



2022 DIRT REPORT

Ver 16.0

Ontario Regional
ORCGA
Common Ground Alliance





Important Information



Blocked Sewer? Always Call Before You Clear.

Sewer drain emergencies and flooded basements can be stressful. But before you or a plumber attempt to clear a blocked sewer or septic line, be sure to call **Ontario One Call** toll free at **1-800-400-2255** for a free sewer safety inspection.

Resolve clogs quickly and safely



Blockages in pipes that run inside your home typically can be cleared safely on your own.



If the clog is in sewer or septic pipes that run outside the walls of your home, call **Ontario One Call** for a **FREE** safety inspection before you or a plumber attempt to clear it.



Never use motorized or water-jetting equipment to clear a blocked sewer line without an inspection.

To request your **FREE** inspection, contact **Ontario One Call** at **1-800-400-2255**. These inspections are available 24/7 and are treated as emergencies. If a cross bore is found, the sewer line will be fixed at no cost to you.

What is a cross bore?

In rare cases, underground natural gas pipelines could unintentionally run through sewer or septic pipes – this is called a cross bore. Left undisturbed, cross bores aren't an immediate safety risk. However, using motorized or water-jetting equipment to clear a blocked sewer line could damage the natural gas line, resulting in a real and immediate risk to public safety, including a gas leak, fire or explosion.

Smell gas? Act fast!

Natural gas smells like rotten eggs or sulphur. If you smell gas or think you have a gas leak, leave the area immediately and call Enbridge Gas at **1-866-763-5427** or **911** from a safe distance (like a neighbour's home).



Visit enbridgegas.com/sewersafety for more safety information and videos.

Message from the President and CEO



**Douglas Lapp,
President & CEO**

Underground infrastructure provides crucial essential services to homes, businesses, public institutions, and communities. Whether it is delivery of natural gas for heating, electric power for lighting, high speed fibre for communications, or water supply; these are all critical for both business and day to day living. The risk of disruption to the delivery of these services through this vital infrastructure exists every day, and at every excavation job site.

The upcoming expansion of broadband infrastructure in Ontario as a result of Ontario Bill 257 highlights the increased dependence on buried infrastructure in both business and at home. Coming out of the COVID-19 Pandemic and the evolution of numerous “working from home” options at the workplace has heightened the criticality of telecommunications infrastructure to that of other essential services such as power, natural gas and water/sewer.

The increased activity in underground construction from broadband and transit projects has highlighted the need to improve on the timely delivery of utility locates, resulting in amendments to the Ontario Underground Infrastructure Notification System Act (OUIINS) through the passing of Bill 93 in 2022, and the “Dedicated Locator” initiative to address late locates on project work.

To provide the best defence against underground strikes, the understanding and analysis of infrastructure damages or events and drilling down into their root causes will help to determine which aspects of the excavation process should be targeted for awareness, training, and oversight to reduce the frequency and consequences of these events.

The overall number of damages in 2022 increased from 2021 by approximately 4.7%, bringing the number of recorded damages to 4,769. However, there was also a 2.1% decrease in locate requests overall and a corresponding decrease in One Call Notifications of 3.2%. Slight increases in damage events were noted in most areas across Ontario, with substantial decreases in the Sarnia area of 52% or 63 and Ontario South-east at 31.8% or 34.

The most prevalent root cause for underground utility damages continues to be Excavation Practices Not Being Sufficient, with a slight increase over 2021 of 6%. Underground utility damages due to notification issues increased from 2021 by 17.8% and continues to be a concern as close to 100% of these are due to no call being made to Ontario One Call prior to excavation activity (37% of damages).

Clearly, there continues to be considerable work ahead to educate excavators on safe digging practices and the need to Call or Click Before You Dig.

The 2022 DIRT Report is the result of the dedicated volunteers on the ORCGA Reporting and Evaluation Committee, led by Co-Chairs Leah Borley of Hydro One and Frank Zechner of the Residential & Civil Construction Association of Ontario (RCCAO).

On behalf of the ORCGA Board of Directors, I would like to extend a sincere thank you to the Reporting and Evaluation Committee for ensuring that the 2022 DIRT Report was accessible on the ORCGA website, as well as being distributed to all members before April 1st, the start of the 2023 Dig Season.

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(647) 221-2572

Ontario Regional
ORCGA
Common Ground Alliance

Reporting & Evaluation Committee Members

The Reporting & Evaluation (R&E) Committee is a group of diverse stakeholders who are responsible for analyzing the data submitted into the Damage Information Reporting Tool (DIRT), identifying trends, making recommendations based on the data, and ensuring that the annual DIRT Report is created and published in a timely manner.

The R&E Committee also determines the ORCGA Excavator of the Year award winners. We welcome any new industry members to get involved; your voice matters. Contact us at office@orcga.com or **(866) 446-4493**.

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The Ontario Regional Common Ground Alliance (ORCGA) is a non-profit organization that is driving Safe Excavation for workers, the public and underground infrastructure through Advocacy, Education and Engagement.

The ORCGA is a growing organization with approximately 500 active members and sponsors representing a wide cross section of stakeholders:

Electrical Distribution	Insurance	Railway
Electrical Transmission	Landscaping/Fencing	Regulator
Engineering	Land Surveying	Road Builder
Equipment and Supplies	Locator	Safety Organization
Excavator	Municipal and Public Works	Telecommunications
Gas/Oil Distribution	One Call	Transmission Pipeline
Homebuilder		

The ORCGA works to foster an environment of safety throughout Ontario for all workers and the public. This is accomplished by offering practical tools while promoting public awareness and compliance of best practices regarding underground infrastructure and ground disturbance.

The ORCGA welcomes open participation and new members on its various committees. In order to submit a suggestion, or to join a meeting, please visit www.orcga.com to learn about the scope of the various committees.

General inquiries about the ORCGA can be made to:

Ontario Regional Common Ground Alliance (ORCGA)
545 North Rivermede Road, Unit 102
Concord, ON L4K 4H1

Telephone: (905) 532-9836
Toll Free: (866) 446-4493
Email: office@ORCGA.com

To learn more about the ORCGA's Dig Safe Program, visit www.digsafe.ca.



Like and follow us on your favourite social media sites!

1.1 Reporting and Evaluation Committee Recommendations

1. No Notification to One Call Centre

'No Notification to One Call Centre' root cause subcategory rose a dramatic 18% in 2022. Events in this subcategory increased by 219, surpassing the increase of overall facility events (216). See Page 18, Figure 11 for more details.

This must be a primary focus of ORCGA education and future campaigns. Particular focus should be placed on Dig Safe messaging to geographic areas which show high percentages of No Locate Request events, focusing on Contractor/Developers, who accounted for 64% of the no locate damages in 2022.

2. Excavation Issues

This remains a major issue and is the number one root cause of facility events; emphasis must be made to reduce events due to Improper Excavation Practices Not Sufficient. Targeted outreach, training and/or education should be provided to excavators to reduce events resulting from this root cause, focusing on the Construction Industry due to this group being a major contributor of these events.

'Excavator dug prior to valid start date/time' events increased 303% compared to 2021. We recommend more targeted outreach to excavators on waiting to dig until your locate has been completed.

'Excavator dug after valid ticket expired' events increased 46% compared to 2021. The Committee recommends more targeted outreach to excavators regarding locate validity periods.

If you are digging before your locate becomes valid or after your locate has expired you are in contravention of Ontario Underground Infrastructure Notification System Act, 2012 (OUINS Act): Commencement of Excavation or Dig, Section 10 (1) or Continuation After Expiry of Validity Period Section 10 (2).



In order to improve the overall completeness of submissions, the committee is advising submitters to:

Submit events in a timely manner

It is recommended that Damage Information Reporting Tool (DIRT) data is submitted on a monthly or bi-monthly basis, so the events are fresh in your memory and details are easy to recall.

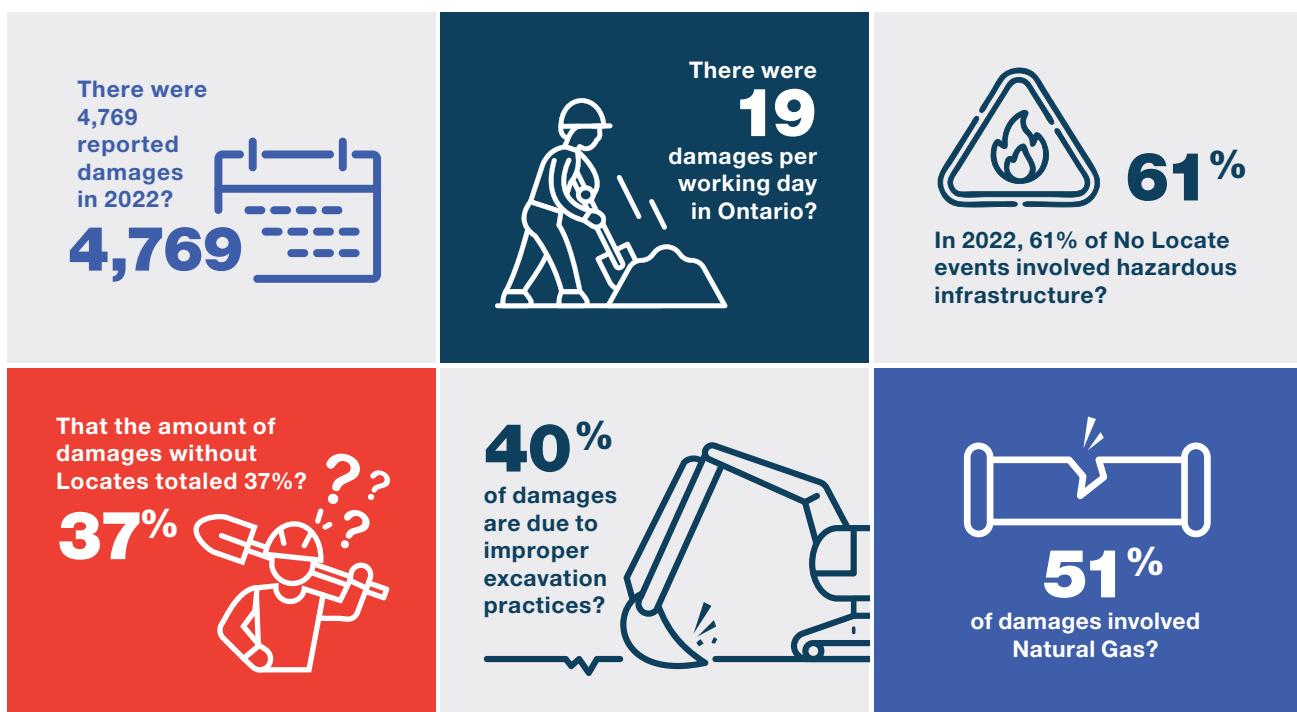
Complete the Late Locate Question

Although this is not mandatory it is strongly recommended that submitters answer to the best of their ability in order to gather enough data to determine if there is a relationship between damages and late locates.

Unknown/Other

It is the goal of this report to provide as much insight as possible for all stakeholders. Usage of the "unknown/other" categories limits our ability to provide clear measurable data to all stakeholders.

Did You Know?



Why take the risk?

You're probably pretty sure where the underground utilities and pipelines are on your worksite.

But would you settle for "pretty sure" when it comes to turning off a breaker, or putting your hand into a piece of machinery?

Why take the risk?

Whether trenching, boring, grading or any other type of ground disturbance, contact Ontario One Call first, and wait for the locate.

Visit OntarioOneCall.ca, because trying to save time could cost you more than you can imagine.



1.2 Data

The Damage Information Reporting Tool (DIRT) is the result of the efforts made by the ORCGA to gather meaningful data about the occurrence of facility events. An “event” is defined by the DIRT User’s Guide as “the occurrence of downtime, damages, and near misses.” Gathering information about these types of events gives the ORCGA the opportunity to analyze the contributing factors and recurring trends. This allows the ORCGA to identify potential educational opportunities to meet our overall goals of reducing damages and increasing safety for the public and all stakeholders.

The annual DIRT Report provides a summary and analysis of the known events submitted during the prior year, and as additional years of data are collected, it also provides the ability to monitor trends over time. The 2022 report focuses on the data gathered throughout Ontario during the three-year period between 2020 and 2022. This data can be helpful for all stakeholders to use as a benchmark for their damage prevention performance. It identifies current issues facing the industry, region and province.

Data Analysis Disclaimer: Industry stakeholders have voluntarily submitted their underground facility event data into DIRT. The data submitted is not inclusive of all facility events that occurred during the report year as it represents only the information voluntarily submitted by industry stakeholders.

The information presented in this report is based on current information provided to the ORCGA for events that occurred, or were updated, in 2022.

When reviewing statistics published in this report, it is important to note that contributors perform retroactive submissions for the three-year period. This will cause the volume of facility events submitted by year to change in each report.

In addition to the number of events submitted, an important factor is the completion of the associated information which allows for better overall analysis of the contributing factors. Each submitted record contains numerous data elements that are vital to understanding and interpreting the incidents reported in DIRT. It is important that stakeholders align their data collection and reporting practices with those found on the DIRT Field Form.

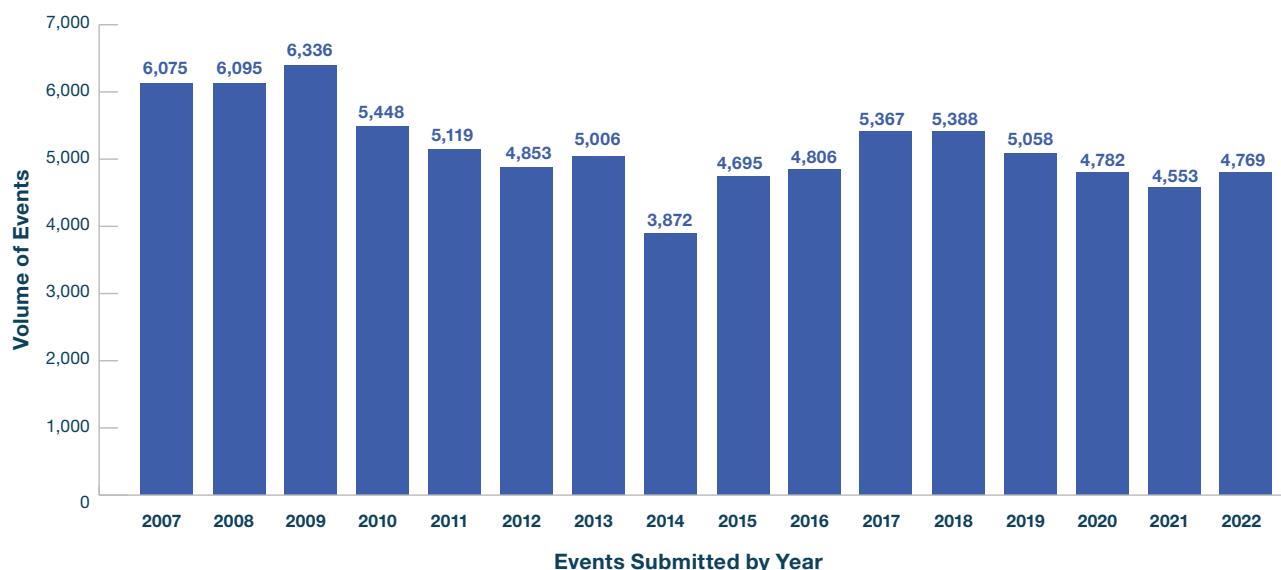
To gauge the overall level of completion of records submitted, the Data Quality Index (DQI) was implemented in 2009. This provides DIRT contributors a way to review the quality of the facility event records they submit.

When reviewing the statistics published in this report, it is important to note that only events with complete data were included; records with missing data were removed from the analysis.

2.1 Facility Event Analysis

2022 saw an overall increase in facility events, despite a decrease in requests. This is the first time since 2018 that we have seen an increase in damages. We will break out incidents to gain insight on where attention and efforts are to be made to continue reducing damages in the future.

Figure 1: Facility Events Submitted by Year



Mind the Lines

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and are dangerous.

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lines are located and know how
to avoid risks to stay safe.

Learn more at
HydroOne.com/MindtheLines

Hydro One supports public and
worker safety and is a proud
sponsor of the ORCGA

**CLICK
BEFORE YOU DIG**



2.2 Facility Events Submitted Across Ontario

Table 1 outlines the ORCGA geographic areas and the constituent municipalities/cities.

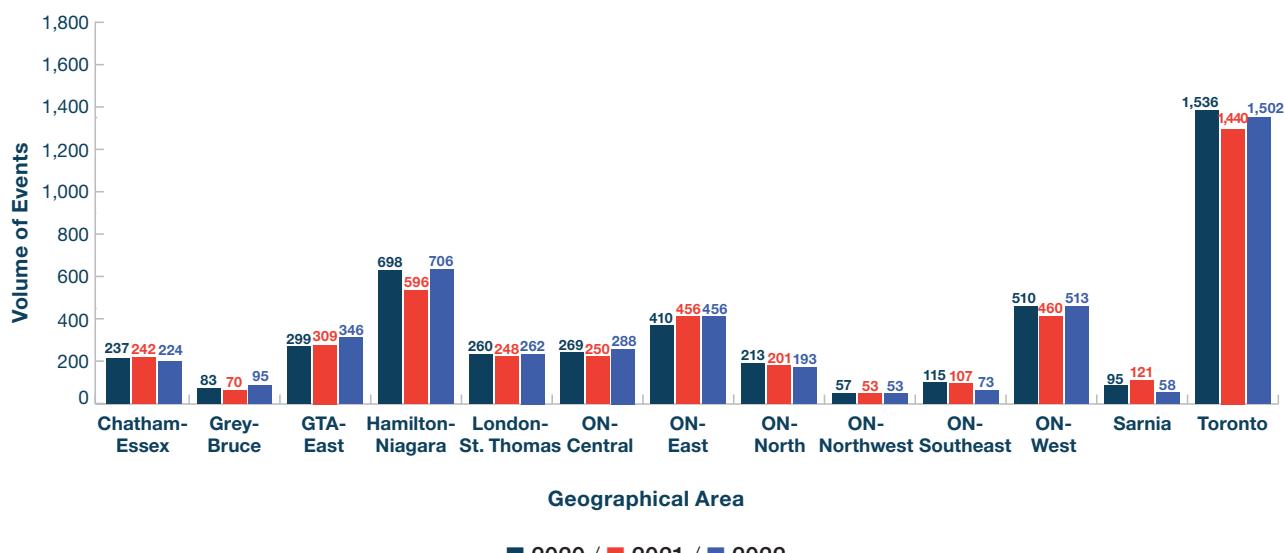
Table 1: Geographic Area Breakdown by Region/Municipality/City

Geographic Area	Cities
Chatham-Essex	Chatham-Kent, Essex
Grey-Bruce	Bruce, Grey
GTA-East	Durham, Kawartha Lakes, Northumberland, Peterborough
Hamilton-Niagara	Haldimand, Halton, Hamilton-Wentworth, Niagara, Norfolk
London-St. Thomas	Elgin, Middlesex
ON-Central	Dufferin, Simcoe
ON-East	Akwesasne, Lanark, Ottawa, Prescott & Russell, Renfrew, Stormont, Dundas & Glengarry
ON-North	Algoma, Cochrane, Greater Sudbury, Haliburton, Manitoulin, Muskoka, Nipissing, Sudbury, Temiscamingue, Timiskaming
ON-Northwest	Kenora, Rainy River, Thunder Bay
ON-Southeast	Frontenac, Hastings, Leeds & Grenville, Lennox & Addington, Prince Edward
ON-West	Brant, Huron, Oxford, Perth, Waterloo, Wellington
Sarnia	Lambton
Toronto	Peel, Toronto, York

Figure 2 illustrates the number of events for each geographic area over the past three years.

There have been minor fluctuations, however the majority of Geographic Councils are seeing an upward trend in events.

Figure 2: Volume of Events Submitted Per Geographic Area



2.0 | Data Analysis

Notifications decreased by 3% in 2022 which may be due to labour shortages and economic situations.

Table 2: Notifications Per Geographic Area

Geographical Area	2020	2021	2022
Central	206,678	241,198	253,699
Chatham-Essex	299,473	313,816	286,483
East	613,616	678,522	632,810
Grey-Bruce	87,449	103,032	110,792
GTA-East	428,078	473,380	462,862
Hamilton-Niagara	882,364	909,844	914,040
London-St. Thomas	244,691	284,812	267,477
North	193,942	195,532	180,318
Northwest	70,736	70,264	64,981
Sarnia	86,089	104,735	93,172
Southeast	123,212	134,991	131,355
Toronto	1,970,221	2,044,766	1,978,923
West	539,783	586,820	571,122
GRAND TOTAL	5,746,332	6,141,712	5,948,034

Figure 3 illustrates the number of events in 2022 where Ontario One Call was notified for a locate request versus not being notified for a locate request, broken down by geographic area.

Figure 3: Locate Versus No Locate Events by Geographic Area

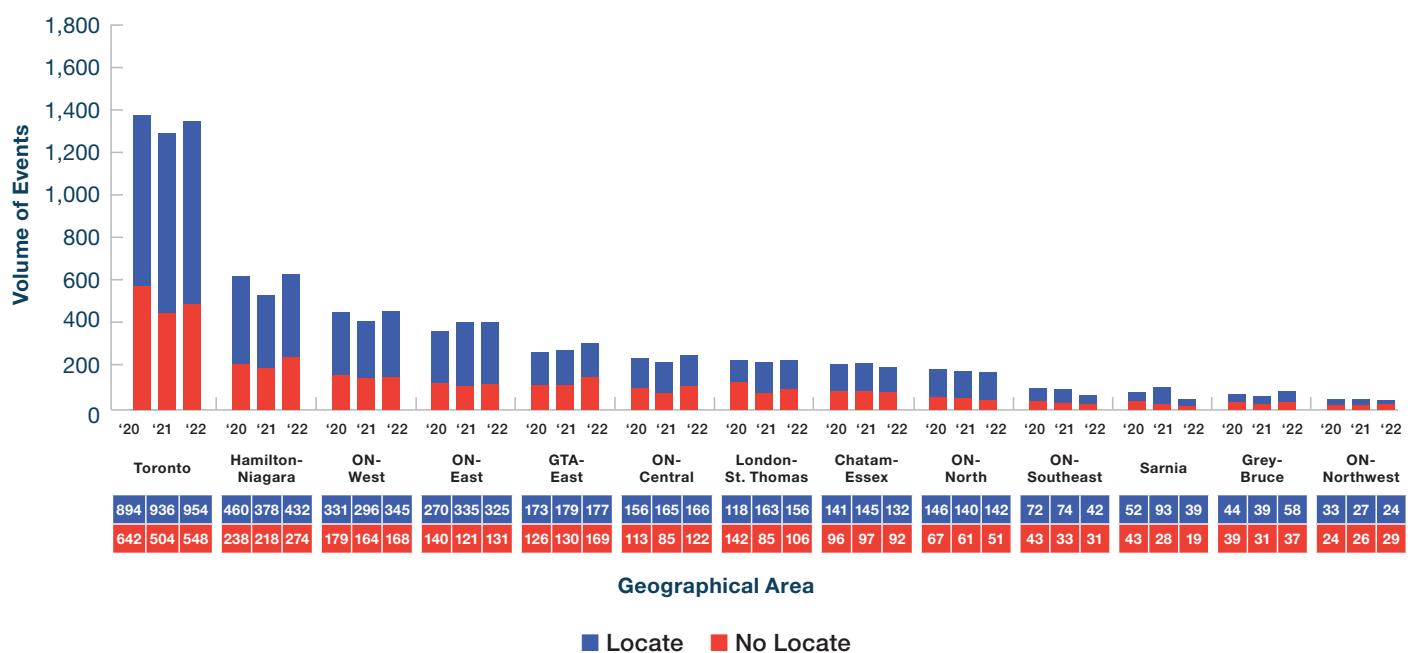
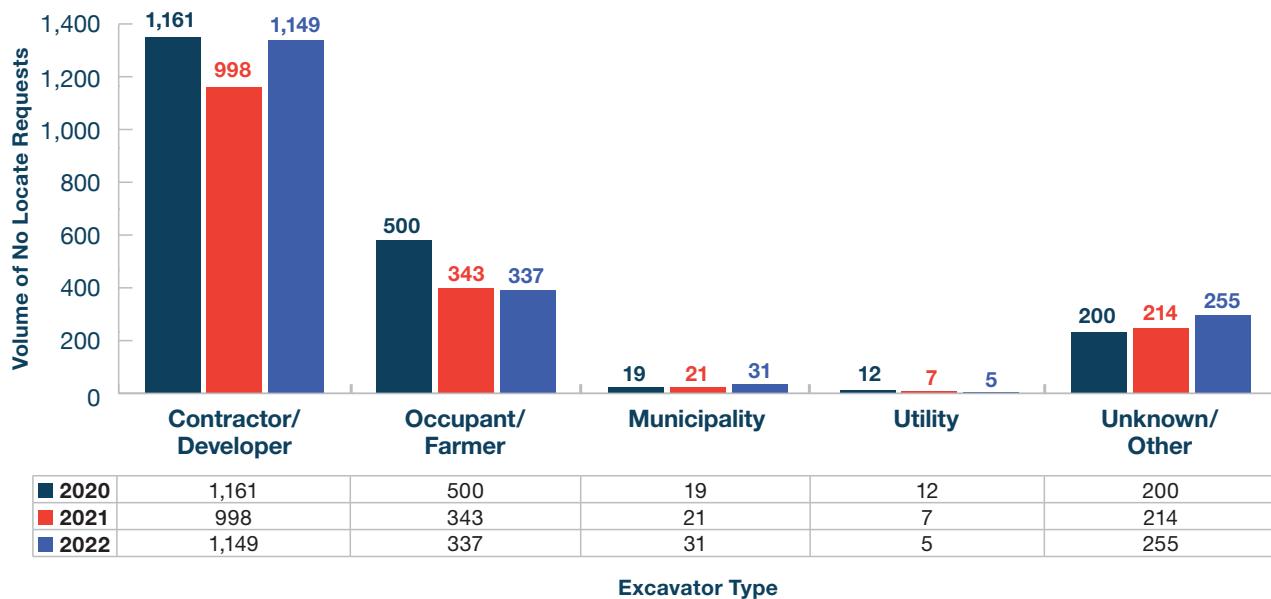


Figure 4 provides further analysis on the categories of excavators that are not submitting locate requests.

Increased education should be targeted towards the Contractor/Developer who were responsible for 64% of the no locate damages in 2022 and saw an increase of 15% in events compared to 2021.

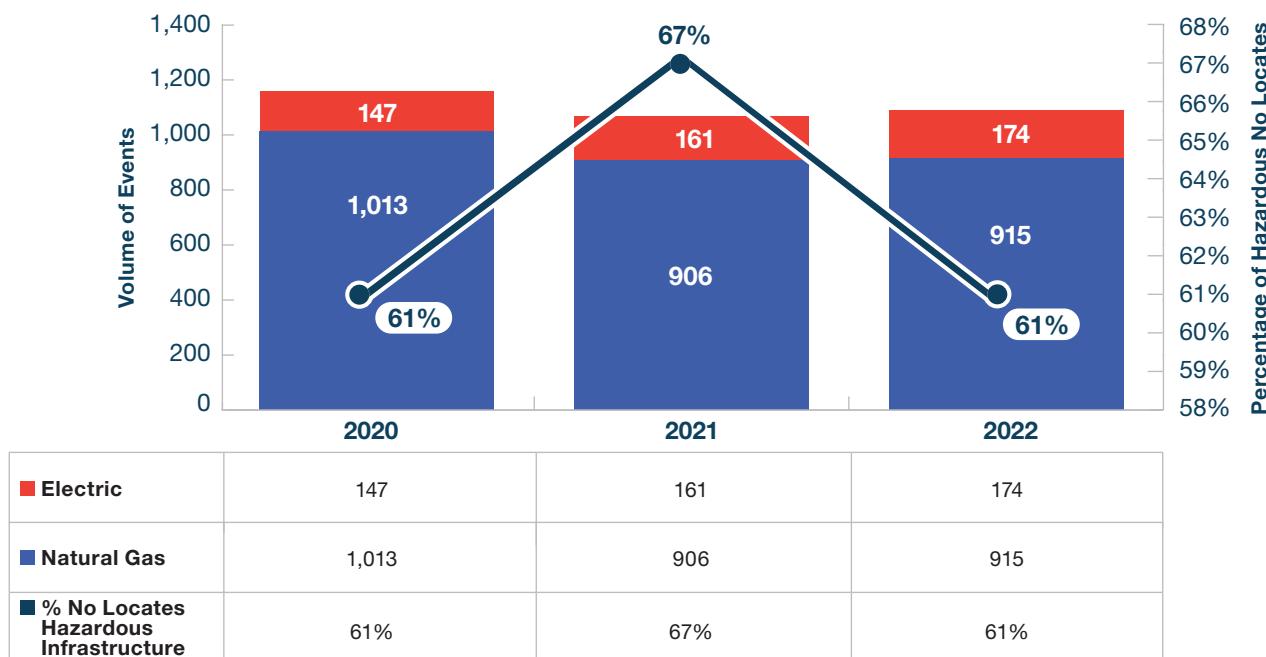
Figure 4: No Locate Damages by Excavator Type



In 2022, 61% of No Locate events involved hazardous infrastructure; 915 Natural Gas and 174 Electrical.

Although this is a 6% decrease compared to 2021, the number of hits on hazardous infrastructure is the most concerning as any of these damages could have resulted in serious consequences.

Figure 5: No Locates with Hazardous Infrastructure



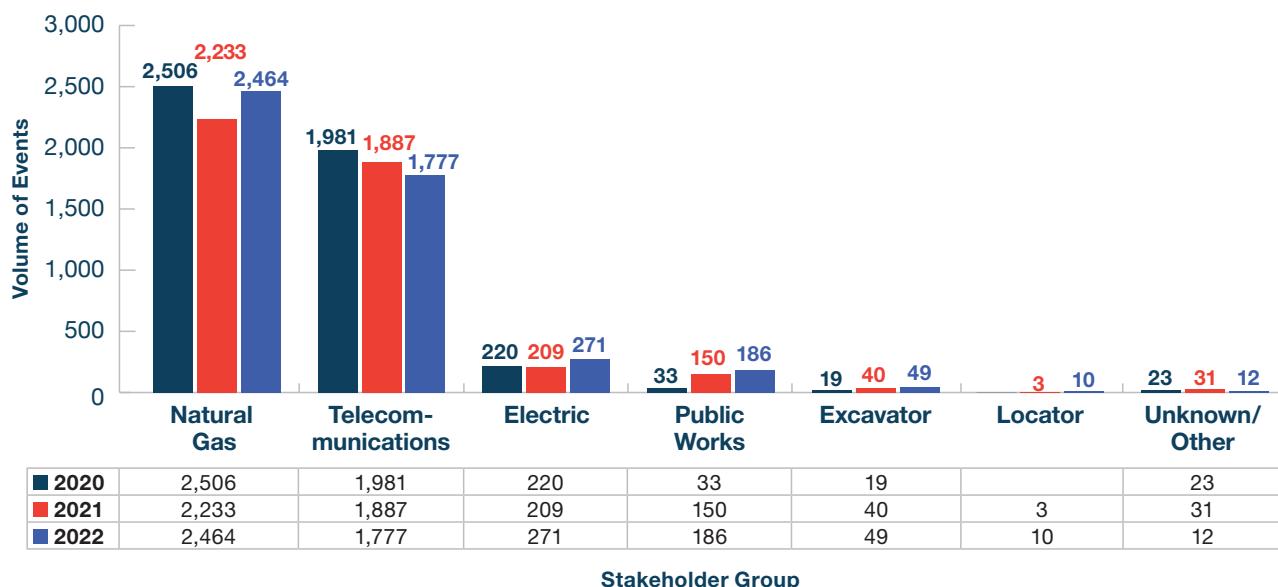
2.3 Submitted Facility Events by Stakeholder Group

Figure 6 illustrates a distribution of events by stakeholder group for the past three years.

Natural Gas and Telecommunications continue to submit the highest volume of events. Also 2022 saw an increase of 10% in events for Natural Gas.

In order to support future trend analysis, additional stakeholders are encouraged to submit their events into DIRT.

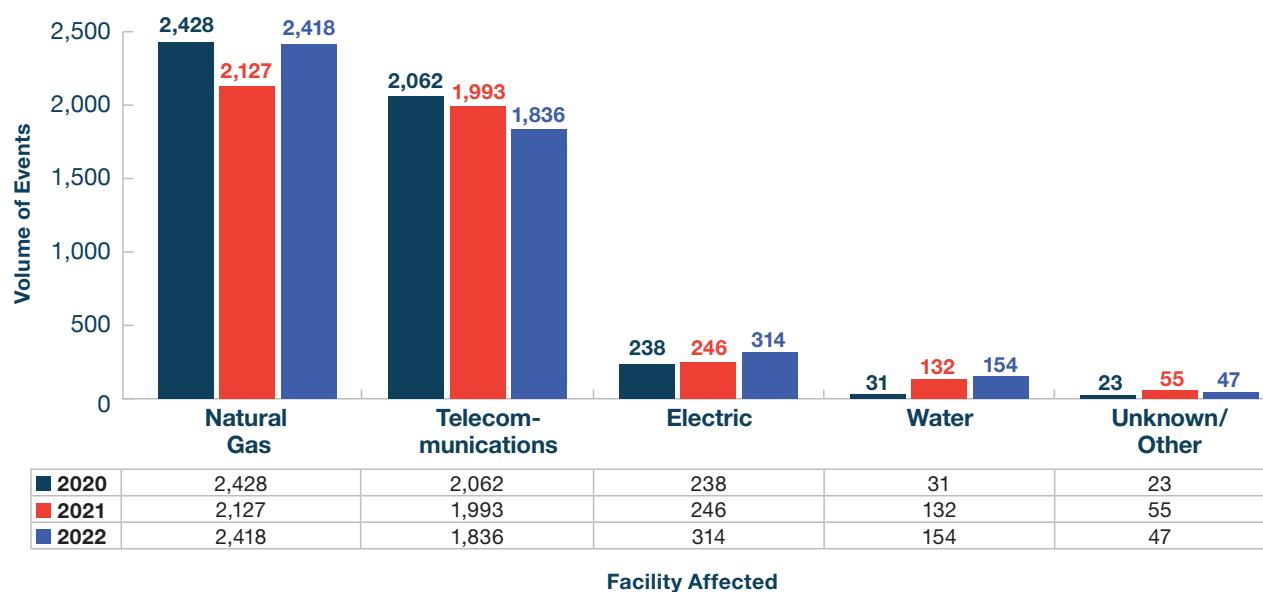
Figure 6: Facility Events Submitted by Stakeholder Group



2.4 Submitted Facility Events by Type of Facility Operation Affected

Figure 7 illustrates that Natural Gas and Telecommunications continue to be the primary facilities affected by events reported in DIRT. This aligns with the high volume of events that the facilities continue to submit.

Figure 7: Submitted Facility Events by Type of Facility Affected



2.5 Volume of Events by Excavation Equipment Group

Table 3 outlines the types of excavation equipment included in each equipment group.

Table 3: List of Equipment Groups

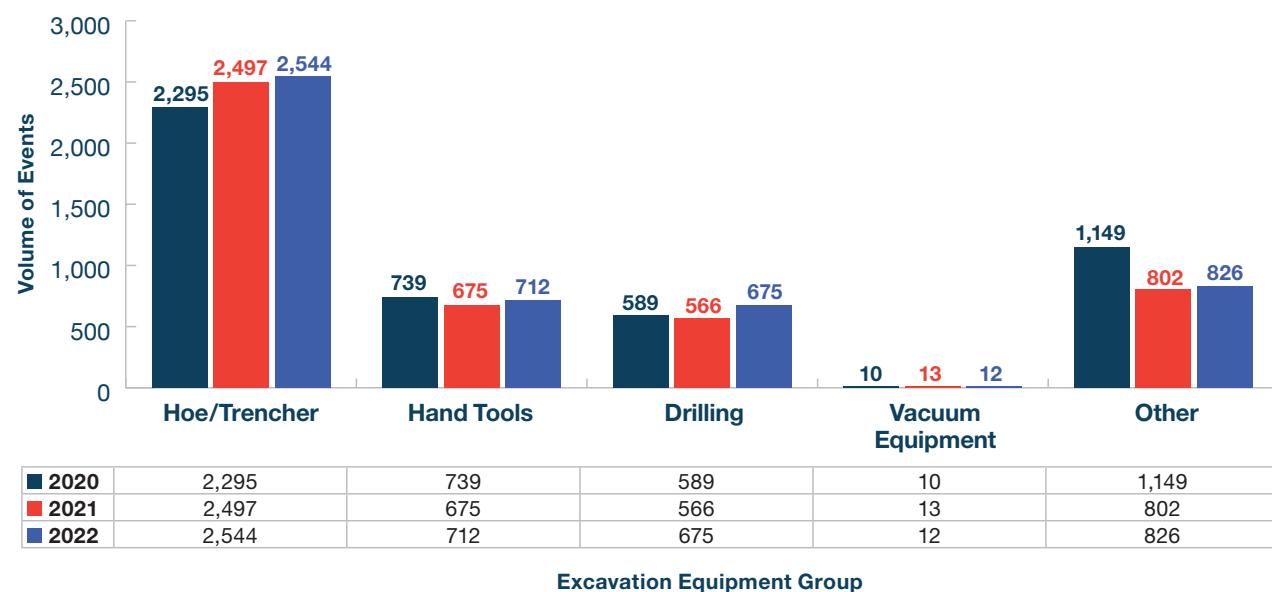
Group	Excavation Equipment Type	
Hoe/Trencher	Backhoe/Trackhoe	Trencher
Hand Tools	Hand Tools	Probing Device
Drilling	Auger	Directional Drilling
	Boring	Drilling
Vacuum Equipment	Vacuum Equipment	
	Bulldozer	Grader/Scraper
Other	Data Not Collected	Milling Equipment
	Explosives	Other
	Farm Equipment	

Figure 8 illustrates a distribution of events caused by various groups of excavation equipment.

In 2022, the Hoe/Trencher group continued to account for the largest volume of events. The only Equipment Group showing a decrease was Vacuum Equipment.

Submitters are encouraged to minimize listing equipment as ‘other’ in order to improve data accuracy.

Figure 8: Submitted Facility Events by Excavation Equipment Group



2.6 Facility Events By Root Cause

Table 4 denotes the breakout of Root Causes and their subcategories.

Table 4: 2022 Root Cause Category and Subcategory

Root Cause Category	Root Cause Subcategory	
Excavation Practices Not Sufficient	Marks faded or not maintained	Excavator failed to protect/shore facilities
	Improper backfilling practices	Excavator dug prior to verifying marks by test-hole (pothole)
	Failure to maintain clearance	Improper excavation practice not listed above
Locating Issue	Facility not marked due to : Abandoned Facility	Facility not marked due to : Unlocatable Facility
	Facility not marked due to : Incorrect Facility records/maps	Facility marked inaccurately due to: Abandoned facility
	Facility not marked due to : Locator error	Facility marked inaccurately due to: Incorrect facility records/maps
	Facility not marked due to : No response from Operator/contract locator	Facility marked inaccurately due to: Locator error
	Facility not marked due to : Tracer wire issue	Facility marked inaccurately due to: Tracer wire issue
Miscellaneous Root Causes	Deteriorated facility	Root Cause not listed (comment required)
	One-Call notification center error	Previous damage
Notification Issue	No notification made to the one-call center/811	Excavator dug outside area described on ticket
	Excavator provided incorrect notification information	Excavator dug prior to valid start date/time
		Excavator dug after valid ticket expired

Figure 9 illustrates the distribution of events by Root Cause. The most common causes of events are a result of Excavation Issues, which saw a 6% increase compared to 2021, and Notification Issues which increased by 18%. Greater emphasis should be made to reduce events by providing targeted outreach and education to the excavator community.

Figure 9: Facility Events by Root Cause

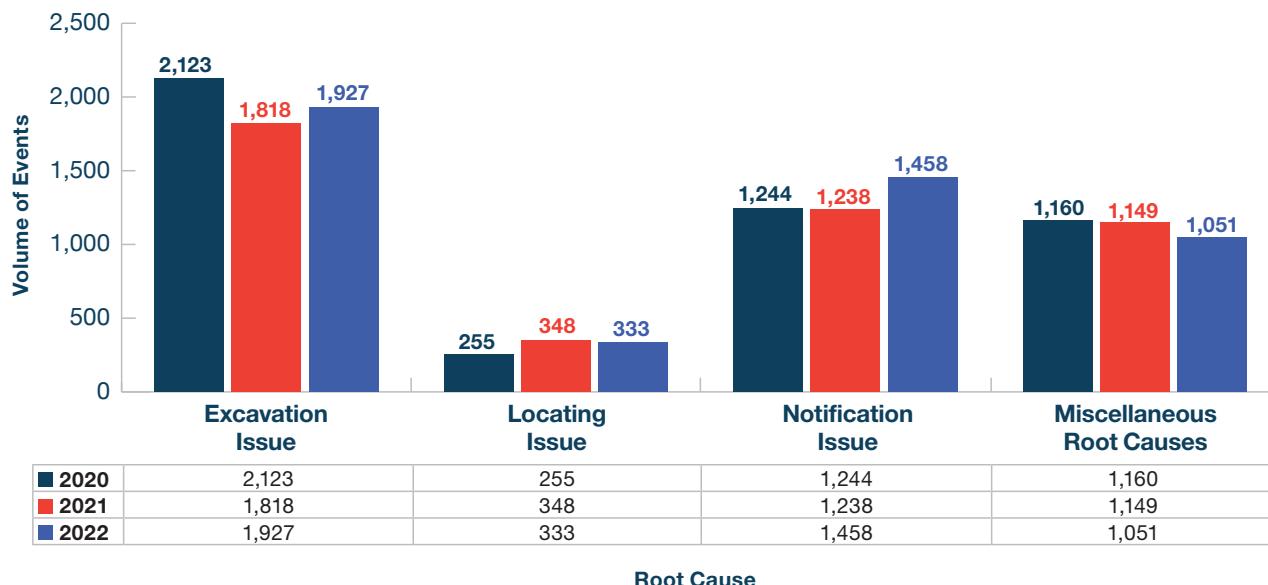
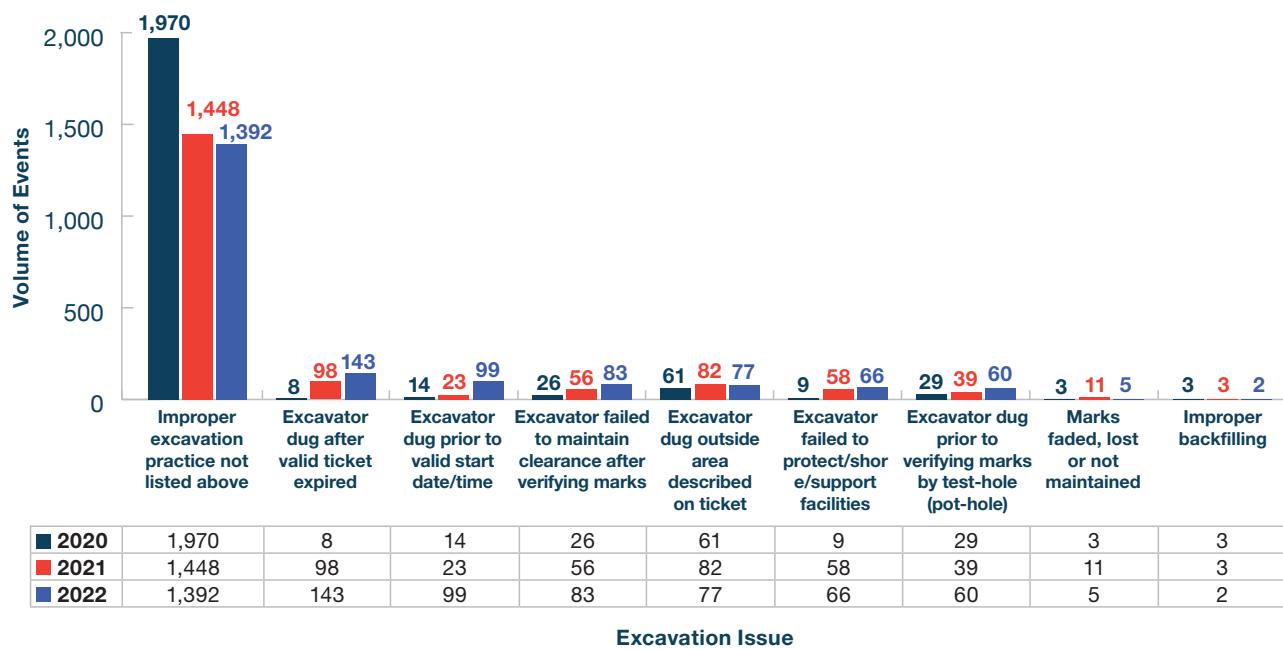


Figure 10 illustrates a three-year breakdown of the Root Cause subcategories for Facility Events by Excavation Issue. As seen below, Improper Excavation Practice Not Listed Above continues to be one of main issues. This Root Cause subcategory is defined as any other excavator error, which cannot be classified as one of the other eight Root Cause subcategories within Excavation Issues.

The next highest Root Cause subcategory is the excavator digging after their valid ticket had expired.

Figure 10: Facility Events by Excavation Issue



2.0 | Data Analysis

Figure 11 illustrates a three-year breakdown of the Root Cause subcategories for Notification Issues.

No notifications to the One-Call Centre saw a dramatic increase of 18%. Overall Facility Events increased by 216, while No Notification to the One Call Center increased by 219.

This figure illustrates the need to continuously increase excavator and general public awareness about requesting a locate before digging starts.

Figure 11: Facility Events by Notification Issues

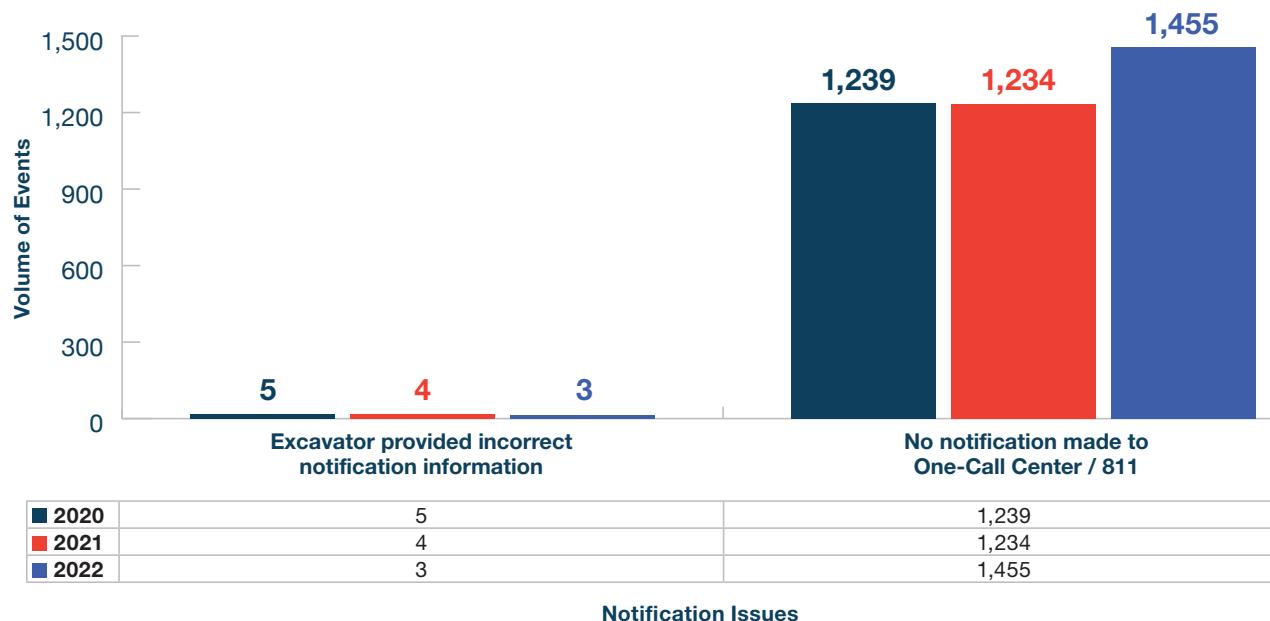


Figure 12 illustrates a three-year breakdown of the Root Cause subcategories for Miscellaneous Root Causes.

The most prevalent Root Cause subcategory is Root Cause Not Listed Above.

Figure 12: Facility Events by Miscellaneous Root Causes

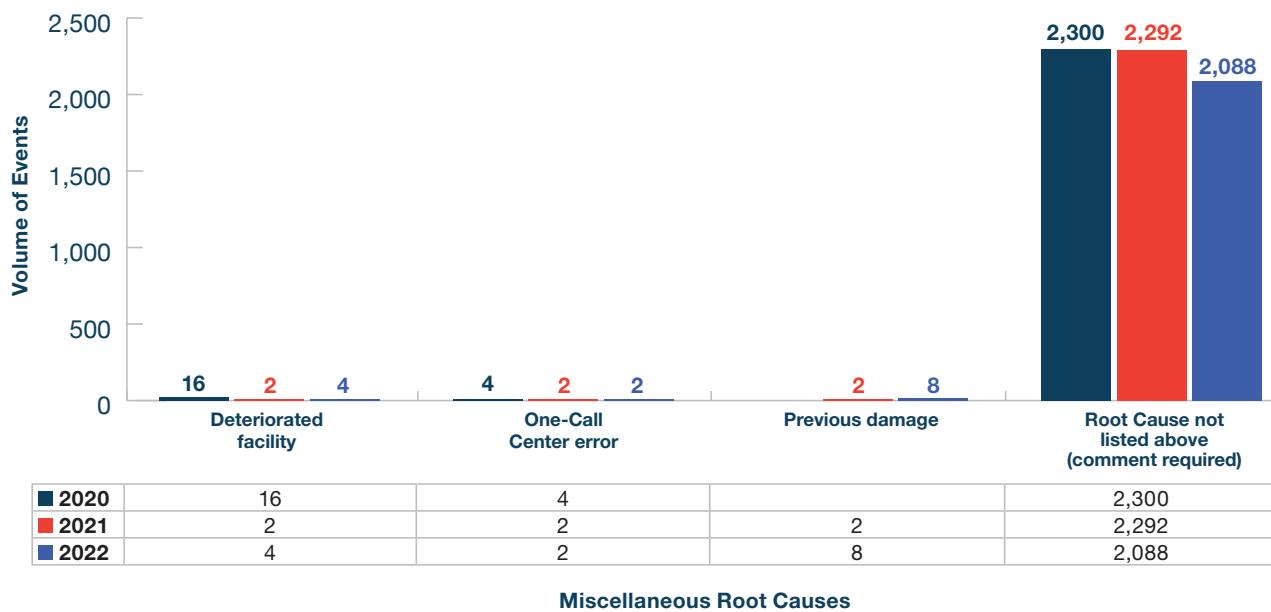
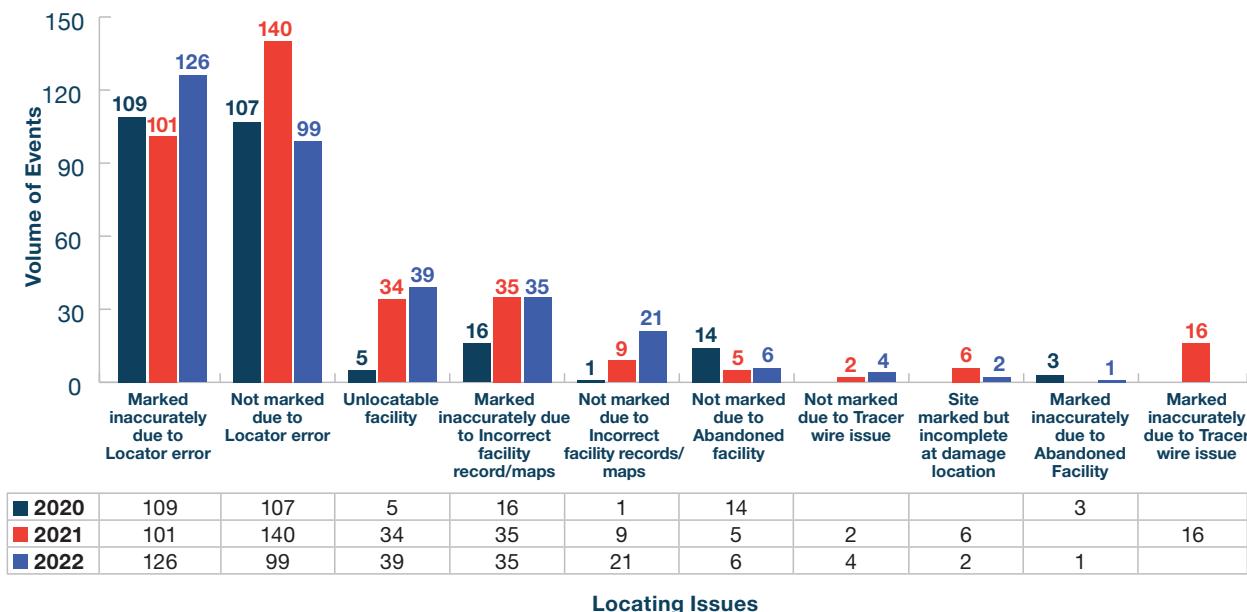


Figure 13 illustrates a three-year breakdown of the Root Cause subcategories for Facility Events by Locating Issues. While we have seen a 29% decrease in Not Marked due to Locator Error, the majority of other sub-categories have seen an increase.

Figure 13: Facility Events by Locating Issues

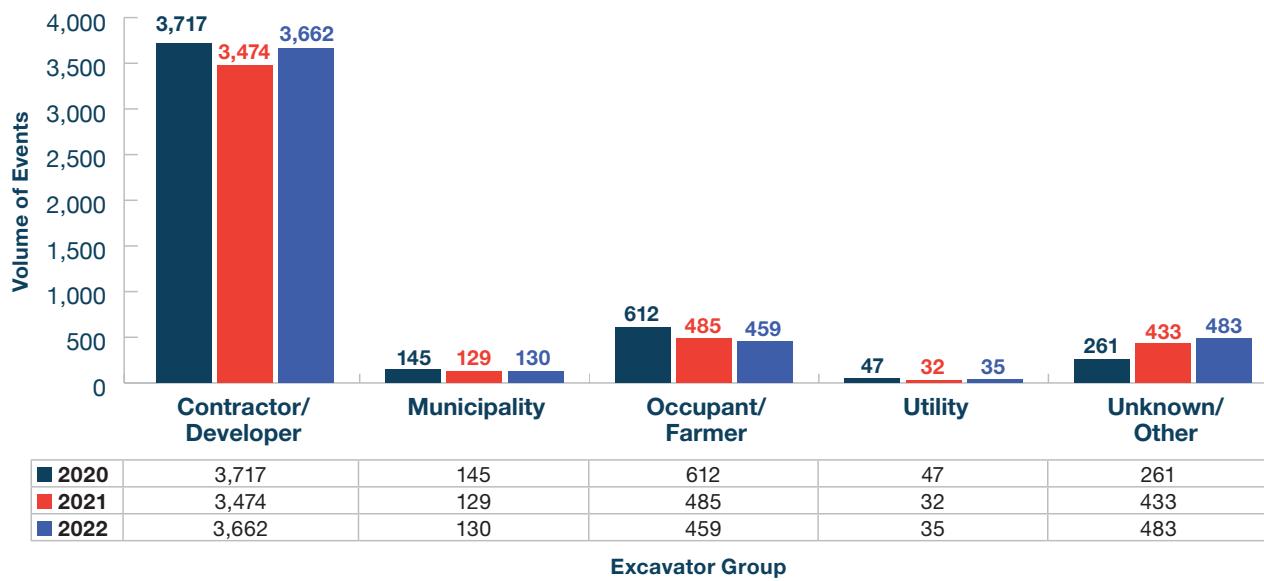


2.7 Facility Events by Excavator Group

Figure 14 illustrates the distribution of events by Excavator Group showing that Contractor/Developer continues to be involved in the majority of reported events, contributing to 77% of the events in 2022.

In order to develop useful educational tools to improve the damage prevention performance in Ontario, it is important to examine the parties causing reported events. Additional analysis of these groups is provided in the 3.0 Multi-Field Analysis section of this report.

Figure 14: Facility Events by Type of Excavator



2.8 Facility Events by Type of Work Performed

Figure 15 illustrates a distribution of Events by Type of Work Performed. Sewer and Water was the primary type of work causing events in 2022, with an unexpected 39% increase of events compared to 2021. Construction continues to be an area of concern as it was the secondary type of work causing events in 2022 and saw a 14% increase compared to 2021.

A reduction in the Unknown/Other category represents an improvement in data quality. We continue to encourage reduced use of this category.

Figure 15: Facility Events by Type of Work Performed

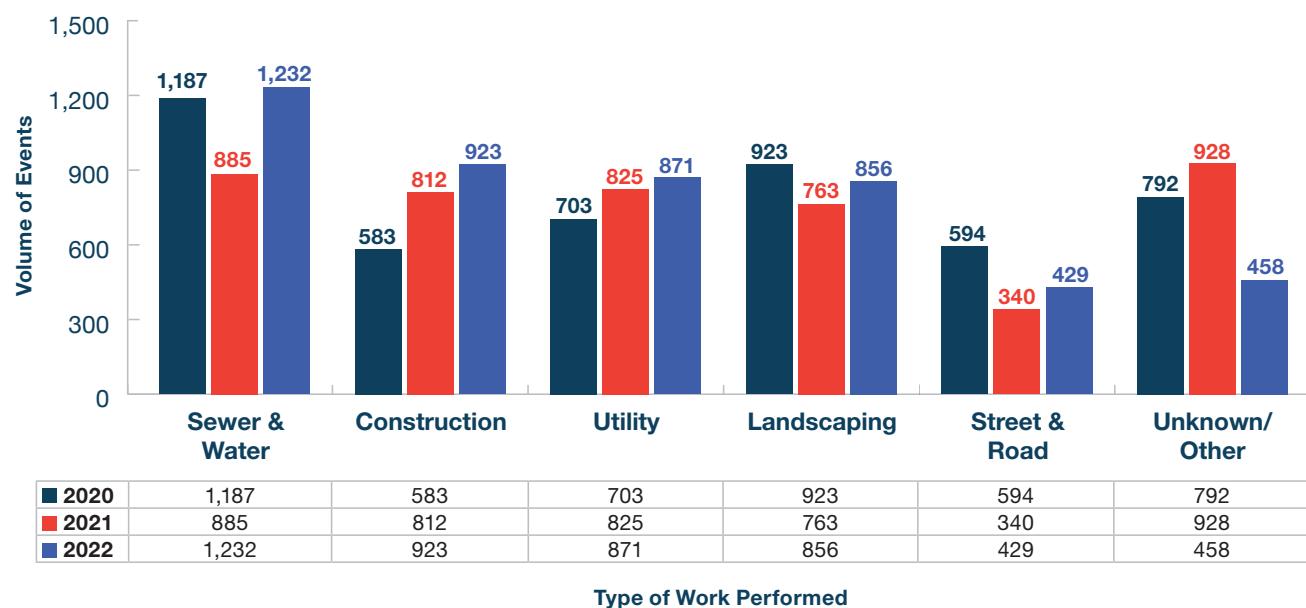


Table 5 illustrates a three-year breakdown of facility events by the most common types of work performed. When broken down into identifiable subgroups, Sewer, with 717 events, had the highest volume in 2022 followed by Building Construction with 670 events, and Telecommunications with 500 events.

These work types account for 40% of events and would provide the greatest impact in being reduced.

Unknown/Other events had a significant reduction with 453 events in 2022 compared to 927 events in 2021.

Table 5: Facility Events by Types of Work

GROUP & TYPES OF WORK	2020	2021	2022
Sewer & Water	1,187	885	1,232
Sewer	626	603	717
Water	173	28	290
Drainage	388	254	225
Construction	583	812	923
Bldg. Construction	291	552	670
Driveway	168	141	164
Site Development	70	85	57
Bldg. Demolition	11	13	23
Grading	43	21	9
Landscaping	923	763	856
Fencing	496	413	478
Landscaping	404	332	354
Waterway Improvement	10	6	15
Irrigation	11	10	6
Agriculture	2	2	3
Utility	703	825	871
Telecommunications	302	403	500
Electric	255	233	229
Natural Gas	145	189	136
Liquid Pipeline	1		6
Street & Road	594	340	429
Road Work	387	193	196
Curb/Sidewalk	114	58	112
Storm Drain/Culvert	44	63	95
Traffic Sign	16	5	5
Street Light	3	3	5
Traffic Signal	1	6	5
Pole	24	8	5
Public Transit Authority	2	1	5
Railroad	3	3	1
Unknown / Other	792	928	458
Unknown/Other	791	927	453
Engineering/Surveying	1	1	5

3.0 | Multi-Field Analysis

3.1 Analysis of Root Cause and Facilities Affected by Types of Work

The following charts illustrate the Root Causes of events for the six work groups of Sewer and Water, Construction, Landscaping, Utility, Street & Road, and Unknown/Other for 2020, 2021 and 2022.

Figure 16: Facility Events by Root Cause Category and Work Type

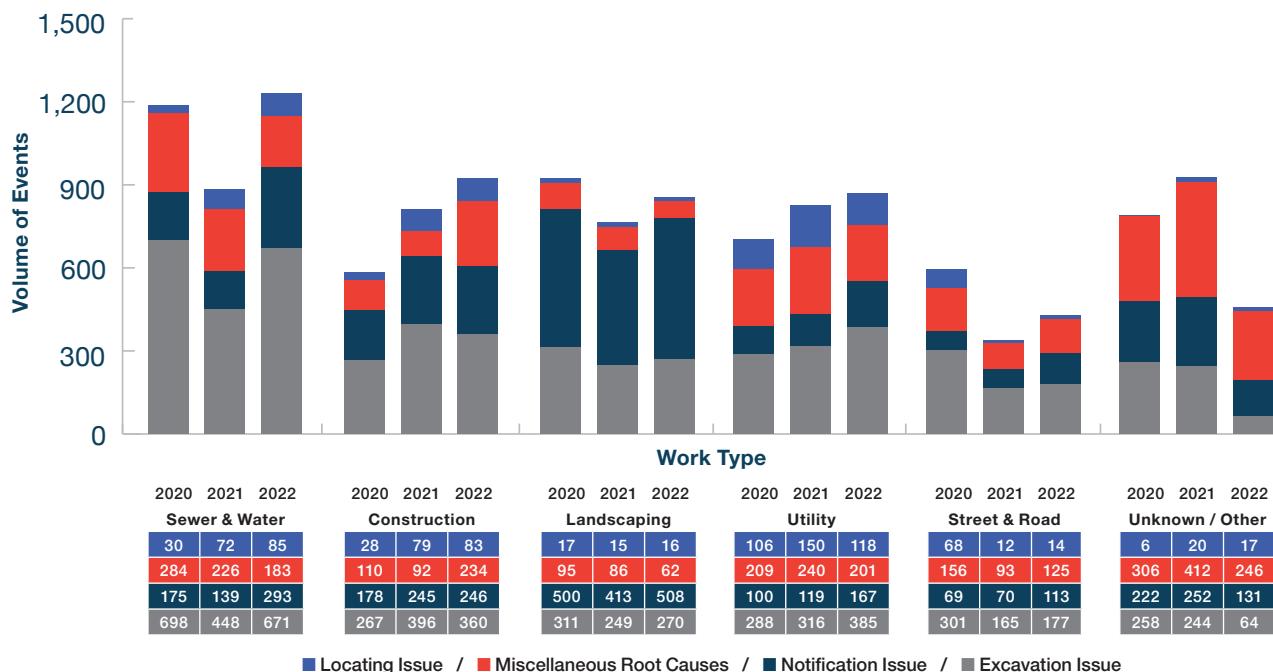


Figure 17 illustrates that the Contractor/Developer excavator type continues to represent the majority of events submitted under the Excavation Issues category, and saw an increase in 2022. Notification Issues in the Contractor/Developer category also increased by 22%.

Figure 17: Facility Events by Root Cause Category and Excavator Type

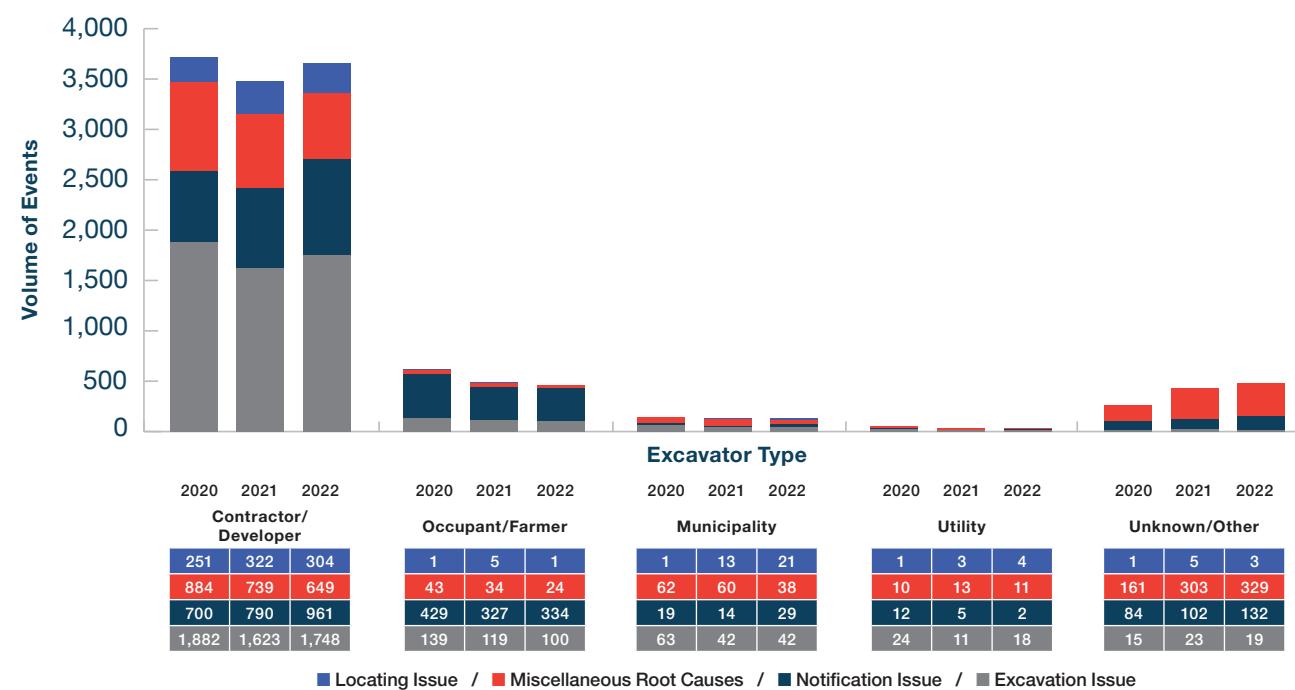


Figure 18 illustrates the damage ratio relative to the volume of events over the past 16 years. Industry practice is to measure damage prevention performance by the volume of damages per thousand notifications.

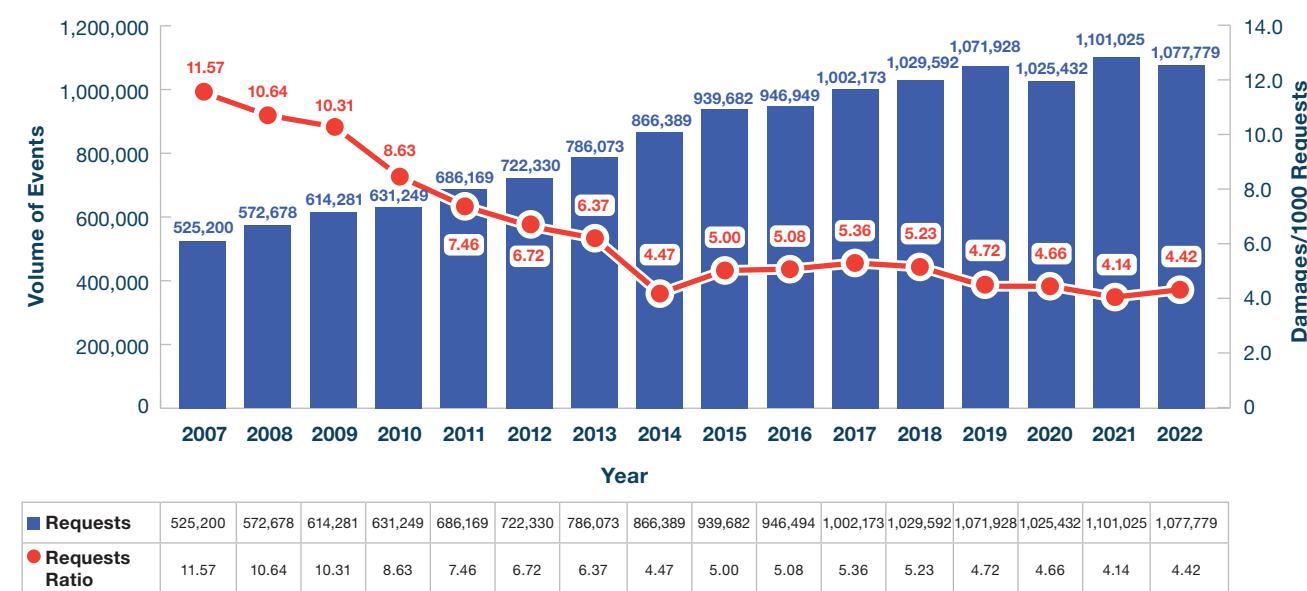
The Damage Ratio saw a slight increase of .06 in 2022 due to the combined impact of increased damages and decreased notification volume.

Figure 18: Damage Ratio - Damages/1000 Notifications



In response to the Ontario One Call process changes, this chart was created to show damages per 1000 requests as this has remained consistent and is driven by either public awareness or economic events.

Figure 19: Damages/1000 Requests



Based on many industry articles, presentations, and discussions, it has been identified that Late Utility Locates are problematic in Ontario and beginning in 2020, the DIRT Report was updated to include Late Utility Locates data. The question is: “Was the locate completed within the required timeframe?”, and the response consists of selecting “Yes”, “No”, or “Unknown” as an answer.

Data collection began in November 2020, therefore this graph does not represent a full year of collected information for 2020. Responses to this question have still not risen to a satisfactory level, which shows a need for the committee to continue to reach out to data submitters and further educate them on this question. This issue is a shared concern for all stakeholders. The utilities have a central and vital role in providing data. We cannot find potential solutions if we do not have the relevant data.

Figure 20: Was the locate completed within the required timeframe?

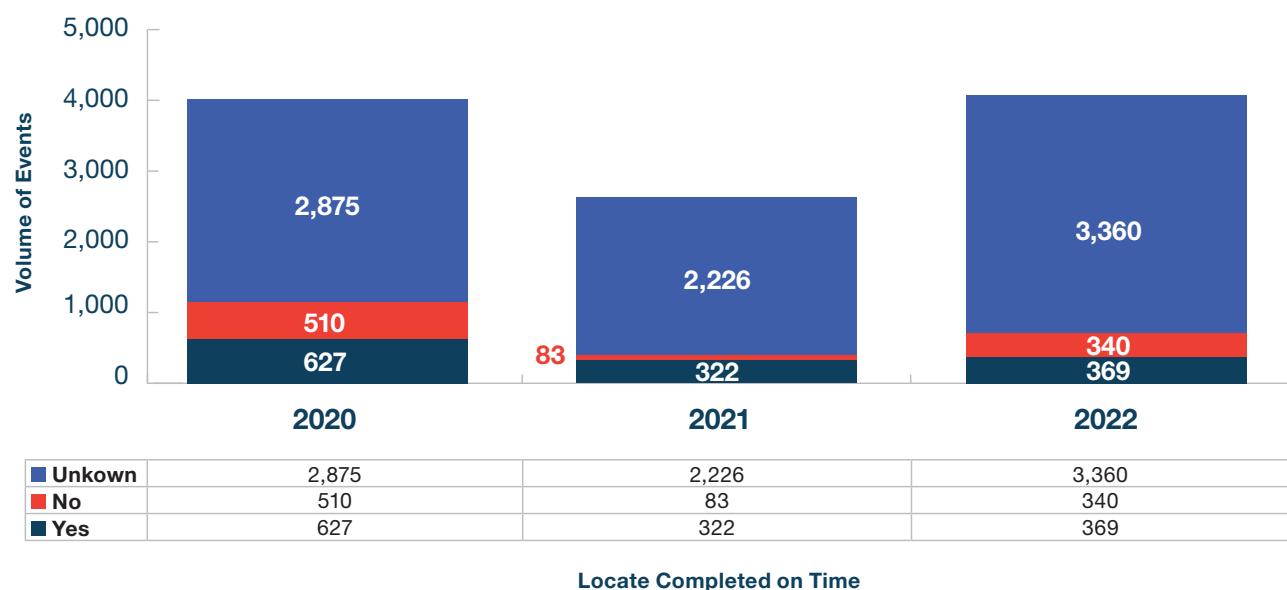
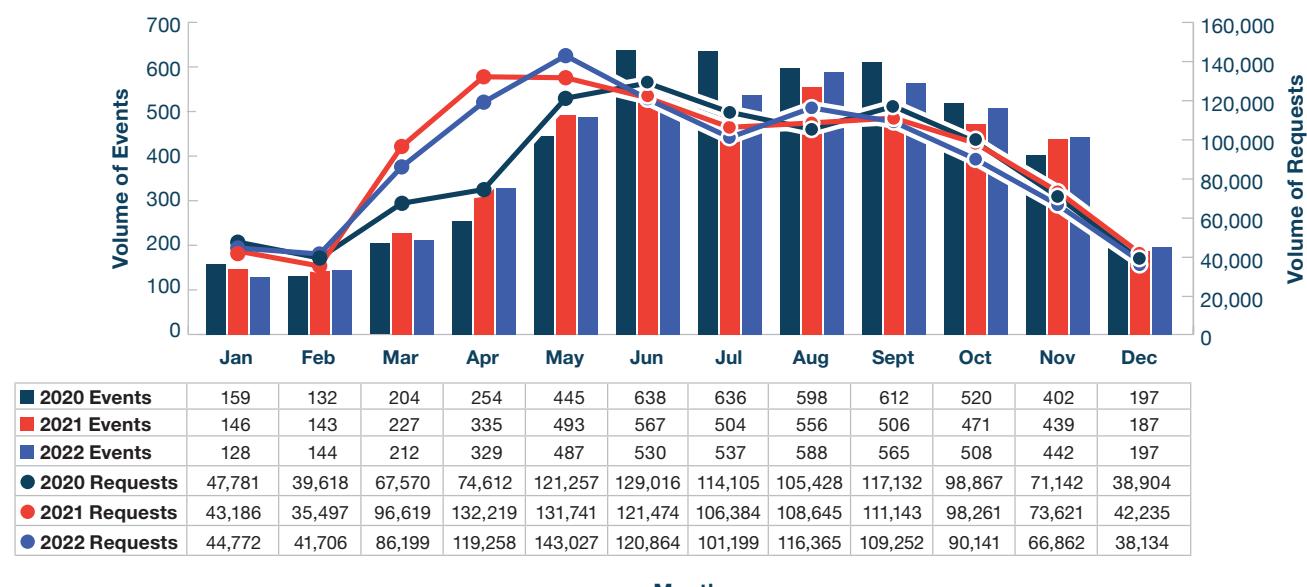


Figure 21 shows that although the peak of locate requests happened in May, the peak of damage incidents occurred in August of 2022.

Figure 21: Damages by Month



4.0 | Regional Partner Data

In 2021, the number of damages reported via DIRT for Canada totaled 11,402, which is comparable to the 11,573 damages reported in 2020. Table 6 shows a summary of key performance indicators related to damages by Province/Region. Canada-wide, there was an average of 46 damages per workday (assuming 251 workdays per year).

Table 6 – Summary by Province/Region, 2021

PROVINCE/REGION	% of Population	Damages	% of Damages	Damages per Work Day	Locate Requests	Damages per 1,000 Requests*	Locate Notifications	Damages per 1,000 Notifications**
British Columbia	13%	1,282	11%	5.1	241,374	5.31	687,075	1.87
Alberta	12%	3,792	33%	15.2	468,907	8.09	1,597,579	2.37
Saskatchewan	3%	789	7%	3.2	166,496	4.74	468,320	1.68
Manitoba	4%	195	2%	0.8	82,244	2.37	206,444	0.94
Ontario	39%	4,402	39%	17.6	1,101,026	4.00	6,141,712	0.72
Quebec	23%	927	8%	3.7	334,728	2.77	614,091	1.51
Atlantic	6%	15	0.13%	0.06	62,298	0.24	72,205	0.21
Total	100%	11,402	100%	45.66	2,457,073	4.64	9,787,426	1.16

* Locate request is defined as 'communication between an excavator and a staff member of a One-Call Centre in which a request for locating underground facilities is processed.'

** Notifications: Ticket data transmitted to underground infrastructure owners.

Ontario is the only province with legislation mandating registration with a One-Call Centre.

1 Top 10 Canadian Construction Trends to Watch in 2023

Canadian Construction Association president Mary Van Buren shares her insights into what to have on our collective radars as the next 12 months unfold.

By Mary Van Buren

1. Recession or ramp up?

The case for investing in infrastructure makes economic and social sense. As Canada and other countries seek to curb inflation, there will be more onus on governments to continue to invest. There are new highway and light rail developments, climate resilience retrofits, and vital maintenance projects underway as part of the nation's growth plan. Risk can fluctuate in every construction project, but private investors are especially vulnerable in today's market of escalating prices, supply chain disruptions, rising interest rates on loans, and challenges securing workers.

2. Where is the action on the federal promise to collaborate?

The federal government's 2021 invitation to consult on Canada's National Infrastructure Assessment was highly welcomed by the Canadian Construction Association (CCA) and our industry, but what happened?

We jumped on the opportunity to provide a national vision for infrastructure resilience, recommending a strategy that would identify needs and priorities based on independent expert advice. The consultations appeared to be a step in the right direction yet little concrete action has taken place since.

3. Rallying around increased investment in trade-enabling infrastructure

Canada's reputation as a trading nation is in steep decline. In just 10 years, the country has fallen from 10th position to 32nd in terms of its trade transportation infrastructure. This is just below Azerbaijan and ahead of Turkey and Saudi Arabia. We need a massive scale-up in our country's trade infrastructure.

The 2022 Federal Budget made some modest investments to improve supply chain infrastructure and support the existing National Trade Corridors Fund, but more is needed for Canada to remain globally

competitive, expand into new and emerging markets, attract investors, and boost employment.

The industry has recommended a path forward, identifying and investing in Canada's key trade gateways and corridors across the country that will link resources to industry, people to jobs, and products to market. It's time to show that Canada can deliver the goods through a strategic trade infrastructure program.

4. Targeted immigration to build industry workforce capacity

It's no secret that Canada is facing its most severe labour shortage in over 50 years. The situation is especially acute for the construction sector and its 81,000 open yet unfilled jobs. Retirements and recruitment challenges will be a heavy blow to Canada's future economic growth if steps aren't taken to rebuild Canada's workforce now.

Training takes time and we need workers now. Immigration and temporary foreign labour can help alleviate the choke points, but to get there we need to modernize Canada's immigration policy. While the federal government has pledged to increase immigration, it's not just a numbers game. The current federal immigration point system does not favour the trades. Many newcomers cannot even find work in their field of expertise. We need to put their skills and experience to work and expedite the recognition of their training and credentials.

5. Renaissance of skilled trades as a valued career path

After years of relegating skilled trades to a career of last resort, governments and educational institutions are reinvested in promoting these careers.

The projected demand for skilled workers is far outweighing the number of people who are choosing to pursue a career in the trades. A report by the Canadian Apprenticeship Forum found that 75,000 new apprentices will need to be hired per year over the next

five years to meet the demand for skilled journeypersons in Red Seal trades.

Smart investments are now being made to support businesses in offering apprenticeship training to Canadians from all backgrounds. The Canadian Apprenticeship Service is one such program that CCA is promoting, and it offers financial incentives to small and medium-sized employers who hire and train new first-year apprentices in 39 Red Seal trades. Schools and local businesses are also doing a better job at exposing youth to potential career paths.

This new appreciation for skilled trades combined with an infusion of new Canadians will help propel diversity and inclusivity forward, with greater representation from women, new Canadians, Indigenous and other equity-seeking groups.

6. New constraints for projects

Today's financial climate and supply chain issues are forcing developers to rethink their project plans. Rising interest rates, taxes and debt financing are particular concerns, delaying or slowing down projects. Availability of bonding and insurance may also tighten.

Contractors will continue to face unpredictability in supply availability and costing. The war in Ukraine, the "Buy U.S." initiative, massive infrastructure investment south of the border, and the potential for disruptions from climate related events all stand to impact the supply chain. It will be important to influence and monitor policies to secure a more resilient and green supply chain.

7. Green building takes a strong step forward

Over 120 countries, including Canada, are setting targets to limit emissions and decarbonize economies. With buildings representing almost 40 per cent of global greenhouse gas emissions, not to mention the environmental impact of heavy industry, Canada's Green Building Strategy is looking to the Canadian construction sector to make a real impact on annual carbon dioxide emissions.

This is perhaps a once in a generation opportunity to make a quantum leap in building green. It requires mobilization of both private and public sectors, and all levels of government. Developing a buy clean policy, incenting businesses, mandating change through building code amendments, and deliberately including climate resilience in the project scope at the tender process should be considered. Education and training

are also critical pieces of the puzzle, including access to better data, technologies, tools and standards as well as supporting workforce training programs geared towards low-carbon construction.

8. Uncertainty surrounding hybrid workplaces

COVID-19 significantly disrupted both employer and employee beliefs that the office is the centre of corporate culture and connectedness. Even before the pandemic, the construction industry began adopting digital tools and apps for the job site. With many firms only recently establishing rules of in-office presence, there will continue to be some tension between employers and employees as we navigate new ways of working together.

9. Automation is becoming essential

As self-checkouts replace traditional cashiers in grocery stores and pharmacies as a response to a lack of workforce, the construction industry will also be turning its attention to increased use of technology. With 81,000 job openings, and despite significant effort to recruit and retain a workforce, the business case for automation is strengthening.

Some companies are looking at robotics and new technologies, like exoskeletons and drones, as tools to increase productivity, growth and safety. As more technology is adopted in the industry, new types of jobs will be added within the sector – attracting new talent that wish to use cutting-edge technologies in the industry.

10. Collaboration gains strength

The value of involving contractors earlier in the project is gaining steam. Owners are recognizing that early engagement and collaboration can produce a more informed project plan, resulting in better pricing for risk and potentially identifying more efficient and effective ways of delivering projects.

This is a step in the right direction to updating Canada's current procurement system to one that supports fair competition, long-term value and sustainability over low-cost bid, and shared risk. Too often contractors take on the majority risk of project costs and delays due to the shortage of workers, materials and supply chain disruptions. 

Source: On-Site Magazine, Dec. 2022, pages 18-19.

2 The Root Causes of Underground Utility Strikes



Scott Laing, Coordinator, Research and Stakeholder & Public Relations, Infrastructure Health and Safety Association

In 2021, the City of Toronto signalled its concern with the frequency of underground utility strikes on construction projects. The Infrastructure Health and Safety Association (IHSA) responded to this concern by facilitating a two-day root cause analysis workshop, using processes developed by the Ministry of Labour, Immigration, Training, and Skills Development.

Workshop participants included recognized subject-matter experts (five employers and five labour representatives) from IHSA's Ontario-wide Labour-Management Network, plus more than a dozen other industry stakeholders. Meeting virtually due to pandemic restrictions at the time, the group first developed a defined risk statement:

Strikes to underground infrastructure services, including gas, water, hydro, etc., can cause serious unintentional adverse effects on workplace safety, the well-being of workers and employers, as well as damage to property, infrastructure, and the community. These underground infrastructure services can include hydro lines, gas conduits, telecommunication and electrical cables, sewers, water lines, drainage systems, and oil pipelines.

Based on this risk statement, the group then identified and prioritized causal factors, controls, and solutions related to underground strikes.

The Costs of Underground Strikes

Underground strikes are very costly to the construction industry. They result in direct costs arising from repairing the damage to utilities and infrastructure. Just as importantly, however, they have many indirect costs, which arise from the various disruptions caused by a strike. Underground strikes can result (and *have resulted*) in worker injuries and deaths, and can leave a lasting impact on the communities the utilities serve.

Direct costs include:

- Materials used
- Labour
- Administrative costs related to the repair of damaged infrastructure and/or rehabilitation of injured workers.

Indirect costs include:

- Worker injury and/or death
- The intervention of emergency services
- Evacuating businesses and residences
- Service disruption following damages to infrastructure
- Loss of product
- Environmental impact
- Economic impact on businesses and companies
- Work delays
- Administrative and legal costs
- Negative impact for owner companies
- Disturbances to neighbouring lands and infrastructure
- Traffic disturbances.

Additionally, there are direct and indirect costs related to employees, such as:

- Noncompliance fines and penalties
- The reputation of the company hurt by bad publicity
- Poor morale and reduced productivity, particularly after an incident
- Poor employee retention leading to increased hiring, onboarding, and training costs
- Employee sick leaves and increased volume of illnesses and injuries.

Underground infrastructure is crucial to our communities. Preventing damage to this infrastructure ensures the maintenance of vital services, keeps workers safe, and helps to reduce business costs for all underground infrastructure stakeholders.

The Root Cause Workshop's Fishbone Exercise

Defending against underground strikes starts with analyzing and understanding how these events occur. Drilling down to their root causes can help to determine which aspects of the excavation process should be targeted for awareness, training, and oversight, in order to reduce the frequency and consequences of underground strikes.

The root cause workshop group used a fishbone diagram to help identify the reasons for imperfections, variations, defects, and failures in excavations causing underground utility strikes on construction projects. The fishbone consisted of the following categories:

- **Tools and Machines:** Equipment, technology, tool design, maintenance
- **Culture:** Work culture/attitudes, values, organization leadership, traditions, beliefs, and interactions
- **Processes:** Methods, procedures, work instructions, policies
- **Environment:** Working environment, work surroundings including air, noise, light, accommodation, and well-being at work
- **People:** Behaviour, experience, mental health, age
- **Measures:** Data, indicators, evaluation, techniques/actions used to measure performance, quality

Once completed, the fishbone diagram contained 77 primary root cause factors.

Worker and management participants then voted confidentially on the importance of each of the 77 identified primary factors. (Industry representatives were not involved in the vote; however, they

continued to participate in any discussion that occurred during the voting process.)

Primary Causal Factors of Underground Strikes

Participants' ranking votes narrowed the 77 identified causal factors to a "top 10" list. This list was shared with all workshop attendees, who then discussed possible solutions and controls for each of the top 10 factors.

Priority	Category	Primary Causal Factor
1*	Processes	Valid and accurate locates
	Processes	Locates not present before/during the dig
2	Processes	Ability to read locates
3	Measures	Marking of locates
4	People	Locators
	Processes	Locate standardization
5	Culture	Lack of reviewing locates
6	Measures	Confidence in locates
7	Measures	Mapping of utilities
8	Culture	Training workers
	Tools and Machines	Effectiveness of locate equipment
9	Culture	Crossing utilities as part of overall job
10	People	Lack of knowledge
	People	Company safety culture

*Rankings with multiple causes indicate a tie

It is notable that the top three primary factors were ranked the same by management and labour representatives. However, the importance of other factors varied among the two groups:

Primary Causal Factor	Worker Ranking	Management Ranking
Valid and accurate locates	1	1
Locates not present before/during the dig	2	2
Ability to read locates	3	3
Effectiveness of locate equipment	4	14
Crossing utilities as part of overall job	5	13
Marking of locates	6	5
Locate standardization	7	6
Lack of reviewing locates	8	8
Confidence in locates	9	9
Training workers	10	12
Mapping of utilities	11	7
Lack of knowledge	12	10
Company safety culture	13	11
Locators	14	4

Industry Recommendations and Conclusions

The controls and solutions determined by the underground strikes root cause working group relate to the top primary causal factors (as listed above) that may contribute to underground utility strikes in the construction industry. Given recent underground strikes in construction, it is important that specific solutions targeting systemic weaknesses be implemented immediately.

Based on the list of controls/solutions provided by the industry subject-matter experts, research, and government (regulator), the following five action items are recommended:

1. Identify best-practice guidelines for planning and working in the vicinity of underground utilities

- ✓ Including roles and responsibilities to promote accountability among employers, supervisors, and workers—as well as OneCall, utility owners, and municipalities.

2. Review and promote standardized and clear utility locate ground markings and documentation

- ✓ Including the utilization of a digital portal to access locates, digitized locate forms, and clearer icons.

3. Develop and provide education on reading locates

- ✓ Including required training to ensure workers and supervisors have the knowledge to accurately determine where identified underground utilities are located.

4. Review and enhance practices, procedures, and regulations to foster accountability

- ✓ Including policies, procedures, and regulations relating to the completion and review of locates prior to excavating, as well as the overall planning and execution of work in the vicinity of underground utilities.

5. Develop a framework to improve organizations' workplace safety culture

- ✓ Including procedures to assess and improve leading and lagging indicators of workplace safety at all levels of the organization, promote management buy-in for developing and enforcing safe work practices, and recognize employees for working safely.

Though every trenching or excavation task must be treated individually based on the “facts on the ground,” the recommendations above provide a firm foundation for prevention. By taking steps such as promoting locate standardization, improving worker training, and enhancing accountability, the industry can reduce the risk of underground utility strikes—and the financial and human costs that go with them. 

3 Will a FLURRY of Rail Transit Projects Create a BLIZZARD of Locate Requests?

Since the early 1980's Ontario residents have been demanding more extensive rail transit projects.

By 2013, two significant underground rail transit projects: the O-Train Line 1 in Ottawa and the Eglinton Crosstown Transit line in Toronto had started construction. Recently, more rail transit projects have been announced by Metrolinx for the Toronto area, including:

- a) The Scarborough Subway, 7.8 km long, adding or altering 3 stations; target completion 2029;
- b) The Ontario Line, 15.6 km long, mostly below ground, adding or altering 15 stations; target completion 2031;
- c) The Yonge North Subway Extension, 8 km long, adding or altering 5 stations; target completion 2029-30;
- d) The Eglinton Crosstown West Extension, 9.2 km long, adding or altering 8 stations; target completion 2031; and
- e) The Finch West Extension, 11 km long, adding or altering 17 stations/stops; target completion 2031.

While most are quick to welcome the new transit projects, some do not appreciate the complexities involved in planning and building these systems, especially when the right of way is in the centre of busy roadways such as Eglinton Avenue, Yonge Street or Queen Street in Toronto. Constructing one or more rail transit projects often requires excavating large quantities of fill within existing road allowances. As most readers know, that is precisely where the majority of buried utilities are located. Any utilities which might be impacted by the construction or operation of the rail transit system must be catalogued, removed and re-installed somewhere else within the road allowance, before the stations are constructed and the tracks are laid. For most rail transit projects, the excavation activities span

several years but most of the digging and boring is completed about 3 or 4 years before the target opening dates.

Excavation Quantity

Unlike replacement of gas services, or water lines, rail transit infrastructure occupies a significant width of the roadway as depicted in Figure A below.

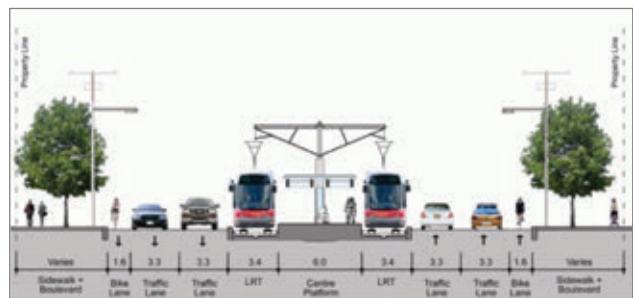


Figure A – Typical cross-section of an LRT stop¹

Metrolinx typically prohibits the installation or operation of utilities directly below the rail and platform right-of-way and imposes significant restrictions on the presence of buried utilities within a 2-metre wide band on either side of the immediate LRT track pad. This means that a significant number of buried services such as phone, electrical and water will need to be relocated. The relocation program will trigger a series of locate requests for both the existing locations of the utilities as well as locate requests for the new sites of those services. It is only after the relocation of existing utilities that the LRT track pads and platforms can be installed.

Some of the new subway and LRT stations will be constructed using a variation of the cut and cover technique, which will likely trigger locate requests for areas that are much wider and deeper than the rail portion of the right-of-way.

¹ Image created by Metrolinx as part of its online information for the Eglinton Crosstown LRT



Figure B – Large area excavated for an underground LRT station²

Most of the right of ways for the five rail transit projects have been developed for higher and higher densities of residential, retail and commercial uses since the 1950's or earlier.

A Blizzard of Notifications?

The bottom line is that rail transit projects have the potential to trigger a large number of utility locate requests within a relatively short period of time. The question is whether the flurry of rail transit projects will trigger a blizzard of notifications that could overwhelm available resources.

To answer that question, we need to estimate the number of locates that will be generated during the excavation phases of the five rail transit projects and compare that to the typical number of locate requests that arise over similar periods.

There will clearly be considerable overlap for the excavation phases of the five rail projects. For the purpose of this article, it is assumed that:

- a) 70% of the excavation work for all five projects takes place during the three year block of Jan 2023 through to Dec 2025;
- b) the typical density of buildings that require buried utility services along the right of way, is 350 buildings per km of right of way; and

- c) the average number of services for each building is estimated as "five" (1 water, 1 sewer, 1 buried telecom, 1 buried electrical and 1 natural gas).

The cumulative length of right of way for all five projects is 52 km. Based on 5 notifications per building facing the right-of-way, and 350 buildings per km, this would trigger approximately 91,000 notifications, or about 30,000 notifications per year, excluding any relocates or remarks.

Re-Locates and Re-Markings

There may be a need for a relatively high number of re-locates and re-markings, given the finite validity period of locates (typically 60 days) and the duration of excavation activities for a given block or area and the fact that it may be difficult to co-ordinate the simultaneous removal and relocation of all existing services within a specific block. Natural gas line replacements might have to wait until all of the water and sewer services have been constructed, which again could trigger additional locates. Each re-locate or re-marking would be done by a locator and the locator would need to verify that he or she has the most up to date mapping information. If each locate has, on average, 1-2 re-locates or re-marks, this would increase the total number of notifications to 60,000 - 90,000 per year, whereas the average number of notifications in Toronto is about 2 million per year.

While the additional number of notifications from the five rail transit projects would be about 3 to 5%, that percentage may not represent a true measure of the impact of the projects on the workload of locators.

Quantity of Markings Work

As already noted, most of the right-of-ways for the new rail transit projects is existing roadways with higher density developments. Unlike, projects such as the replacement of an older gas conduit to a single family home, the proposed zone of excavation to construct a rail transit system is likely the full width of

² Image of the Laird LRT station provided on the Metrolinx website

the road allowance. Markings would be required not only for an existing gas main, but the span of each service line branching from the main right up to the lot line of the home or business fronting the roadway.

Not only are more markings required, the locators will likely need to place their paint marks and flags on busy roadways which might be even more congested by lane closures and detours.

Impact of Abandoned Pipes and Conduits

Roadways such as Pape Avenue and Queen Street may have a high concentration of abandoned infrastructure given the evolution of those neighborhoods and increasing densities. Three adjacent lots may have had single-storey detached homes in the 1930's, replaced by triplexes in the early 1960's and by 2010, gave way to a six-storey condo mid-rise. In each case, the utility services would likely have been upsized and/or upgraded, leaving the older pipes and cables in place. Consequently, many of the

areas that will need to be excavated likely have a large concentration of abandoned services.

Locators focus their efforts on active/live utilities and often have no information for any abandoned infrastructure within the proposed work zone. If an abandoned pipe is encountered during excavation, all work in that area is often suspended pending an investigation about whether or not the pipe or cable is active. The locator may need to assist in that investigation and confirm that all active services have been accurately marked.

Conclusions

The number of notifications that are likely associated with the upcoming five rail transit projects might only constitute an increase of 3 to 5%. However, the sheer size of the project, a greater likelihood of abandoned pipes and conduits, and the overall congestion of the project work sites, will require a higher effort by the locate services industry. 



In order to improve the overall completeness of submissions, the committee is advising submitters to:

Submit events in a timely manner

It is recommended that Damage Information Reporting Tool (DIRT) data is submitted on a monthly or bi-monthly basis, so the events are fresh in your memory and details are easy to recall.

Complete the Late Locate Question

Although this is not mandatory it is strongly recommended that submitters answer to the best of their ability in order to gather enough data to determine if there is a relationship between damages and late locates.

Unknown/Other

It is the goal of this report to provide as much insight as possible for all stakeholders. Usage of the "unknown/other" categories limits our ability to provide clear measurable data to all stakeholders.



EXCAVATOR OF THE YEAR AWARDS

ORCGA recognizes excavators with the Best In-Class safe digging practices.

Congratulations to our 2022 Excavators of the Year

Each year, the Ontario Regional Common Ground Alliance (ORCGA) proudly recognizes excavators with the Best In-Class safe digging practices and congratulates the winners by presenting them with The Excavator of the Year Award.

Excavators are divided into 8 categories: Electric, Gas, Homebuilder, Landscape, Roadbuilder, Sewer/Water, Telecommunications, and Most Improved.

The Excavator of the Year winners are determined by reviewing each excavator's individual damage rate for the previous year. A damage rate is a calculation based on the excavator's volume of locate requests, measured against their number of digging related damages to underground infrastructure. Input from infrastructure owners is also used in determining the winners. To qualify, excavators must have submitted a minimum of 500 locate requests to Ontario One Call.

ELECTRIC



GAS



HOME BUILDER



LANDSCAPE



ROAD BUILDER



SEWER/WATER



TELECOMMUNICATIONS



MOST IMPROVED



Appendix A:

Report Findings: Data Quality Index

Table 7 indicates the Data Quality Index (DQI) for each individual part of the DIRT Field Form. The DQI is a measure of data quality and consists of the evaluation of each organization that submitted records, in addition to the evaluation of each record submitted to DIRT. The overall average DQI is 75.7%.

The weight assigned to the various DIRT parts varies based upon its value in analyzing the event for damage prevention purposes, with Root Cause receiving the largest weight. The overall DQI for a set of records can be obtained by averaging the individual DQI of each record. The “2022 DQI” column in the table below represents the average of all 4769 submitted events in the 2022 dataset.

Table 7: DIRT Submission Parts and DQI

DIRT Parts	Relative Weight	2020 DQI	2021 DQI	2022 DQI
A: Who is submitting this information?	5%	100.0	100.0	100.0
B: Date and Location of the event	12%	77.1	78.4	78.4
C: Affected Facility Information	12%	78.2	78.4	78.8
D: Excavation Information	14%	85.4	85.1	88.3
E&F: Notification, Locating, Marking	12%	100.0	100.0	100.0
G: Excavator Downtime	6%	11.6	14.0	13.0
H: Description of Damage	14%	45.1	36.5	33.3
I: Description of the Root Cause	25%	76.0	74.8	78.1
Total Weighted DQI	100%	75.3	74.2	75.7

Of the various parts of the damage report, Parts G: Excavator Downtime and H: Description of Damage are often not included, as most of the organizations inputting data into DIRT do not track this information.

7.0 | Appendices

Appendix B: Damage Information Reporting Tool (DIRT) - Field Form

FRESH DIRT (beginning 2018)

Rev: 11/7/2017

** indicates a Required Field

Damage Information Reporting Tool (DIRT) - Field Form

Part A – Original Source of Event Information

Who is providing the information?		<input type="checkbox"/> Electric	<input type="checkbox"/> Engineer/Design	<input type="checkbox"/> Equipment Manufacturer
<input type="checkbox"/> Excavator	<input type="checkbox"/> Liquid Pipeline	<input type="checkbox"/> Locator	<input type="checkbox"/> Natural Gas	<input type="checkbox"/> Private Water
<input type="checkbox"/> Public Works	<input type="checkbox"/> Railroad	<input type="checkbox"/> Road Builders	<input type="checkbox"/> Unknown/Other	<input type="checkbox"/> Federal / State Regulator
Name of person providing the information:				

Part B – Type, Date, and Location of Event

Type of Event:	<input type="checkbox"/> DIRT Event	<input type="checkbox"/> Underground Damage	<input type="checkbox"/> Underground Near Miss		
	<input type="checkbox"/> Non-DIRT Event	<input type="checkbox"/> Above Grade	<input type="checkbox"/> Aerial	<input type="checkbox"/> Natural Cause	<input type="checkbox"/> Submarine
*Date of Event:	(MM/DD/YYYY)				
*Country	*State	*County	City		
Street address:	Nearest Intersection:				
Latitude/Longitude:	Lat:	Lon	<input type="checkbox"/> Decimal Degrees <input type="checkbox"/> D M S		
*Right-of-Way where event occurred					
Public:	<input type="checkbox"/> City Street	<input type="checkbox"/> State Highway	<input type="checkbox"/> County Road	<input type="checkbox"/> Interstate Highway	<input type="checkbox"/> Public-Other
Private:	<input type="checkbox"/> Private Business	<input type="checkbox"/> Private Land Owner	<input type="checkbox"/> Power /Transmission Line	<input type="checkbox"/> Private Easement	<input type="checkbox"/> Dedicated Public Utility Easement
	<input type="checkbox"/> Pipeline	<input type="checkbox"/> Railroad	<input type="checkbox"/> Unknown/Other		

Part C – Affected Facility Information

*What type of facility operation was affected?		<input type="checkbox"/> Cable Television	<input type="checkbox"/> Electric	<input type="checkbox"/> Liquid Pipeline		
<input type="checkbox"/> Natural Gas	<input type="checkbox"/> Sewer	<input type="checkbox"/> Steam	<input type="checkbox"/> Telecommunications	<input type="checkbox"/> Water	<input type="checkbox"/> Unknown/Other	
*What type of facility was affected?		<input type="checkbox"/> Distribution	<input type="checkbox"/> Gathering	<input type="checkbox"/> Service/Drop	<input type="checkbox"/> Transmission	<input type="checkbox"/> Unknown/Other
Was the facility part of a joint trench?		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown		
Did this event involve a Cross Bore?		<input type="checkbox"/> Yes	<input type="checkbox"/> No			
Was facility owner One Call Center member?		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown		
If No, is facility owner exempt from One Call Center membership?		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown		
Measured Depth		<input type="checkbox"/> Embedded in concrete/asphalt pavement	<input type="checkbox"/> <18" / 46 cm	Measured depth		
From Grade		<input type="checkbox"/> 18" – 36" / 46 - 91 cm	<input type="checkbox"/> >36" / 91 cm	from grade _____ in/cm		

Part D – Excavation Information

*Type of Excavator		<input type="checkbox"/> Contractor	<input type="checkbox"/> County	<input type="checkbox"/> Developer	<input type="checkbox"/> Farmer	<input type="checkbox"/> Municipality	
		<input type="checkbox"/> Occupant	<input type="checkbox"/> Railroad	<input type="checkbox"/> State	<input type="checkbox"/> Utility	<input type="checkbox"/> Unknown/Other	
*Type of Excavation Equipment		<input type="checkbox"/> Auger	<input type="checkbox"/> Backhoe/Trackhoe	<input type="checkbox"/> Boring	<input type="checkbox"/> Bulldozer		
		<input type="checkbox"/> Drilling	<input type="checkbox"/> Directional Drilling	<input type="checkbox"/> Explosives	<input type="checkbox"/> Farm Equipment	<input type="checkbox"/> Grader/Scraper	<input type="checkbox"/> Hand Tools
		<input type="checkbox"/> Milling Equipment	<input type="checkbox"/> Probing Device	<input type="checkbox"/> Trencher	<input type="checkbox"/> Vacuum Equipment	<input type="checkbox"/> Unknown/Other	
*Type of Work Performed		<input type="checkbox"/> Agriculture	<input type="checkbox"/> Bldg. Construction	<input type="checkbox"/> Bldg. Demolition	<input type="checkbox"/> Cable Television		
		<input type="checkbox"/> Curb/Sidewalk	<input type="checkbox"/> Drainage	<input type="checkbox"/> Driveway	<input type="checkbox"/> Electric	<input type="checkbox"/> Engineering/Survey	
		<input type="checkbox"/> Fencing	<input type="checkbox"/> Grading	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Landscaping	<input type="checkbox"/> Liquid Pipeline	<input type="checkbox"/> Milling
		<input type="checkbox"/> Natural Gas	<input type="checkbox"/> Pole	<input type="checkbox"/> Public Transit Auth.	<input type="checkbox"/> Railroad	<input type="checkbox"/> Road Work	<input type="checkbox"/> Sewer
		<input type="checkbox"/> Site Development	<input type="checkbox"/> Steam	<input type="checkbox"/> Storm Drain/Culvert	<input type="checkbox"/> Street Light	<input type="checkbox"/> Telecommunication	
		<input type="checkbox"/> Traffic Signal	<input type="checkbox"/> Traffic Sign	<input type="checkbox"/> Water	<input type="checkbox"/> Waterway Improvement	<input type="checkbox"/> Unknown/Other	

Part E – Notification and Locating

*Was the One-Call Center notified?		<input type="checkbox"/> Yes	<input type="checkbox"/> No	Ticket Number		
If Yes, type of locator		<input type="checkbox"/> Facility Owner	<input type="checkbox"/> Contract Locator	<input type="checkbox"/> Unknown/Other		
If No, is excavation activity and/or excavator type exempt from notification?		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown		
Was work area white-lined?		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown		

Part F – Intentionally left blank

Appendix B: Damage Information Reporting Tool (DIRT) - Field Form

FRESH DIRT (beginning 2018)

Rev: 11/7/2017

** indicates a Required Field

Part G – Excavator Downtime

Did Excavator incur down time?	<input type="checkbox"/> Yes	<input type="checkbox"/> No				
If yes, how much time?	<input type="checkbox"/> < 1 hr	<input type="checkbox"/> 1 - <2 hrs	<input type="checkbox"/> 2 - <3 hrs	<input type="checkbox"/> 3+ hrs	Exact Value _____	<input type="checkbox"/> Unknown
Estimated cost of down time?	<input type="checkbox"/> \$0	<input type="checkbox"/> \$1 - 1000	<input type="checkbox"/> \$1,001 - 5,000	<input type="checkbox"/> \$5,001 - 25,000		
	<input type="checkbox"/> \$25,001 - 50,000	<input type="checkbox"/> >\$50,000	Exact Value _____	<input type="checkbox"/> Unknown		

Part H – Interruption and Restoration

*Did the damage cause an interruption in service?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown				
If yes, duration of interruption	<input type="checkbox"/> < 1 hr	<input type="checkbox"/> 1 - <6 hrs	<input type="checkbox"/> 6 - <12 hrs	<input type="checkbox"/> 12 - <24 hrs	<input type="checkbox"/> 24 - <48 hrs		
	<input type="checkbox"/> 48+ hrs	Exact Value _____ hrs	<input type="checkbox"/> Unknown				
Approximately how many customers were affected?	<input type="checkbox"/> Unknown	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2 - 10	<input type="checkbox"/> 11 - 50	<input type="checkbox"/> 51+	Exact Value _____
Estimated cost of damage / repair/restoration:	<input type="checkbox"/> \$0	<input type="checkbox"/> \$1 - 1,000	<input type="checkbox"/> \$1,001- 5,000	<input type="checkbox"/> \$5,001 - 25,000			
	<input type="checkbox"/> \$25,001 - 50,000	<input type="checkbox"/> > \$50,000	Exact Value _____	<input type="checkbox"/> Unknown			

*Part I – Root Cause Select only one

Notification Issue	Locating Issue	
<input type="checkbox"/> No notification made to One Call Center/ 811	<i>Facility not marked due to:</i>	
<input type="checkbox"/> Excavator dug outside area described on ticket	<input type="checkbox"/> Abandoned facility	
<input type="checkbox"/> Excavator dug prior to valid start date/time	<input type="checkbox"/> Incorrect facility records/maps	
<input type="checkbox"/> Excavator dug after valid ticket expired	<input type="checkbox"/> Locator error	
<input type="checkbox"/> Excavator provided incorrect notification information	<input type="checkbox"/> No response from operator/contract locator	
Excavation Issue	<input type="checkbox"/> Tracer wire issue	
<input type="checkbox"/> Excavator dug prior to verifying marks by test-hole (pothole)	<input type="checkbox"/> Unlocatable Facility	
<input type="checkbox"/> Excavator failed to maintain clearance after verifying marks	<i>Facility marked inaccurately due to:</i>	
<input type="checkbox"/> Excavator failed to protect/shore support facilities	<input type="checkbox"/> Abandoned facility	
<input type="checkbox"/> Improper backfilling practices	<input type="checkbox"/> Incorrect facility records/maps	
<input type="checkbox"/> Marks faded or not maintained	<input type="checkbox"/> Locator error	
<input type="checkbox"/> Improper excavation practice not listed above	<input type="checkbox"/> Tracer wire issue	
Miscellaneous Root Causes		
<input type="checkbox"/> Deteriorated facility	<input type="checkbox"/> One Call Center Error	<input type="checkbox"/> Previous damage
<input type="checkbox"/> Root Cause not listed (comment required)		

Part J – Additional Comments

Part Z – Images and Attachments: List the file names of any images and attachments to submit with this report

Appendix C: Glossary of Terms & Definitions

Abandoned: with reference to underground infrastructure, taken out of service permanently but left in place.

Alternate Locate Agreement (ALA): A contractual agreement between a facility owner and an excavator that allows the excavator to proceed with their excavation work without receiving a traditional field locate.

Backfill: The act of filling the void created by excavating or the material used to fill the void.

CCGA: The Canadian Common Ground Alliance's (CCGA) primary role is to manage damage prevention issues of national interest that Regional Partners consider best addressed through a single voice.

CGA: The Common Ground Alliance (CGA) is a member-driven association dedicated to ensuring public safety, environmental protection, and the integrity of services by promoting effective damage prevention practices.

Compliance: Adherence to acts and regulations.

Damage: Any impact, stress and/or exposure that results in the need to repair an underground facility due to a weakening or the partial or complete destruction of the facility, including, but not limited to, the protective coating, lateral support, cathodic protection or the housing for the line, device or facility.

Damage Reporting: The immediate reporting to appropriate authorities and the owner of any damage made or discovered in the course of excavation or demolition work.

Daylighting: The exposure of underground utility infrastructure by minimally intrusive excavation practices to ascertain precise horizontal and vertical position or other attributes. (Note: may also be referred to as potholing" or "test pitting".)

Demolition Work: The intentional, partial or complete destruction by any means of a structure served by, or adjacent, to an underground line or facility.

Depth: The vertical distance below grade.

DIRT: Damage Information Reporting Tool.

Downtime: Lost time reported by a stakeholder on the Damage Information Reporting Tool (DIRT) field form for an excavation project due to failure of one or more stakeholders to comply with applicable damage prevention regulations.

DQI: The Data Quality Index (DQI) is a measure of data quality and consists of the evaluation of each organization that submitted records, in addition to the evaluation of each record submitted to DIRT.

Event: The occurrence of an underground infrastructure damage, near miss, or downtime.

Excavate or Excavation: An operation using equipment or explosives to move earth, rock or other material below existing grade. (Note: Excavation can include augering, blasting, boring, coring, digging, ditching, dredging, drilling, driving-in, grading, plowingin, pulling-in, ripping, scraping, trenching and vacuuming).

Excavator: Any person proposing to or engaging in excavation or demolition work for themselves or for another person.

Facility: See Utility Infrastructure.

Facility Owner/Operator: Any person, utility, municipality, authority, political subdivision, or other person or entity who owns, operates, or controls the operation of an underground line/facility.

Grade (noun): The surface elevation.

Grade (verb): The act of changing the surface elevation.

Hand Digging: any movement of earth using a hand shovel*. The preference is to use an insulated or wooden-handled shovel.

Joint Trench: A trench containing two or more underground infrastructures that are buried together by design or agreement.

Appendix C: Glossary of Terms & Definitions

Locate (noun): The provision of location information by a facility owner (or their agent) in the form of ground surface markings and/or facility location documentation, such as drawings, mapping, numeric descriptions or other written documentation.

Locate (verb): The process of an underground plant owner or their agent providing information to an excavator which enables them to determine the location of a facility.

Locate Request: A communication between an excavator and the owner or their agent (usually the notification service) in which a request for locating underground facilities is processed.

Locate Ticket: A locate request document created by the notification service or an owner marked with a unique identification number.

Locator: A person whose job is to locate underground infrastructure.

LSP: Locate Service Provider - a person authorized by the owner to locate and mark its underground facilities.

Marks or Markings: Surface marking indicating the presence of underground infrastructure including but not limited to highly visible paint and/or labeled stakes or flags to indicate the approximate location of buried facilities within the Located area.

Near Miss: An event where damage did not occur, but a clear potential for damage was identified.

Notifications: Ticket data transmitted to underground infrastructure owners.

One Call Centre: A system which provides a single point of contact to notify facility owners/operators of proposed excavation activities.

ORCGA: The Ontario Regional Common Ground Alliance (ORCGA) is a Regional Partner of both the Common Ground Alliance (CGA) and the Canadian Common Ground Alliance (CCGA). It is a non-profit organization promoting efficient and effective damage prevention for Ontario's vital underground infrastructure.

Person: Any individual or legal entity, public or private.

Public: The general population or community at large.

Root Cause: The primary reason an event occurred.

Test Hole(s): Exposure of a facility by safe excavation practices used to ascertain the precise horizontal and vertical position of underground lines or facilities.

Ticket: All data required from an excavator to transmit a valid notification to the owner

Ticket number: A unique identification number assigned by the one call center to each locate request.

Tolerance Zone: The space in which a facility is located, and in which special care is to be taken.

Underground: Beneath the ground surface or submerged, including where exposed by temporary excavation.

Utility: a private, publicly, or cooperatively owned entity whose purpose is to deliver a commodity or service such as communications, television/internet, power, electricity, light, heat, gas, oil, water, steam, and waste collection.

Utility Infrastructure: a cable, line, pipe, conduit, or structure used to gather, store, or convey products or services. (Note: may also be referred to as "facility" or "plant".)

Vacuum Excavation: A means of soil extraction through vacuum where water or air jet devices are commonly used for breaking the ground.

* This does not include picks, bars, stakes, or other earth-piercing devices.

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