

A Presentation on Managing Utility Risks at the 124th AOLS AGM in London

By Lawrence Arcand, P. Eng.

It was a cold wet day on February 25th when I sat gathering my thoughts before my morning presentation at the 124th AOLS AGM in London. As an engineer, there is always something that makes me a little nervous standing up in front of a group of land surveyors. Both professions share a lot of common traits; both are very technical, analytical, detail oriented, and yet both possess their own areas of focus and strength. My biggest fear - getting very technical survey-based questions from the crowd that would go right over my head. It was a packed house, which is always great to see as a presenter. There were many familiar faces, but many more that I did not recognize. Out of the corner of my eye I caught Ophir Wainer from our office starting to video the presentation. Last deep breath to calm the nerves ... and it was go time!

Thankfully, the topic of the day was something I am very passionate about: using practices and processes to most effectively manage the risks associated with existing utilities on capital infrastructure projects. Heck, I have spent the last 13 years of my life dedicated to improving the processes that we use in Ontario and across Canada, with the hope of improving the industry as a whole.

I started out with a great story that exemplifies what *not* to do. It was an Urban Transit project in Toronto, and not enough attention was paid by the team working on the Environmental Assessment/conceptual stage. The result - a \$14M dollar project turns into a \$105M dollar project mainly due to all the complexities that arose from dealing with the existing Utilities. The key lesson learned is that we have the tools to do better and we, as professionals, need to implement those tools to ensure it does not happen on the next project.

The idea of professional collaboration is one that is gaining a lot of momentum across North America. The American Society of Civil Engineers (ASCE) recently started a brand new group called the Utility Engineering & Survey Institute (UESI). UESI's goal is to be the worldwide leader in generating products and services that promote and reward excellence in the engineering, planning, design, construction, operations, and asset management for utility infrastructure and engineering surveying. I thought it was great to see the ASCE recognize the strong relationship between civil engineers and surveyors. I also thought it was great when I found information from the AOLS Insurance Advisory Committee that has made some very distinct and



Lawrence Arcand (left), Ophir Wainer (centre) and Josh Cowan from T2 Utility Engineers pose in their T2ue Hockey Jerseys at their exhibit booth during the AGM in London

relevant observations that I decided to share during the presentation:

- Losses occur because of an error or omission
- Errors and omissions occur because of a mistake
- Mistakes occur because the proper process/procedures were not followed or important steps were skipped.

When I read these points I thought they were great. For me, it underlines how engineers and surveyors need to work together on these projects, each understanding our strengths and weaknesses and doing our specific part in the process to get to the end product.

At this point in the presentation, I was getting a lot of head nods and obvious acceptance of what I was talking about. It was great, but I was still talking at the 10,000 ft level. It was time to dive into some of the specifics and highlight some of the standards that we utilize to manage utilities. Talking about standards and guidelines is always a challenge. How can you be informative and yet not put your audience to sleep – not always easy!

There are 3 important guidelines in the utility world that I wanted to focus on:

- ASCE 38-02 – Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data
- TAC - Guideline for the Coordination of Utility Relocations
- CSA S250-11 - Mapping of underground utility infrastructure

because they are able to learn from and leverage the best practices of others into their operations.

The TAC Guideline will be used more by engineers and coordinators than surveyors, but the guideline does lay out the use of the ASCE 38-02 and CSA S250-11 guidelines which require collaboration between the two professions.

The ASCE 38-02 has been around since 2002 and it has become the “go to” document for engineers, creating composite utility drawings showing the location of existing utilities on a project. The real value of the standard is the way it lays out the various Quality Levels that can be used for depicting the Utilities on the drawings. The engineer can work with a surveyor to collect the field data, then take that data and through analysis, review and interpretation, assign it a Quality Level, which is dependent on how the information was collected and the reliability of that data.

Quality Level D – Information derived from existing utility records.

Quality Level C – Information obtained by surveying and plotting visible above-ground utility features and by using professional judgment in correlating this information to 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 subsurface utilities.

Quality Level A – Precise horizontal and vertical location of utilities obtained by the actual exposure (or verification of previously exposed and surveyed utilities) and subsequent measurement of subsurface utilities, usually at a specific point.

The use of the ASCE 38-02 standard and the proper execution of Subsurface Utility Engineering (SUE) processes has revolutionized the way we create composite utility drawings in Ontario and throughout Canada. It is improving our engineering designs, reducing risks on projects and ultimately saving project owners money. A study by the University of Toronto in 2006 showed a savings of \$3.41 for every \$1 owners spent doing SUE. The Centre for the Advancement of Trenchless Technologies (CATT) at the University of Waterloo is about to update that study and dig even deeper into the cause and effects.

The last guideline that I reviewed with the group was CSA S250-11. This guideline is probably the one where Surveyors had the most opportunity to get involved and provide valuable input. One key aspect of CSA S250-11 is assigning Accuracy Levels to as-built and record drawings.

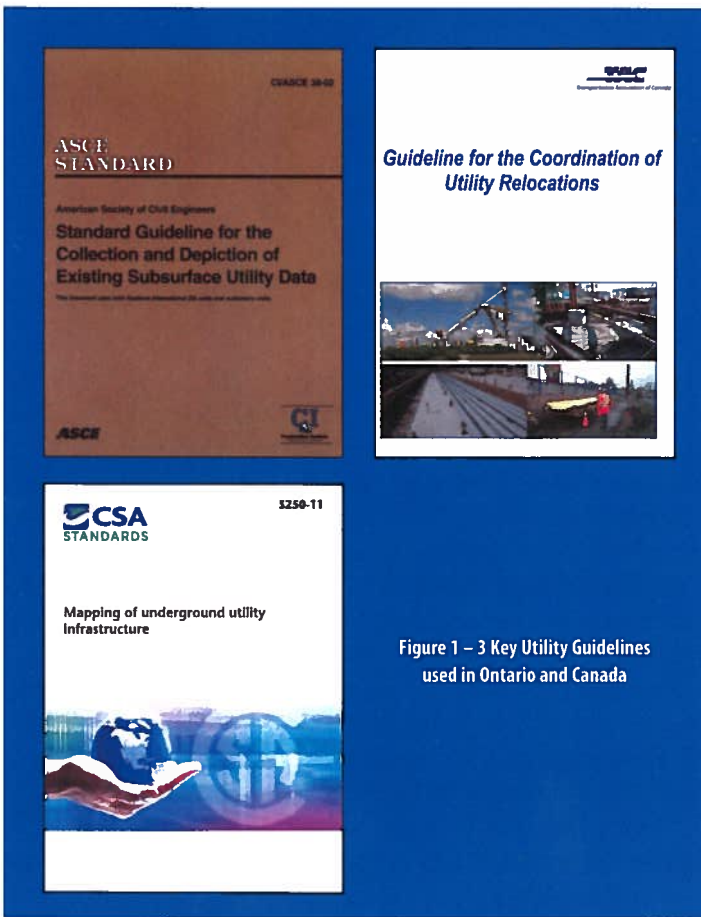


Figure 1 – 3 Key Utility Guidelines used in Ontario and Canada

I started with the Transportation Association of Canada (TAC) guideline which is brand new ... so new it is not even published yet. We are hoping to see it come out from TAC in late spring, and I am excited to say that due to some persistence on behalf of our Public Utilities Management Subcommittee (PUMS) and some generous sponsors, we will be able to distribute it for free. This free distribution will hopefully accelerate the awareness and use of the standard across the country and hopefully push it towards acceptance and adaptation as the “go to” document. At the heart of the guideline is a flowchart which helps to lay out the general processes to be followed for managing Utility Coordination efforts on projects. Having this flowchart benefits Utilities because it provides consistency for Utilities that operate within many jurisdictions and municipalities. It benefits municipalities and other ROW owners

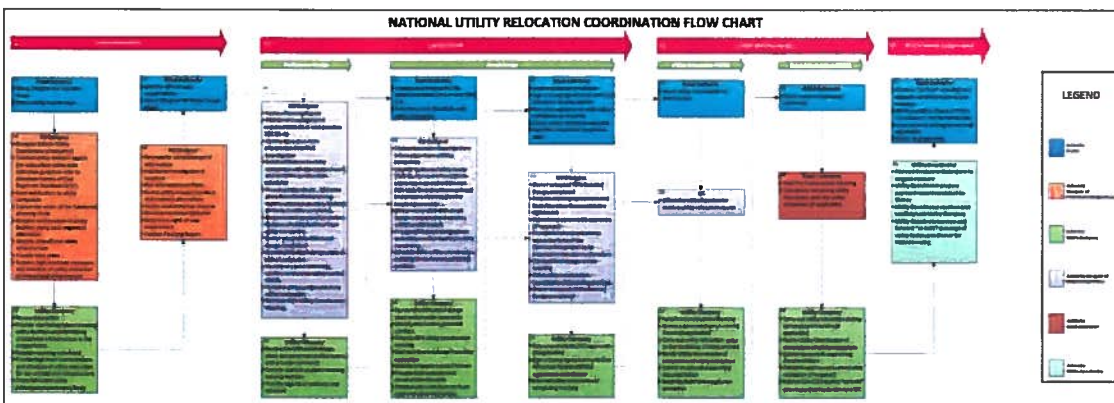


Figure 2- Flowchart from the TAC – Guideline for the Coordination of Utility Relocations

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Accuracy level	Description	Reference
1	Accurate to within +/- 25 mm in the x, y, and z coordinates, and referenced to an accepted geodetic datum with a 95% confidence level.	Absolute
2	Accurate to within +/- 100 mm in the x, y, and z coordinates, and referenced to an accepted geodetic datum with a 95% confidence level.	Absolute
3	Accurate to within +/- 300 mm in the x, y, and z coordinates, and referenced to an acceptable geodetic datum or topographical and cadastral features with a 95% confidence level.	Absolute or relative
4	Accurate to within +/- 1000 mm in the x, y, and z coordinates, and referenced to an acceptable geodetic datum or topographical and cadastral features with a 95% confidence level.	Absolute or relative
5	Accurate to within +/- 1000 mm in the x and y coordinates, and referenced to an acceptable geodetic datum or topographical and cadastral features with a 95% confidence level.	Absolute or relative
0	No information available related to spatial accuracy.	

Figure 3– Accuracy Level Chart from CSA S250-11

One of the primary reasons why we need the ASCE 38-02 standard is that we have poor records of our underground Utilities. CSA S250-11 aims to rectify the issue on a go forward basis, by preparing better records, so that future generations will know where the infrastructure is underground. Surveyors need to play a big role in collecting that accurate data and helping to depict it in a way that can be shared with future generations.

At this point of the presentation time was running out and it was time to wrap things up. Time to sum up the key points of my talk:

- Utilities pose one of the major risks on Infrastructure Projects
- Ontario Land Surveyors and Professional Engineers need to work together to focus on their unique strengths and manage these Liabilities
- There are great new guidelines that can be followed which will help to guide us:
 - TAC- PUMS Guideline
 - ASCE 38-02 (UESI)
 - CSA S250-11

The hour was now up. I had made it through and not only were all the people still there, but I think that the room was even more crowded than when I started. There were a lot of great questions, but I think that the ultimate acknowledgement that the presentation was well received was when I got the e-mail from Maureen Mountjoy a month or so later. Her e-mail said that she heard good things about the presentation and wanted me to write an article so that all those who were not able to attend could benefit.

Now you know why you are reading this article. I hope that all who attended the presentation took at least one new piece of knowledge and information away from it, and I hope that is the same for everyone reading this article.



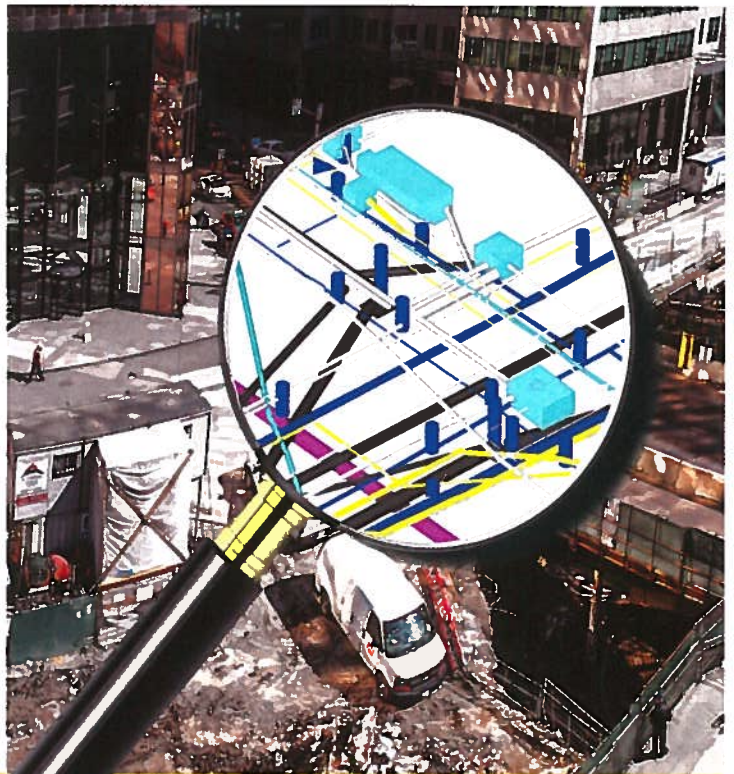
Thanks Maureen for inviting me to share!




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