CCGA

Canadian Common Ground Alliance

DIRT Report 2022

October 2023

DIG SAFE

Damage Reporting Evaluation Committee

The Damage Reporting Evaluation Committee is a group of diverse stakeholders representing the Canadian Common Ground Alliances across Canada who are responsible for analyzing the data submitted into the CCGA Damage Information Reporting Tool (DIRT), identifying trends and making recommendations based on the data.

Alberta
Josef Rosenberg
Utility Safety Partners

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Chair's Message

On behalf of the Canadian Common Ground Alliance (CCGA) Board of Directors, I am pleased to provide the sixth annual CCGA National DIRT (Damage Information Reporting Tool) Report for 2022.

The DIRT report provides us with valuable information on the state of Damage Prevention in Canada. Like previous years, this report presents characteristics, themes and contributing factors leading to buried infrastructure damages in Canada as reported through the DIRT reporting system.

Underground infrastructure provides crucial and essential services to homes, businesses, public institutions, and communities. Whether it is delivery of natural gas for heating, electric power for lighting, high speed fiber 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.

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

In reviewing the 2022 report and comparing with previous years, underground infrastructure damages dropped slightly from 2021, with a 3.4% decrease (774 damages), corresponding with a decrease in the number of locate requests of 3.4% (85,267 requests). This resulted in a slight decrease in the overall damages per 1,000 requests in 2022 of 4.35 versus 4.51 in 2021 (3.55%).

As in previous years, the most prevalent Root Cause Category continues to be Excavation Issues (37%), with the highest individual root cause being No Notification to the One Call Centre, again like previous years.

While reporting damages in DIRT continues to be voluntary, the data is critical for the CCGA to determine root causes and develop mitigating measures to reduce and eliminate them.

On behalf of the CCGA Board of Directors, I would like to extend a sincere thank you to the Reporting and Evaluation Committee for their efforts in completing this 2022 National DIRT Report.

The complete 2022 DIRT Report is available to download at www.canadiancga.com.

Sincerely,

Douglas Lapp, P. Eng.
Board Chair
Canadian Common Ground Alliance

CCGA
Canadian Common Ground Alliance

Introduction

In the modern world, we rely on an endless grid of underground infrastructure to deliver unceasing supplies of vital utilities to our homes and businesses. Millions of petabytes of data, billions of kWh of electricity, trillions of cubic metres of natural gas and trillions of litres of water are transmitted to consumers throughout Canada every year, made possible through vast networks of buried utilities and the concerted efforts of thousands of operators.

These utilities are strategically buried at an accessible, depth just beneath the surface of the earth. The convenient and cost-effective choice to bury most utilities at this depth comes with it an increased risk of a utility strike, unintentional daylighting, or severe accident. The CCGA and its regional partners have made and continue to make an intensive effort to educate, advocate, and increase general awareness among the digging community of the risk their activities can pose to buried infrastructure. The protection of underground lines is essential to ensuring the health, safety, and livelihoods of all who live in Canada. Being able to reasonably track, understand, and ultimately prepare for utility strikes gives superior flexibility to utility owners to respond with greater speed, increased efficiency, and concise solutions.

The Damage Information Reporting Tool (DIRT) was developed by the Common Ground Alliance (CGA). It was designed to record the data found in damage reports for damages made to underground infrastructure during excavation work. It provides a summary and an analysis of damages reported throughout Canada in the DIRT system.

Important note about the DIRT Data

The Damage Information Reporting Tool (DIRT) is a **confidential database** where various stakeholders may enter information related to damages to buried utilities.

- **Participation to DIRT is made on a voluntary basis**. The report does not reflect the total number of damages that take place in Canadian provinces and there is no legal obligation for reporting such damages.
- The data collected is a rich source of industry intelligence on damages related to buried facilities from excavation activities. Despite this, uncertainties remain that limit the ability to draw firm conclusions on the trends over time and across jurisdictions. For one, since damages are reported to DIRT on a voluntary basis, **they do not reflect the total number of damages that take place in a given year**. For example, an increase in damages in one year, relative to another, could reflect a difference in actual damages, or it could reflect an increase in the number of damages being reported. In addition, not all regions have adopted the database to the same extent. As a result, some jurisdictions contain more comprehensive data than others do. Results may vary from one yearly report to another, due to retroactive data being entered from time to time, thus making comparison difficult from one report to the next.
- Event/Damage is defined as any impact, near miss 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.

2022 Highlights

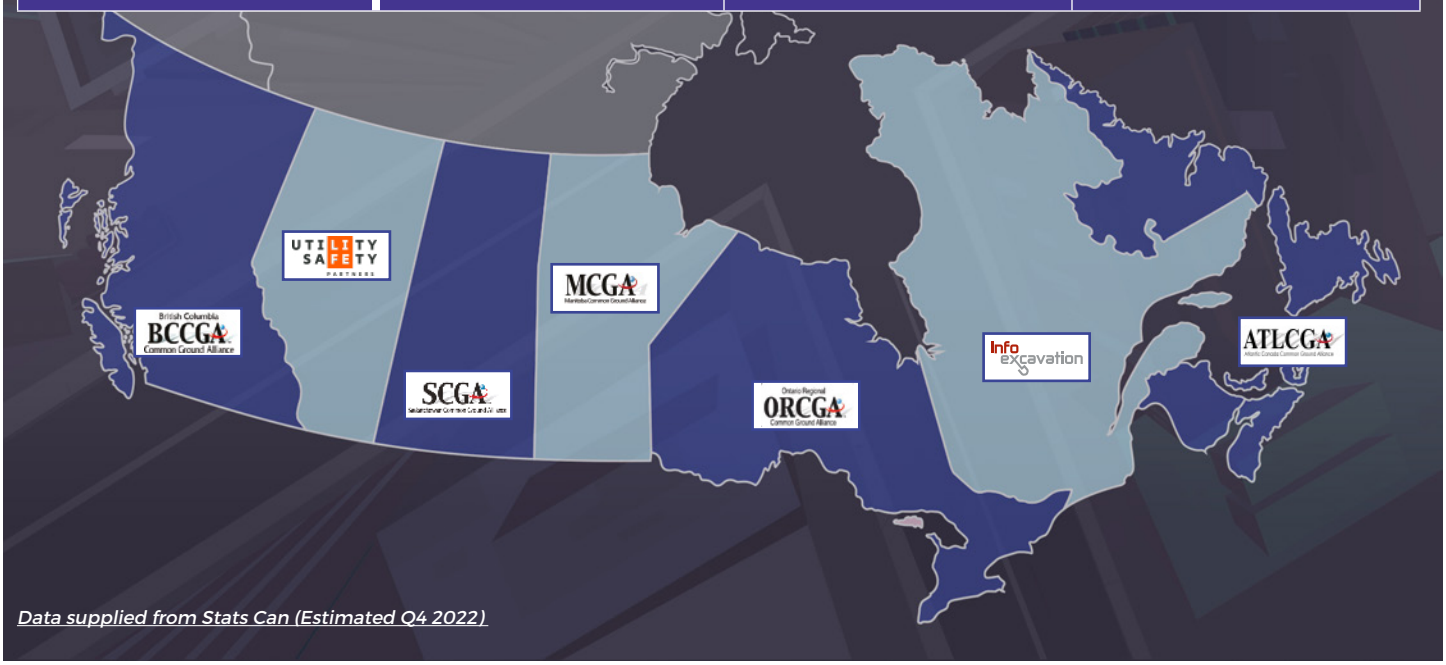
- More than 42.4 damages occurred per workday.
- The total number of reported damages Canada-wide in 2022 totaled 10,636, which is a decrease of 7% from 11,410 in 2021, and 9% from 11,686 in 2020.
- Natural Gas and Telecommunication facilities were affected in 82.9% of damages, 39.9% and 43.1% respectively.
- Work on Water and Sewer systems accounted for 24% of damages and the third most was Electric at 9.2%.
- The most common known root cause of damages was Excavation Issue (37%)
- Over 5 years No Notification Made to One Call Centre has consistently been in the top three root causes and this year is the #1 reason for incidents.

In 2022, seven Canadian regions reported damages via the DIRT system.
The regions and their respective population values are shown in **Table 1**.

RECALL:
That damages are reported to DIRT on a voluntary basis and therefore do not reflect the total number of damages that take place in a year in Canadian provinces, often reflecting the major contributors to the DIRT program in each province.

Table 1 – Canadian Regions

Province/Region	2022 Population	% of Population	% of Damages per capita
British Columbia	5,368,266	14%	6%
Alberta	4,601,314	12%	32%
Saskatchewan	1,205,119	3%	41%
Manitoba	1,420,228	4%	8%
Ontario	15,262,660	39%	11%
Quebec	8,751,352	22%	2%
Atlantic	2,553,264	6%	0%
Canada (incl. Territories)	**39,292,355**	**100%**	**100%**



Data supplied from Stats Can (Estimated Q4 2022)

2022 Highlights (cont'd)

Table 2 presents a summary of key performance indicators related to reported damages by province/region. Canada-wide, there were on average **42.4** damages per workday (using **251** workdays in **2022**).

Table 2 - Damages, Requests, Notifications by Province/Region 2022

Province/Region	Damages	Damages per Work Day	Damages per 1,000 Requests*	Damages per 1,000 Notifications**
British Columbia	1,099	4.4	4.69	1.60
Alberta	3,021	12	6.57	1.89
Saskatchewan	599	2.4	4.03	1.28
Manitoba	265	1.1	3.49	1.28
Ontario	4,797	19.2	4.17	0.71
Quebec	840	3.3	2.68	1.37
Atlantic	15	0.1	0.24	0.21
Canada	**10,636**	**42.4**	**4.35**	**1.03**

* 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.

Location and Year of Damages

Table 3 illustrates the total number of reported damages per year (2018-2022) by province/region and the percent of total damages. Interesting to note that both Saskatchewan and Manitoba percentage of damages have remained stable.

Table 3 - Damages, Requests, Notifications by Province/Region 2022

Incident Types by Province	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
	Number of Damages					Percentage of Damages				
British Columbia	1,408	1,304	1,228	1,277	1,099	12%	11%	11%	11%	10%
Alberta	3,139	3,613	3,790	3,688	3,021	26%	30%	32%	32%	28%
Saskatchewan	673	669	693	723	599	6%	6%	6%	6%	6%
Manitoba	219	196	222	197	265	2%	2%	2%	2%	2%
Ontario	5,313	5,005	4,782	4,555	4,797	44%	42%	41%	40%	45%
Quebec	1,235	1,102	954	923	840	10%	9%	8%	8%	8%
Atlantic	54	60	15	47	15	0%	1%	0.1%	0.4%	0%
National Totals	**12,041**	**11,949**	**11,684**	**11,410**	**10,636**	**100%**	**100%**	**100%**	**100%**	**100%**

In **Table 4** below, we have broken out the near misses that are part of the overall Damage numbers.
A near miss as defined in the CCGA Best Practices 4.0 glossary is, «An event where damage did not occur, but a clear potential for damage was identified».

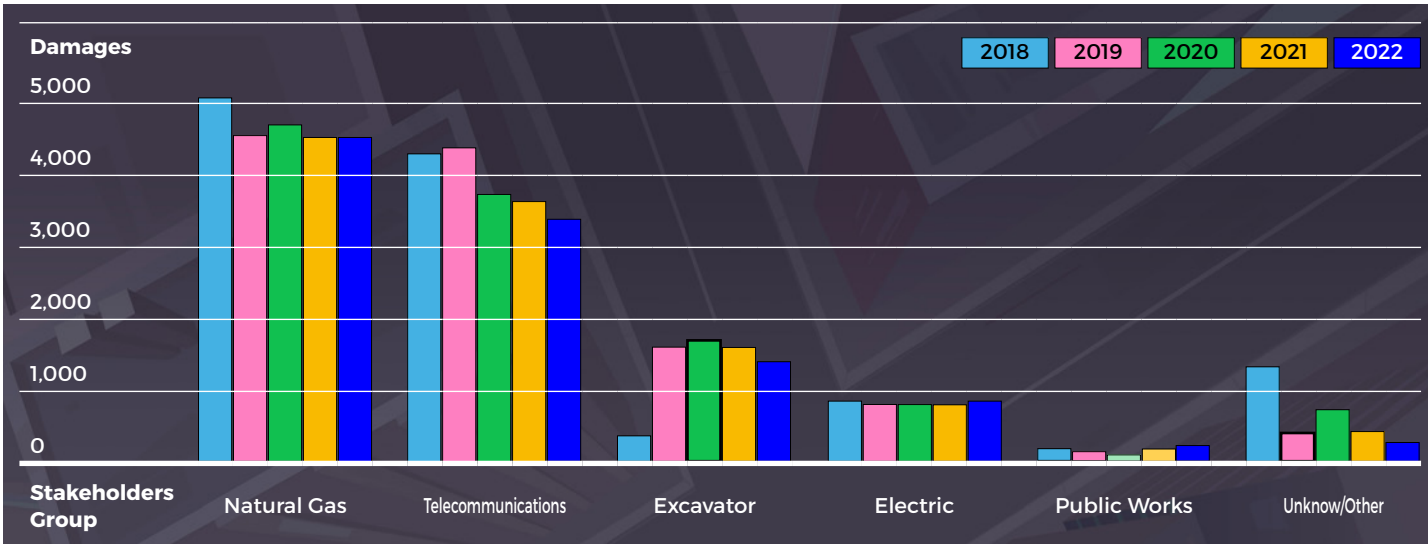
Table 4 - Total Near Misses Per Year, by Facility Type 2018 - 2022

Facility Types	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
	Number of Near Misses					Percentage of Near Misses				
Natural Gas	105	101	101	47	64	2%	2%	2%	1%	1%
Telecommunications	78	91	94	42	11	2%	2%	2%	1%	0%
Unknown/Other	100	69	87	29	27	19%	11%	10%	4%	5%
Electric	59	26	39	20	11	6%	3%	4%	2%	1%
Liquid Pipeline	44	26	45	21	18	10%	68%	74%	48%	49%
Water & Sewer	8	6	6	2	3	6%	5%	6%	1%	1%
National Totals	**394**	**319**	**372**	**161**	**134**	**3%**	**3%**	**3%**	**1%**	**1%**

Reporting Stakeholders

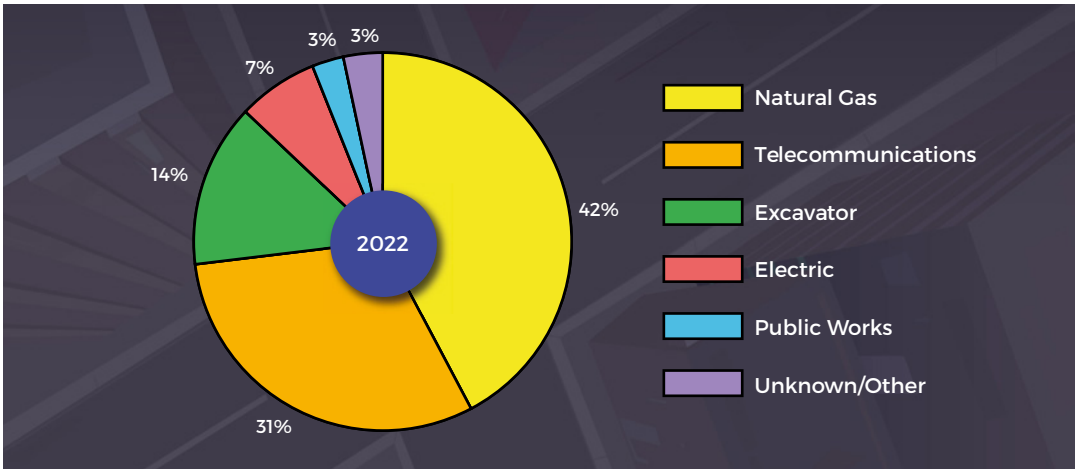
Stakeholders involved with Telecommunications and Natural Gas report damages most often. **Figure 1** shows total damages by the six most common stakeholder groups for the 2018-2022 period.

Figure 1 - Damages by Stakeholder Group 2018 - 2022



Stakeholder Group	2018	2019	2020	2021	2022
Natural Gas	5,024	4,562	4,654	4,520	4,494
Telecommunications	4,210	4,322	3,773	3,732	3,279
Excavator	292	1,699	1,747	1,682	1,488
Electric	890	757	706	737	731
Public Works	224	173	127	274	288
Unknown/Other	1,401	436	677	465	356
National Totals	**12,041**	**11,949**	**11,684**	**11,410**	**10,636**

Figure 2 -Percentage of Damage Events by Stakeholder 2022



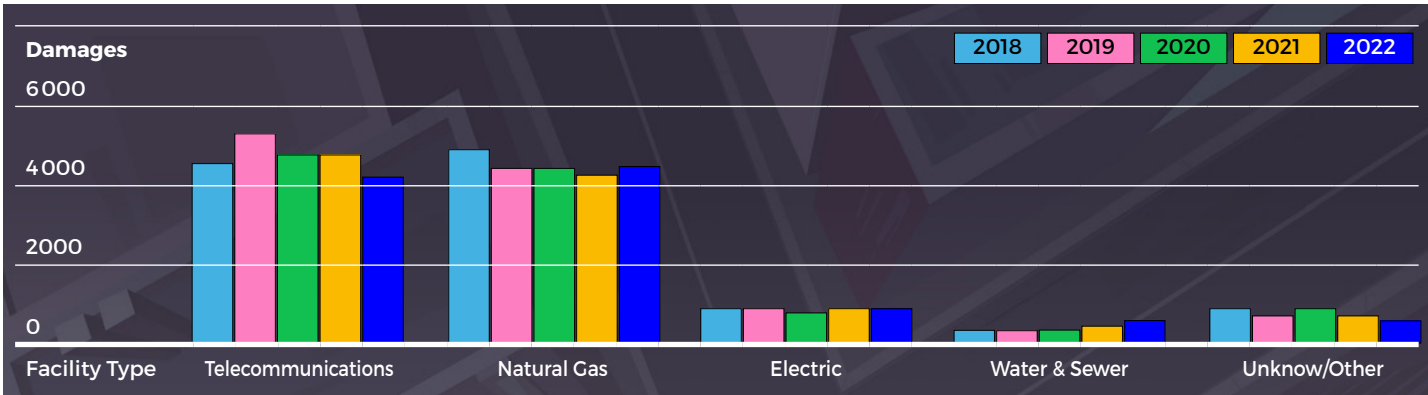
As shown in **Figure 2**, 73% of total damages were reported by stakeholders in the Natural Gas and Telecommunication sectors in 2022, which is very close to the 72% reported in 2021.

Even though there has been a 1% increase in the damages reported by Natural Gas and Telecommunications stakeholders, the overall number of damages have reduced from 2021.

Facilities Affected

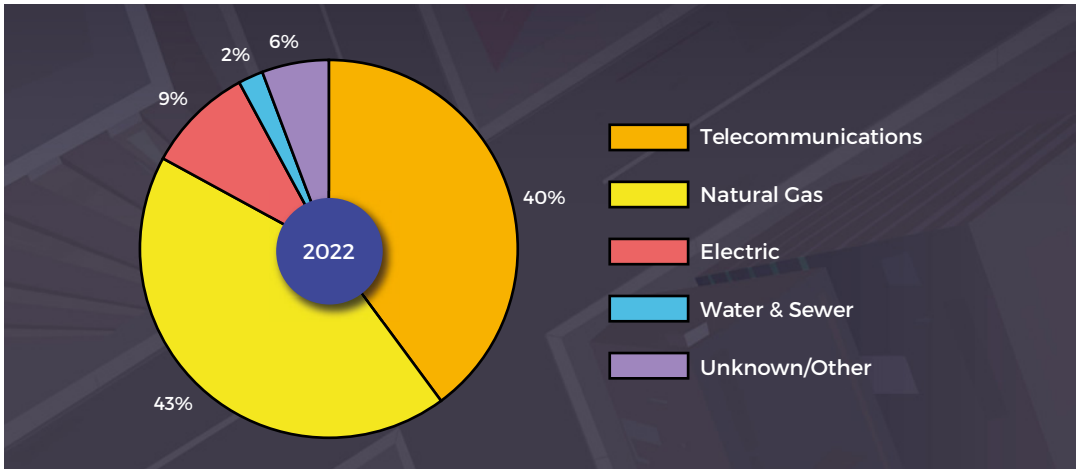
Natural Gas has remained relatively stable stable with only a 0.8% increase.
Telecommunications has seen a sharp decline of 18.1%.
Electric remained stable and Water and Sewer saw an increase from 196 in 2021 to 227 in 2022.

Figure 3 -Damages by Affected Facility 2022



Stakeholder	2018	2019	2020	2021	2022
Telecommunications	4,821	5,486	5,022	5,007	4,241
Natural Gas	5,085	4,699	4,680	4,543	4,581
Electric	1,050	963	939	974	978
Water & Sewer	124	122	104	196	227
Unknown/Other	961	679	939	690	609
National Totals	**12,041**	**11,949**	**11,684**	**11,410**	**10,636**

Figure 4 -Damages by Affected Facility



Of the 10,636 reported damages that occurred in 2022, Natural Gas and Telecommunication facilities were affected in 83% of the incidents (**Figure 4**).

This is a 1% increase over 2021, for reasons already noted previously.

Facilities Affected (cont'd)

Shown in **Table 5** is the percent of damages by Facility Type affected at a provincial level.
Typically, the highest facilities affected do not necessarily reflect those damaged the most; rather they often point to which utilities in each region contribute to DIRT the most:

- In British Columbia, for example, 87% of damages affected Natural Gas facilities
- In Quebec, 50% of damages affected Telecommunications facilities
- In Saskatchewan, 39% of damages affected Electric facilities.

Table 5 -Percentage of Damages by Affected Facility by Province/Region 2022

Province/ Region	Telecom-munications	Natural Gas	Electric	Water/ Sewer	Liquid Pipeline	Unknown/ Other
British Columbia	9%	87%	0%	0%	1%	3%
Alberta	57%	20%	7%	1%	0%	15%
Saskatchewan	27%	34%	39%	0%	1%	1%
Manitoba	0%	45%	55%	0%	0%	0%
Ontario	38%	50%	7%	4%	0%	1%
Quebec	50%	33%	9%	0%	1%	8%
Atlantic	0%	73%	27%	0%	0%	0%
National Totals	**40%**	**43%**	**9%**	**2%**	**0%**	**5%**

Excavator Information

This section describes the type of excavator and excavator equipment involved in damages.

Excavator Type

Figures 5 and 6 report the number and percentage of reported damages by type of excavator, respectively.

Contractor damages have been consistently decreasing from 2018 to 2022 by 12%. Occupant/Farmer has decreased by 7.3% in reported damages. All the other Excavator types have remained fairly stable.

Figure 5 -Percentage of Damage Reports by Excavator Type, 2022

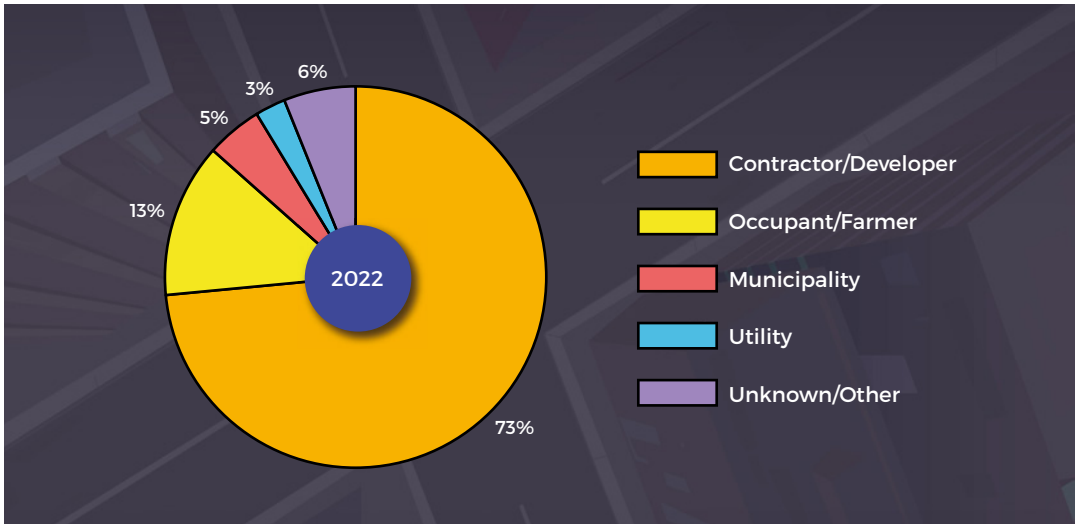
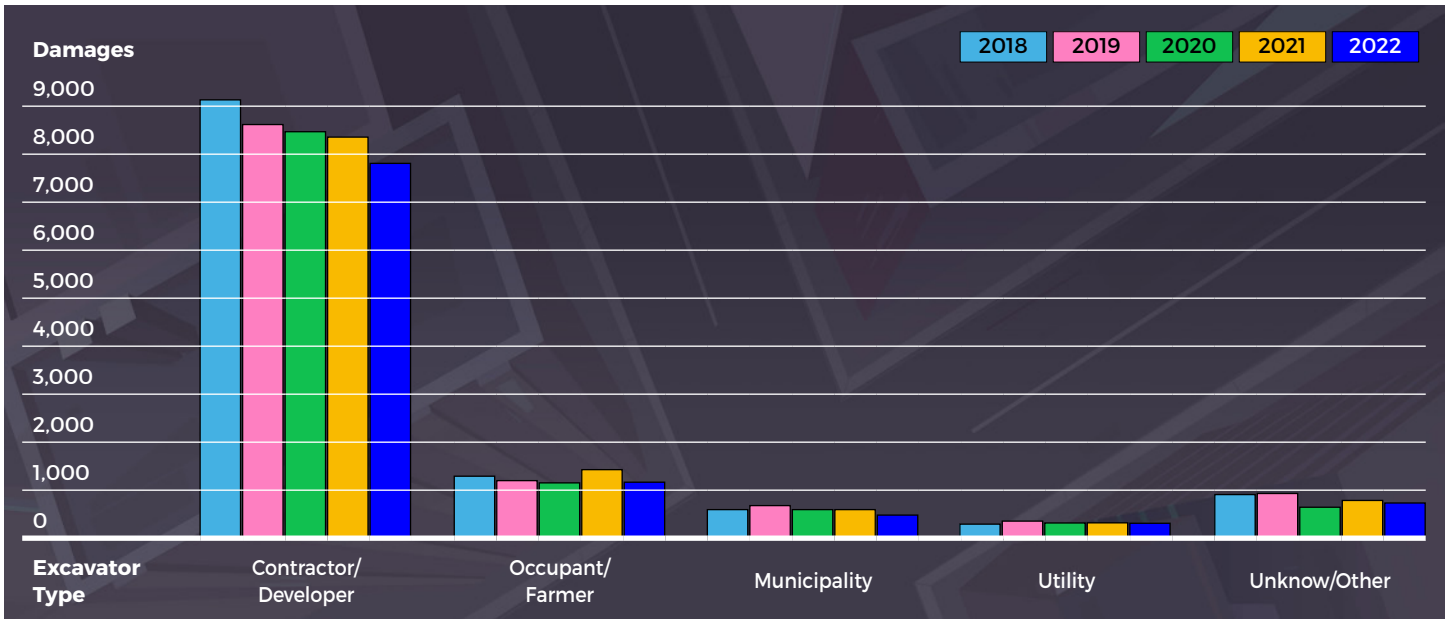


Figure 6 -Damages by Excavator Type 2018 -2022



Stakeholder	2018	2019	2020	2021	2022
Contractor/Developer	9,005	8,793	8,587	8,324	7,926
Occupant/Farmer	1,246	1,156	1,527	1,358	1,155
Municipality	593	678	556	560	458
Utility	251	341	302	341	312
Unknown/Other	946	981	712	827	785
National Totals	**12,041**	**11,949**	**11,684**	**11,410**	**10,636**

Excavator Information (cont'd)

Excavator Equipment Type

As shown in **Figure 7**, the Hoe/Trencher category remains, once again, the most common equipment type cited in damage reports (57%) in 2022 **(Figure 8)** Hoe/Trencher dropped 2% in 2022 compared to 2021.

Figure 7 -Percentage of Damage Reports by Excavator Equipment Type, 2022

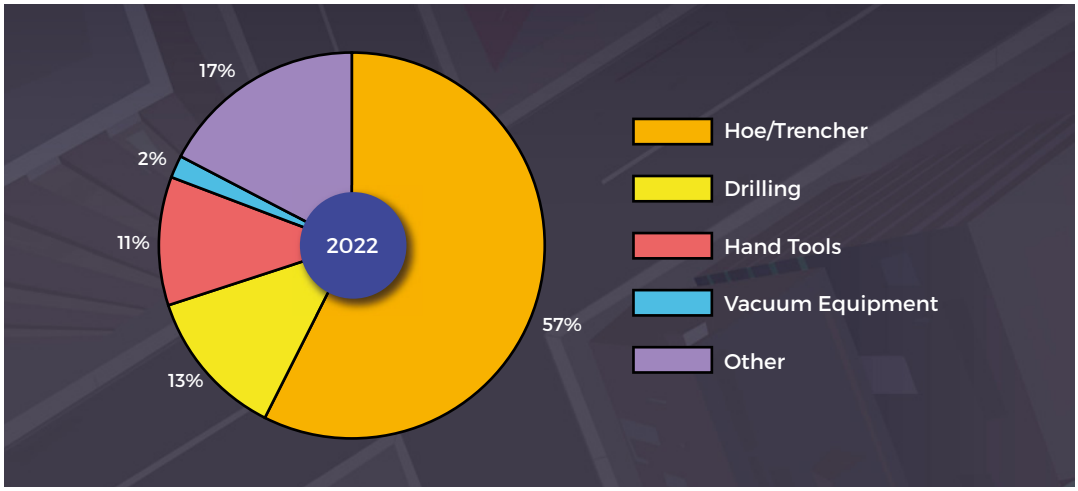
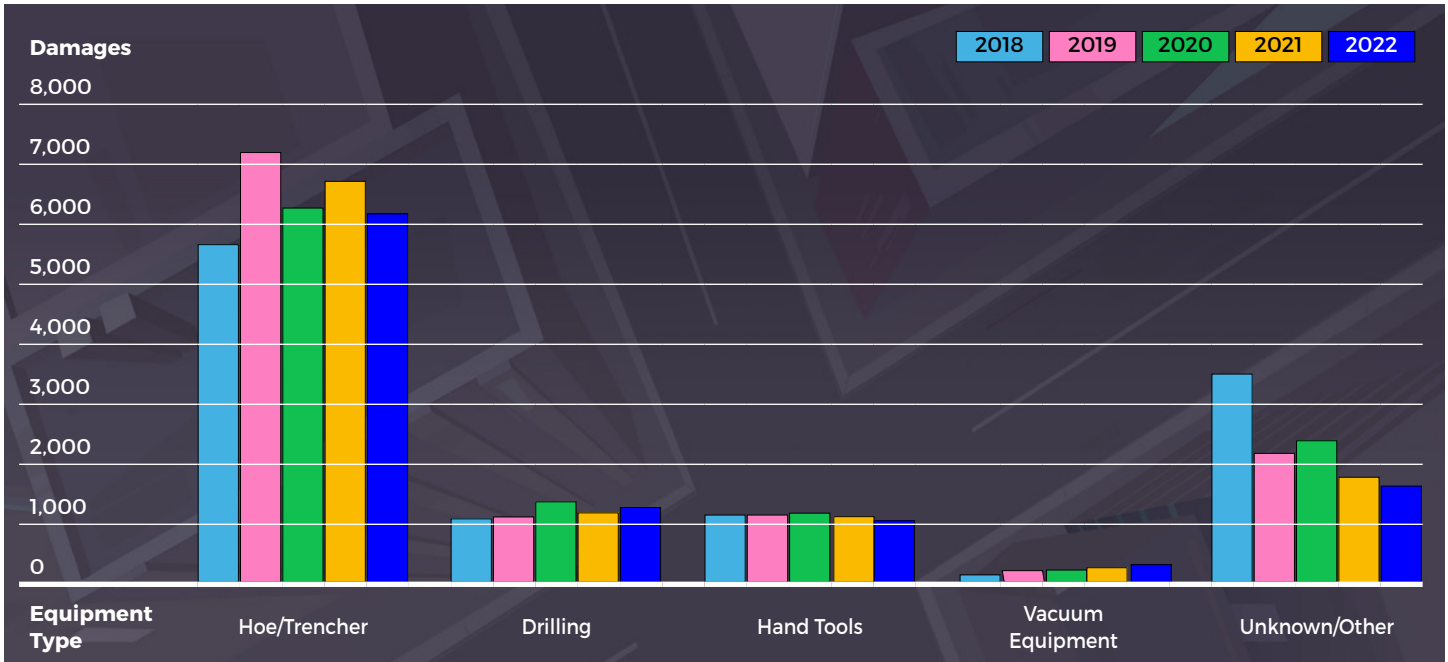


Figure 8 -Damages by Excavator Type 2018 -2022



Stakeholder	2018	2019	2020	2021	2022
Contractor/Developer	9,005	8,793	8,587	8,324	7,926
Occupant/Farmer	1,246	1,156	1,527	1,358	1,155
Municipality	593	678	556	560	458
Utility	251	341	302	341	312
Unknown/Other	946	981	712	827	785
National Totals	**12,041**	**11,949**	**11,684**	**11,410**	**10,636**

Work Details

Work Details should always be taken into context relative to the percentage of requests placed in each Region by Contractors, rather than Members or Homeowners.
Contractors often maintain the highest percentage of locate requests and in turn, are proportionally the largest contributors to utility strike incidents.
To demonstrate this, **Table 6** illustrates the proportion of each Region's locate requests placed by Contractors in **2022**.

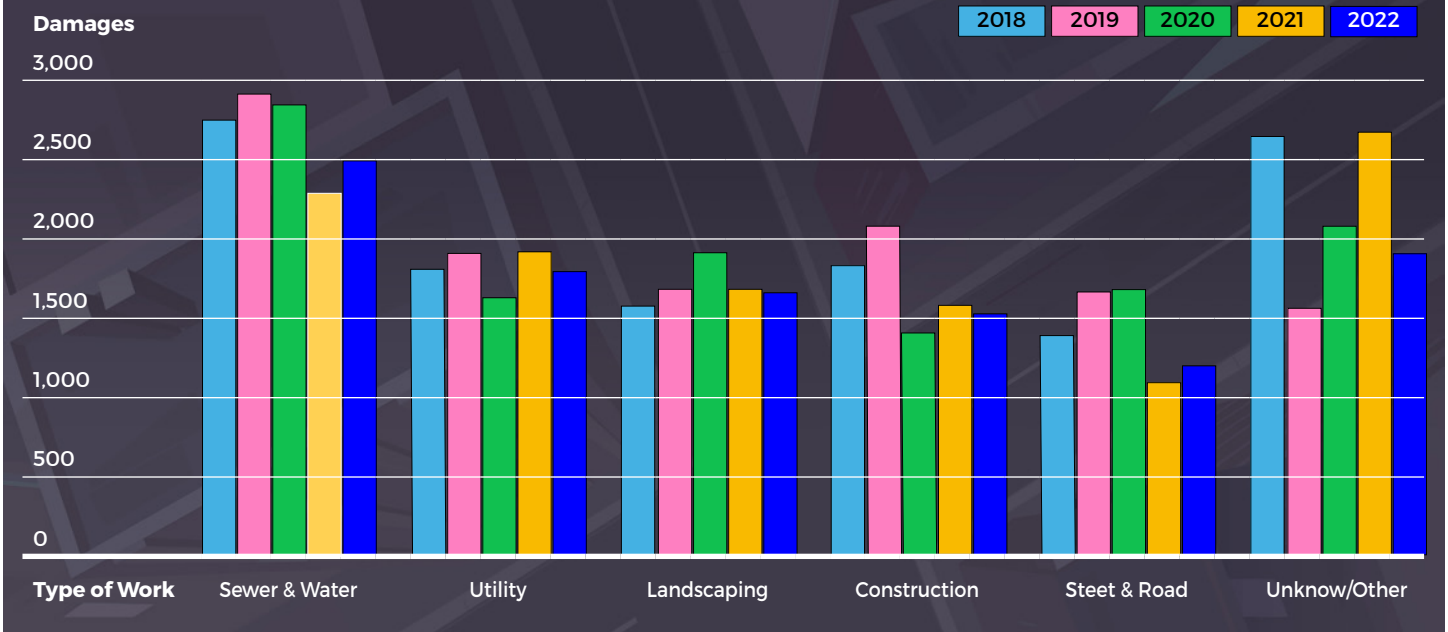
Table 6 - Proportion of Contractor Requests by Region 2022

Province/Region	Total Requests	Contractor Requests	% of Contractor Requests
British Columbia	234,372	153,048	65%
Alberta	459,610	345,149	75%
Saskatchewan	148,680	103,687	70%
Manitoba	76,026	52,929	70%
Ontario	1,149,797	937,344	82%
Quebec	313,761	189,675	60%
Atlantic	62,605	43,878	70%
Canada	**2,444,851**	**1,825,710**	**75%**

Work Details (cont'd)

Figure 9 displays the number of damages by the Type of Work performed for the years 2018 - 2022.
Water and Sewer has seen a small increase of 5.1% from 2021.
The largest decrease from 2021 was in Unknown/Other which dropped by 29.4%.

Figure 9 -Damages by Type of Work Performed, 2018 -2022



Work Type	2018	2019	2020	2021	2022
Sewer & Water	2,797	2,965	2,819	2,380	2,502
Utility	1,798	1,916	1,664	1,910	1,769
Landscaping	1,564	1,614	1,904	1,663	1,642
Construction	1,798	2,157	1,413	1,581	1,543
Street & Road	1,416	1,729	1,733	1,244	1,323
Unknown / Other	2,668	1,568	2,151	2,632	1,857
National Totals	**12,041**	**11,949**	**11,684**	**11,410**	**10,636**

Work Details (cont'd)

As shown in **Figure 10**, Sewer & Water and Utility accounted for 41% of all incidents. Unknown/Other took a decrease of 6% from 2021. Everything else remains fairly stable.

Figure 10 -Percentage of Damages by Type of Work Performed, 2022

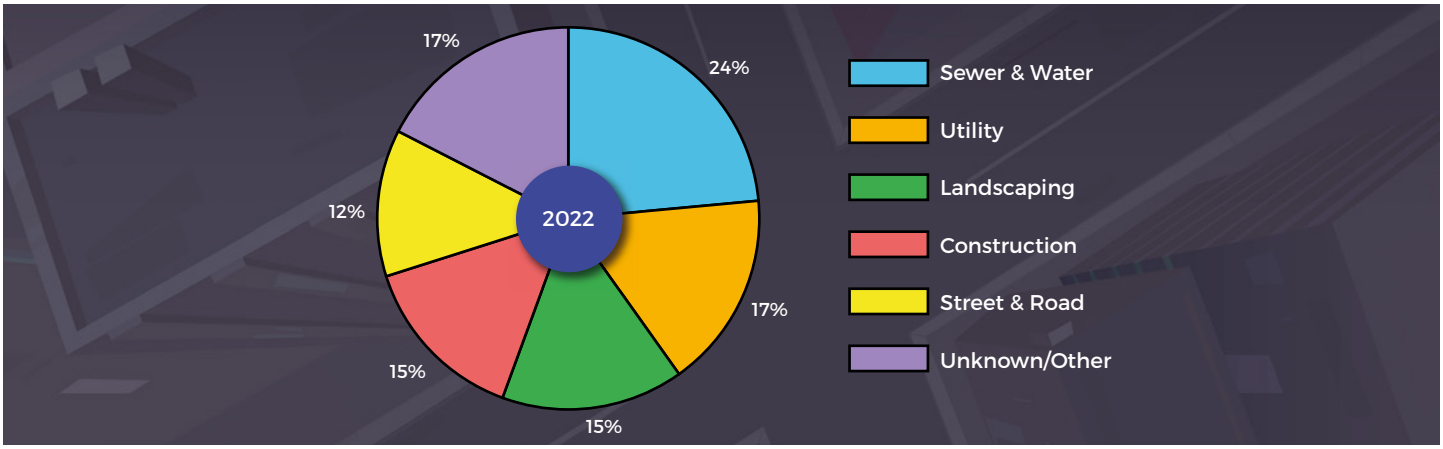


Table 7 – Percentage of Damages by Type of Work Performed 2018 - 2022

Work Type	2018	2019	2020	2021	2022
Sewer & Water	23%	25%	24%	21%	24%
Utility	15%	16%	14%	17%	17%
Landscaping	13%	14%	16%	15%	15%
Construction	15%	18%	12%	14%	15%
Street & Road	12%	14%	15%	11%	12%
Unknown / Other	22%	13%	18%	23%	17%

Work Details (cont'd)

Table 8 presents Damages by Type of Work Performed and Type of Excavator for the year 2022.

- The leading Excavator Type was, once again, Contractors with 74.5% of total damages. This of course is because Contractors overwhelmingly perform the most excavations in any given year (see **Figure 6**)
- As in 2021, the second highest rate of damages (10.9% of total damages), was work performed by Occupant/ Farmer, with Landscaping being their most common type of work

Table 8 - Damages by Type of Work Performed and Type of Excavator 2022

Type of Work	Contractor/ Developer	Occupant/Farmer	Municipality	Utility	Unknown/ Other
Sewer & Water	1,878	192	251	100	81
Utility	1,418	83	16	175	77
Landscaping	1,039	503	29	3	68
Construction	1,311	126	6	2	98
Street & Road	1,116	29	102	12	64
Unknown / Other	1,164	222	54	20	397
National Totals	**7,926**	**1,155**	**458**	**312**	**785**

The primary Work Type varied by province. The leading Work Performed causing damages in Saskatchewan (SK) was Utility (150).
Damages attributed to work performed on Water & Sewer systems were the most frequent in Ontario (ON) (1240), British Columbia (BC) (267), Quebec (211) and Atlantic (ATL) (5).
Unknown/Other was heavily seen in Alberta (AB) (697).
Table 9 reports Damages by Type of Work Performed by Province.

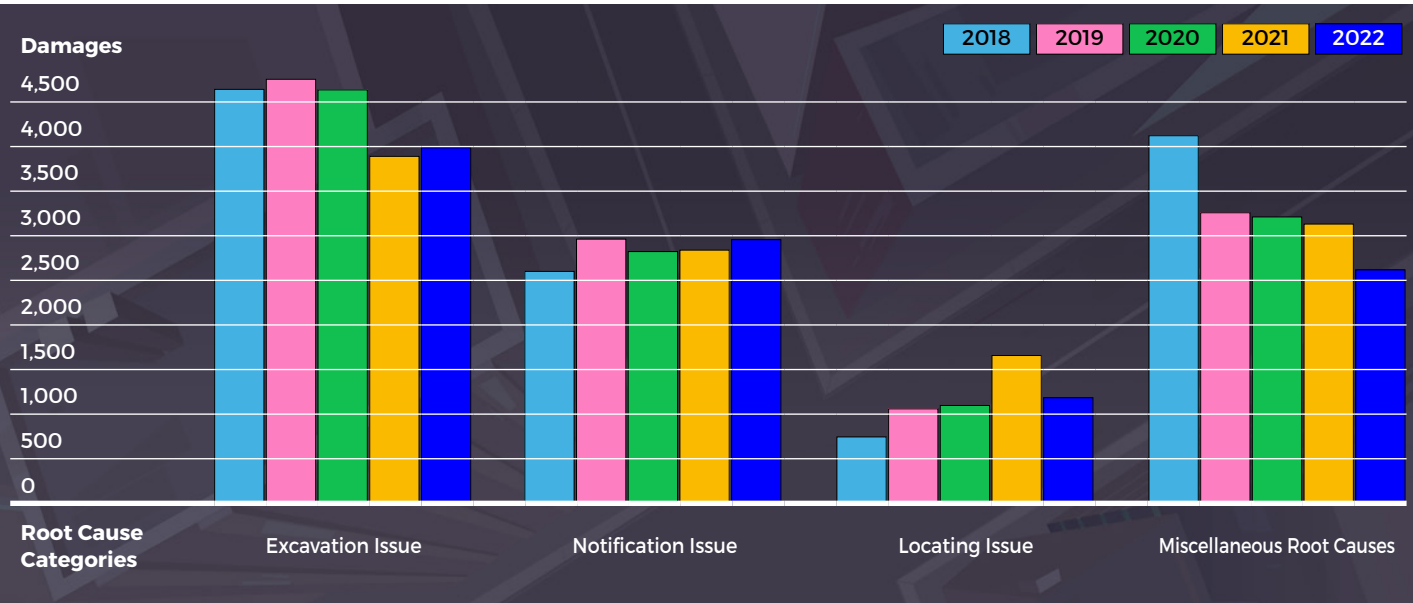
Table 9 - Damages by Type of Work Performed by Province 2022

Type of Work	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Quebec	Atlantic
Sewer & Water	267	651	128		1,240	211	5
Utility	125	544	150		873	76	1
Landscaping	246	331	109		858	96	2
Construction	218	235	51		932	105	2
Street & Road	64	563	68		432	194	2
Unknown / Other	179	697	93	265	462	158	3
Provincial/Regional Totals	**1,099**	**3,021**	**599**	**265**	**4,797**	**840**	**15**

Root Cause

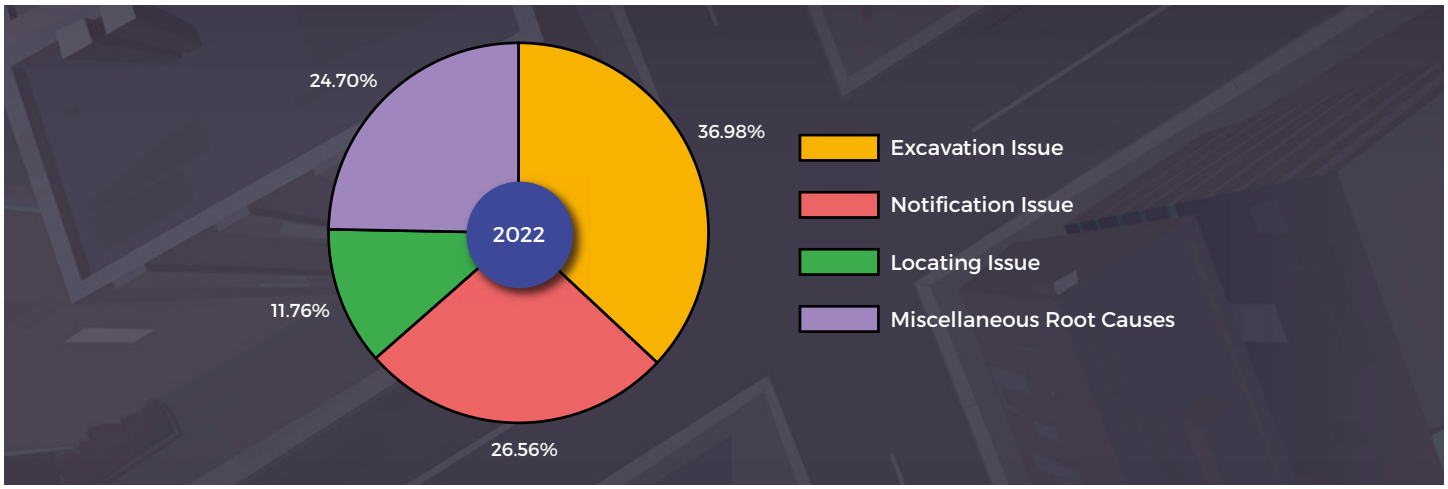
Root Cause describes the reason for reported damages, or more specifically, what was the fundamental cause of the damage occurrence. **Figure 11** and **Figure 12** provide a breakdown of Known Root Causes from 2018 to 2022. Excavation issues saw a reversal of its trend and experienced a 3% increase in 2022 compared to 2021. Notifications also saw in increase of nearly 3% while both Locating Issues and Miscellaneous Root Causes both saw decreases of about 3% each.

Figure 11 - Known Root Causes, 2018-2022



Root Cause	2018	2019	2020	2021	2022
Excavation Issue	4,572	4,624	4,525	3,874	3,933
Notification Issue	2,636	2,969	2,743	2,714	2,825
Locating Issue	757	1,065	1,164	1,677	1,251
Miscellaneous Root Causes	4,076	3,291	3,252	3,145	2,627
National Totals	**12,041**	**11,949**	**11,684**	**11,410**	**10,636**

Figure 12 - Known Root Causes, 2022

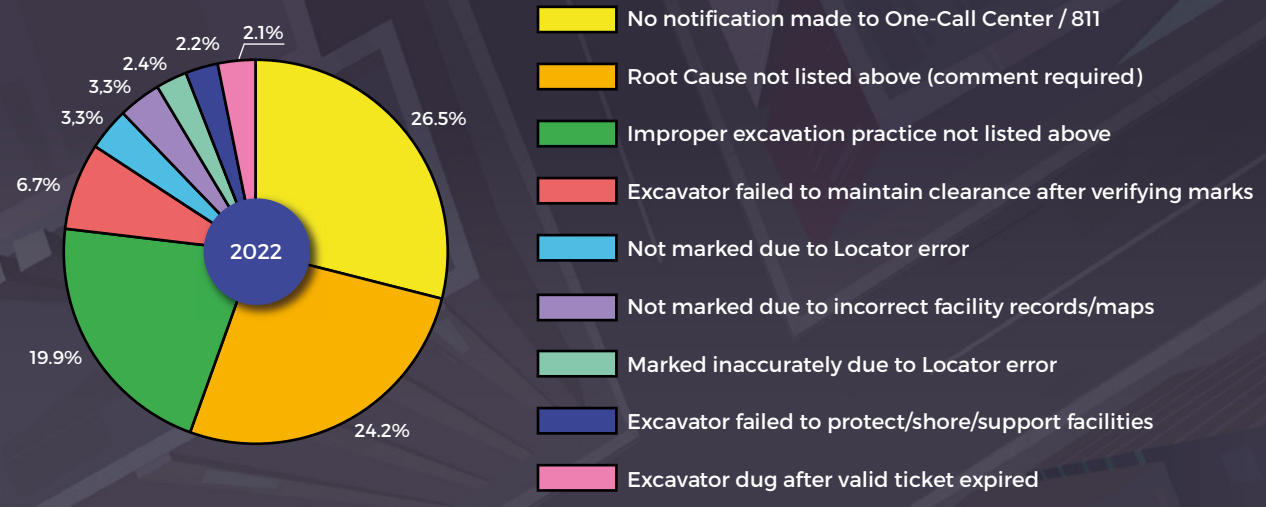


Root Cause (cont'd)

In **Figure 13**, we see a breakout of the top 90% of root cause sub-categories. In 2022 the variance is mostly dominated by a three-way split of Root Cause Not Listed Above (24%, down +3% over 2020), No Notification Made to One-Call Centre (26%, also up +2%), and Improper Excavation Practice Not Listed Above (20%, up +2%). Following up, Failed to Maintain Clearance After Verifying Marks (3%, down -5%) Not Marked Due to Locator Error (7%, up +1%) have flipped positions from 2021.

While it can be difficult to identify actions to address the entire range of Root Causes, there are some key actions to help address the most common Root Cause – "No Notification Made to One-Call Centre". Education initiatives, public outreach, and safety campaigns centered around promoting the ease of placing online requests can help mitigate (or possibly eliminate) this cause. Unfortunately, growth from 2021 to 2022 in this Root Cause identifies that Regional CGC's need to focus more on these actions. Issues with Excavation Practices and Excavators Maintaining Clearance can also be concentrated upon through boots-on-the-ground Ambassadorship and educational programs that walk through the processes of safe excavation with Excavators.

Figure 13 - Top 90% of Root Cause Sub-Categories 2018-2022



Root Cause Sub-Categories	2018	2019	2020	2021	2022
No notification made to One-Call Center / 811	2,623	2,958	2,735	2,704	2,815
Root Cause not listed above (comment required)	4,008	3,201	3,215	3,083	2,576
Improper excavation practice not listed above	3,233	2,981	2,674	2,268	2,121
Excavator failed to maintain clearance after verifying marks	548	654	1,022	629	712
Not marked due to Locator error	263	109	588	860	347
Not marked due to Incorrect facility records/maps	151	459	173	245	346
Marked inaccurately due to Locator error	227	192	249	157	254
Excavator failed to protect/shore/support facilities	139	179	284	234	229
Excavator dug after valid ticket expired	59	33	55	126	220

Root Cause (cont'd)

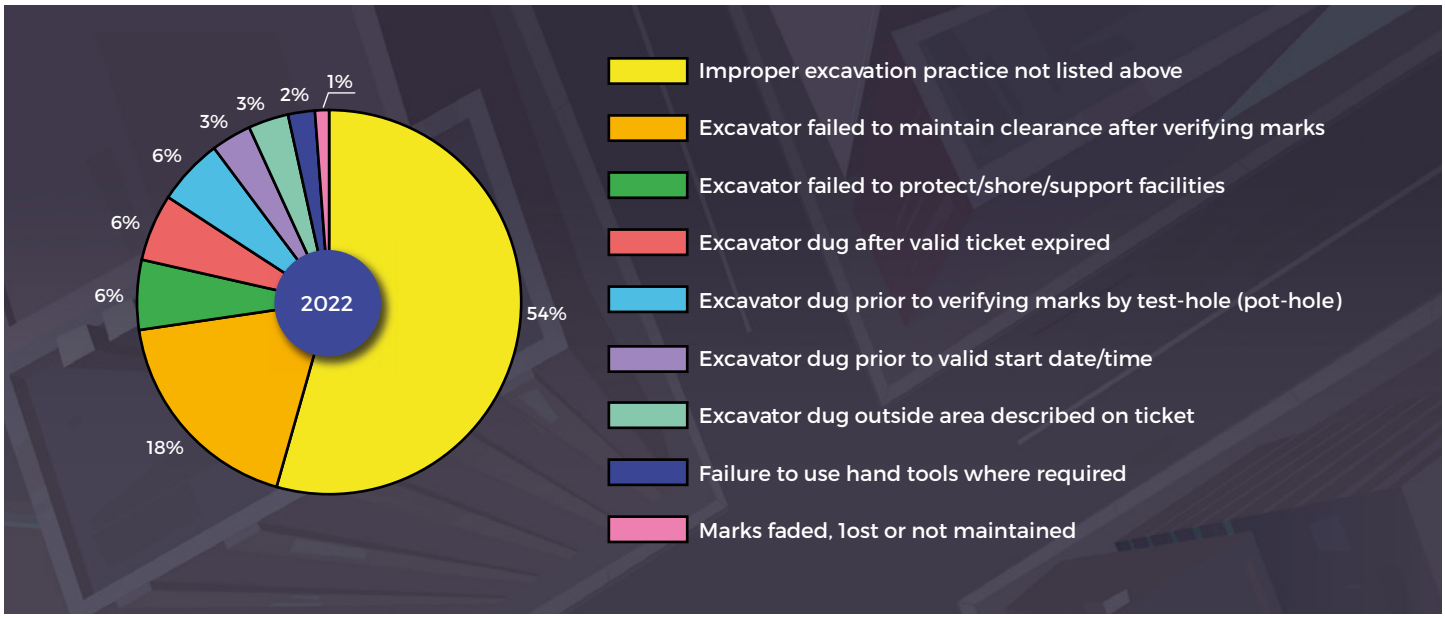
Of the **26%** of damages attributed to No Notification Made to One-Call Centers, **73%** of the events involved an Electric or Natural Gas facility posing a much higher safety risk to the public, worker and community (**Table 10**). This demonstrates that notifying One-Call Centres is a critical measure in preventing workplace injury.

Table 10 - No Locate Damages and Percentage of Damages with Hazardous Utilities 2022

Province/Region	2022 No Locate Damages	No Locate Request, Electric	No Locate Request, Natural Gas	Percent of Total – No Locate, Electric, Natural Gas
British Columbia	628	0	621	99%
Alberta	332	18	216	70%
Saskatchewan	183	58	88	80%
Manitoba	43	16	27	100%
Ontario	1,457	18	913	64%
Quebec	167	0	67	40%
Atlantic	5	4	1	100%
National Totals	**2,815**	**114**	**1,933**	**73%**

Of the **3933** known Root Causes attributed to Excavation Issues, Improper Excavation Practice Not Listed Above is once again on top, back to **54%** (**-10%** from **2021**) as it was in 2021. Unfortunately, this points to requiring more specific descriptors of damages for this Category within the DIRT system.
Of the known causes, Excavator Failed to Maintain Clearance to the Marking leads again with **18%**, the same as in 2021 of utility strikes occurring in this instance within this cause group.
Figure 14 presents known Root Causes attributed to Excavation Issues.

Figure 14 - Known Root Cause by Excavation Issue 2022



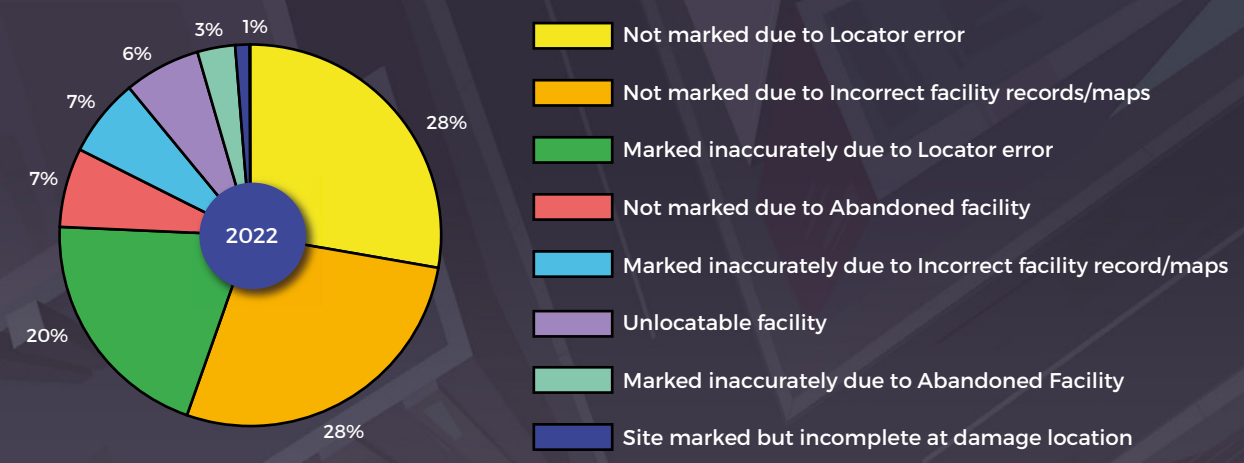
Root Cause (cont'd)

Figure 15 presents known Root Causes attributed to Locating Issues.
Of the **1677** known Root Causes attributed to Locating Issues, the top three make up over **75%** of the damages. They are:

- Not Marked Due to Locator Error (**28%**, down **-20%** from **2021**)
- Not Marked Due to Incorrect Facility Records/Maps (28%, up 12% from 2021)
- Marked Inaccurately due to Locator Error (**20%**, up **9%** from **2021**).

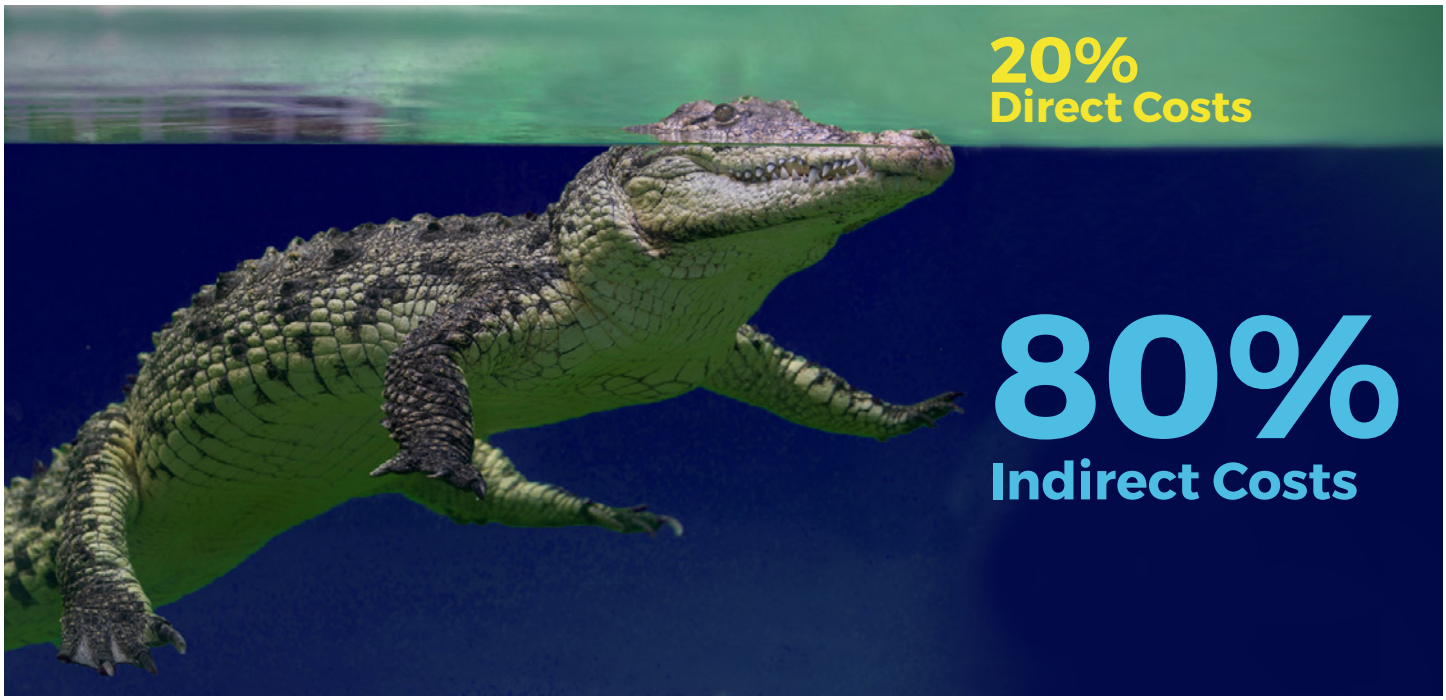
2022 saw an overall decrease in Locating Issues and it falling to fourth behind Excavation, Notification and Miscellaneous Root Causes. (**see Figure 11**)

Figure 15 - Known Root Cause by Locating Issue 2022



Root Cause	2018	2019	2020	2021	2022
Not marked due to Locator error	35%	10%	51%	51%	28.0%
Not marked due to Incorrect facility records/maps	20%	43%	15%	15%	28.0%
Marked inaccurately due to Locator error	30%	18%	21%	9%	20.0%
Not marked due to Abandoned facility	3%	5%	5%	7%	7.0%
Marked inaccurately due to Incorrect facility record/maps	5%	11%	3%	5%	7.0%
Unlocatable facility	3%	6%	3%	6%	6.0%
Marked inaccurately due to Abandoned Facility	1%	1%	0%	0%	3.0%
Site marked but incomplete at damage location	1%	2%	1%	4%	1.0%
Not marked due to Tracer wire issue	0%	0%	0%	0%	0.0%
No response from operator/contract locator	2%	0%	0%	0%	0.0%
Marked inaccurately due to Tracer wire issue	1%	3%	0%	1%	0.0%
National Totals	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Societal Costs



The Cost of damage to underground infrastructures is estimated to be over **$1 billion** per year.

Each year, the CCGA releases the DIRT report to outline damage events throughout Canada, many which have both an obvious and less obvious price to be paid by both those affected and society at large.

The utility strikes recorded have their costs reflected as both direct costs (e.g., cost to repair damaged underground infrastructures) and indirect costs (e.g., loss of productivity due to downtime resulting from damages) including but not limited to:

- Service disruption
- Deployment of emergency services
- Evacuation
- Loss of product
- Environmental impact and mitigation
- Economic impact
- Work delays
- Administrative and legal costs

Damage Prevention messaging should always emphasize the less direct societal costs that affect everyone, even those not involved in the event. It is a powerful and simple message to impart that utility safety affects us all, so diligence and care should be taken at all times.

Additional Information per Province

Over and above the data collected in the DIRT system, One-Call Centers provide important information related to data found in locate requests made in every province. Members such as the owners of underground infrastructure, including utilities and municipalities, provide One-Call Centers with the mapping data of their buried facilities.
Table 11 shows the breakdown of locate requests placed via telephone versus the Web, as well as the number of registered members of OneCall Centres by province/region.
Table 12 is a summary of the provincial and regional information.

Table 11 - Registered members at One-Call Centres Percentage of Phone Versus Web Locate Requests

One Call Centres	Registered Members	Phone Locate Requests (%)	Web Locate Requests (%)
British Columbia	360	19%	81%
Alberta	859	12%	88%
Saskatchewan	123	28%	72%
Manitoba	73	20%	80%
Ontario	845	7%	93%
Quebec	278	6%	94%
Atlantic	37	5%	95%
Canada	**2,575**	**11%**	**89%**

Table 12 - Summary by Province/Region 2022

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	14%	1,099	10%	4.4	234,372	4.69	664,384	1.60
Alberta	12%	3,021	28%	12	459,610	6.57	1,551,932	1.89
Saskatchewan	3%	599	6%	2.4	148,680	4.03	413,202	1.28
Manitoba	4%	265	2%	1.1	76,026	3.49	192,062	1.28
Ontario	39%	4,797	45%	19.2	1,149,797	4.17	6,699,251	0.71
Quebec	22%	840	8%	3.3	313,761	2.68	554,051	1.37
Atlantic	6%	15	< 1%	< 1	62,605	0.24	72,635	0.21
Canada	**100%**	**10,636**	**100%**	**42.4**	**2,444,851**	**4.35**	**10,147,517**	**1.03**

‡ StatsCan (2022)
* 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.

Additional Information per Province (cont'd)

Lastly, for 2022 we will continue tracking the total number of companies that are registered with each Regional DIRT database.

As of now, Ontario (58) and Alberta (71) have the largest pool of submissions (and also have the largest total incidences recorded in 2022).

It is notable that there is some corollary between the number of registered submitters and the total number of incidents recorded.

Table 13 - Registered DIRT Submitters by Province

Province/Region	2022
Alberta	71
Ontario	58
Quebec	7
Saskatchewan	6
Atlantic	5
British Columbia	5
Manitoba	1

Register with DIRT and Be Part of the Damage Prevention Solution

The Canadian Common Ground Alliance (CCGA) invites you to register with Regional Partner Virtual DIRT and report damages to Canada's buried infrastructure.

Doing so will allow more thorough analysis and enable damage prevention and safety solutions that will benefit all Canadians.

CCGA
Canadian Common Ground Alliance

Alberta:
utilitysafety.ca

Atlantic:
atlanticdigsafe.ca

British Columbia:
commongroundbc.ca

Manitoba:
manitobacga.com

Ontario:
orcga.com

Quebec:
info-ex.com

Saskatchewan:
scga.ca

Conclusions and Actions

DIRT is an extremely powerful, but limited tool. The data represented in this report is voluntarily submitted by stakeholders within each Regional CGA, and does **not fully** represent all damages or utility strikes that occur within each Region. Each analysis comes with notable caveats relative to the nature of DIRT:

- not all damages are submitted
- the submissions are restricted to which stakeholders have chosen to submit (which can lead to overrepresentation by certain industry/facility owners)
- the methodology can vary region to region, steps are being taken to normalize this

The conclusions drawn here are meant to help drive both public policymaking and shape best practices in the interest of reducing risk and injury for excavators and overall public safety. Maintaining functional and safe underground infrastructure is a goal all stakeholders share.

No Notification to the One-Call Centre

No Notification to the One-Call Centre again leads the identifiable Known Root Causes. Steps have be taken to increase usage of the various One-Call services. Simplifying the process, increasing accessibility via software and online services, promotion of ease of use and reliable locator turnarounds. Regional CGA's should be focusing awareness through the use of their Ambassador or Communication Programs to encourage to ensure consistent usage and notification to the One-Call Centre.

Increasing Data Quality in DIRT

Each region tends to take a different approach to DIRT; some are relatively hands-off, while others work closely with submitters. Each region is focused on increasing their submitters into the DIRT tool. With this increase in submitters, we are finding a continual decrease in data quality due to the overuse of Unknown/Other. In the Root Cause Category we notice that **45%** of submissions use Unknown/Other which make actionable items difficult. Regions should be following up with submitters, to identify the issue in assigning a Known Root Cause. Should Unknown/Other be chosen, Comment Required is requested. We encourage submitters to follow up with their previous entries to ensure they have the most up-to-date data possible.

CCGA
Canadian Common Ground Alliance

Regional Profiles

British Columbia

British Columbia BCCGA Common Ground Alliance

	2018	2019	2020	2021	2022
PROFILE					
Population	5,016,322	5,071,336	5,145,785	5,249,635	5,368,266
Land area	922,503	922,503	922,503	922,503	922,503
Population density	5.4	5.5	5.6	5.7	5.8
Housing starts*	40,857	44,932	37,734	47,609	46,821
Employment in construction	238,400	236,600	213,200	173,121	183,201
Construction GDP ($ millions)	20,294	22,110	23,033	25,371	27,000
SUMMARY					
Locate requests	203,758	202,052	212,056	241,374	234,372
Notifications	821,445	679,203	609,367	687,075	664,384
Locate requests to notifications ratio	1:4.03	1:3.36	1:2.87	1:2.85	1:2.83
Damages	1,408	1,304	1,228	1,277	1,099
Damages per work day	5.6	5	4.9	5.1	4.4
Damage ratio per 1,000 notifications	1.7	1.92	2.02	1.86	1.62
Damage ratio per 1,000 locate requests	6.9	6.45	5.79	5.29	5.44
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	143	135	175	299	246
Construction	184	435	345	228	218
Water/Sewer	397	415	358	323	267
Road/Street	130	117	86	75	64
Utilities	168	109	127	166	125
Unknown/other	386	93	137	186	179
DAMAGES BY FACILITY TYPE					
Electric	0	0	0	0	0
Natural Gas	1,228	1,139	1,032	1,085	956
Liquid Pipeline	36	22	32	6	9
Telecommunications	106	111	112	128	98
Unknown/Other	38	32	52	58	36
ROOT CAUSE					
Excavation Issue	660	447	426	498	338
Notification Issue	616	720	620	597	628
Locating Issue	4	4	1	3	3
Miscellaneous Root Causes	128	133	181	179	130
Damage Prevention/One Call Legislation					
British Columbia CGA: commongroundbc.ca BC One-Call: bc1c.ca	Partial legislation: BC Oil and Gas Commission and the Canada Energy Regulator governed pipelines are required to register with BC One-Call *Note that not all housing starts will be associated with an excavation; in the case of condo developments, for example, one excavation will be associated with numerous housing starts.				

Regional Profiles

Alberta

	2018	2019	2020	2021	2022
PROFILE					
Population	4,330,206	4,371,316	4,428,082	4,464,170	4,601,314
Land area	640,330	640,330	640,330	640,330	640,330
Population density	6.8	6.8	6.9	7.0	7.2
Housing starts	26,085	27,325	24,023	31,945	36,544
Employment in construction	245,400	236,800	217,600	165,724	178,555
Construction GDP ($ millions)	26,212	24,329	21,404	23,551	24,928
SUMMARY					
Locate requests	351,934	403,434	426,324	468,907	459,610
Notifications	1,477,711	1,463,751	1,470,207	1,597,579	1,551,932
Locate requests to notifications ratio	1:4.20	1:3.63	1:3.45	1:3.41	1:3.38
Damages	3,139	3,613	3,790	3,688	3,021
Damages per work day	12.5	14.4	15.2	14.8	12.0
Damage ratio per 1,000 notifications	2.2	2.47	2.58	2.31	2.06
Damage ratio per 1,000 locate requests	9.1	8.96	8.89	7.87	7.49
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	317	477	519	374	331
Construction	298	301	321	357	235
Water/Sewer	546	921	972	751	651
Road/Street	421	735	797	607	563
Utilities	408	673	582	663	544
Unknown/other	1,149	506	599	936	697
DAMAGES BY FACILITY TYPE					
Electric	179	205	219	221	197
Natural Gas	672	526	554	664	600
Liquid Pipeline	381	0	3	8	14
Telecommunications	1,458	2,277	2,165	2,233	1,723
Water/Sewer	61	80	72	62	44
Unknown/Other	388	525	777	500	443
ROOT CAUSE					
Excavation Issue	550	1,163	1,129	734	882
Notification Issue	237	406	410	411	333
Locating Issue	306	631	747	1,117	716
Miscellaneous Root Causes	2,046	1,413	1,504	1,426	1,090
Damage Prevention/One Call Legislation					
Utility Safety Partners: utilitysafety.ca	Partial legislation: Alberta Energy Regulator and the Canada Energy Regulator governed pipelines are required to register with Utility Safety Partners				

Regional Profiles

Saskatchewan

	2018	2019	2020	2021	2022
PROFILE					
Population	1,165,903	1,174,462	1,177,782	1,180,867	1,205,119
Land area	588,244	588,244	588,244	588,244	588,244
Population density	2.0	2.0	2.0	2.0	2.0
Housing starts	3,610	2,427	3,087	4,174	4,211
Employment in construction	49,500	47,100	41,000	28,556	30,336
Construction GDP ($ millions)	5,776	5,519	4,919	4,434	4,831
SUMMARY					
Locate requests	148,166	141,518	151,282	166,496	148,680
Notifications	466,764	450,209	450,209	468,320	413,202
Locate requests to notifications ratio	1:3.15	1:3.18	1:2.98	1:2.81	1:2.78
Damages	673	669	693	723	599
Damages per work day	2.7	2.7	2.8	2.9	2.4
Damage ratio per 1,000 notifications	1.44	1.49	1.54	1.54	1.33
Damage ratio per 1,000 locate requests	4.54	4.73	4.58	4.34	4.23
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	124	127	149	115	109
Construction	55	49	101	66	51
Water/Sewer	78	94	90	173	128
Road/Street	70	63	32	49	68
Utilities	162	200	177	181	150
Unknown/other	184	136	202	139	93
DAMAGES BY FACILITY TYPE					
Electric	271	258	271	304	232
Natural Gas	224	232	226	246	201
Liquid Pipeline	3	1	8	5	4
Telecommunications	172	170	184	167	159
Unknown/Other	3	8	4	1	3
ROOT CAUSE					
Excavation Issue	277	317	316	312	250
Notification Issue	159	186	221	219	188
Locating Issue	78	123	117	160	140
Miscellaneous Root Causes	159	43	39	32	21
Damage Prevention/One Call Legislation					
Saskatchewan CGA: scga.ca Sask 1st Call: sask1stcall.com	Partial legislation: Canada Energy Regulator governed pipelines are required to register with Sask 1st Call				

Regional Profiles

Manitoba

	2018	2019	2020	2021	2022
PROFILE					
Population	1,356,836	1,369,465	1,379,469	1,386,333	1,420,288
Land area	552,371	552,371	552,371	552,371	552,371
Population density	2.5	2.5	2.5	2.5	2.6
Housing starts	7,376	6,946	7,314	8,006	8,095
Employment in construction	47,200	50,400	46,700	34,914	36,116
Construction GDP ($ millions)	4,628	4,683	4,182	4,102	3,820
SUMMARY					
Locate requests	64,090	74,861	76,276	82,244	76,026
Notifications	173,292	191,226	183,366	206,444	192,226
Locate requests to notifications ratio	1:2.70	1:2.55	1:2.40	1:2.51	1:2.53
Damages	219	196	222	197	265
Damages per work day	0.9	0.8	0.9	0.8	1.1
Damage ratio per 1,000 notifications	1.26	1.02	1.21	0.95	1.39
Damage ratio per 1,000 locate requests	3.42	2.62	2.91	2.40	3.54
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	33	27	2	0	0
Construction	20	13	0	1	0
Water/Sewer	58	60	1	0	0
Road/Street	28	24	0	0	0
Utilities	22	19	0	0	0
Unknown/other	58	53	219	196	265
DAMAGES BY FACILITY TYPE					
Electric	132	110	120	100	145
Natural Gas	87	86	102	96	120
Liquid Pipeline	0	0	0	0	0
Telecommunications	0	0	0	1	0
Unknown/Other	0	0	0	0	0
ROOT CAUSE					
Excavation Issue	153	137	151	136	179
Notification Issue	41	36	48	32	43
Locating Issue	21	22	18	21	29
Miscellaneous Root Causes	4	1	5	8	14
Damage Prevention/One Call Legislation					
Manitoba CGA: manitobacga.com One-Call: clickbeforeyoudigmb.com	Partial legislation: Canada Energy Regulator governed pipelines are required to register with ClickBeforeYouDigMB				

Regional Profiles

Ontario

	2018	2019	2020	2021	2022
PROFILE					
Population	14,392,203	14,636,131	14,721,852	14,940,912	15,262,660
Land area	908,608	908,608	908,608	908,608	908,608
Population density	15.8	16.1	16.2	16.4	16.7
Housing starts	78,742	68,985	81,305	99,566	96,060
Employment in construction	353,764	360,984	335,942	370,686	393,824
Construction GDP ($ millions)	53,030	53,561	55,625	58,986	57,404
SUMMARY					
Locate requests	1,077,815	1,121,749	1,077,237	1,174,071	1,149,797
Notifications	6,698,205	6,773,133	6,320,045	6,722,709	6,699,251
Locate requests to notifications ratio	1:6.21	1:6.04	1:5.87	1:5.73	1:5.83
Damages	5,313	5,005	4,782	4,555	4,797
Damages per work day	21.2	19.9	18.9	18.1	19.2
Damage ratio per 1,000 notifications	0.87	0.80	0.76	0.68	0.77
Damage ratio per 1,000 locate requests	5.16	4.67	4.44	3.88	4.48
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	831	750	922	763	858
Construction	1,072	1,182	583	813	932
Water/Sewer	1,281	1,166	1,188	885	1,240
Road/Street	496	523	594	340	432
Utilities	950	815	703	825	873
Unknown/other	683	569	792	929	462
DAMAGES BY FACILITY TYPE					
Electric	341	270	238	246	322
Natural Gas	2,408	2,332	2,427	2,128	2,419
Liquid Pipeline	17	13	18	22	5
Telecommunications	2484	2,343	2,062	1,994	1,843
Water/Sewer	62	42	32	134	183
Unknown/Other	1	5	5	31	25
ROOT CAUSE					
Excavation Issue	2,356	2,085	2,124	1,818	1,940
Notification Issue	1,321	1,381	1,243	1,239	1,460
Locating Issue	302	249	255	348	338
Miscellaneous Root Causes	1,334	1,290	1,160	1.150	1,059
Damage Prevention/One Call Legislation					
OntarioCGA: orcga.com One-Call: on1call.com	Provincial legislation: Canada Energy Regulator governed pipelines and all buried infrastructure within public rights of way are required to register with Ontario One-Call				

Regional Profiles

Quebec

	2018	2019	2020	2021	2022
PROFILE					
Population	8,390,499	8,484,965	8,575,812	8,631,147	8,751,352
Land area	1,667,712	1,667,712	1,667,712	1,667,712	1,667,712
Population density	5.0	5.1	5.1	5.2	5.2
Housing starts	46,874	47,967	54,066	67,962	57,107
Employment in construction	249,600	264,600	257,200	221,203	237,250
Construction GDP ($ millions)	23,884	24,602	23,913	26,508	26,033
SUMMARY					
Locate requests	275,000	288,149	295,587	334,728	313,761
Notifications	595,000	625,499	597,549	614,091	554,051
Locate requests to notifications ratio	1:2.16	1:2.17	1:2.02	1:1.83	1:1.77
Damages	1,235	1,102	954	923	840
Damages per work day	4.9	4	3.8	3.6	3.3
Damage ratio per 1,000 notifications	2.07	1.8	1.60	1.50	1.34
Damage ratio per 1,000 locate requests	4.49	3.82	3.23	2.76	2.92
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	112	93	135	109	96
Construction	164	168	118	109	105
Water/Sewer	416	298	204	233	211
Road/Street	261	252	220	162	194
Utilities	84	94	65	76	76
Unknown/other	198	197	212	239	158
DAMAGES BY FACILITY TYPE					
Electric	127	120	91	100	78
Natural Gas	443	369	324	312	274
Liquid Pipeline	0	2	0	3	5
Telecommunications	570	540	499	452	418
Water/Sewer	1	0	0	0	0
Unknown/Other	94	71	40	56	65
ROOT CAUSE					
Excavation Issue	558	463	367	361	334
Notification Issue	231	205	198	189	168
Locating Issue	45	32	26	28	25
Miscellaneous Root Causes	401	402	363	345	313
Damage Prevention/One Call Legislation					
QCGA et One-Call: info-ex.com	Partial legislation: Pipelines governed by the Canada Energy Regulator are required to register with Info-Excavation.				

Regional Profiles

Atlantic Region

ATLCGA
Atlantic Canada Common Ground Alliance

	2018	2019	2020	2021	2022
PROFILE					
Population	2,416,754	2,426,711	2,446,405	2,480,826	2,553,264
Land area	500,531	500,531	500,531	500,531	500,531
Population density	4.8	4.8	4.9	5.0	5.1
Housing starts	9,299	10,103	10,351	12,097	13,091
Employment in construction	82,300	84,700	78,600	69,529	66,409
Construction GDP ($ millions)	7,500	7,652	6,979	7,162	7,470
SUMMARY					
Locate requests	45,000	52,361	55,593	62,298	62,605
Notifications	53,700	68,686	66,373	72,205	72,635
Locate requests to notifications ratio	1:1.19	1:1.31	1:1.19	1:1.16	1:1.16
Damages	54	60	15	47	15
Damages per work day	0.2	0.2	0.06	0.19	0.1
Damage ratio per 1,000 notifications	1.00	0.87	0.22	0.01	0.22
Damage ratio per 1,000 locate requests	1.21	1.15	0.27	0.65	0.29
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	4	5	2	3	2
Construction	5	9	3	7	2
Water/Sewer	21	11	6	15	5
Road/Street	10	15	4	11	2
Utilities	4	6	0	4	1
Unknown/other	10	14	0	7	3
DAMAGES BY FACILITY TYPE					
Electric	0	0	0	3	4
Natural Gas	17	15	15	12	11
Liquid Pipeline	0	0	0	0	0
Telecommunications	29	45	0	32	0
Water/Sewer	0	0	0	0	0
Unknown/Other	0	0	0	0	0
ROOT CAUSE					
Excavation Issue	18	12	12	15	10
Notification Issue	31	35	3	27	5
Locating Issue	1	4	0	0	0
Miscellaneous Root Causes	4	9	0	5	0
Damage Prevention/One Call Legislation					
Altantic Canada CGA: atlanticdigsafe.ca One-Call: info-ex.com	Partial legislation: Pipelines governed by the Canada Energy Regulator are required to register with Info-Excavation.				

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.

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.

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

Glossary of Terms & Definitions (cont'd)

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.

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.