
2.3 Review of all applicable shop drawings
2.4 Structural aspects of unbonded post-tensioned concrete design and construction

MECHANICAL

3.1 HVAC systems and devices, including high *building* requirements where applicable
3.2 *Fire dampers* at required *fire separations*
3.3 Continuity of *fire separations* at HVAC penetrations
3.4 Functional testing of mechanically related fire emergency systems and devices
3.5 Maintenance manuals for mechanical systems
3.6 Structural capacity of mechanical components, including anchorage and seismic restraint
3.7 Review of all applicable shop drawings
3.8 Mechanical systems, Part 10 requirements

Certified Professional Program
MAY 1 1 2015
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL LINTON

RECEIVED
CITY OF VANCOUVER
MAY 12 2015
COMMUNITY SERVICES
PLANNING & DEVELOPMENT SERVICES

CRP's Initial

Schedule B - *Continued*

BL 464 665
Building Permit No.

4050 Ash Street, Vancouver, BC
Project Address

Geotechnical
Discipline

PLUMBING

4.1 Roof *drainage systems*
4.2 Site and foundation *drainage systems*
4.3 *Plumbing systems* and devices
4.4 Continuity of *fire separations* at plumbing penetrations
4.5 Functional testing of plumbing *related fire emergency systems* and devices
4.6 Maintenance manuals for *plumbing systems*
4.7 Structural capacity of plumbing components, including anchorage and seismic restraint
4.8 Review of all applicable shop drawings
4.9 Plumbing systems, Part 10 requirements

FIRE SUPPRESSION SYSTEMS

5.1 Suppression system classification for type of *occupancy*
5.2 Design coverage, including concealed or special areas
5.3 Compatibility and location of electrical supervision, ancillary alarm and control devices
5.4 Evaluation of the capacity of city (municipal) water supply versus system demands and domestic demand, including pumping devices where necessary
5.5 Qualification of welder, quality of welds and material
5.6 Review of all applicable shop drawings
5.7 Acceptance testing for "Contractor's Material and Test Certificate" as per NFPA Standards
5.8 Maintenance program and manual for suppression systems
5.9 Structural capacity of sprinkler components, including anchorage and seismic restraint
5.10 For partial systems — confirm sprinklers are installed in all areas where required
5.11 Fire Department connections and hydrant locations
5.12 Fire hose standpipes
5.13 Freeze protection measures for fire suppression systems
5.14 Functional testing of fire suppression systems and devices

Certified Professional Program
MAY 1 1 2015
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL LINTON

ELECTRICAL

6.1 Electrical systems and devices, including high building requirements where applicable
6.2 Continuity of *fire separations* at electrical penetrations
6.3 Functional testing of electrical related fire emergency systems and devices
6.4 Electrical systems and devices maintenance manuals
6.5 Structural capacity of electrical components, including anchorage and seismic restraint
6.6 Clearances from *buildings* of all electrical utility equipment
6.7 Fire protection of wiring for emergency systems
6.8 Review of all applicable shop drawings
6.9 Electrical systems, Part 10 requirements

GEOTECHNICAL — Temporary

7.1 *Excavation*
7.2 Shoring
7.3 Underpinning
7.4 Temporary construction dewatering

GEOTECHNICAL — Permanent

8.1 Bearing capacity of the soil
8.2 Geotechnical aspects of *deep foundations*
8.3 Compaction of engineered fill
8.4 Structural considerations of soil, including slope stability and seismic loading
8.5 Backfill
8.6 Permanent dewatering
8.7 Permanent underpinning

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
K.S. HUI
24938

(Professional's Seal and Signature)

April 2, 2015
Date

CRP's Initials

BU 463163

CITY OF VANCOUVER

Community Services Group
Development Services
Processing Centre - Building Branch

Certified Professional Program - Authorized Staged Construction Form

Name of CP: Michael Linton
Address: 4083 Cambie Street
Stage No: 1
Building Permit #: BU 463163
PC-BB Engineer: K. Lau

This Building Permit has been issued for staged construction under the Certified Professional Program. Construction is authorized to proceed only to the extend of the work as described below and shown on the drawings processed by the City. All work shall be carried out in accordance with the drawings submitted and accepted for building permit as itemized on the attached list.

Extent of work:

Excavation/Shoring

Authorized by: (PC-BB Engineer)
Date: (YYYY-MM-DD) 2015-06-09

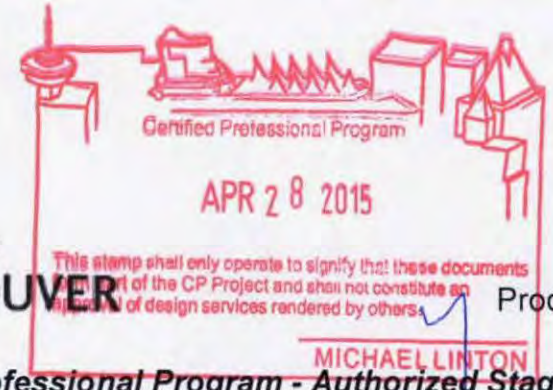
Commitment by Certified Professional:

"I acknowledge that this permit is issued for staged construction under the Certified Professional Program. I undertake to assure that construction on the project site will not proceed beyond the scope of work as described on this form and as illustrated on the drawings itemized on the attached "Authorized Staged Construction Drawing List". I undertake that the drawings released by the City for this stage of construction will be maintained on site for reference and review by City Inspectors. I undertake to inform the City promptly if work proceeds on site beyond the scope of work authorized in this document."

Signed:
Date: Nov 27 2014

Cc: CP
CRP
DBI
DOMINO

CP Stamp:



CITY OF VANCOUVER

Community Services Group
Development Services
Processing Centre - Building Branch

Certified Professional Program - Authorized Staged Construction Drawing List

Name of CP: Michael Linton Address: 4083 Cambie Street

Stage No: 1 Building Permit # BU 463 163

PC-BB Engineer: Kevin Lau

The drawings listed below have been accepted for this stage of construction.

Drawing No.	Description	Last Revision No.	Last Revision Date
G1	Bulk Excavation Shoring Plan	6	March, 5, 2015
G2	Bulk Excavation Shoring Section "1"	6	March, 5, 2015
G3	Bulk Excavation Shoring Section "2"	6	March, 5, 2015
G4	Bulk Excavation Shoring Section "3"	6	March, 5, 2015
G5	Bulk Excavation Shoring Section "4"	6	March, 5, 2015
G6	Bulk Excavation Shoring Section "5"	6	March, 5, 2015
G7	Bulk Excavation Shoring Section "6"	6	March, 5, 2015
G8	Bulk Excavation Shoring Section "7"	6	March, 5, 2015
G9	Bulk Excavation Shoring Section "8"	6	March, 5, 2015
G10	Bulk Excavation Shoring Section "8"	6	March, 5, 2015
G11	Bulk Excavation Shoring Elevation Looking East	6	March, 5, 2015
G12	Bulk Excavation Shoring Elevation Looking North	6	March, 5, 2015
G13	Bulk Excavation Shoring Elevation Looking West	6	March, 5, 2015
G14	Bulk Excavation Shoring Elevation Looking South	6	March, 5, 2015
G15	Bulk Excavation Shoring Details	6	March, 5, 2015
G16	Bulk Excavation Shoring Notes	6	March, 5, 2015
G17	Bulk Excavation Shoring Notes	6	March, 5, 2015
G18	Bulk Excavation Shoring Notes	6	March, 5, 2015

G19	Bulk Excavation Shoring Notes	*6*	*March, 5, 2015*
Figure 1	Erosion and Sediment Control Plan	1	November 6, 2014
Figure 2	Erosion and Sediment Control Details	1	November 6, 2014
Figure 3	Erosion and Sediment Control Notes	1	November 6, 2014

C7002_CPauthstagedconst_GeotechnicalRev01

July 22, 2013

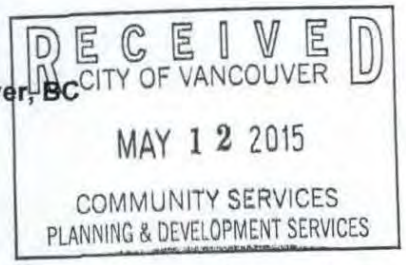
Reference No. VAN-00213210-A0

BU 464685

DT5 Developments Ltd.
c/o #212 – 1961 Collingwood Street
Vancouver, BC V6R 3K6

Via email: mooneyjd007@gmail.com

Attention: Mr. David Mooney



Re: Geotechnical Exploration Report
587 and 591-599 West King Edward Avenue, Vancouver, BC

Dear Sir:

1.0 INTRODUCTION

Further to your authorization, **exp** Services Inc. (**exp**) has completed a geotechnical exploration for the proposed multi-family development at the above referenced site. The purpose of the exploration was to assess subsurface conditions at the site and provide recommendations regarding foundation design, bearing capacity and settlements, excavation and shoring, backfill, compaction, temporary dewatering during construction, and comments on groundwater levels and possible fluctuations, and other requirements.

The work has been performed in general accordance with **exp**'s proposal dated June 5, 2013 (Ref. 13Z-01342). This report does not include assessment of subsurface conditions related to environmental issues. The attached "Interpretation & Use of Study and Report" contains instructions to readers and should be included with any copies of the report.

2.0 EXISTING SITE CONDITIONS AND PROPOSED DEVELOPMENT

Exp understands that the proposed development is anticipated to consist of 21 townhomes with underground parkade, and renovation and relocation of the existing "Hobbit House". The townhouses would consist of wood frame structures, constructed on a concrete parkade.

The property is located on the north side of West King Edward Avenue and west of Ash Street in Vancouver, BC, and contained a series of single family houses, including the Hobbit House. The site topography slopes downward to the north and east.

The project site covers an area of about 63m by 39.6m, with the proposed development arrayed along King Edward Avenue, Ash Street and the lane to the north. As part of the development, the existing Hobbit House will be raised and moved to facilitate parking. Based on the conceptual plans dated May 23, 2013 provided by W.T. Leung Architects, the underground parking level may require excavation depths of up to 5.5m along King Edward, and decrease to minimal at the lane. The proposed building setbacks would be as follows:

275 – 3001 Wayburne Drive, Burnaby, BC V5G 4W3, Canada
T: +1.604.874.1245 • www.exp.com

- Along King Edward, 3.7m setback for the upper 2 floors of townhouses, and 9.1m setback for the parkade level.
- Ash Street/west property line, 3.7m setback along for the townhouses. The parkade setback along the west property line was not known at the time of writing.
- East property line, 1.5m setback along the east property line to the relocated Hobbit House, 1.5m setback to the parkade. Note that there was an existing neighboring house located about 1.8m away from the east property line.

3.0 FIELD EXPLORATION

The fieldwork for this project was conducted on June 19, 2013.

A total of three (3) test holes were drilled using a truck mounted auger drill to depths ranging from 7.6 to 9.1m at the approximate locations indicated on the attached Test Hole Location Plan (Figure 1). The logs of these test holes are attached and labelled AH13-01 to AH13-03. In addition to the auger holes, dynamic cone penetration testing was carried out at AH13-01 and AH13-02. This consisted of driving a standardized metal cone into the ground. The number of blow counts per foot is an indication of the in-situ density or strength of the soil. The penetration test blow counts are plotted on the corresponding auger hole log.

The fieldwork was carried out under the field supervision of a member of **exp**'s geotechnical staff who located the test holes, logged the subsurface conditions and collected soil samples for further classification and routine water content determination. The test results are shown on the test hole logs.

4.0 GENERAL SUBSURFACE CONDITIONS

Detailed descriptions of the soil conditions encountered in each test hole are presented in the attached test hole logs. The following table is a brief summary of the general soil conditions as encountered at the test hole locations. The actual soil profiles may vary between the test hole locations and below the depth explored.

Unit No.	Layer	Soil Description	Thickness or depth in meters (typical)
1	ORGANIC SILT/FILL	Topsoil or silt fill.	About 1m thick in AH13-02 and AH13-03. 3.7m thick at AH13-01. This suggests there is a possibility of some fill along the south property line, perhaps part of a cut and fill done for re-grading purposes.
2	SILT	Varies from firm/stiff to hard. Composition varies from sandy silt to clayey silt.	Found below about 1m depth at AH13-02 and AH13-03. Thickness varied from zero to 2m thick, extended to about 3m depth. Not found in AH13-01.
3	SAND	Dense. Composition varies. In the excavation zone in AH13-01, contained some silt to silty, some gravel.	Found below 3 to 3.7m depth. Test holes were terminated in this layer.

At the time of the exploration, no groundwater seepage was encountered in AH13-01, drilled to 7.6m below grade near the south property line. Groundwater seepage was noted in AH13-02 and AH13-03 at a depth of 3 to 3.7m, near the north property line. This was below the maximum depth of the proposed excavation. It should be noted that perched groundwater may occur and depth and volume of groundwater seepage would typically fluctuate with the changes in season, precipitation and local land use.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General

Based on the subsurface conditions encountered in the test holes, conventional shallow strip and spread footing foundations and slab-on-grade floor construction are considered feasible for the proposed development. Foundations and floor slabs should be founded on the native SILT (Unit 2), or SAND (Unit 3), or on structural fill placed directly over these soils.

It was assumed that the existing Hobbit House would be raised and/or moved temporarily, to allow conventional excavation and possible shoring to take place in the southeast quadrant. The parkade level in this area would be constructed, and the House placed on the new parkade.

Detailed recommendations follow below.

5.2 Excavation and Temporary Slopes

Excavation depths would be about 1m along the north property line, up to 5.5m at the southwest corner, and 4m at the southeast corner. Excavation depths would be zero to roughly 4m along the east property line.

Temporary open cut slopes greater than 1.2m deep within the surficial fill and topsoil (Unit 1) should generally be no steeper than 1H:1V (horizontal:vertical). Flatter slopes may be required if pockets of unstable fill are encountered.

Temporary open cut slopes in the native SILT (Unit 2), or SAND (Unit 3), should generally be no steeper than 3H:4V. A layer of polyethylene sheeting should be placed on the slope cuts and secured in place. This slope cut is expected to be feasible on the south face of the excavation, where the parkade is set back from the property line.

A sloped excavation is generally expected to be feasible along the south property line where native soils are encountered, as the parkade is well set back from the property line.

AH13-01 encountered deep fill to 3.7m near the south property line. Over-excavation and removal of this undesirable fill is required for support of townhouse footings at the location. This over-excavation would then be replaced with structural fill (as described in Section 5.4) to support townhouse footings. Structural fill should extend laterally past the footing perimeter by a distance equal to the depth of structural fill beneath the footing (1:1 projection). This will require that the over-excavation extend to the property line at full depth, and would require a vertical cut at property line. This is only feasible if over-excavation and replacement is done in short sections, say 2m in width, or use vertical shoring.

A sloped excavation along the east property line may be feasible, if the cut slope can extend outside the property. Permission would be required from the neighboring property owner. Note that special procedures could be required to support the neighbor's chimney, depending on its foundation level.

If slope cuts cannot be contained within the property lines, shoring using shotcrete and soil anchors would be required. This may be required along the east property line. Permission would also be required from the neighboring property owner, as soil anchors would extend into the neighboring property.

Groundwater seepage into the excavation is expected to be minor, and it should be feasible to control using conventional sump pumping.

Detailed excavation and shoring design is outside the scope of this report.

Occasional large boulders may be encountered during excavation. It is possible that splitting or blasting of these boulders may be required to break down the boulders to a size that can be trucked offsite.

5.3 Subgrade Preparation

Existing fill, organic silt/topsoil, soft/loose soils and other unsuitable soils should be stripped from the proposed building envelope areas to expose the underlying native SILT (Unit 2), or SAND (Unit 3). Note that localized deeper excavation may be required to remove unsuitable materials such as along the south side of the site. Excavations may encounter large boulders. Larger boulders may require blasting or other techniques for removal.

The native soils encountered at this site are considered moisture sensitive and prone to softening on disturbance or exposure. Ponding of water on the exposed subgrade soil during construction should be minimized by proper drainage. Any water-softened or disturbed material should be stripped and removed. Stripping to final grades should be carried out using an excavator equipped with a smooth clean-out bucket. The excavator should progressively retreat from excavated areas as the stripping proceeds in order to prevent disturbance to the exposed subgrade. No construction traffic should be allowed on the prepared subgrade prior to placement of a protective granular layer. A thin layer of clear crushed gravel may be placed on the subgrade to reduce disturbance.

All stripped subgrade should be reviewed by the Geotechnical Engineer shortly after excavation and prior to covering with structural fills, granular layers or concrete. Any soft/disturbed soils identified during the subgrade review should be over-excavated and replaced with compacted structural fills as detailed in Section 5.4 below.

5.4 Structural Fill

Any areas where structural fills are required to support building foundations or slabs should be stripped and prepared in accordance with Section 5.3 (Subgrade Preparation) above.

Structural fill should consist of 19mm minus crushed gravel. Structural fill should be placed in maximum 300mm lifts in loose thickness. Each lift should be compacted to at least 95% Modified Proctor maximum dry density before the next lift is placed. A representative of **exp** should review the placement and compaction of structural fill to confirm that the specified density is achieved.

5.5 Foundations

The proposed building may be supported by conventional strip and spread footings. The proposed parkade grade suggests that footing level would be in the order of 0.5 to 5.5m below existing grade, depending on location. The subgrade at or near footing level is expected to consist of the native SILT (Unit 2), or SAND (Unit 3). Footings may be constructed on this native subgrade, or on structural fill placed directly over these soils as described in Section 5.4 above.

- Footings supported on the native very stiff to hard SILT (Unit 2), or dense SAND (Unit 3), may be designed for an allowable bearing pressure of 200 kPa.
- Footings supported on the structural fill may be designed for an allowable bearing pressure of 200 kPa. Where footings are supported on structural fill, the structural fill should extend laterally past the footing perimeter by a distance equal to the depth of structural fill beneath the footing (1:1 projection).

The allowable bearing pressure may be increased by a factor of 1.5 to obtain ultimate factored bearing resistance.

The minimum width of strip and spread footings should be 450mm and 900mm, respectively. A minimum embedment depth of 450mm for exterior footings is recommended for frost protection and confinement considerations. A minimum embedment depth of 300mm for footings at interior heated areas is recommended for confinement considerations.

Where adjacent footings are stepped, the upper footing should extend below a 2H:1V gradient line projected upward from the bottom edge of the lower footing. Footings should be positioned similarly next to structures such as vaults, elevator pits, etc.

Total settlement of strip and column footings constructed as described above were estimated to be 25mm or less. Differential settlements were estimated to be about one-half of total settlements, over a distance of 20m.

5.6 Seismic Considerations

Based on the soil conditions encountered and the 2012 BC Building Code, the subject site would generally be classified as Site Class "C". The soils encountered are not expected to be susceptible to liquefaction during the design earthquake event.

Firm ground peak horizontal acceleration (PGA) with a 2% probability of exceedance in 50 years is 0.47g.

5.7 Perimeter Drainage

Perimeter drainage should be installed at footing level around the exterior of the proposed building. The drainage should consist of minimum 150mm diameter perforated PVC pipe surrounded with at least 150mm of 19mm clear crushed gravel. In addition, a minimum 150mm thickness of birdseye gravel should be placed over the clear crushed gravel to act as a filter. The remaining backfill around the exterior foundation walls should be clean sand and gravel or clean sand (less than 5% fines) to

permit free drainage of seepage water to the perimeter drains. The invert of the drains should be located a minimum of 200mm below the underside of the slab-on-grade/basement slab, but not lower than the underside of adjacent footings.

The footing drain system should be discharged by solid pipe into the permanent off-site storm water system. Roof drains should be separate from the footing drain system.

The surrounding grade should be sloped to direct surface water away from the completed building.

5.8 Slab-on-Grade Floors

Prior to slab-on-grade construction, the subgrade should be prepared and reviewed as described in Section 5.3 (Subgrade Preparation). It is recommended that floor slabs be underlain with a minimum 150mm thickness of 19mm clear crushed gravel, compacted to an equivalent of 95% of its Modified Proctor maximum dry density. The free-draining underslab gravel should be hydraulically connected to the perimeter drain system. Minimum 6 mil polyethylene sheeting should be provided beneath the slab-on-grade to reduce dampness in moisture sensitive areas.

5.9 Backfill and Lateral Earth Pressures

Free draining granular backfill, containing less than 5% fines (passing 0.075mm sieve) should be used against the basement walls and retaining walls. Wall backfill should be compacted to at least 95% Modified Proctor maximum dry density in areas supporting pavement or structural elements.

The suggested lateral earth pressures are shown on the attached Figure 2, "Lateral Pressure for Foundation Wall Design".

5.10 Geotechnical Review during Building Construction

Geotechnical field reviews will be required to satisfy Letters of Assurance requirements that will need to be submitted to the City of Vancouver, and to document that the recommendations of the geotechnical report are followed. It is expected that geotechnical field reviews will be needed to address the following issues:

- review of excavation slopes exceeding WorkSafeBC requirements;
- review of shoring, anchor installation and shotcrete removal;
- confirm adequacy of stripped/excavated subgrade for building envelope areas;
- review of excavated footing subgrades to confirm allowable bearing pressure prior to structural fill, rebar and concrete placement;
- density testing of any structural fill placed under slabs-on-grade.

6.0 CLOSURE

Please be advised that the contents of this report are based on information provided to **exp** by DT5 Developments Ltd. and their agents, and **exp**'s understanding of the proposed development as described in this report. If the development plans change or if during construction the soil conditions are noted to be different than those described in this report, **exp** must be notified promptly and the

recommendations on the geotechnical aspects of the proposed development reviewed and adjusted accordingly.

Also, note that this report was prepared for the exclusive use of **exp**'s client, DT5 Developments Ltd. and their designated consultants and agents, and may not be used by other parties without written consent of **exp**. **Exp** "Interpretation & Use of Study and Report Instructions" is attached. These instructions form an integral part of this report and should be included with any copies of this report.

Site Contractors should make their own assessment of subsurface conditions and select the construction means and methods most appropriate to the site conditions. This geotechnical report should not be included in contract specifications without suitable qualifications and prior review by **exp**.

We appreciate this opportunity to be of service to you. If you have any questions regarding the contents of this report, or if we can be of further assistance to you on this project, please call the undersigned.

Sincerely,

exp Services Inc.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
K.S. HUI
24938

Kai-Sing Hui, P.Eng.
Senior Geotechnical Engineer

Reviewed by:

Walt Dengler, P.Eng.
Senior Geotechnical Engineer

cc: Konning Tam, Architect, W.T. Leung Architects Inc. konning@wtleungarcc.com

Attachments: Interpretation & Use of Study and Report
Test Hole Location Plan (Figure 1)
Lateral Pressure Diagram (Figure 2)
Test Hole Logs (AH13-01 to AH13-03)

WD:ksh:dm

L:\2013 (starting at 0210575-A0)\0213210-A0 KSH King Edward Green\Report\exp LE 2013 07 22 Geo Exploration Rpt West K Edward Ave.docx

INTERPRETATION & USE OF STUDY AND REPORT

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering consulting practices in this area. No other warranty, expressed or implied, is made. Engineering studies and reports do not include environmental consulting unless specifically stated in the engineering report.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF THE REPORT

The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document are only valid to the extent that there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT. WE WILL CONSENT TO ANY REASONABLE REQUEST BY THE CLIENT TO APPROVE THE USE OF THIS REPORT BY OTHER PARTIES AS "APPROVED USERS". The contents of the Report remain our copyright property and we authorise only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of the Report by those parties. The Client and Approved Users may not give, lend, sell or otherwise make the Report, or any portion thereof, available to any party without our written permission. Any use which a third party makes of the Report, or any portion of the Report, are the sole responsibility of such third parties. We accept no responsibility for damages suffered by any third party resulting from unauthorised use of the Report.

5. INTERPRETATION OF THE REPORT

a. Nature and Exactness of Descriptions: Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations, or building envelope descriptions, utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarising such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of, and accept, this risk. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b. Reliance on Provided information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.

c. To avoid misunderstandings, **exp** Services Inc. (**exp**) should be retained to work with the other design professionals to explain relevant engineering findings and to review their plans, drawings, and specifications relative to engineering issues pertaining to consulting services provided by **exp**. Further, **exp** should be retained to provide field reviews during the construction, consistent with building codes guidelines and generally accepted practices. Where applicable, the field services recommended for the project are the minimum necessary to ascertain that the Contractor's work is being carried out in general conformity with **exp**'s recommendations. Any reduction from the level of services normally recommended will result in **exp** providing qualified opinions regarding adequacy of the work.

6.0 ALTERNATE REPORT FORMAT

When **exp** submits both electronic file and hard copies of reports, drawings and other documents and deliverables (**exp**'s instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by **exp** shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by **exp** shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of **exp**'s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except **exp**. The Client warrants that **exp**'s instruments of professional service will be used only and exactly as submitted by **exp**.

The Client recognizes and agrees that electronic files submitted by **exp** have been prepared and submitted using specific software and hardware systems. **Exp** makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, BC V5G 4W3
Telephone: 604-874-1245

BH 464 677

RECORD OF AUGERHOLE : AH13-01

CLIENT DT5 Developments Ltd.
PROJECT NUMBER VAN-00213210-A0
DRILLING DATE 6/19/13
DRILLING CONTRACTOR Uniwide Drilling Co. Ltd.
DRILLING METHOD Solid Stem Auger
LOGGED BY DGS **CHECKED BY** KSH

PROJECT NAME King Edward Green Development
PROJECT LOCATION 587 King Edward Avenue, Vancouver, BC West
AUGERHOLE LOCATION N: 5455165 E: 491407
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** —
▼ **AFTER DRILLING** —

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		SOD						
		SILT, trace sand, trace gravel, rootlets, brown, moist, (loose) (FILL)	0.1	S1	AU		5	16
		SILT, trace gravel, light brownish grey with rust staining, moist to damp, (stiff to very stiff) slight plastic (FILL?)	0.5				9	
1							17	
				S2	AU		20	18
		-grades to SILT, some sand, some gravel by 1.5m					22	
2							10	
				S3	AU		10	20
		-pockets of peat remnants @ 2.4m					10	
3							8	
		SILT, some organics, dark brown, damp, (firm)	3.0	S4	AU		3	40
		-drilling becomes hard @ 3.7m					3	
		SAND, some silt to silty, some gravel, light brown with rust stains, damp, (dense to very dense) sand is fine to medium grained, gravel is sub-angular to sub-rounded	3.7				2	
4		-DCPT Refusal 25 blows/25mm					25	
				S5	AU			11
5								
				S6	AU			10
6		-grades to SAND, trace to some silt, trace to some gravel by 6m						
7								
				S7	AU			8

Bottom of hole at 7.6m.

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, BC V5G 4W3
Telephone: 604-874-1245

RECORD OF AUGERHOLE : AH13-02

CLIENT DT5 Developments Ltd.
PROJECT NAME King Edward Green Development
PROJECT NUMBER VAN-00213210-A0
PROJECT LOCATION 587 King Edward Avenue, Vancouver, BC
DRILLING DATE 6/19/13
AUGERHOLE LOCATION N: 5455195 E: 491452
DRILLING CONTRACTOR Uniwide Drilling Co. Ltd.
ELEVATION
DRILLING METHOD Solid Stem Auger
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** 3.0m inferred
LOGGED BY DGS **CHECKED BY** KSH
▼ **AFTER DRILLING** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		CONCRETE	0.1	S8	AU		9	31
		SILTY SAND & GRAVEL, black, damp, (loose) (FILL)						
		ORGANIC SILT, some sand, some gravel, trace to some organics, dark brown, damp to wet, (firm to soft) (POSSIBLE PREVIOUS TOPSOIL)	0.3	S9	AU		11	67
1							1	
		SILT, some sand, some gravel, light brownish grey with rust staining, moist, (hard) slightly plastic	1.1				23	
				S10	AU		61	12
2		SANDY SILT, some gravel to gravelly, grey, damp, (stiff to very stiff) sand is fine grained, gravel is angular to sub-rounded	1.8				78	
				S11	AU			10
3		SAND, some silt, trace gravel, grey, wet, (dense to very dense) sand is well graded	3.0					
4		-grades to GRAVELLY SAND to SANDY GRAVEL by 3.9m, gravel is sub-rounded to sub-angular	4.0	S12	AU			17
5				S13	AU			12
6								
7				S14	AU			9
8								
9				S15	AU			13

Bottom of hole at 9.1m.

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, BC V5G 4W3
Telephone: 604-874-1245

RECORD OF AUGERHOLE : AH13-03

CLIENT DT5 Developments Ltd.
PROJECT NUMBER VAN-00213210-A0
DRILLING DATE 6/19/13
DRILLING CONTRACTOR Uniwide Drilling Co. Ltd.
DRILLING METHOD Solid Stem Auger
LOGGED BY DGS **CHECKED BY** KSH

PROJECT NAME King Edward Green Development
PROJECT LOCATION 587 King Edward Avenue, Vancouver, BC
AUGERHOLE LOCATION N: 5455202 E: 491409
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** 3.7m inferred
▼ **AFTER DRILLING** —

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	RECOVERY %	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		SILT, trace to some sand, trace gravel, rootlets, light brown, dry (firm)						
1		ORGANIC SILT, some sand to sandy, some gravel, wood fibres and peat remnants, black with red and orange inclusions, damp, (soft) plastic	0.3	S16	AU			61
2		SILT, some sand, some gravel, light brownish grey with rust staining, damp (firm to stiff) plastic	1.1	S17	AU			21
3		CLAYEY SILT, some sand, some gravel, seams of sand, grey, damp, (very stiff to hard) plastic	2.1	S18	AU			15
4		SAND, trace silt, occasional pockets of organic silt, light brown, damp, (dense to very dense) fine to medium grained ▽	3.0	S19	AU			18
5		-silt content increasing with depth						
6				S20	AU			19
		SAND & GRAVEL, trace silt, grey, wet, (dense to very dense)	6.1					
		SAND. light brown, wet, (dense to very dense) fine to medium grained	6.4					
7		SAND, some silt, grey, wet, (dense to very dense) fine grained	7.0	S21	AU			23
8								
9		-becomes coarser by 10m		S22	AU			18

Bottom of hole at 9.1m.

EXP GEO W/O P P 0213210-A0.GPJ EXP STD GDT 7/22/13

BUILDING BY-LAW 2014 – CITY OF VANCOUVER

SCHEDULE C-B

Forming Part of Subsection 2.2.7, Division C of the Building By-law

BU464685
Building Permit No.

ASSURANCE OF PROFESSIONAL FIELD REVIEW AND COMPLIANCE

Notes: (i) This letter must be submitted after completion of the project but prior to final inspection by the *Chief Building Official*. A separate letter must be submitted by each *registered professional of record*.
(ii) This letter is endorsed by: Architectural Institute of B.C., Association of Professional Engineers and Geoscientists of B.C.
(iii) In this letter the words in italics have the same meaning as in the Building By-law.

To: *The Chief Building Official*

Re: Geotechnical
Discipline (e.g. Architectural, etc.) (Print)

King Edward Green - Blocks A, B, C and Parkade
Name of Project (Print)

4050 Ash Street, Vancouver, BC
Address of Project (Print)

Lot A Block 660 District Lot 526 Group 1 NWD Plan EPP32820
Legal Description of Project (Print)

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K.S. HUI 24938 1/17/17

(Professional's Seal and Signature)

(Each *registered professional* of *record* shall complete the following:)

Kai-Sing Hui, P.Eng.
Name (Print)

275 - 3001 Wayburne Drive
Address (Print)

Burnaby, BC V5G 4W3

604.874.1245
Phone No.

January 17, 2017
Date

I hereby give assurance that

(a) I have fulfilled my obligations for *field review* as outlined in Subsection 2.2.7, Division C of the Building By-law and in the previously submitted Schedule B, "ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW, and
(b) those components of the project opposite my initials in Schedule B substantially comply in all material respects with
  (i) the applicable requirements of the Building By-law and other applicable enactments respecting safety, not including construction safety aspects, and
  (ii) the plans and supporting documents submitted in support of the application for the *building* permit,
(c) I am a *registered professional of record* as defined in the Building By-law.

(If the *registered professional of record* is a member of a firm, complete the following:)

I am a member of the firm exp Services Inc.
and I sign this letter on behalf of the firm. (Print name of firm)

Note: The above letter must be signed by a *registered professional of record,* who is a *registered professional*. The Building By-law defines a *registered professional* to mean
(a) a person who is registered or licensed to practise as an architect under the Architects Act, or
(b) a person who is registered or licensed to practise as a professional engineer under the Engineers and Geoscientists Act.

CITY OF VANCOUVER
Sustainable Development Program
FEB 08 2017
This stamp shall only operate to signify that these documents form part of the CP Project and shall not constitute an approval of design services rendered by others.
MICHAEL LINTON

WL
CRP's Initials