Improving Current SUE Specifications and Contract Documents

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MUNICIPAL ENGINEERS ASSOCIATION

Workshop and Annual General Meeting
THUNDER BAY
November 21 – 23, 2018

Revitalizing Global Underground Utility Infrastructure

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Agenda

3 Step Program for SUE and Utility Coordination for Municipal Projects

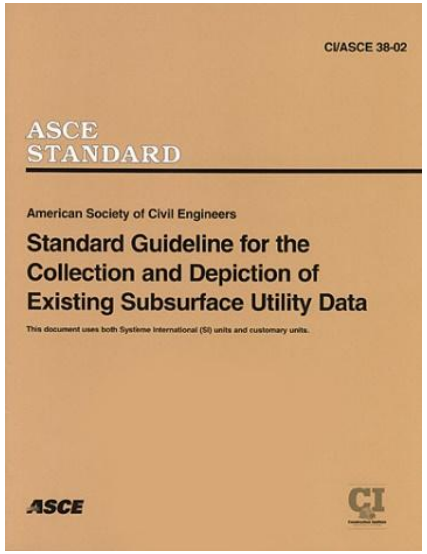
1. Step 1 – What Specifications and Documents
2. Step 2 – When in a Project Lifecycle
3. Step 3 – Why Implement SUE and Utility Coordination

Step 1

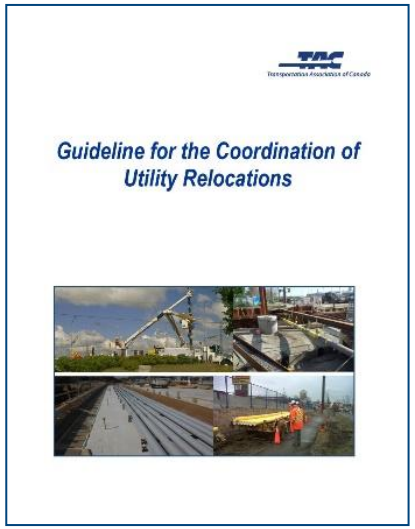
What Specs & Documents?

What?

- SUE Specification – ASCE 38

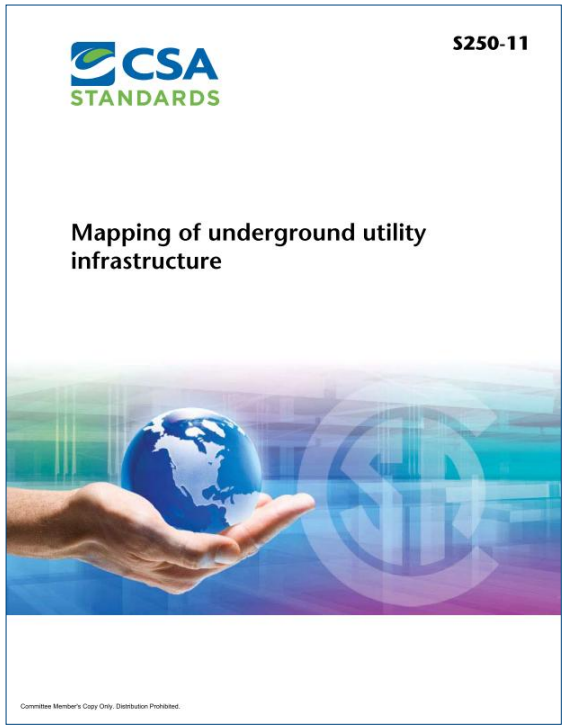


- TAC Guideline for the Coordination of Utility Relocations



What?

- CSA S250



What?

- Request For Pre- Qualification
- Request For Quotation
- Request For Proposal
- Guideline/Processes/Policies/Agreements

What?

Request For Proposal

2.2.2. Utility Conflicts and Relocation

Using the results obtained during the coordination of utilities, the consultant shall identify any potential conflicts and perform a subsurface utility Quality Level A (QL-A) investigation to confirm and map existing utility. Notifications and on-going communication with affected utilities is required to ensure compliance with any regulatory standards. The collection and depiction of information and any required submittals shall confirm to the applicable provisions of CI/ASCE 38-02, "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data". A copy of CI/ASCE Standard 38-02 is available from the American Society of Civil Engineers at www.asce.org.

If required, the consultant shall recommend a proposed solution to the utility conflict. Every effort shall be made to avoid relocating a utility.

What?

Request For Proposal – SUE Standing Offer

P-XX-XX **SUBSURFACE UTILITY ENGINEERING (SUE) AND UTILITY COORDINATION SERVICES**	
Date of Release of RFP:	Month / Day / Year
Closing Time for Submission of Proposal:	Month / Day / Year on or before 1:00 p.m. Eastern Time
Submit Proposal to:	Director of Supplies and Services Supplies and Services Branch, 1st Floor The Regional Municipality of York 17250 Yonge Street Newmarket, ON L3Y 6Z1

What?

Request For Proposal – SUE Standing Offer

Quality Level of Collected Utility Data

The quality level of the utility data to be collected will be determined on a project by project basis and will be outlined in the task order applicable to the individual project. All utility information collected and depicted on a composite utility drawing is to be in accordance with the Quality Levels outline in the CI/ASCE Standard 38-02. The various Quality Levels as outlined in CI/ASCE 38-02 are:

- Quality Level ‘D’
- Quality Level ‘C’
- Quality Level ‘B’
- Quality Level ‘A’

What?

Municipal Access Agreements

AS-CONSTRUCTED DRAWINGS

12. If requested in writing by the Municipality, the Company shall provide the Municipality with "as-constructed" drawings, which may include appropriate certification requirements commensurate with the type of Work completed. The Company shall provide the "as-constructed" drawings to the Municipality within three (3) months of installing the Plant, at its own expense and to the satisfaction of the Commissioner. The Company shall ensure that all "as constructed" drawings conform to the following CSA S250 levels:

i. CSA S250 Level 2 for all above ground installations (x,y,z coordinates +/- 100mm);

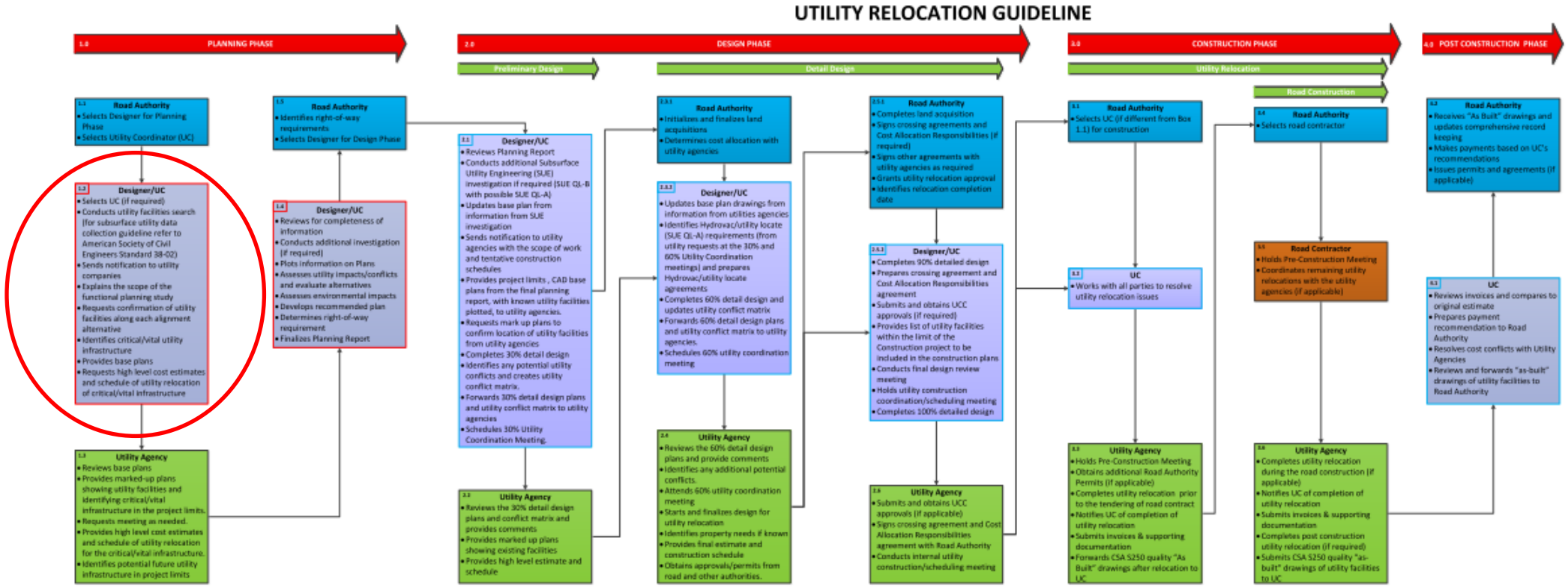
ii. CSA S250 Level 2 for all underground installation performed by open trench method (x,y,z coordinates +/- 100mm); and

iii. CSA S250 Level 3 for all underground installations performed by a trenchless method (x,y,z coordinates +/- 300mm).

The Company shall submit all "as-constructed" drawings to the Municipality in a pdf copy and a digital format that is acceptable to the Municipality.

What?

Guidelines



What?

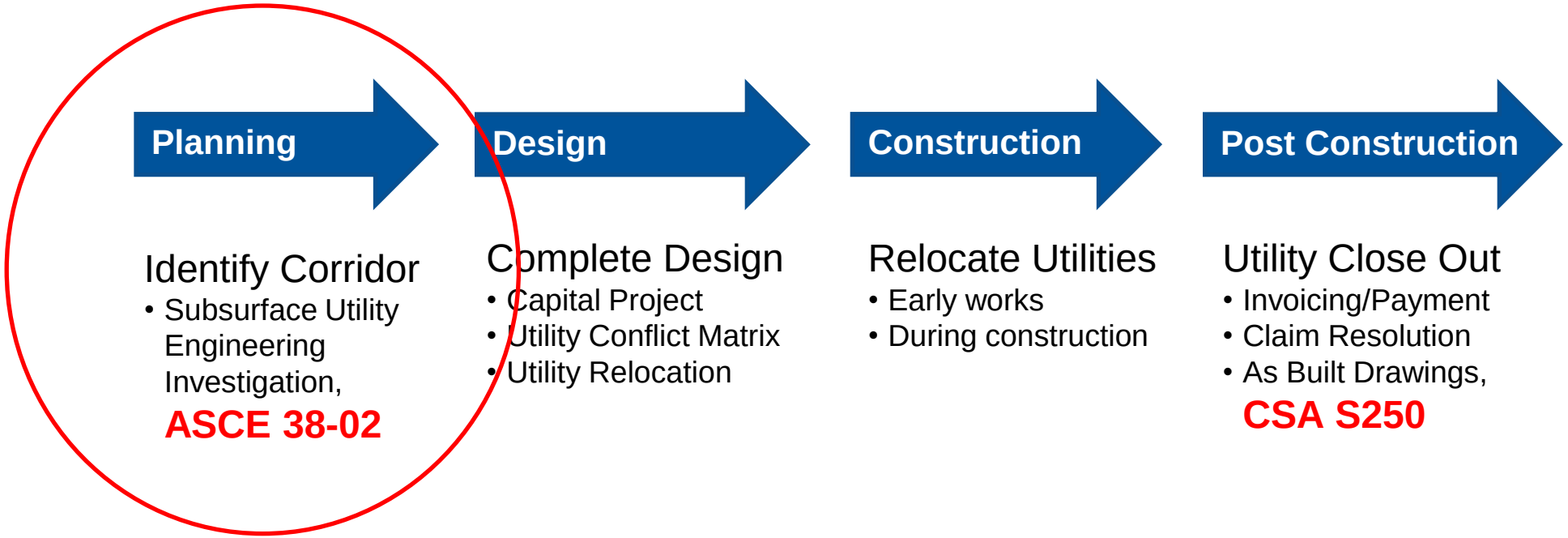
Designer/UC

- Selects UC (if required)
- Conducts a Subsurface Utility Engineering (SUE) investigation to a quality level required for the project's Planning Phase (for subsurface utility data collection guideline refer to American Society of Civil Engineers Standard 38-02)
- Sends notification to utility companies
- Explains the scope of the functional planning study
- Requests confirmation of utility facilities along each alignment alternative
- Identifies critical/vital utility infrastructure
- Provides base plans
- Requests high level cost estimates and schedule of utility relocation of critical/vital infrastructure

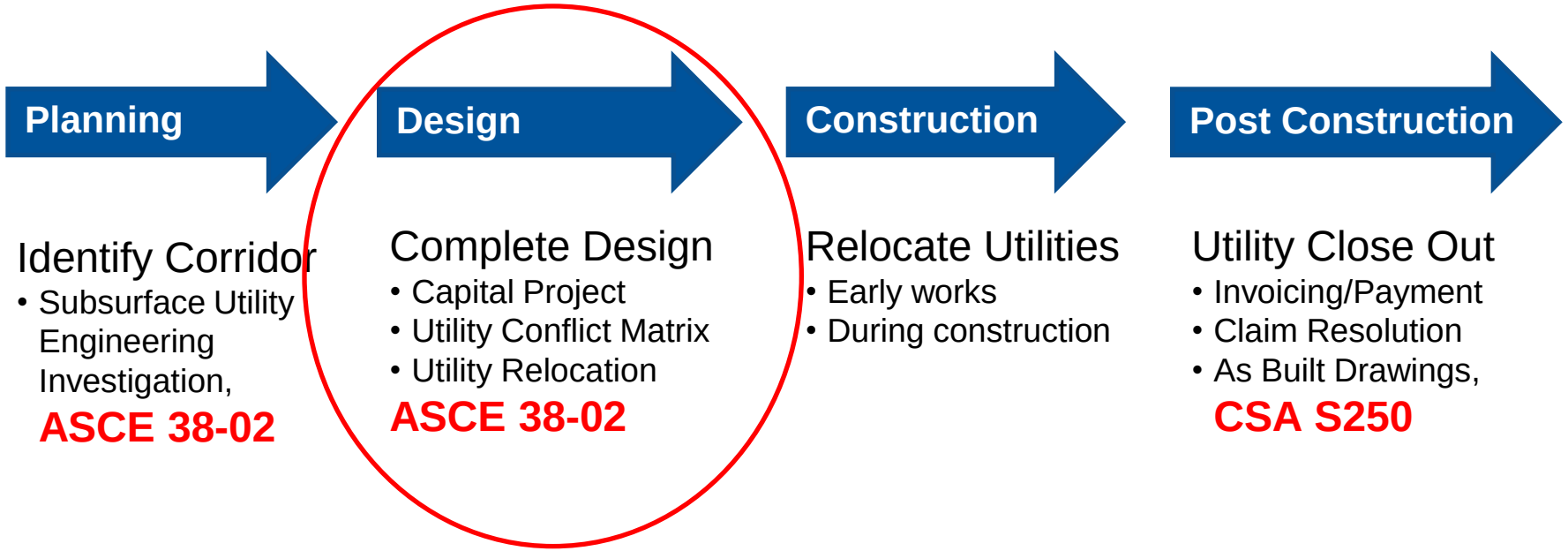
Step 2

When to use SUE in Project Lifecycle?

When?


Planning
Design
Construction
Post Construction
Identify Corridor
• Subsurface Utility Engineering Investigation,
ASCE 38-02
Complete Design
• Capital Project
• Utility Conflict Matrix
• Utility Relocation
Relocate Utilities
• Early works
• During construction
Utility Close Out
• Invoicing/Payment
• Claim Resolution
• As Built Drawings,
CSA S250

When?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CSA S250

Step 3

Why Implement SUE and UC ?

Why?

Manage Risks

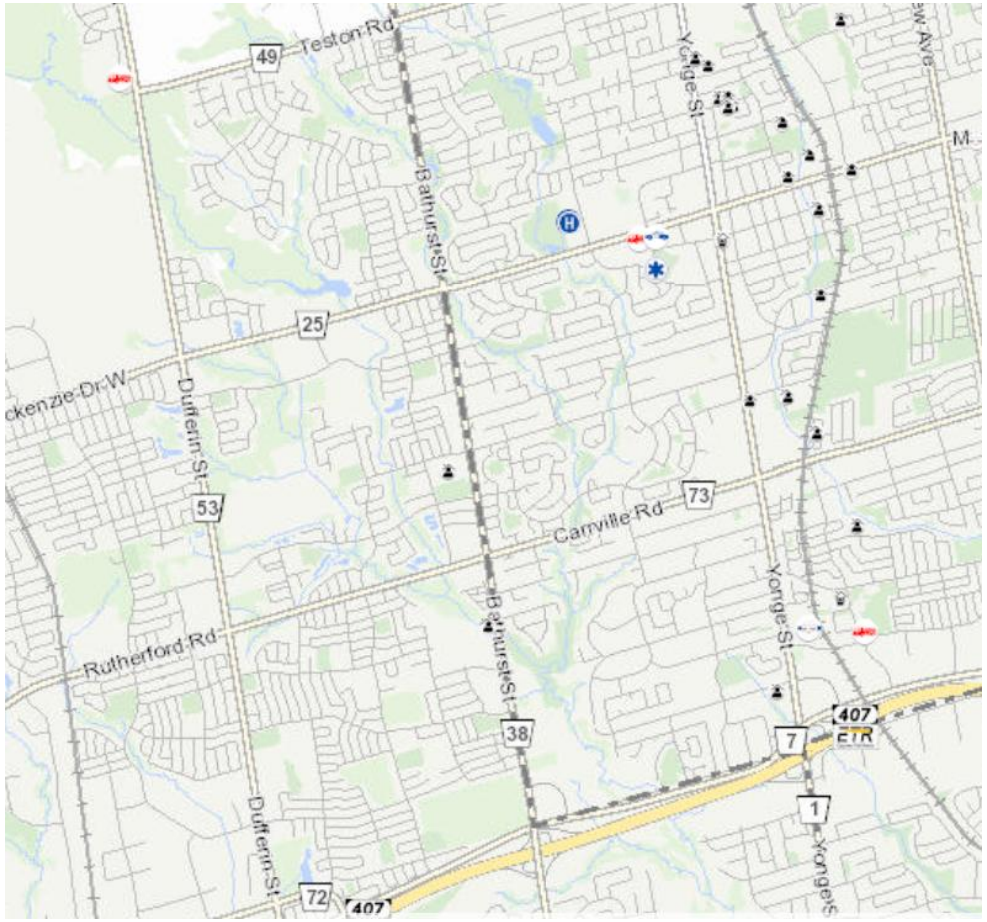
associated with the

Utility Coordination

on Public Right-of-Way Capital Projects

Bathurst Street Story!!

Bathurst Street Story!!



Bathurst Street Story!!

1954

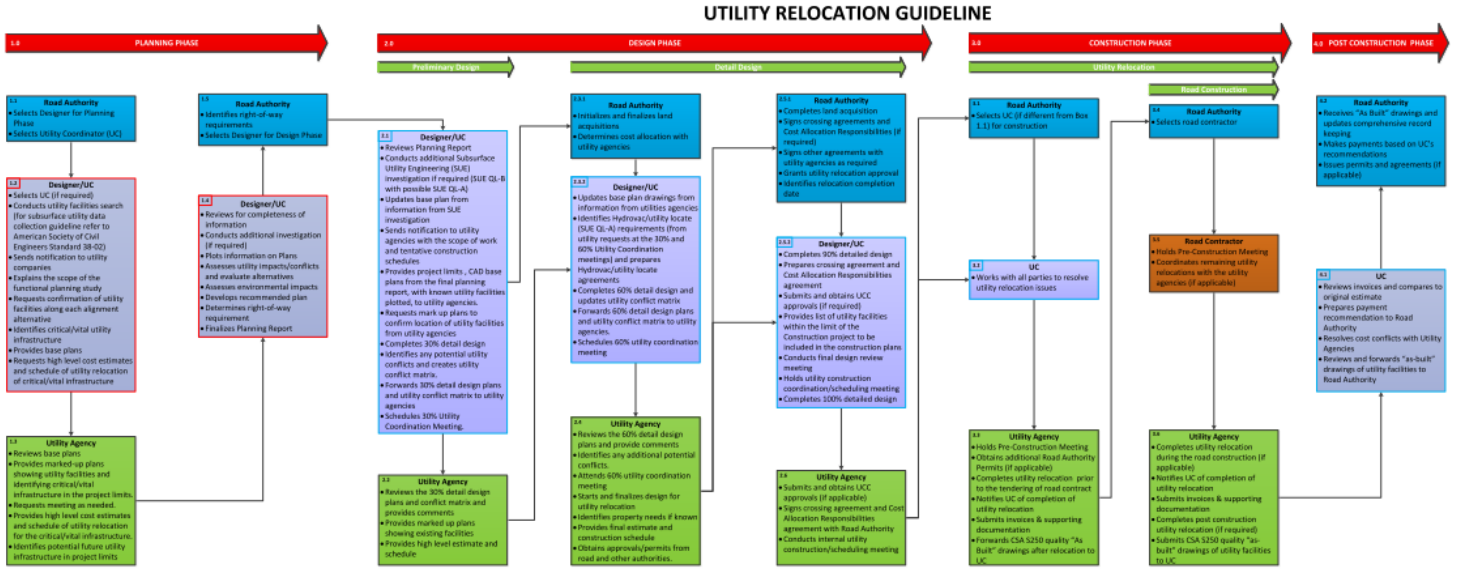
1988

2002

2017

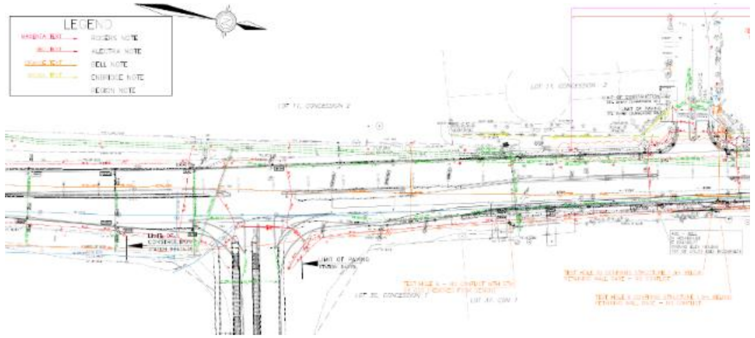
UC Best Practices

TAC -Transportation Association of Canada's - Guideline for the Coordination of Utility Relocation



Bathurst Street – Hwy 7 to Teston Road, York Region (Vaughan and Richmond Hill)

Experienced Utility Coordinator's Deliverables



Composite Utility Plan
(ASCE 38-02 Compliant)

Utility Conflict Matrix

T2 utility engineers

York Region Contract # - [illegible]
T2ue Project # [illegible]
Updated: December 15, 2017
Status: PRELIMINARY

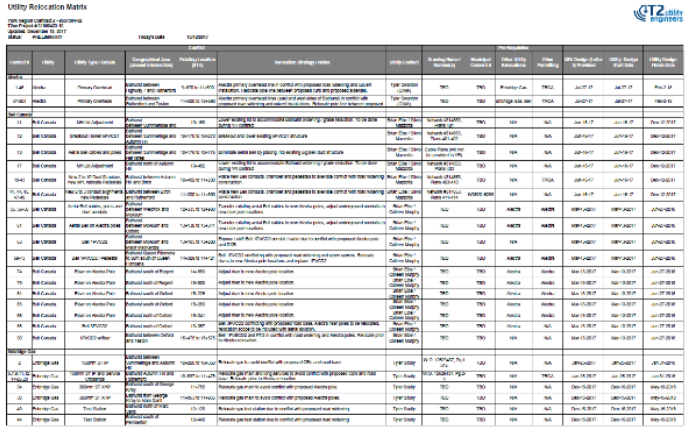
(white)	conflict resolved
(light blue)	tentative TH (requires designating first)
(red)	confirmed conflict
(yellow)	engineering review required

Con #	Utility Information	Ex. Location (Sta Start)	Ex. Location (Sta End)	Conflict Distance (m)	Proposed Grade Change (m)	Location	Assessment of Effects	Investigation Required	Relocation Required	Resolved
Bell										
1	Bell Conduit (9PVCD1) - ABND	9+700	10+100	-	-	Bathurst - within NB lanes	Existing Bell structure confirmed abandoned by Bell - remove as required.	No	No	Yes
2	Bell Conduit (12PVCD1)	9+730	9+760	30	-	East blvd crossing Highway 7 ramp	Hwy 7 ramp reconfiguration. Reconfiguration does not increase proposed road base width, no conflict anticipated.	No	No	Yes
3	Bell MH (4DMH6)	9+873	-	-	-	East Blvd	No grade change at Bell MH	No	No	Yes
4	Bell Conduit (12PVCD1)	9+873	9+899	29	-	East Blvd	Bell conduit within proposed boulevard - no conflicts.	No	No	Yes
5	Bell Conduit (12PVCD1)	9+899	-	-	-	East Blvd	QL-B confirms conflict with proposed OGS. Determine if OGS can be moved towards curb by 0.5m. UPDATE - test hole confirms that ex. Bell structure is beneath the proposed 950mm storm sewer, and the OGS has been removed from Parsons design - no conflict.	No	No	Yes
6	Bell Conduit (12PVCD1)	9+899	9+990	91	-	East Blvd	Bell conduit within proposed boulevard - no conflicts.	No	No	Yes
7	Bell Conduit (12PVCD1)	9+990	10+015	25	-	East Blvd	Existing alignment under proposed toe wall. Depth of structure unknown, conflict based on Bell record alignment QL-B investigation confirms alignment, perform test hole to determine if conflict exists with retaining wall. UPDATE - Test hole completed, structure and conduit under proposed retaining wall base by 1.3m - no conflict. Bell to remain.	No	No	Yes
8	Bell Conduit (12PVCD1)	10+015	10+090	75	-	East Blvd	Bell conduit within proposed boulevard - no conflicts.	No	No	Yes
9	Bell Conduit (2PVCD3)	10+016	-	-	-	Crossing	Existing Bell conduits crossing proposed storm sewers and road widening (east side widening only). Proposed storm sewers being installed at approximate same elevation as existing storm sewers. Confirm depth of Bell under east blvd for conflict with proposed road base. UPDATE - test hole 9 confirms conduit is 700mm below proposed road base - no relocation required.	No	No	Yes
10	Bell Conduit (12PVCD1)	10+090	10+160	73	+0.15	East Blvd	Existing alignment under proposed curb and sub-drain. Depth of structure unknown. QL-B investigation confirms alignment, test hole required to confirm conflict with sub-drain and CB lead at 10+141. Bell to confirm elevation of conduit exiting the south side of chamber at 10+160.	No	No	Yes
11	Bell MH (4DMH12)	10+150	-	-	-0.15	East Blvd	Grade decreasing at Bell lid location by 0.15m. Bell MH in proposed curb lane. Bell has confirmed chamber can accommodate grading / road base by installation of steel plate on roof. Chamber to remain in place, steel plate to be placed and collar reduction to be completed during road works. Bell to supply [illegible] design for steel plating and lid reduction to be included into Parsons contract documents.	No	Yes	No
12	Bell Conduit (9PVCD1 or 12PVCD1)	10+150	10+280	130	-	East Blvd	Existing alignment under proposed curb lane. 3 test holes completed over 120m distance, confident in alignment due to test holes completed. Existing structure conflicting with proposed CB leads at 10+190, 10+237 and 10+272, however not in conflict with subdrain or road base. Breakout and lowering or relocation of structure required (0.5m APPROX). Bell to confirm # of cables present and determine if in-contract breakout and lowering is preferred over full relocation.	No	Yes	No
13	Bell Poles and aerial cable	10+176	10+776	600	-	East Blvd	Bell poles in proposed curb lane, relocate. Place into underground conduit or transfer to new Alectra pole line. Bell to confirm scope.	No	Yes	No
14	Bell Conduit (9PVCD1 or 12PVCD1)	10+280	10+446	166	-	East Blvd	Existing alignment under scrutiny, no test holes completed and no QL-B. Line illustrated deviates from record and test holes. Await QL-B results to identify conflicts.	No	No	Yes
15	Bell Conduit (12PVCD1)	10+410	-	-	-	East Blvd	Existing structure not conflicting with proposed CB leads at [illegible]	No	No	Yes
16	Bell Conduit (12PVCD1)	10+446	10+482	36	-	East Blvd	Test hole indicates that Bell structure is below road base and CB lead at 10+473, no conflict.	No	No	Yes

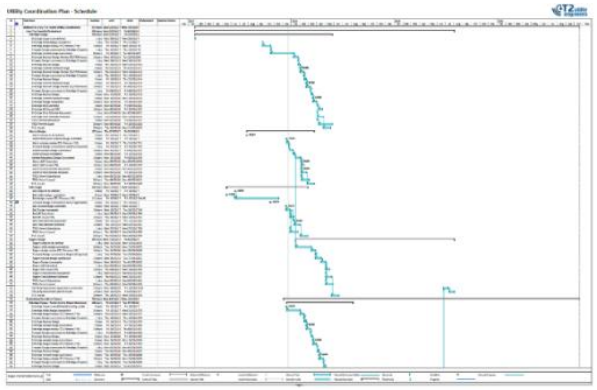
Utility Conflict Matrix
(Comprehensive)

Bathurst Street – Hwy 7 to Teston Road, York Region (Vaughan and Richmond Hill)

Experienced Utility Coordinator's Deliverables



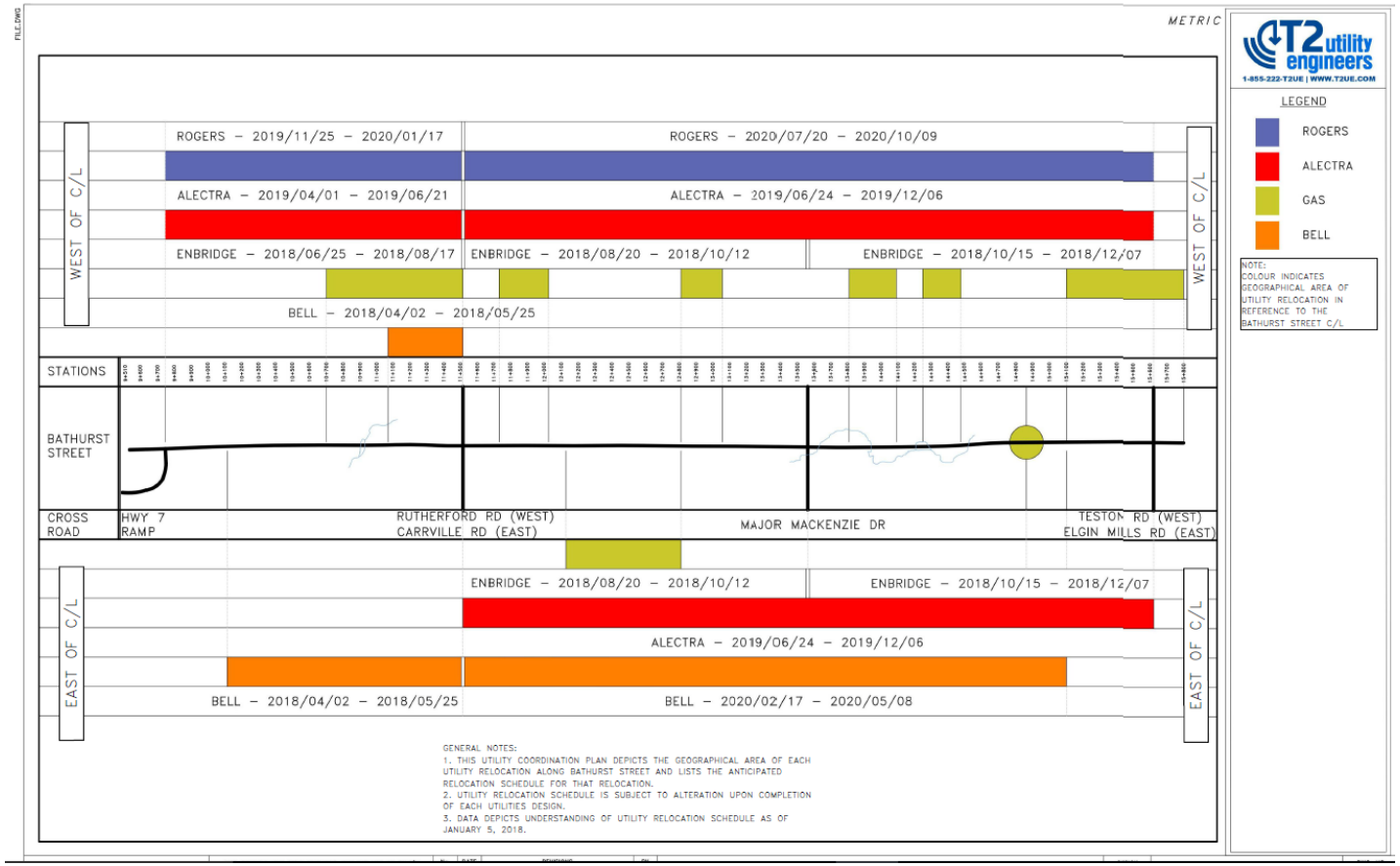
Utility relocation Matrix
(Scope Reduced)



Utility Coordination Schedule
(Utility Design and Construction)

Bathurst Street – Hwy 7 to Teston Road, York Region (Vaughan and Richmond Hill)

Experienced Utility Coordinator's Deliverables



Utility Coordination Plan

Bathurst Street – Hwy 7 to Teston Road, York Region (Vaughan and Richmond Hill)

Utility Relocation Cost Savings

York Region Contract # - 6597304-v2
T2ue Project # 61000423-16
Updated: December 19, 2017
Status: PRELIMINARY

Utility Agency	Location (STA to STA)	Utility Type	Amount of Scope Eliminated	Est. Cost Savings	Est. Schedule Savings	Mitigation Option
Bell Canada	Hwy 7 to Rutherford	U/G duct structures / chambers / cabling	530m of duct structure (estimated $1000/m), 600m of cabling (estimated $500/m)	$ 850,000.00	6-10 months	QL-B confirmed alignment, Test holes confirmed depth, Proposed OGS system relocated
Bell Canada	Major MacKenzie Drive	U/G duct structure (16D)	Breakout / support / reinstatement of non-existent Bell structure during YR contract	$ 100,000.00	1 month	QL-B investigation and collaboration with Bell confirmed no Bell structure present
Bell Canada	McCallum to Oxford Street (east side)	Aerial Bell fiber	2200m of new fiber (assumed $50/m)	$ 110,000.00	6 months	Aerial Bell fiber on existing concrete Alectra poles. Reviewed scope with Alectra and determined that Alectra can "top" (cut in half) the existing concrete poles. Otherwise new fiber would have been required for the entire length.
Enbridge Gas	Rutherford to Major MacKenzie Drive	300mm ST XHP	1230m (Est. $3000 /m)	$ 3,690,000.00	3-6 months	Revised sidewalk alignment, changed to sumpless CB's, adjusted proposed pole design, maintained gas beneath proposed curb lane
Enbridge Gas	Major MacKenzie Drive to Teston	300mm ST XHP	1175m (Est. $3000 /m)	$ 3,525,000.00	8-12 months (due to creek crossings)	Revised sidewalk alignment, changed to sumpless CB's, adjusted proposed pole design, maintained gas beneath proposed curb lane
			TOTAL	$ 8,275,000.00		
			YR Costs (35% of total)	**$ 2,896,250.00**		

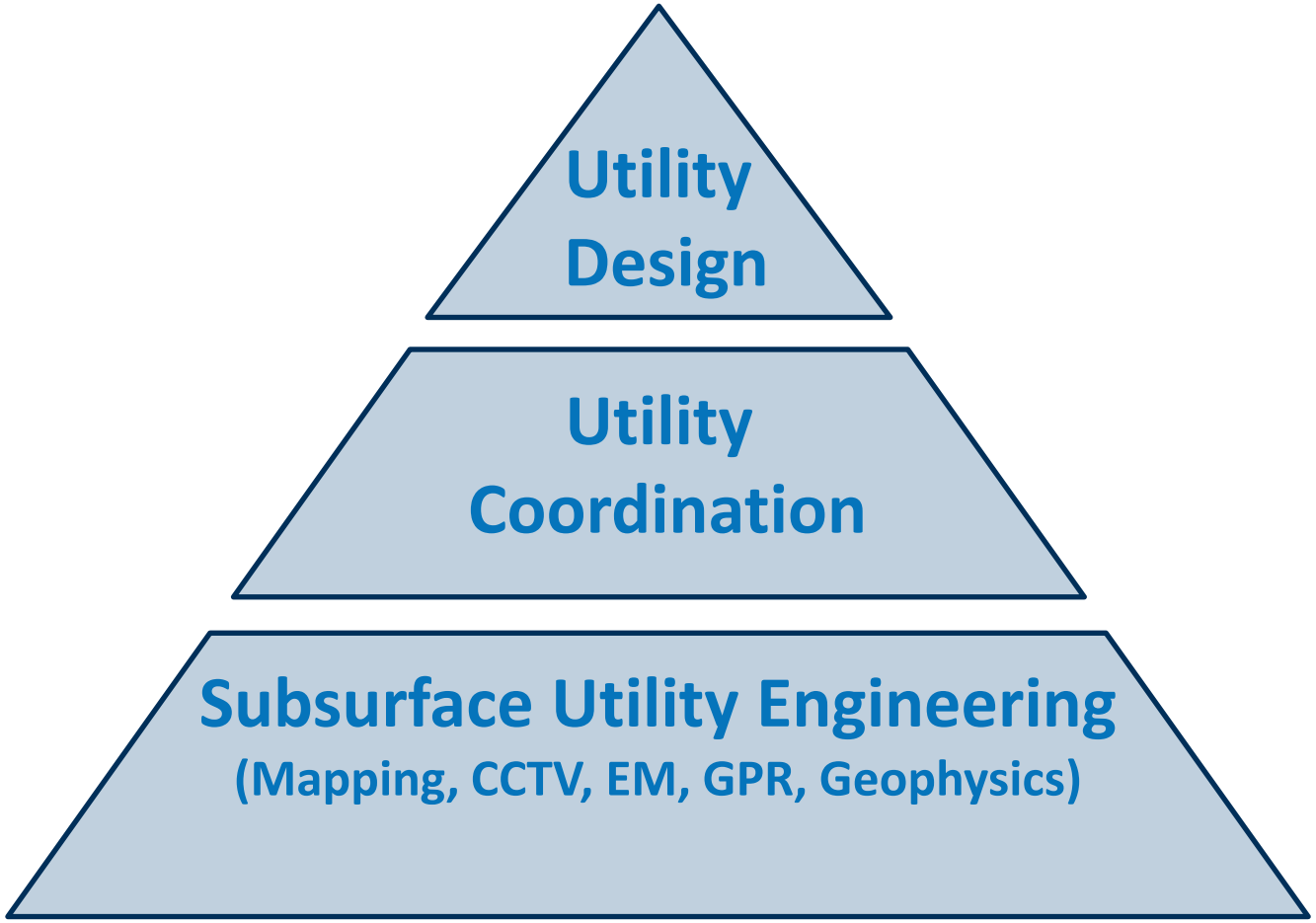
ROI > 10:1

Moral of this Story

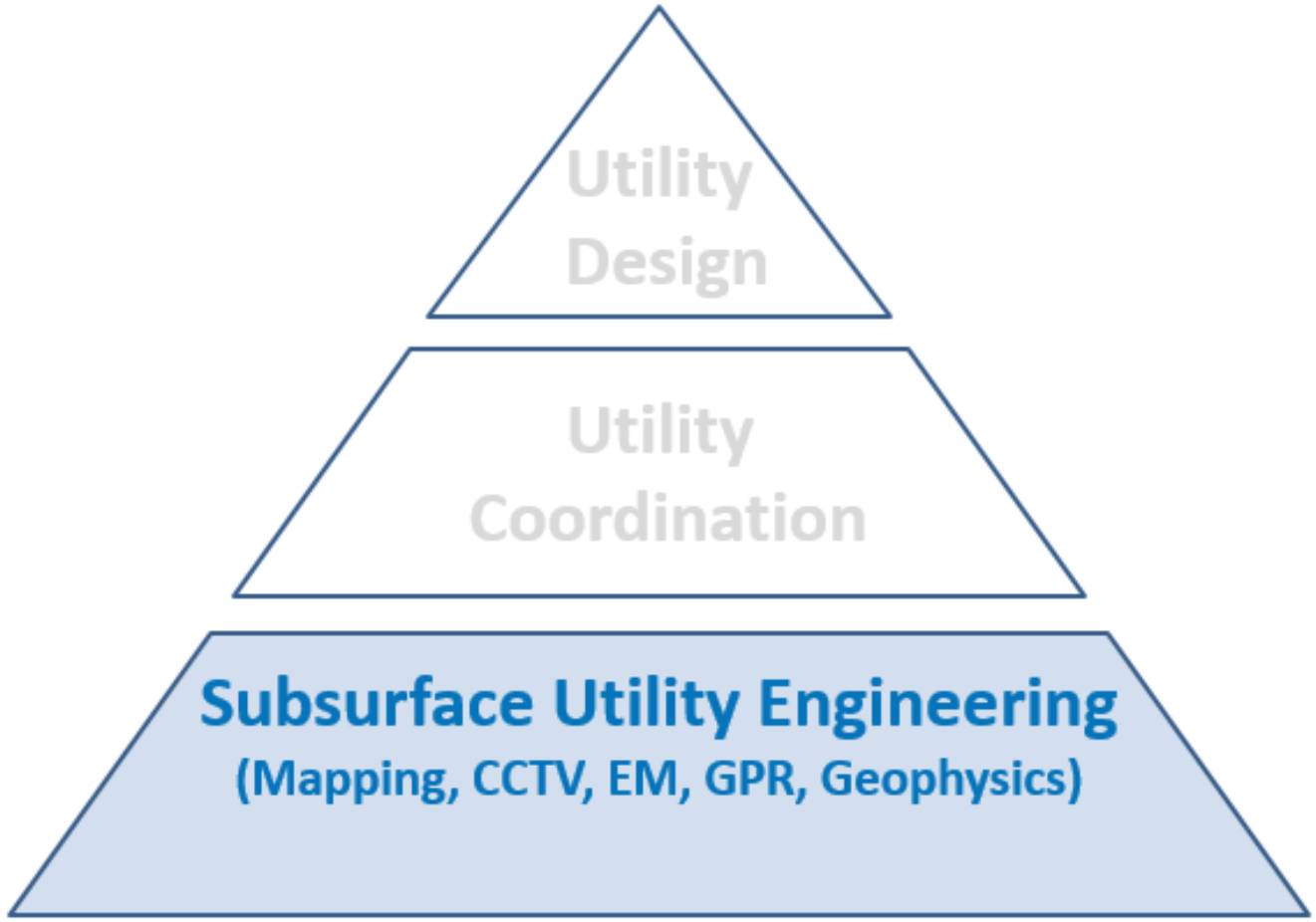
Implementing SUE from the “Get Go”….

Saves the project Time and $Dough$

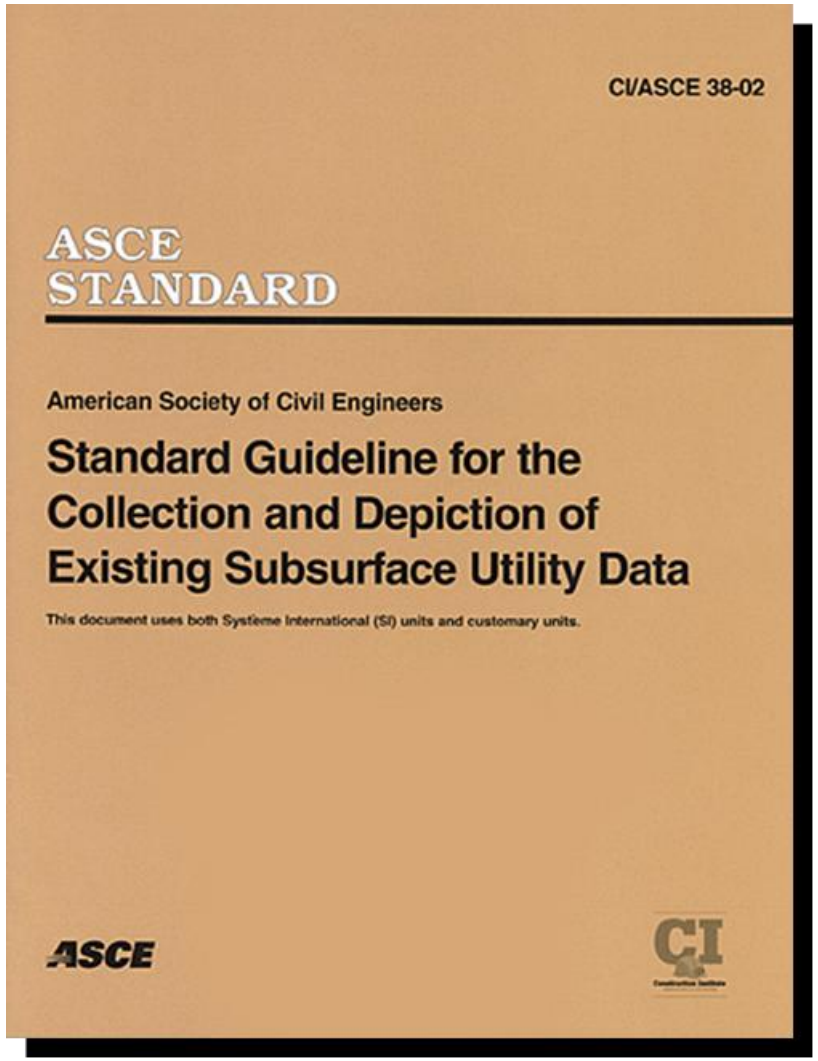
Utility Engineering Services



SUE – Subsurface Utility Engineering



Standards – ASCE 38-02



SUE Quality Levels

NOTES

THE UTILITY INFORMATION SHOWN ON THIS DRAWING WAS COLLECTED IN ACCORDANCE TO ASCE STANDARD 38–02. THE INFORMATION IS SHOWN BY QUALITY LEVEL WHICH INDICATES THE LEVEL OF EFFORT USED TO DETERMINE THE LOCATION OF THE DATA

INCREASED QUALITY ↓

QUALITY LEVEL "D" – INFORMATION DERIVED FROM EXISTING RECORDS OR VERBAL RECOLLECTIONS.

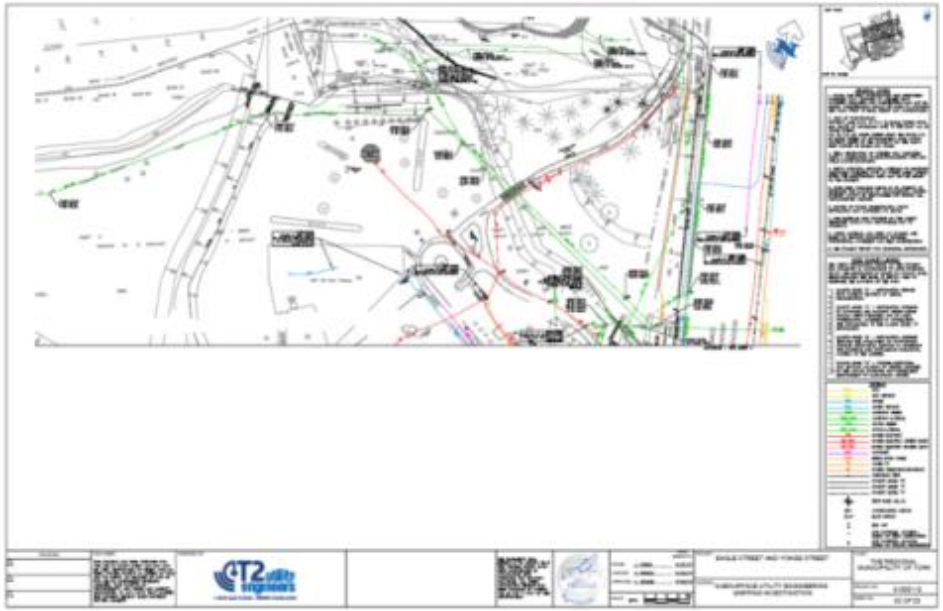
QUALITY LEVEL "C" – INFORMATION OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGEMENT IN CORRELATING THIS INFORMATION TO THE QUALITY LEVEL "D" INFORMATION.

QUALITY LEVEL "B" – INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF THE UTILITIES.

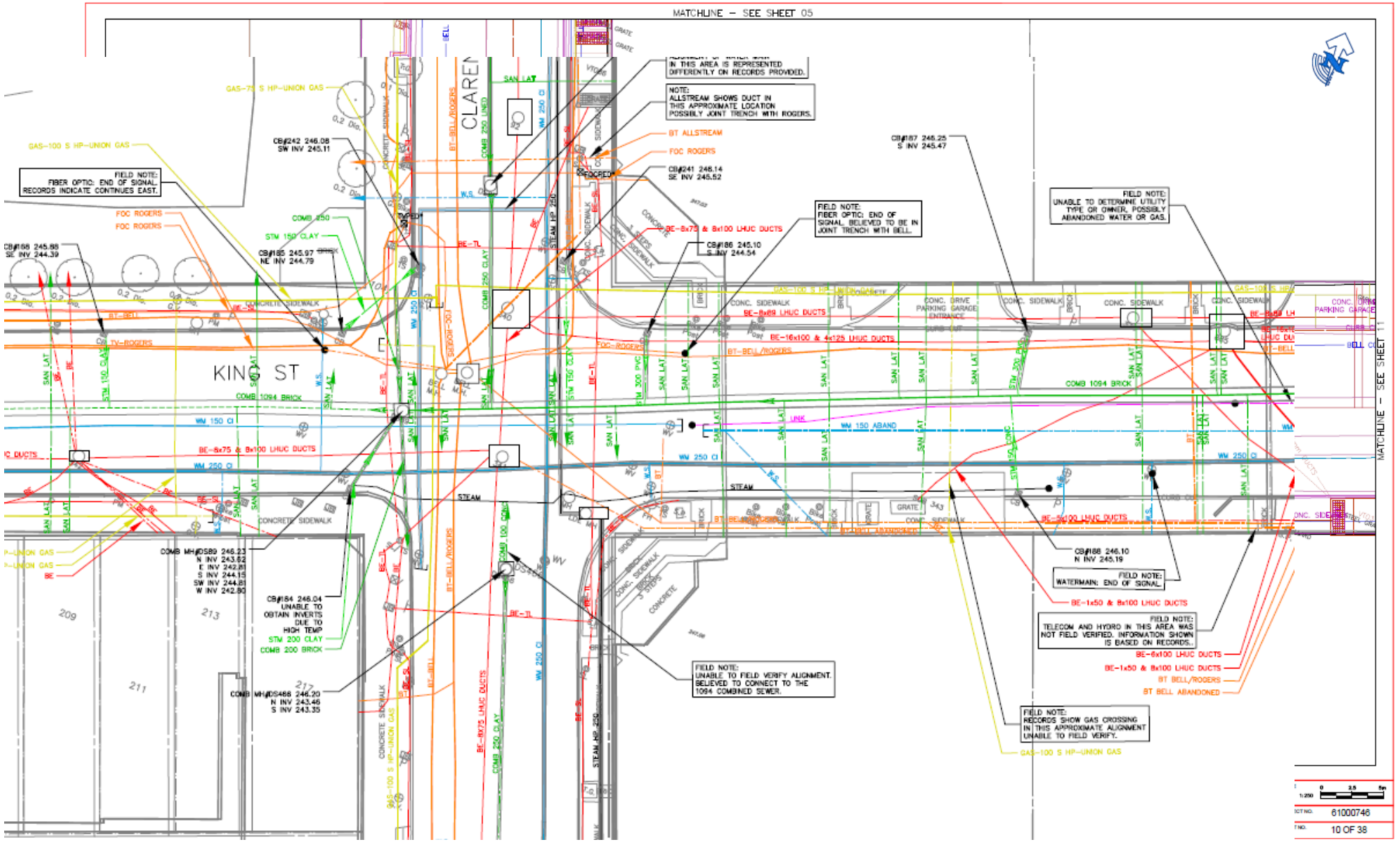
QUALITY LEVEL "A" – PRECISE HORIZONTAL AND VERTICAL LOCATION OF UTILITES OBTAINED BY THE ACTUAL EXPOSURE AND SUBSEQUENT MEASUREMENT OF SUBSURFACE UTILITIES.

A, B, C, D

Most Accurate **Least Accurate**

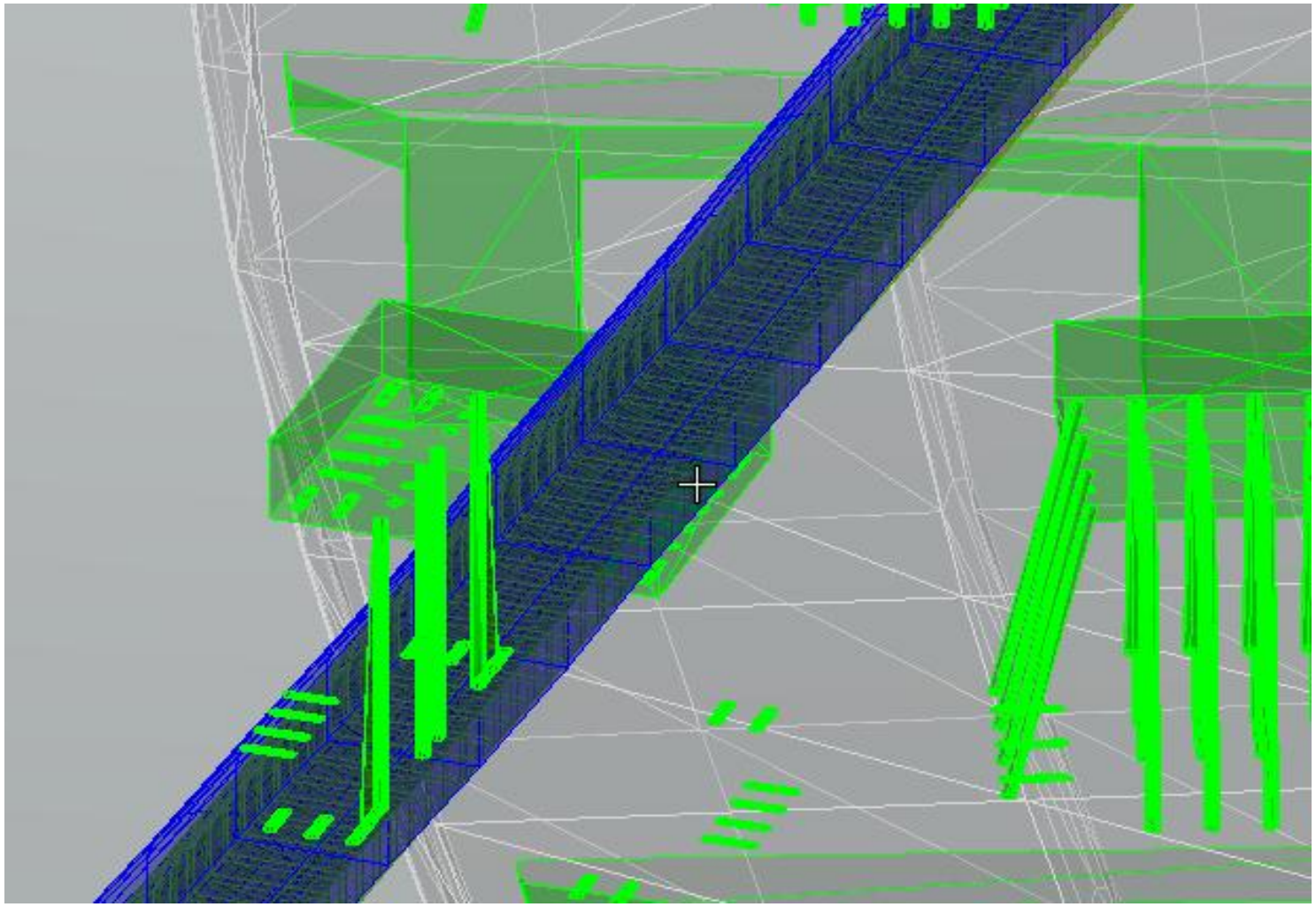


SUE Investigation – QLD vs QLB



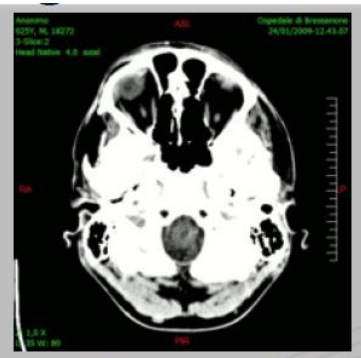
Current SUE Technologies

- Integrating all technologies for Deliverables



Multi-Channel GPR

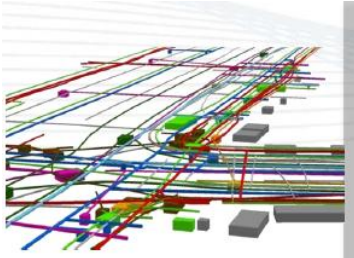
Multi-Channel GPR

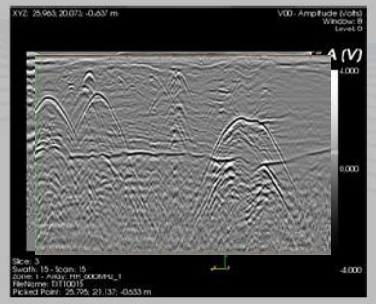


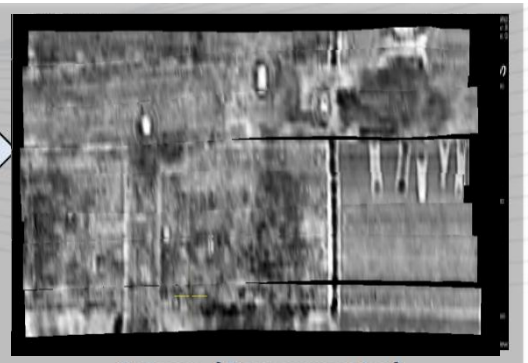
Radiography

CAT (Tomography)

From detection to mapping…







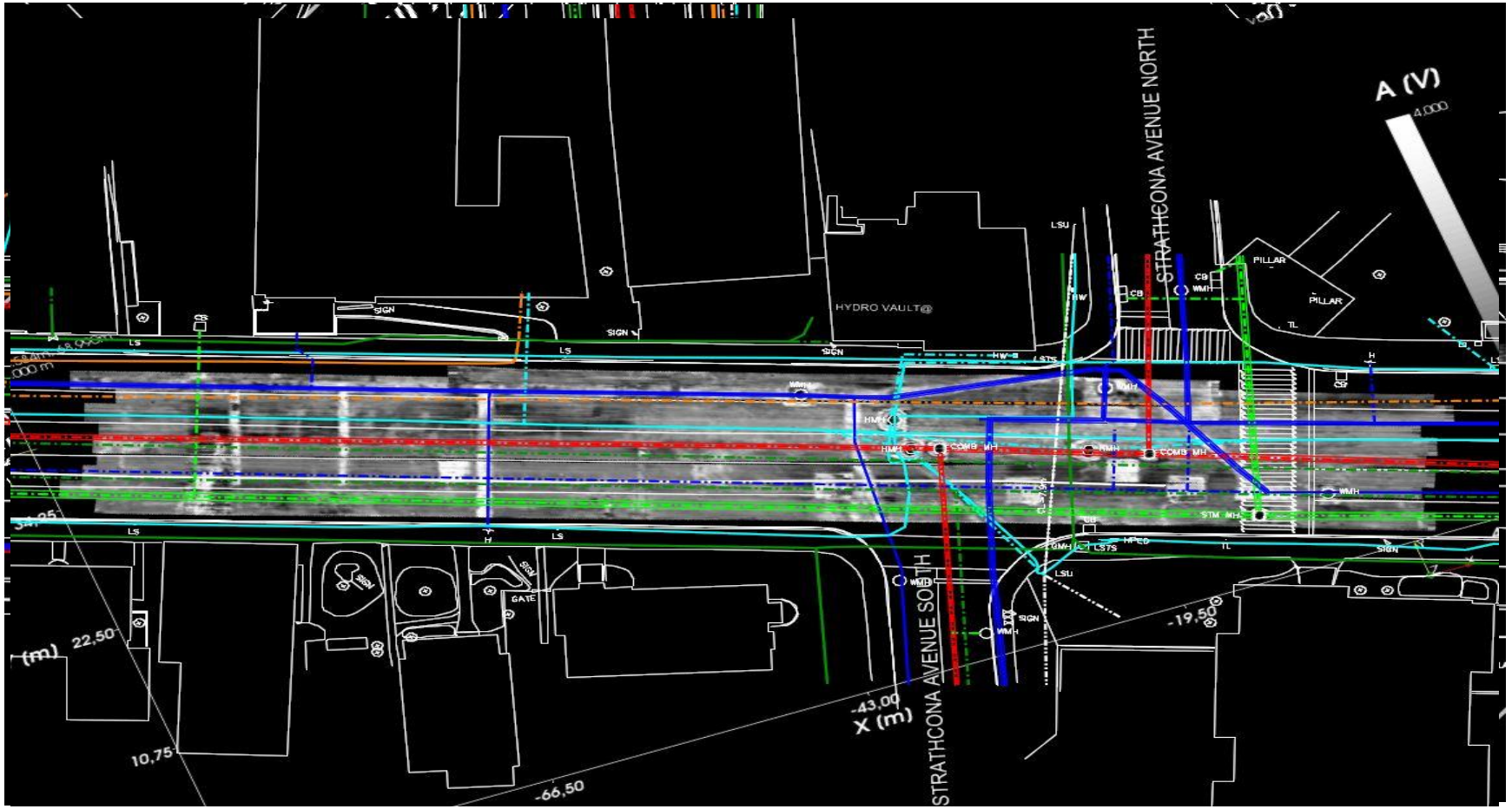
B-Scan

C-Scan (Tomography)

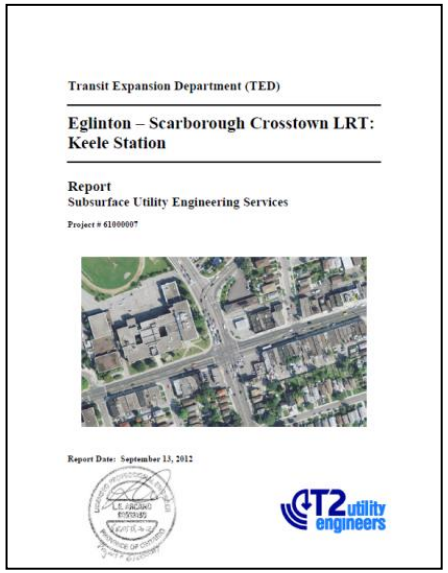
Multi-Channel GPR

Results - MCGPR

SUE Drawing with MCGPR



SUE Deliverables



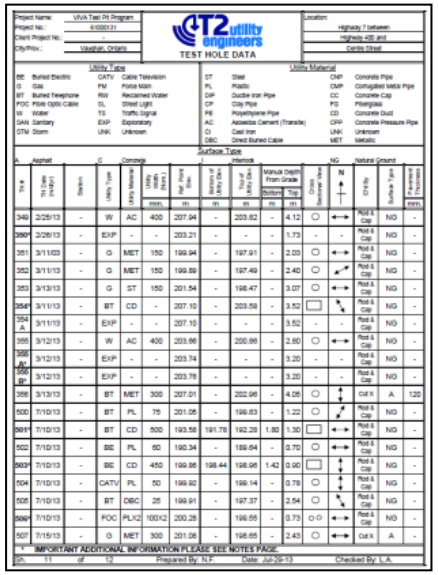
Transit Expansion Department (TED)

Eglinton – Scarborough Crosstown LRT: Keele Station

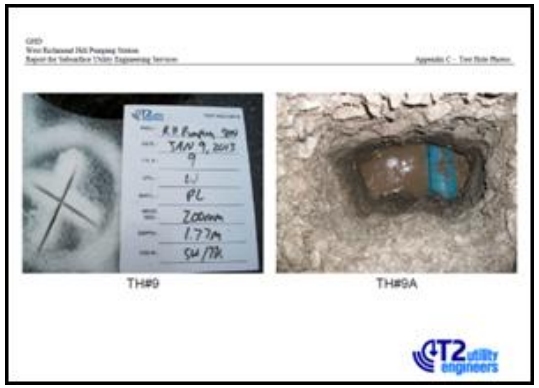
Report
Subsurface Utility Engineering Services

Project # 61000007

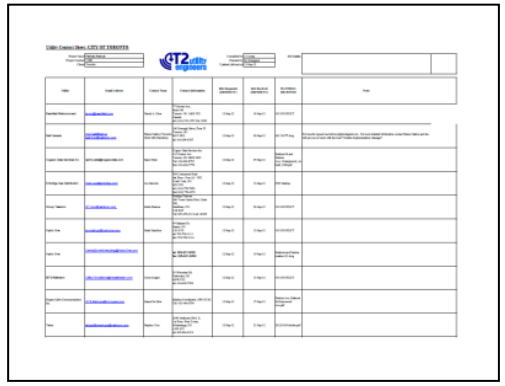
Report Date: September 13, 2012

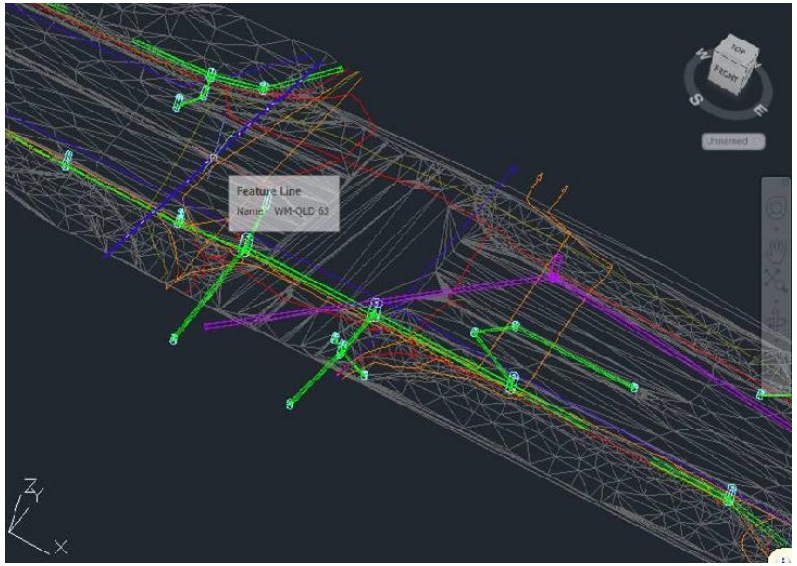


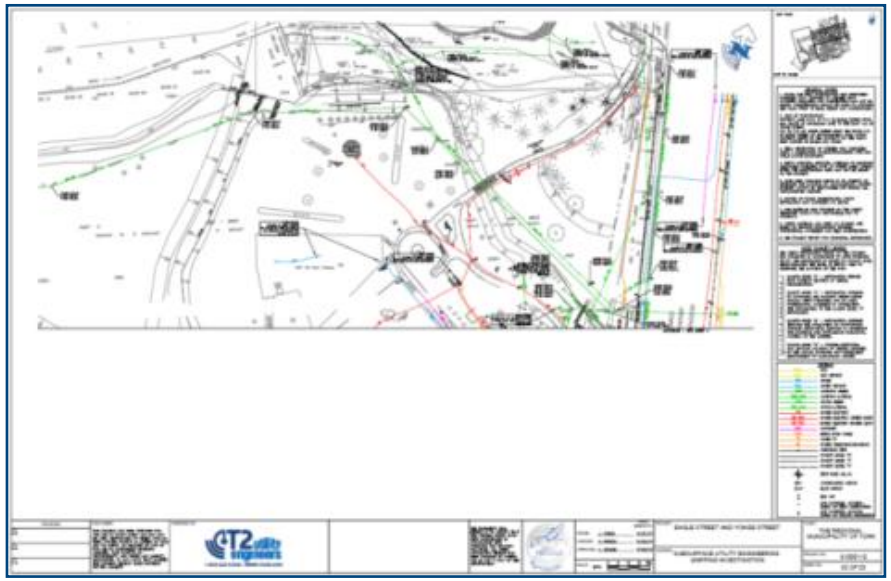
TEST HOLE DATA



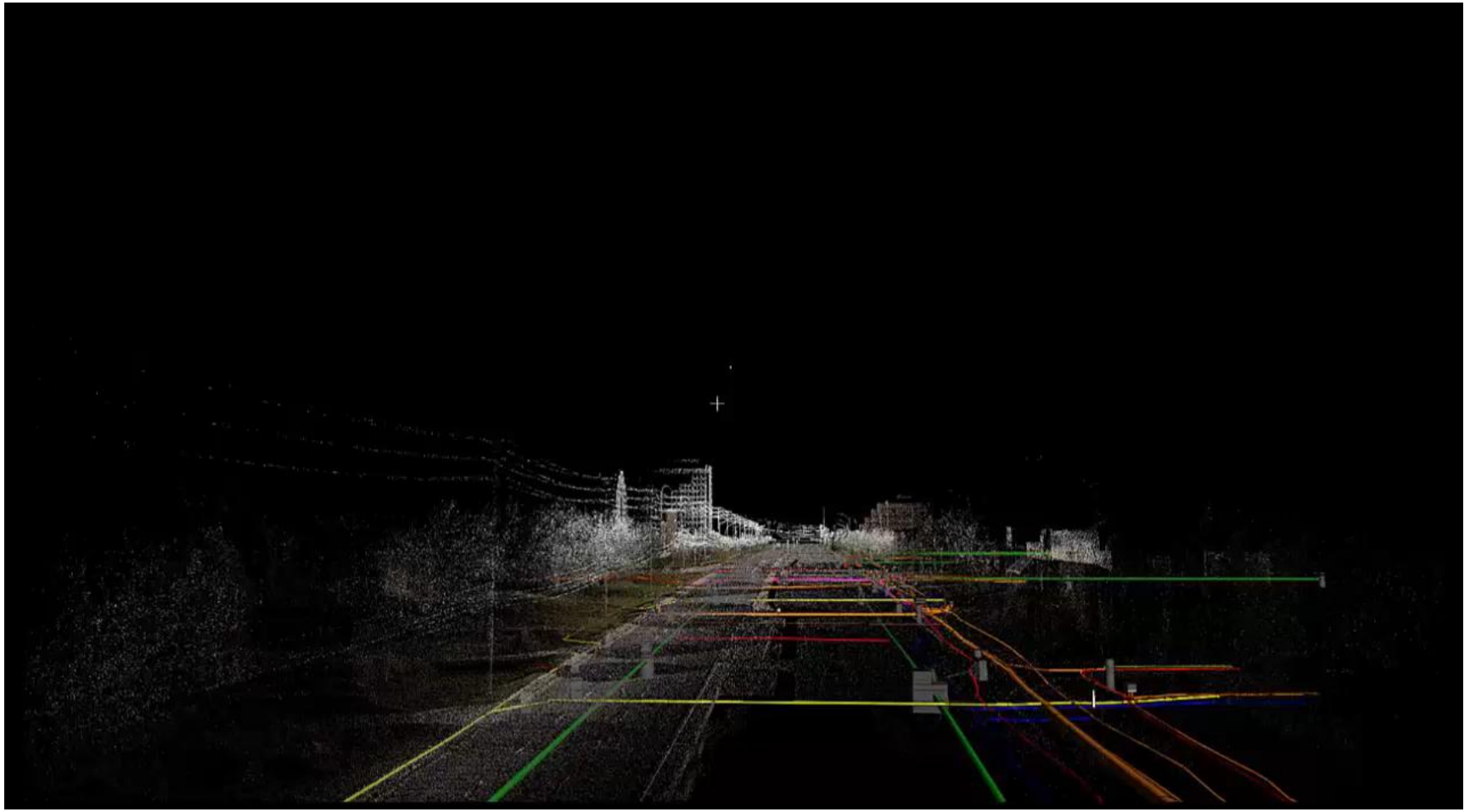
TH#9 TH#9A



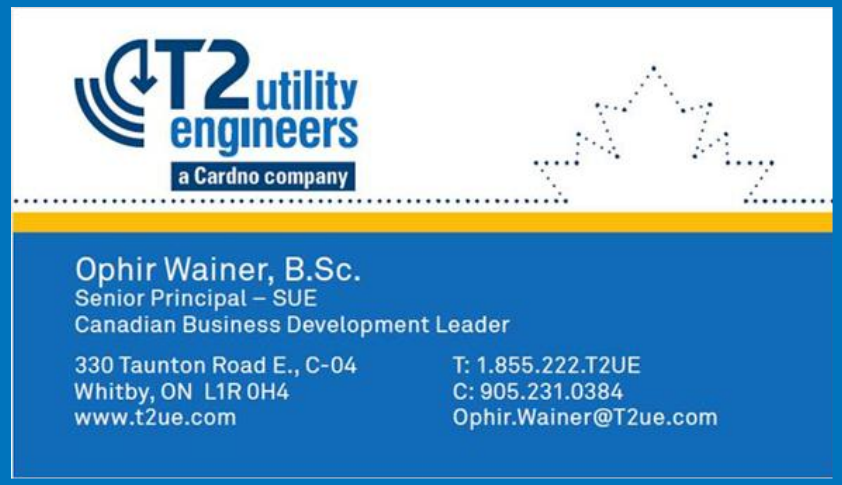




3D Model



Thank you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