

# DIRT Report 2020

October 2021



**DRIG  
SAFE**

# Table of Contents

Chair's Message	3
Introduction	4
2020 Highlights	5
Location and Year of Damages	7
Reporting Stakeholders	8
Facilities Affected	9
Excavator Information	11
Excavator Type	11
Excavating Equipment Type	12
Work Details	13
Root Cause	16
Societal Costs	20
Additional Information Per Province	21
Conclusion and Actions	22
Regional Profiles	23
British-Columbia	24
Alberta	25
Saskatchewan	26
Manitoba	27
Ontario	28
Quebec	29
Atlantic Region	30



## Chair's Message

On behalf of the CCGA Board of Directors, I am pleased to provide the fourth annual, comprehensive, CCGA National DIRT (Damage Information Reporting Tool) Report.

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.

The onset of the COVID-19 Pandemic in the first quarter of 2020, presented unprecedented challenges to Canadians, disrupting their daily lives both personally and professionally. The criticality of this essential infrastructure to individuals has been intensified exponentially with most being forced to not only work from home, but also to stay and remain in their homes to prevent the spread.

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.

The overall number of reported damages in 2020 decreased from 2019 by approximately 3% across Canada, however, the number of locate requests remained relatively constant during this period. As in previous years, the most prevalent root cause continues to be Excavation Issues.

The DIRT report provides us with valuable information on the state of Damage Prevention in Canada. Unfortunately, reporting damages in DIRT remains voluntary; understating the true number and cause of damages in Canada. With this in mind, the CCGA continues to work toward comprehensive damage prevention legislation that includes mandatory damage reporting.

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 2020 National DIRT Report.

Sincerely,



Douglas Lapp, P. Eng.  
Board Chair  
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, and trillions of liters 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, yet fragile, 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

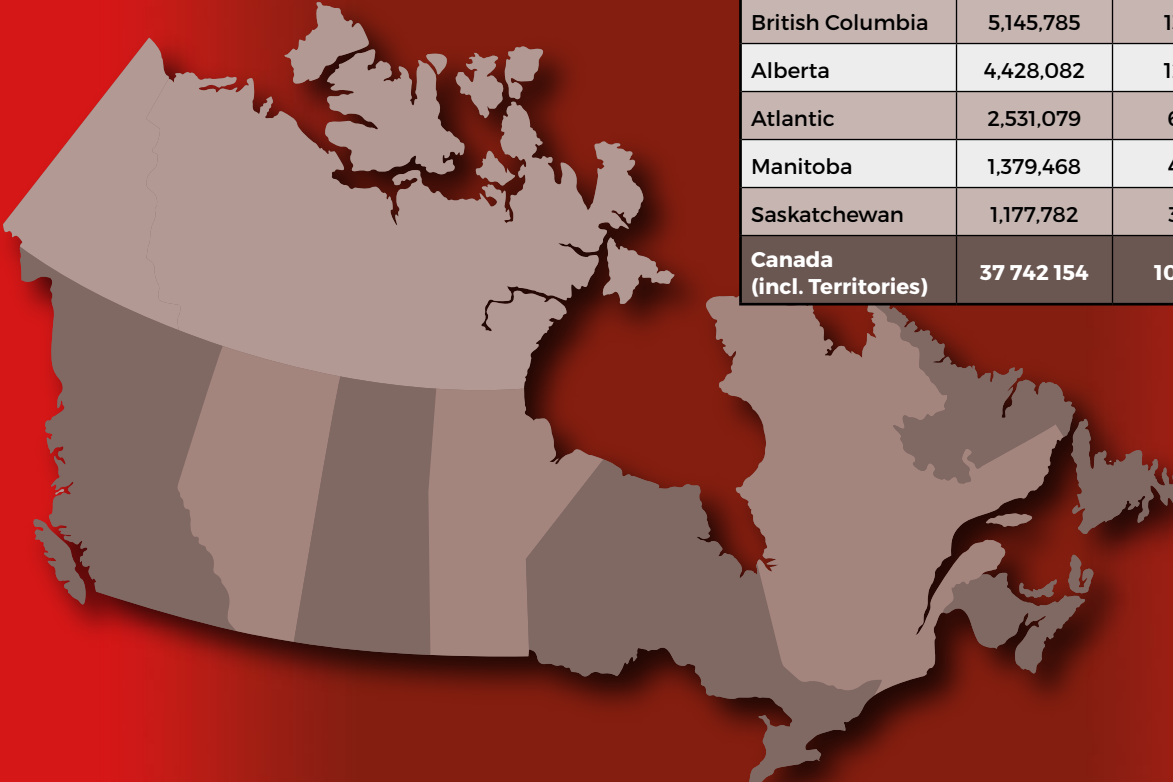
- The Damage Information Reporting Tool (DIRT) is a **confidential database** where various stakeholders may enter information related to damages to buried utilities.
- **Participation to DIRT is made on a voluntary basis.** The report does not reflect the total number of damages that take place in Canadian 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.
- 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.

## 2020 Highlights

- More than **45 damages** occurred per workday.
- The total number of reported damages Canada-wide totaled 11,573, which is **a drop of 3%** from 11,949 in 2019, **and 4%** from 12,041 in 2018.
- Natural gas and telecommunication facilities were affected in **83.4% of damages, 40.9% and 42.6% respectively.**
- Work on water and sewer systems accounted for **27% of damages.**
- The most common known root cause of damages was **excavation issue (36.7%).**
- **RECALL:** Note 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

In 2019, seven Canadian regions reported damages via the DIRT system. The regions and their respective population values are shown in Figure 1.

Figure 1



Province/Region	2020 Population	% of Population	% of Damages
Ontario	14,733,506	39%	39%
Quebec	8,575,812	23%	8%
British Columbia	5,145,785	13%	11%
Alberta	4,428,082	12%	33%
Atlantic	2,531,079	6%	0%
Manitoba	1,379,468	4%	2%
Saskatchewan	1,177,782	3%	7%
<b>Canada (incl. Territories)</b>	<b>37 742 154</b>	<b>100%</b>	<b>N/A</b>

## 2020 Highlights

Table 1 presents a summary of key performance indicators related to damages by province/region. Canada-wide, there were on average 45.9 damages per workday (assuming 252 workdays per year).

**Table 1 - Damages, Requests, Notifications by Province/Region 2020**

Province/Region	Damages	Damages per Work Day	Damages per 1,000 Notifications*	Damages per 1,000 Requests**
British Columbia	1,241	4.9	2.04	5.85
Alberta	3,879	14.8	2.64	9.1
Saskatchewan	753	3.0	1.72	4.98
Manitoba	208	0.8	1.13	2.73
Ontario	4,566	18.1	0.79	4.45
Quebec	911	3.6	1.61	3.27
Atlantic	15	0.06	0.22	0.27
<b>Canada</b>	<b>11,573</b>	<b>45.9</b>	<b>1.27</b>	<b>5.16</b>

\* 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 2 illustrates the total number of reported damages per year (2017-2020) by province/region and the percent of total damages by province/region.

**Table 2 - Total Damages per Year, by Province/Region 2017-2020**

Incident Types by Province	2017	2018	2019	2020	2017	2018	2019	2020
	Number of Damages				Percentage of Damages			
Ontario	5,367	5,313	5,005	4,566	46%	44%	42%	39%
Alberta	2,750	3,139	3,613	3,879	23%	26%	30%	33%
British Columbia	1,449	1,408	1,304	1,241	12%	12%	11%	11%
Quebec	1,302	1,235	1,102	911	11%	10%	9%	8%
Saskatchewan	716	673	669	753	6%	6%	6%	7%
Manitoba	187	219	196	208	2%	2%	2%	2%
Atlantic	17	54	60	15	0,1%	0,4%	1%	0,1%
<b>Grand Total</b>	<b>11,788</b>	<b>12,041</b>	<b>11,949</b>	<b>11,573</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

In Table 3 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 3.0 glossary is, «An event where damage did not occur, but a clear potential for damage was identified». These numbers have historically been part of the data and Near Misses are mandated as needing to be reported under the Canada Energy Regulator Event Reporting Guidelines<sup>1</sup>

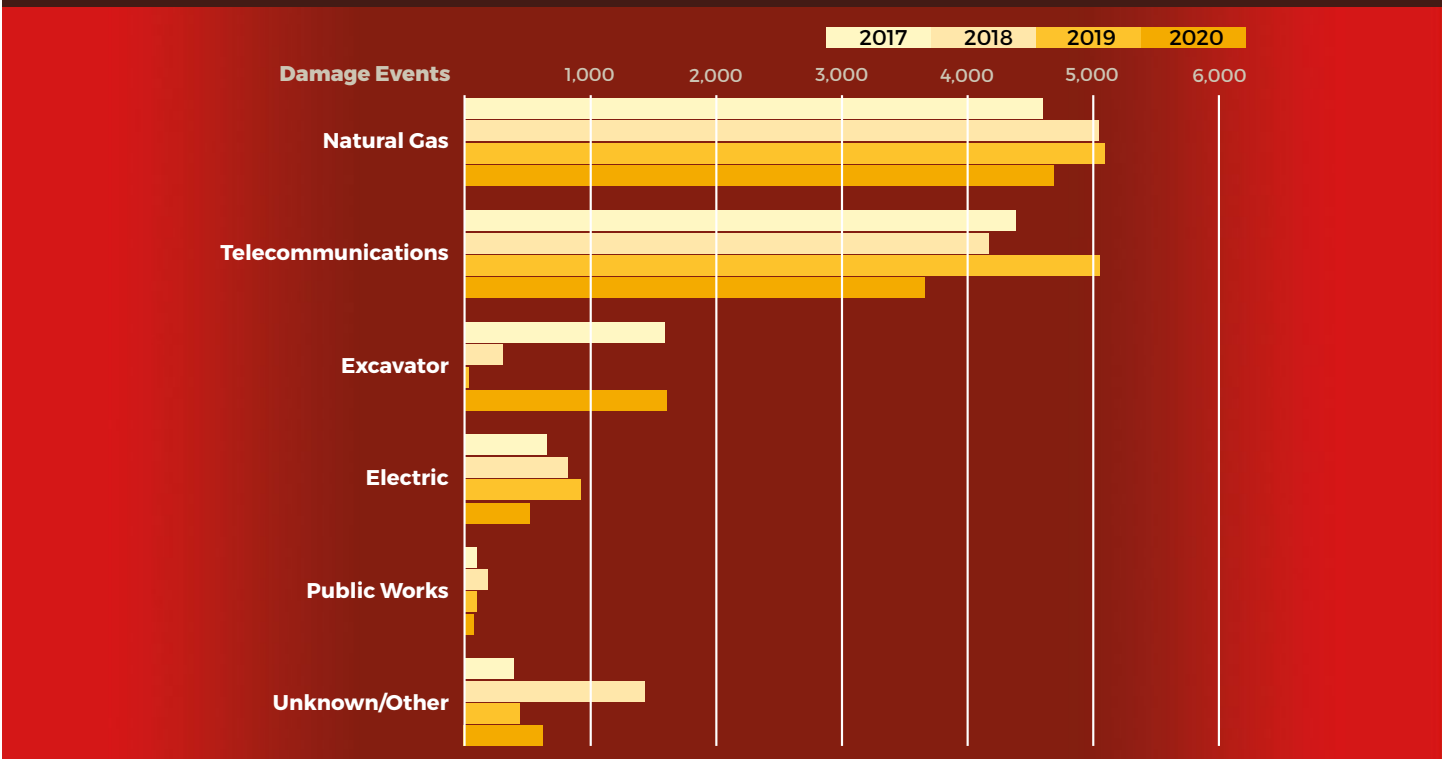
**Table 3 - Total Near Misses per Year, by Facility 2017 - 2020**

Incident Types	2017	2018	2019	2020	2017	2018	2019	2020
	Number of Incidents				Percentage of Near Misses			
Natural Gas	101	105	101	107	34%	27%	32%	28%
Telecommunications	67	78	91	94	22%	20%	29%	25%
Unknown/Other	64	100	69	91	21%	25%	22%	24%
Electric	4	59	26	39	1%	15%	8%	10%
Liquid Pipeline	63	44	26	42	21%	11%	8%	11%
Water & Sewer	0	8	6	10	0%	2%	2%	3%
<b>Total</b>	<b>299</b>	<b>394</b>	<b>319</b>	<b>383</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

# Reporting Stakeholders

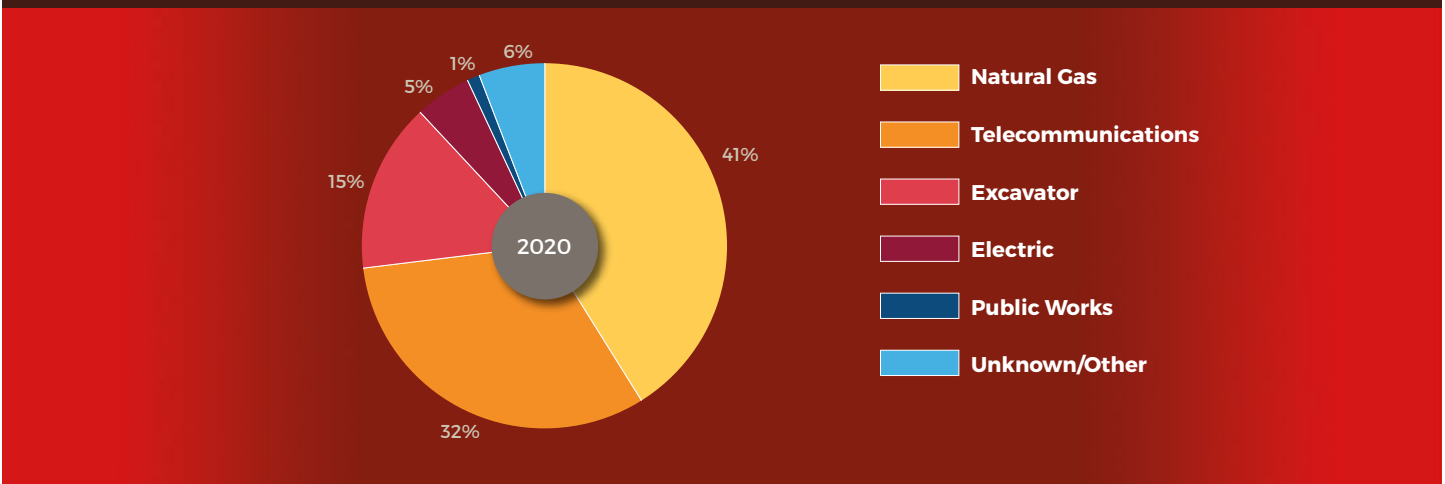
Stakeholders involved with **telecommunications and natural gas report damages most often**. Figure 2 shows total damages by the seven most common stakeholder groups for the 2017-2020 period.

Figure 2 - Damages by Stakeholder Group 2017-2020



As shown in Figure 3, 73% of total damages were reported by stakeholders in the natural gas and telecommunication sectors in 2020, which is very close to 74% in 2019. Most notably, there is a **major jump in Excavator reporting**, due in large part to a surge of Excavators participating in the Alberta DIRT system, so reporting has increased as the volume of contributors grows.

Figure 3 - Percentage of Damage Events by Stakeholder 2020

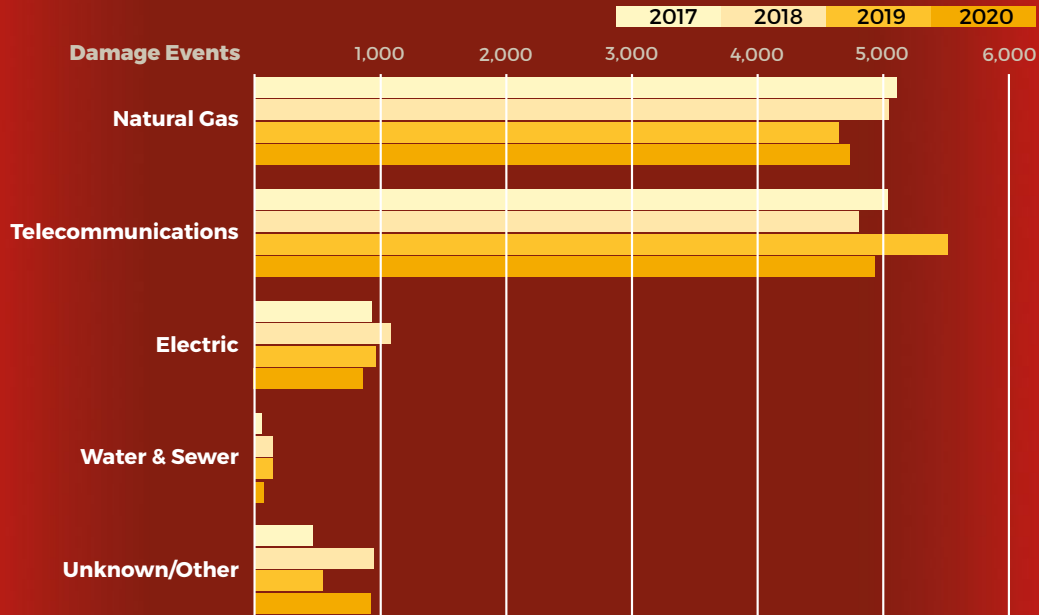




# Facilities Affected

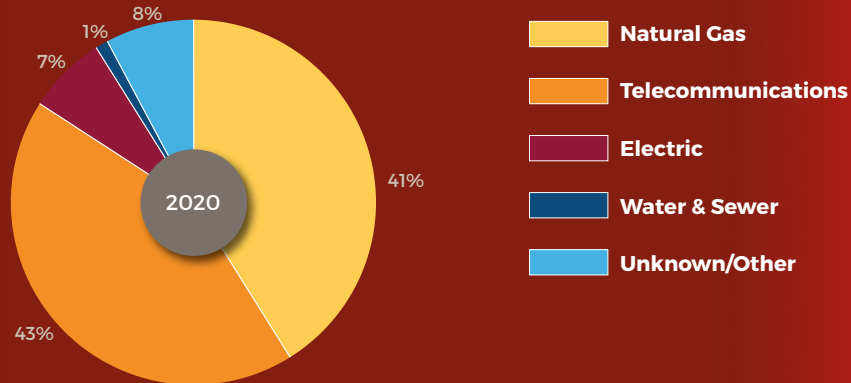
This section describes the facility owner whose operations were affected by damages. There have been some swings in the tracked interval, with Telecommunications dropping 11% between 2019 and 2020, Natural Gas seeing a small (less than 1%) increase, Electric dropping to its lowest numbers in the entire interval (by nearly 5%), and Water & Sewer falling to just two-thirds of the year previous. These are contrasted against a **significant bump in Unknown/Other (43%) between 2019 and 2020** (Figure 4).

Figure 4 - Damages by Affected Facility



Of the 11,573 damages that occurred in 2020, **Natural Gas and Telecommunication facilities were affected in 84% of the incidents** (Figure 5). This is a 1% decrease over 2019, but sees Natural Gas incidents increasing by 2%, while Telecommunications incidents decreased by 3%.

Figure 5 - 2020 Damages by Affected Facility



## Facilities Affected

Shown in Table 4, is the percent of damages by facility type affected at a provincial level. Typically, the highest number of 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, 84% of damages affected Natural Gas facilities.
- In Saskatchewan, 36% of damages affected Electric facilities.
- Manitoba has a notable balance between strikes on both Natural Gas and Electric facilities.

**Table 4 - Percentage of Damages by Affected Facility by Province/Region 2020**

Province/Region	Telecommunications	Natural Gas	Electric	Water	Unknow/Other
British Columbia	9%	84%	0%	0%	7%
Alberta	57%	15%	5%	2%	21%
Saskatchewan	28%	35%	36%	0%	1%
Manitoba	0%	48%	52%	0%	0%
Ontario	41%	53%	5%	0%	1%
Quebec	56%	36%	4%	0%	4%
Atlantic	0%	100%	0%	0%	0%
<b>Canada</b>	<b>43%</b>	<b>41%</b>	<b>7%</b>	<b>1%</b>	<b>8%</b>



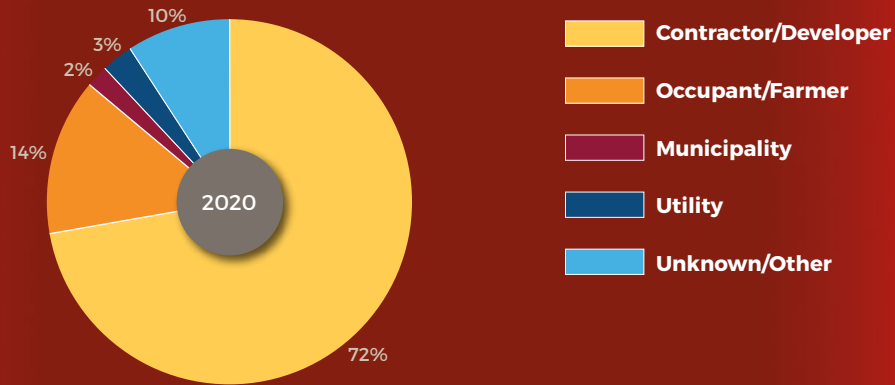
# Excavator Information

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

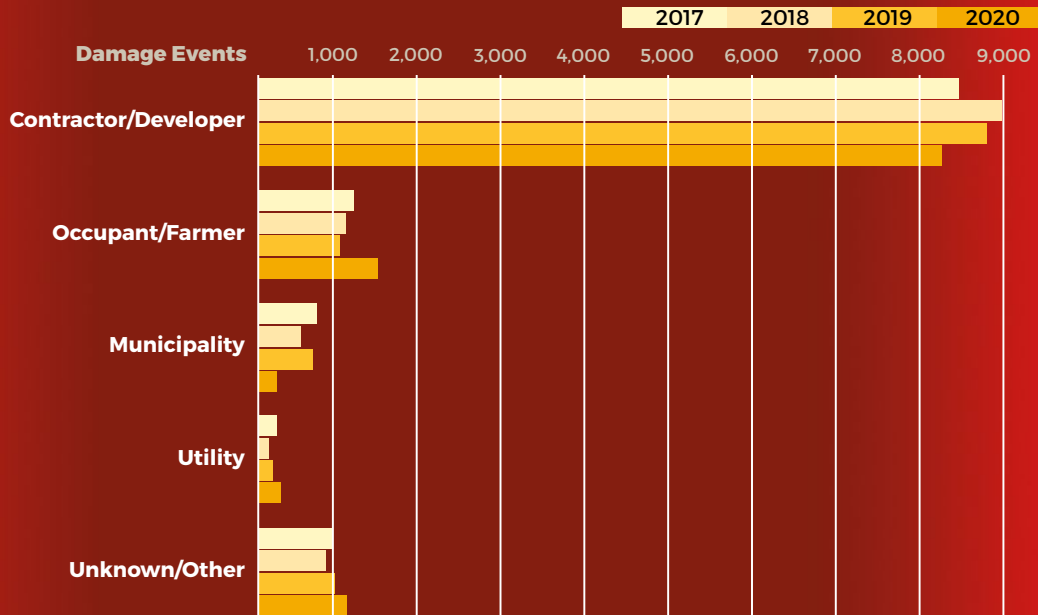
## Excavator Type

Figures 6 and 7 report the number and percentage of damages by type of excavator, respectively. **Contractor damages increased overall relative to the total percentage of submissions.** Municipalities, utility and other/unknown were flat from 2017 to 2019. Occupant/farmer experienced a decline in damages from 2017 to 2019.

**Figure 6 - Percentage of Damage Reports by Type of Excavator, 2020**



**Figure 7 - Damages by Excavator Type 2017-2020**

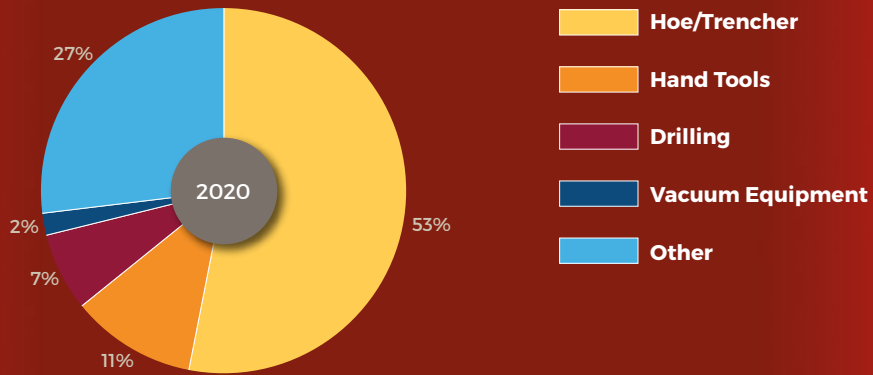


# Excavator Information

## Excavator Equipment Type

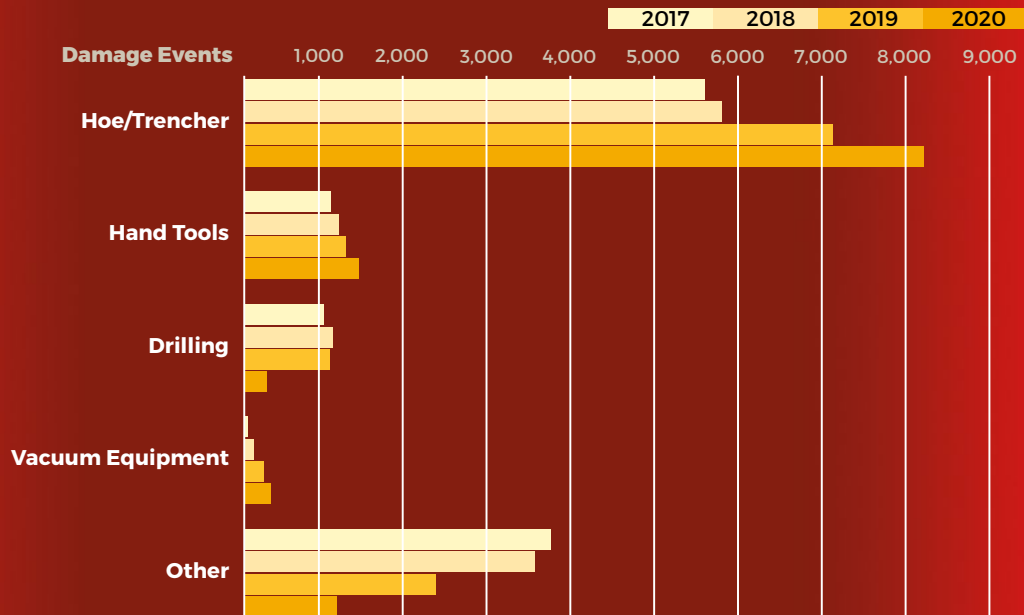
As shown in the graphic below, the **hoe/trencher category** remains, once again, the most common equipment type cited in damage reports (**53%**) in 2020.

**Figure 8 - Percentage of Damage Reports by Excavator Equipment Type, 2020**



In a persistent trend, total Damages relative to Excavation Equipment Type continue to have better identification in each subsequent year, as reporting into “Other” continues to shrink.

**Figure 9 - Damages by Excavation Equipment Type, 2017-2020**



## 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 5 illustrates the proportion of each Region's locate requests placed by Contractors in 2020.

**Table 5 - Proportion of Contractor Requests by Region, 2020**

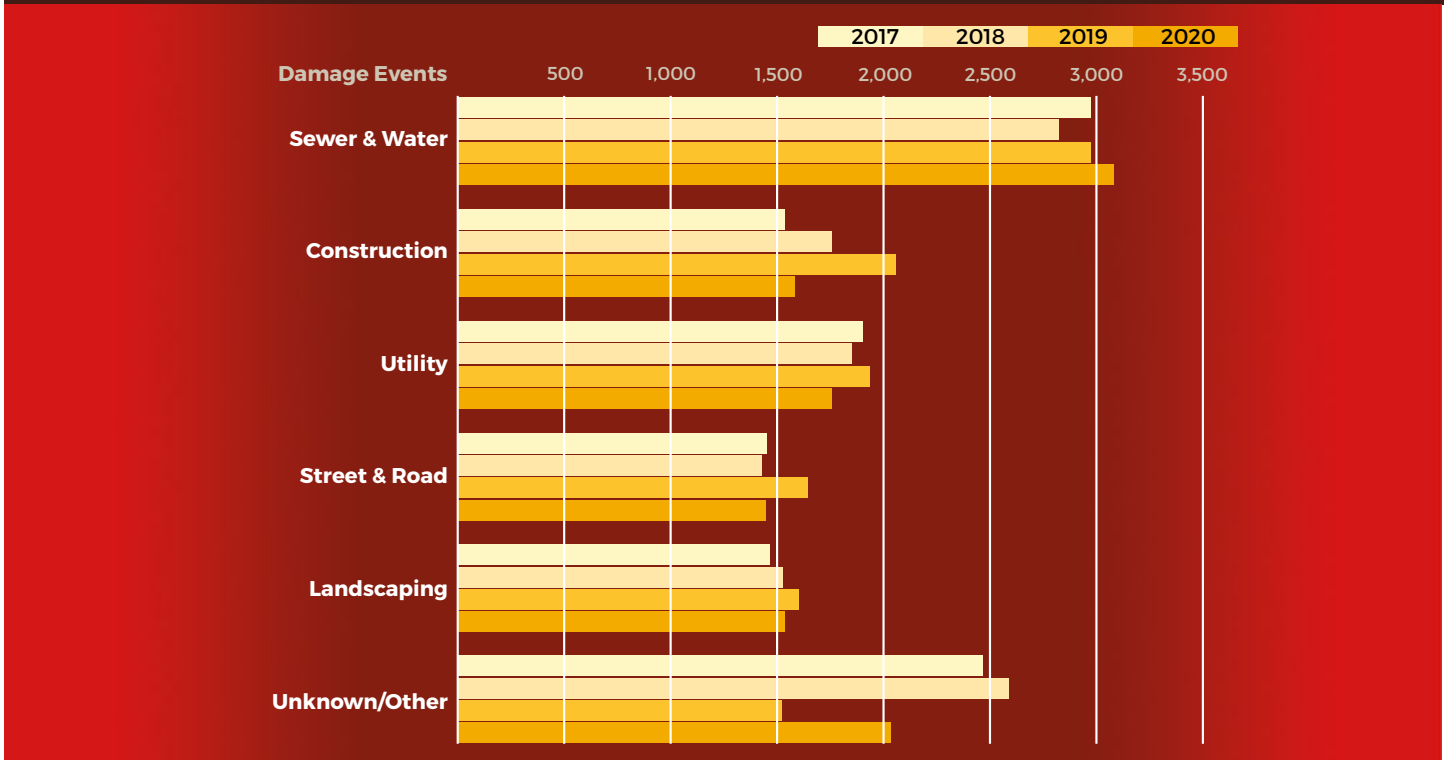
Province/Region	Total Requests	Contractor Requests	% of Contractor Requests
British Columbia	212,056	132,282	62%
Alberta	426,324	271,576	64%
Saskatchewan	151,282	91,596	61%
Manitoba	76,276	45,836	60%
Ontario	1,025,432	942,853	92%
Quebec	293,462	179,576	61%
Atlantic	55,837	38,664	69%
<b>Canada</b>	<b>2,240,669</b>	<b>1,702,383</b>	<b>76%</b>



## Work Details

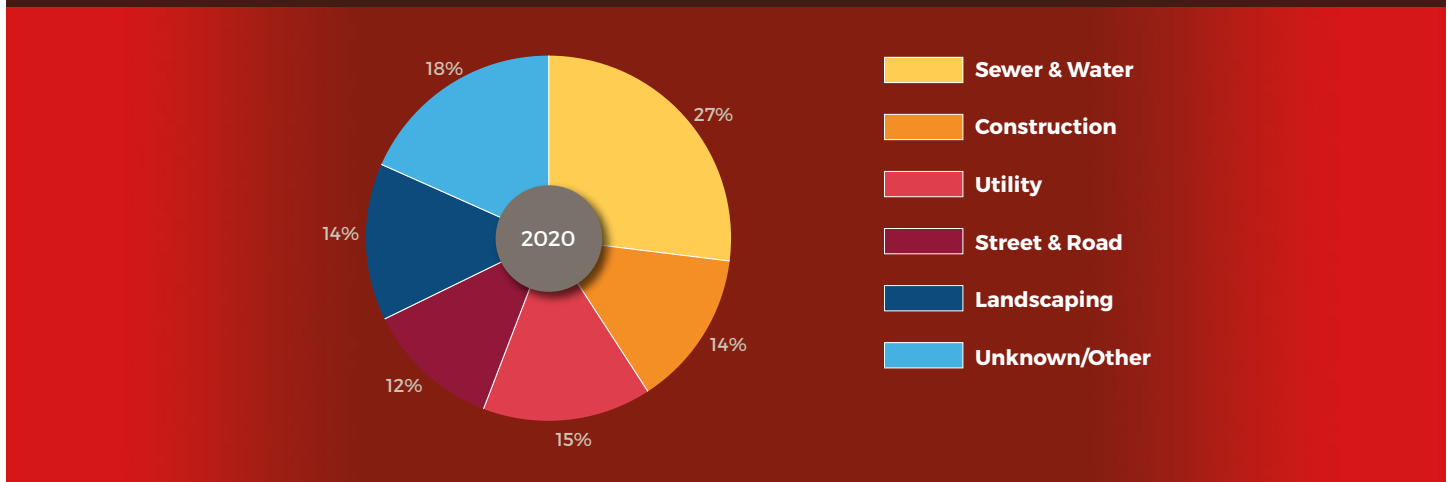
Figure 10 displays the number of damages by the Type of Work performed for the years 2017 to 2020. Sewer & Water is the only Worktype to have had minor increases in volume from 2017 to 2020. All other categories have seen either general stagnation (Construction, Utility, Street & Road, Landscaping) or reduction (Unknown/Other). The overall reduction in Unknown/Other however is a good thing, and offers more clarity into damage events.

Figure 10 - Damages by Type of Work Performed, 2017-2020



As shown in Figure 11, work on **water and sewer systems accounted for 27% of damages** in 2020. Construction (14%), and Street & Road (12%) both saw significant decreases from 2019 to 2020.

Figure 11 - Percentage of Damages by Type of Work Performed, 2020



## Work Details

Table 6 reports damages by type of work performed and type of excavator for the year 2020.

- The top cause of damages was again by **contractors (71.3% of total damages)**. This of course is because Contractors overwhelmingly perform the most excavations in any given year
- The second highest rate of damages (13.5% of total damages), was work performed by occupants, with Landscaping being their most common type of work

**Table 6 - Damages by Type of Work Performed and Type of Excavator, 2020**

Type of Work	Contractor/ Developer	Municipality	Occupant/ Farmer	Utility	Unknown/ Other	Total
Sewer & Water	2,330	303	231	107	143	3,114
Construction	1,175	11	386	3	76	1,651
Utilities	1,429	15	108	164	62	1,778
Unknown / Other	1,142	79	313	22	468	2,024
Street & Road	1253	82	44	12	52	1,443
Landscaping	921	39	489	5	109	1,563
<b>Total</b>	<b>8,250</b>	<b>529</b>	<b>1,571</b>	<b>313</b>	<b>910</b>	<b>11,573</b>

The leading type of damage varied by province. The leading cause of damages in Saskatchewan (SK) was Unknown/Other (n=262). Damages attributed to work performed on water and sewer systems were the most frequent in Alberta (AB) (n=1192), Ontario (ON) (n=1157), Quebec (QC) (n=247), Manitoba (MB) (n=63), and Atlantic (ATL) (n=7). Construction was again most common in British Columbia (BC) (n=425). Table 7 reports Damages by Type of Work Performed by Province.

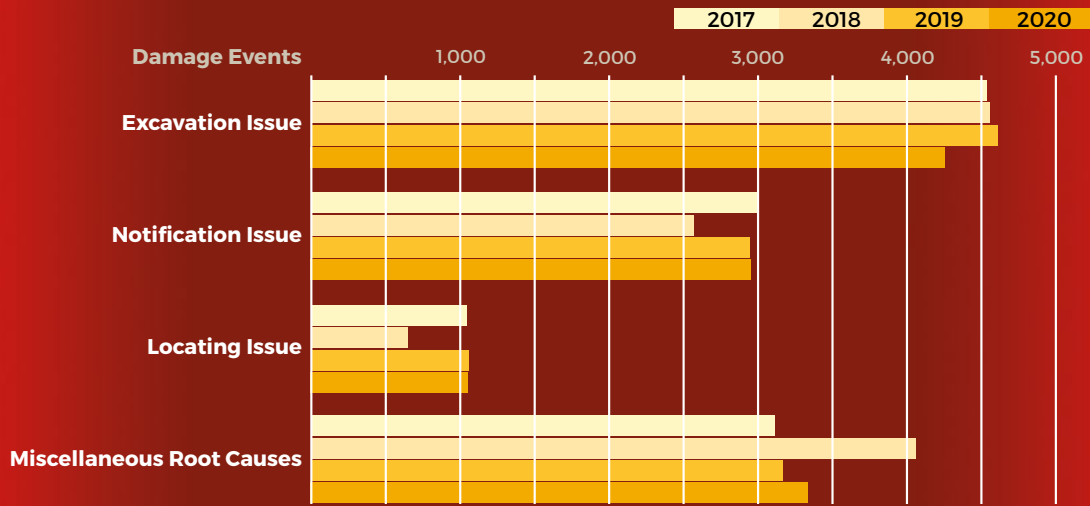
**Table 7 - Damages by Type of Work Performed by Province, 2020**

Type of Work	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Quebec	Atlantic	Total
Sewer & Water	365	1179	96	63	1,157	247	7	3,114
Construction	425	429	101	16	547	131	2	1,651
Utility	153	731	177	17	621	79	0	1,778
Unknown / Other	171	547	262	60	792	192	0	2,024
Street & Road	78	548	31	25	543	214	4	1,443
Landscaping	49	445	86	27	906	48	2	1,563
<b>Grand Total</b>	<b>1,241</b>	<b>3,879</b>	<b>753</b>	<b>208</b>	<b>4,566</b>	<b>911</b>	<b>15</b>	<b>11,573</b>

# Root Cause

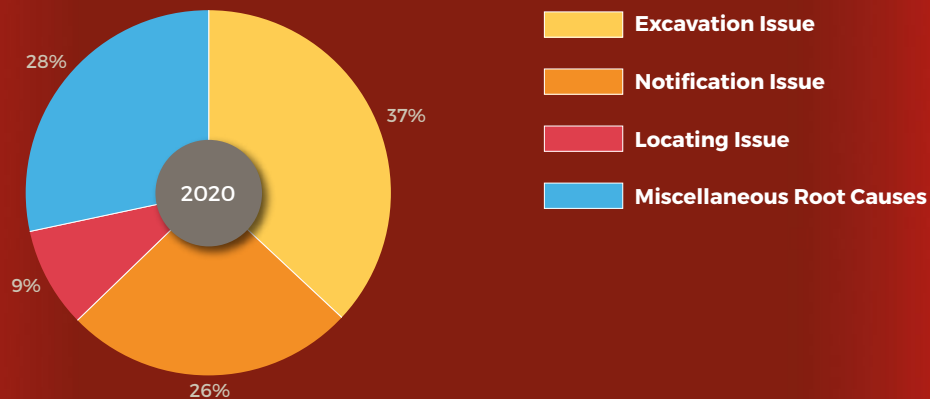
Root cause describes the reason for reported damages, or more specifically, what fundamentally was the cause of the damage occurrence. Figure 12a provides a breakdown of Known Root Causes from 2017 to 2020. There had been a slight year over year increase in Excavation Issues damages, but those saw a decline in 2020. This has been a concern previously, but it is heartening to see a decline. In both Notification Issue and Locating Issue, we are seeing overall a flat trend for 2017 to 2020, with a drop in 2018 for both categories. Meanwhile, Miscellaneous Root causes is the reverse with a large spike in 2018.

**Figure 12a - Known Root Causes, 2017-2020**



Due to changes to the 2018 Field Form, year-to-year sub-category comparisons are less appropriate. In the 2021 (published 2022) report, this will no longer be a problem. In 2021 the legacy root causes sub-categories will no longer be part of the sample group (2019-2021).

**Figure 12b - Known Root Causes, 2020**

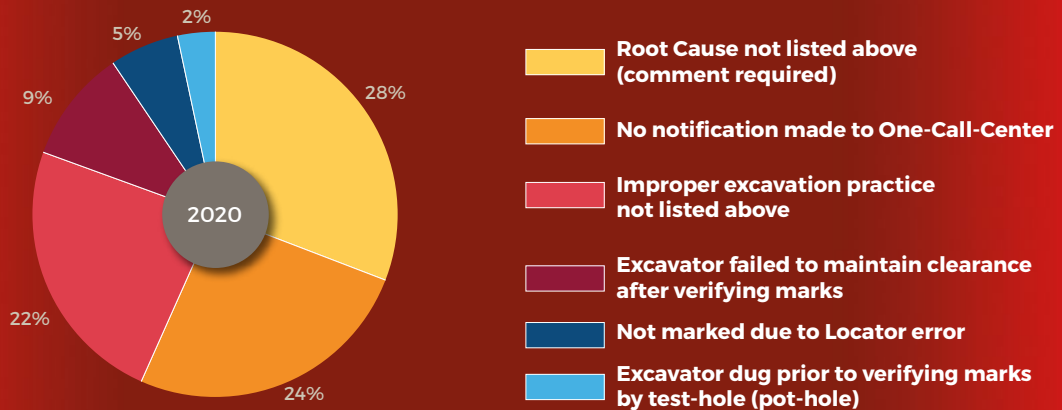




## Root Cause

In Figure 13, we see a breakout of the top 90% of root cause sub-categories. In 2020 the variance is mostly dominated by a three-way split of Root Cause Not Listed Above (28%), No Notification Made to One-Call Centre (24%), and Improper Excavation Practice Not Listed Above (22%). Following up we have Excavator Failed to Maintain Clearance After Verifying Marks (9%) and Not Marked Due to Locator Error (5%). While difficult to focus down on myriad root causes outside the main list, No Notification Made to One-Call Centre is an easy target; education initiatives, public outreach, and safety campaigns centered around promoting the ease of placing online requests can help mitigate (or possibly eliminate) this Cause. Issues with Excavation Practices and Excavators Maintaining Clearance can also be concentrated upon via engagement through boots-on-the-ground Ambassadorship programs that seek to walk through the processes of safe excavation with Excavators on-site.

**Figure 13 - Top 90% of Root Cause Sub-Categories, 2020**



## Root Cause

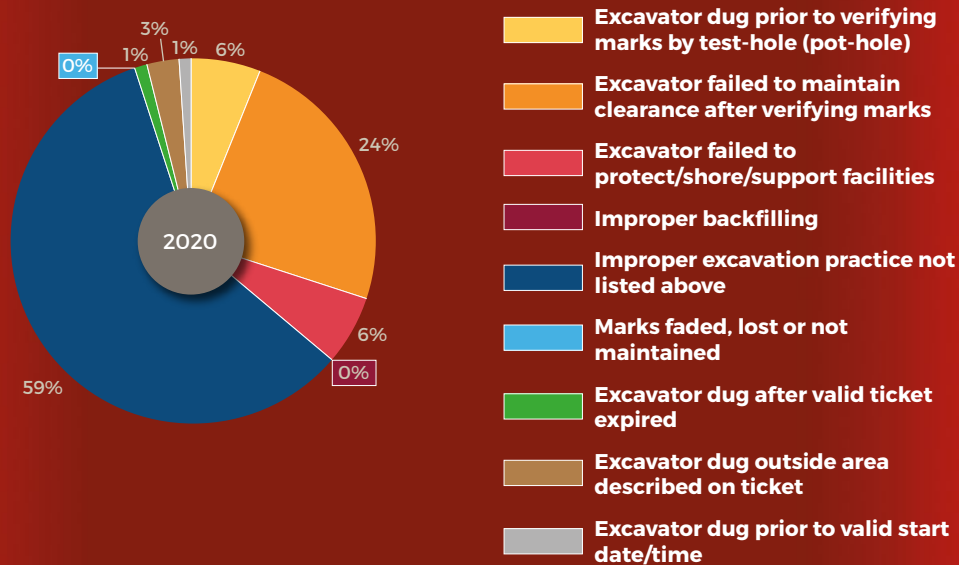
Of the 24% of damages attributed to **no notification made to One-Call Centers**, 85% contacted an Electric or Natural Gas facility posing a much higher safety risk to the public, worker and community safety (Table 8). **This demonstrates that notifying One-Call Centres is a critical measure in preventing workplace injury.**

**Table 8 - No Locate Damages and Percentage of Damages with Hazardous Utilities, 2020**

Province/Region	2020 No Locate Damages	No Locate Request, Electric	No Locate Request, Natural Gas	Percent of Total - No Locate, Electric, Natural Gas
British Columbia	623	0	590	95%
Alberta	416	25	233	62%
Saskatchewan	220	67	106	79%
Manitoba	45	21	24	100%
Ontario	1,230	146	1,013	94%
Quebec	214	0	100	47%
Atlantic	3	0	3	100%
<b>National Total</b>	<b>2,751</b>	<b>259</b>	<b>2,069</b>	<b>85%</b>

Of the 4,414 known Root Causes attributed to Excavation Issues, we find that another majority proportion (59% in 2020, 64% in 2019) are given as “Improper Excavation Practice Not Listed Above”. While this does not give us much insight into the deeper Excavation Issues, it is encouraging to see this number shrink year over year. Of the known causes, Excavators failing to maintain clearance to the marking leads with 24% of utility strikes occurring in this instance within this cause group. Figure 14 presents known root causes attributed to excavation issues.

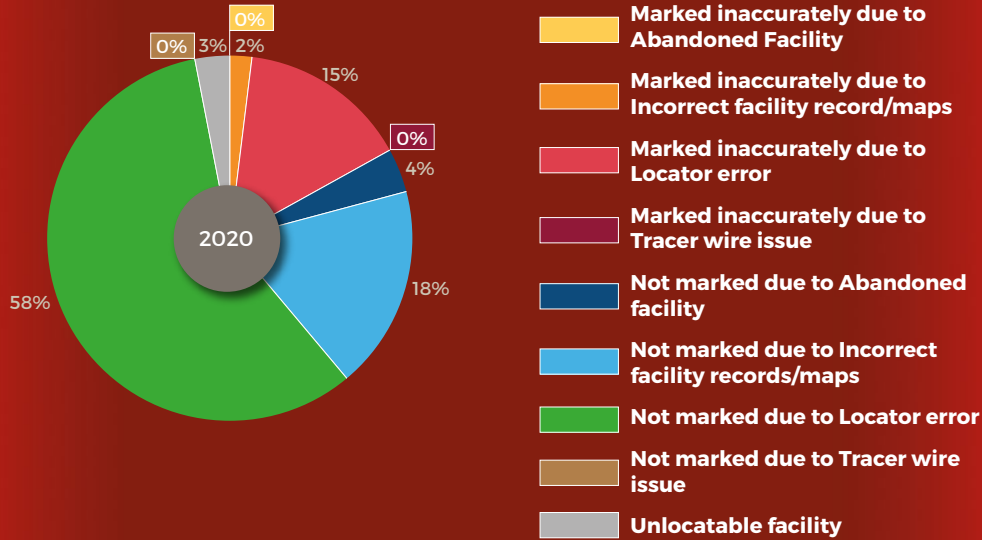
**Figure 14 - Known Root Cause by Excavation Issue**



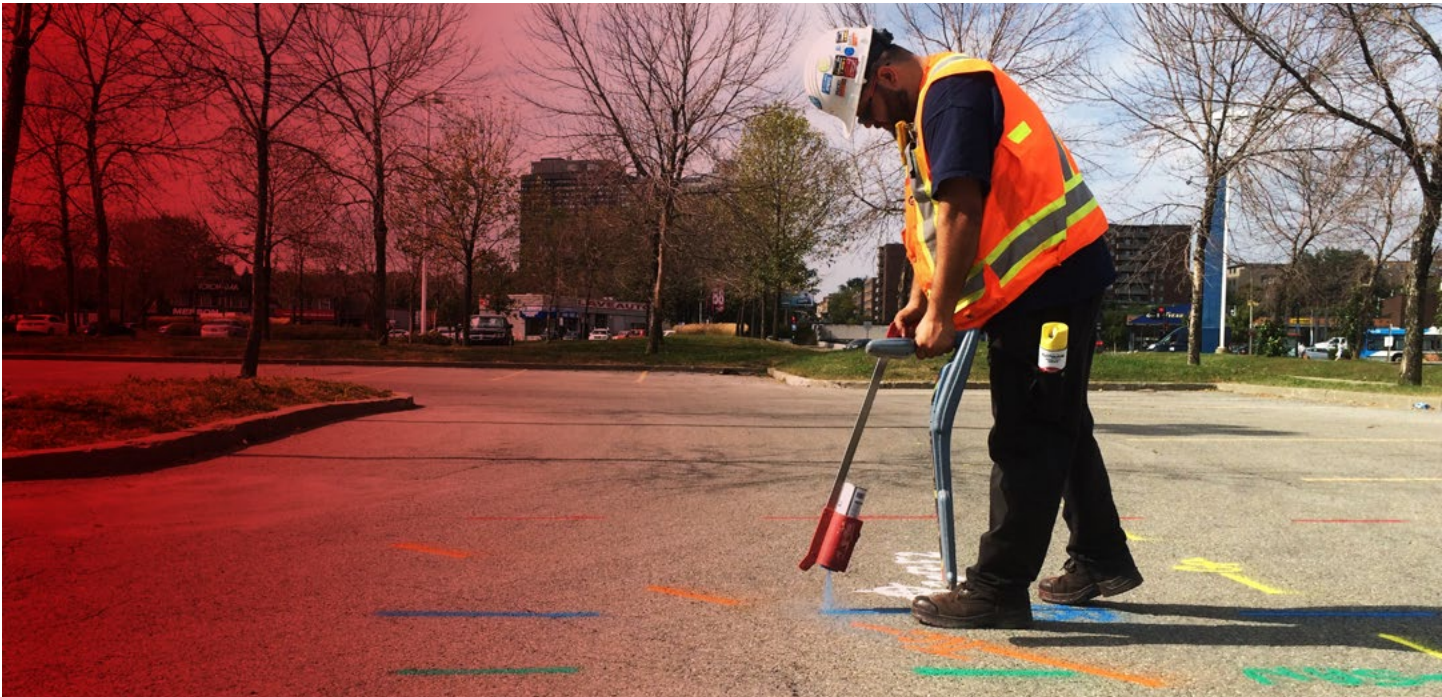
# Root Cause

Figure 15 presents known Root Causes attributed to Location Issues. Of the 1020 known root causes attributed to Location Issues, **the top three make up over 90% of the damages.** They are: Not Marked Due to Locator Error (58%), Not Marked Due to Incorrect Facility Records/Maps (18%), and Marked Inaccurately Due to Locator Error (15%).

Figure 15 - Known Root Cause by Location Issue, 2019



2020 seems to have a very large proportion of on-site Locator-specific errors in this category (76%). Ultimately the takeaway is that a renewed focus should be upon Locator Training, particularly if this trend continues into 2021.



## Societal Costs

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 9 shows the breakdown of locate requests placed via telephone versus the Web, as well as the number of registered members of One-Call Centres by province/region. Table 10 is a summary of the provincial and regional information.

**Table 9 - Registered Members at One-Call Centers and Percentage of Phone Versus Web Locate Requests**

One Call Centres	Registered Members	Phone Locate Requests (%)	Web Locate Requests (%)
British Columbia	364	23%	77%
Alberta	853	17%	83%
Saskatchewan	103	37%	63%
Manitoba	57	27%	73%
Ontario	837	16%	84%
Quebec	260	8%	92%
Atlantic	33	10%	90%
<b>Canada</b>	<b>2,507</b>	<b>17%</b>	<b>83%</b>

**Table 10 - Summary by Province \Region, 2020**

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%	1,241	11%	4.9	212,056	5.85	609,367	2.04
Alberta	11%	3,879	33%	14.8	426,324	9.1	1,470,207	2.64
Saskatchewan	3%	753	7%	3	151,282	4.98	437,685	1.72
Manitoba	4%	208	2%	0.8	76,276	2.73	183,366	1.13
Ontario	39%	4,566	39%	18.1	1,025,432	4.45	5,746,332	0.79
Quebec	23%	911	8%	3.6	293,462	3.27	595,823	1.61
Atlantic	7%	15	<1%	0.06	55,837	0.27	67,725	0.22
<b>Canada</b>	<b>100%</b>	<b>11,573</b>	<b>100%</b>	<b>45.9</b>	<b>2,240,669</b>	<b>5.16</b>	<b>9,110,505</b>	<b>1.27</b>

‡ StatsCan (2020)

\* 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.

## Conclusions and Actions

### 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.

Alberta:  
digsafeab.ca

Atlantic:  
atlanticdigsafe.ca

British Columbia:  
commongroundbc.ca

Manitoba:  
manitobacga.com

Ontario:  
orcga.com

Quebec:  
info-ex.com

Saskatchewan:  
scga.ca

DIRT is an extremely powerful, but limited tool. The data represented in this report is voluntarily submitted by users within each Regional CGA, and not fully representative of all damages or utility strikes that can 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 users have chosen to submit (which can lead to overrepresentation by certain industries/facility owners), and the methodology can vary region to region (though steps have been taken to normalize this over time). 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. Maintaining a functional and safe infrastructure underground is a goal all parties share, and the suggestions from this DIRT analysis should be taken to heart when considering any policy change.

**1) Improper Excavation Practice Not Listed Above** – Once again, this is the #1 “Identifiable” cause of Excavation Issues, though by its nature it is more difficult to quantify. However, this is still a general indication that the damage was caused by an Excavator, but without obvious actionable behavior to target. Increased Excavator targeting should be conducted from CCGA Member’s via training sessions/webinars, on-site visitation through an Ambassadorship program, and engagement by inviting excavators to participate in consortiums and similar groups.

**2) No Notification to the One-Call Centre** – Similarly, No Notification to the One-Call Centre again tops the identifiable Known Root Causes. Ultimately, there is a multi-pronged approach that should 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 ensure consistent usage and notification.

**3) Promote Online Ticket Processes and Develop Best Practice** – As noted in CGA presentations and elsewhere<sup>i</sup>, a noteworthy avenue for reducing utility strikes is to promote the usage of the Online Ticket Submission Processes at various One-Call centers. Excavators placing their own requests rather than having a phone Agent interpreting the request can reduce potential utility strikes by nearly one half, particularly in regions that have virtual white-lining.

i [https://www.cer-rec.gc.ca/en/about/acts-regulations/cer-act-regulations-guidance-notes-related-documents/canada-energy-regulator-event-reporting-guidelines/index.html#s8\\_2](https://www.cer-rec.gc.ca/en/about/acts-regulations/cer-act-regulations-guidance-notes-related-documents/canada-energy-regulator-event-reporting-guidelines/index.html#s8_2)

ii <https://dp-pro.com/canadian-perspective-call-or-click-a-question-of-safety/>


## Regional Profiles



The series of tables below provide summaries of damage data, along with some contextual economic data, for each of the regions currently reporting via the DIRT system in Canada. Time series data is provided for relevant provinces. For each province/region, a summary of whether damage prevention/One-Call legislation exists is also provided.

In addition, at the end of each profile, you will find the web address of the Common Ground Alliance and the One-Call centre for that region.

@ [info@canadiancga.com](mailto:info@canadiancga.com)

[www.CanadianCGA.com](http://www.CanadianCGA.com)  
 [www.ClickBeforeYouDig.com](http://www.ClickBeforeYouDig.com)  
[www.digsafecanada.com](http://www.digsafecanada.com)

 [www.facebook.com/Canadian/CGA](https://www.facebook.com/Canadian/CGA)

 [twitter.com/CanadianCGA](https://twitter.com/CanadianCGA)

### Housing Starts

Table 34-10-0135-01 Canada Mortgage and Housing Corporation, housing starts, under construction and completions, all areas, quarterly

### Construction Employment

Table 14-10-0092-01 Employment by industry, annual, provinces and economic regions (x 1,000)

### Construction GDP

Table 36-10-0402-01 Gross domestic product (GDP) at basic prices, by industry, provinces and territories (x 1,000,000)

## Regional Profiles British Columbia

	2017	2018	2019	2020
<b>PROFILE</b>				
Population	4,817,160	5,016,322	5,071,336	5,145,785
Land area	922,503	922,503	922,503	922,503
Population density	5.2	5.4	5.5	5.6
Housing starts*	43,664	40,857	44,932	37,734
Employment in construction	228,600	238,400	236,600	213,200
Construction GDP (\$ millions)	19,825	20,562	22,650	23,033
<b>SUMMARY</b>				
Locate requests	190,312	203,758	202,052	212,056
Notifications	880,229	821,445	679,203	609,367
Locate requests to notifications ratio	1:4.6	1:4.0	1:3.4	1:2.87
Damages	1,449	1,408	1,304	1,241
Damages per work day	5.8	5.6	5	4.9
Damage ratio per 1,000 notifications	1.7	1.7	1.92	2.04
Damage ratio per 1,000 locate requests	7.76	6.9	6.45	5.85
<b>DAMAGES BY TYPE OF WORK</b>				
Green (Landscaping)	142	143	135	88
Construction	180	184	435	425
Water/Sewer	454	397	415	365
Road/Street	109	130	117	78
Utilities	147	168	109	153
Unknown/other	417	386	93	132
<b>DAMAGES BY FACILITY TYPE</b>				
Electric	0	0	0	0
Natural Gas	1,301	1,228	1,139	1,039
Liquid Pipeline	52	36	22	31
Telecommunications	70	106	111	116
Unknown/Other	26	38	32	55
<b>ROOT CAUSE</b>				
Excavation Issue	516	660	447	423
Notification Issue	830	616	720	626
Locating Issue	12	4	4	1
Miscellaneous Root Causes	91	128	133	191
<b>Damage Prevention/One Call Legislation</b>				
British Columbia CGA: <a href="http://commongroundbc.ca">commongroundbc.ca</a> BC One-Call: <a href="http://bc1c.ca">bc1c.ca</a>	<b>Partial legislation:</b> 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

	2017	2018	2019	2020
<b>PROFILE</b>				
Population	4,286,134	4,330,206	4,371,316	4,428,082
Land area	640,330	640,330	640,330	640,330
Population density	6.7	6.8	6.8	6.9
Housing starts	29,457	26,085	27,325	24,023
Employment in construction	241,000	245,400	236,800	217,600
Construction GDP (\$ millions)	27,552	26,212	24,329	21,404
<b>SUMMARY</b>				
Locate requests	378,360	351,934	403,434	426,324
Notifications	1,649,307	1,477,711	1,463,751	1,470,207
Locate requests to notifications ratio	1:4.4	1:4.4	1:3.6	1:3.5
Damages	2,750	3,139	3,613	3,879
Damages per work day	10.9	12.5	14.4	14.8
Damage ratio per 1,000 notifications	1.7	2.2	2.47	2.64
Damage ratio per 1,000 locate requests	7.31	9.1	8.96	9.1
<b>DAMAGES BY TYPE OF WORK</b>				
Green (Landscaping)	252	317	477	382
Construction	245	298	301	424
Water/Sewer	467	546	921	1,192
Road/Street	322	421	735	553
Utilities	484	408	673	702
Unknown/other	980	1,149	506	626
<b>DAMAGES BY FACILITY TYPE</b>				
Electric	152	179	205	219
Natural Gas	714	672	526	562
Liquid Pipeline	1*	381	0	3
Telecommunications	1,507	1,458	2,277	2,211
Water/Sewer	15	61	80	73
Unknown/Other	361	388	525	811
<b>ROOT CAUSE</b>				
Excavation Issue	576	550	1,163	1,080
Notification Issue	307	237	406	469
Locating Issue	505	306	631	748
Miscellaneous Root Causes	1362	2,046	1413	1,582
<b>Damage Prevention/One-Call Legislation</b>				
Alberta CGA: <a href="http://albertacga.ca">albertacga.ca</a> Alberta One-Call: <a href="http://albertaonecall.com">albertaonecall.com</a>	<p><b>Partial legislation:</b> Alberta Energy Regulator and the National Energy Board governed pipelines are required to register with Alberta One-Call</p> <p>*Note that 2017 data for Alberta does not include damages from a large stakeholder.</p>			

## Regional Profiles

### Saskatchewan

Saskatchewan	2017	2018	2019	2020
<b>PROFILE</b>				
Population	1,163,925	1,165,903	1,174,462	1,177,782
Land area	588,244	588,244	588,244	588,244
Population density	2.0	2.0	2.0	2.0
Housing starts	4,904	3,610	2,427	3,087
Employment in construction	50,700	49,500	47,100	41,000
Construction GDP (\$ millions)	6,094	5,776	5,519	4,919
<b>SUMMARY</b>				
Locate requests	144,855	148,166	141,518	151,282
Notifications	448,874	466,764	450,209	437,685
Locate requests to notifications ratio	1:3.1	1:3.1	1:3.2	1:2.89
Damages	716	673	669	753
Damages per work day	2.9	2.7	2.7	3.0
Damage ratio per 1,000 notifications	1.60	1.44	1.49	1.72
Damage ratio per 1,000 locate requests	4.94	4.54	4.73	4.98
<b>DAMAGES BY TYPE OF WORK</b>				
Green (Landscaping)	99	124	127	113
Construction	172	55	49	101
Water/Sewer	127	78	94	96
Road/Street	52	70	63	31
Utilities	147	162	200	177
Unknown/other	119	184	136	235
<b>DAMAGES BY FACILITY TYPE</b>				
Electric	226	271	258	271
Natural Gas	136	224	232	264
Liquid Pipeline	7	3	1	6
Telecommunications	347	172	170	210
Unknown/Other	0	3	8	2
<b>ROOT CAUSE</b>				
Excavation Issue	268	277	317	335
Notification Issue	171	159	186	240
Locating Issue	199	78	123	115
Miscellaneous Root Causes	78	159	43	63
<b>Damage Prevention/One-Call Legislation</b>				
Saskatchewan CGA: <a href="http://scga.ca">scga.ca</a> Sask 1 <sup>st</sup> Call: <a href="http://sask1stcall.com">sask1stcall.com</a>	<b>Partial legislation:</b> National Energy Board governed pipelines are required to register with Sask 1 <sup>st</sup> Call.			

## Regional Profiles

# Manitoba

	2017	2018	2019	2020
<b>PROFILE</b>				
Population	1,338,109	1,356,836	1,369,465	1,379,469
Land area	552,371	552,371	552,371	552,371
Population density	2.4	2.5	2.5	2.5
Housing starts	7,501	7,376	6,946	7,314
Employment in construction	48,300	47,200	50,400	46,700
Construction GDP (\$ millions)	4,490	4,628	4,683	4,182
<b>SUMMARY</b>				
Locate requests	61,885	64,090	74,861	76,276
Notifications	136,024	173,292	191,226	183,366
Locate requests to notifications ratio	1:2.2	1:2.2	1:2.6	1:2.4
Damages	187	219	196	208
Damages per work day	0.7	0.9	0.8	0.8
Damage ratio per 1,000 notifications	1.3	1.26	1.02	1.13
Damage ratio per 1,000 locate requests	2.86	3.42	2.62	2.73
<b>DAMAGES BY TYPE OF WORK</b>				
Green (Landscaping)	24	33	27	24
Construction	20	20	13	22
Water/Sewer	61	58	60	50
Road/Street	20	28	24	20
Utilities	20	22	19	46
Unknown/other	42	58	53	46
<b>DAMAGES BY FACILITY TYPE</b>				
Electric	85	132	110	109
Natural Gas	102	87	86	99
Liquid Pipeline	0	0	0	0
Telecommunications	0	0	0	0
Unknown/Other	0	0	0	0
<b>ROOT CAUSE</b>				
Excavation Issue	130	153	137	118
Notification Issue	41	41	36	71
Locating Issue	14	21	22	18
Miscellaneous Root Causes	2	4	1	1
<b>Damage Prevention/One-Call Legislation</b>				
Manitoba CGA: <a href="http://manitobacga.com">manitobacga.com</a> One-Call: <a href="http://clickbeforeyoudigmb.com">clickbeforeyoudigmb.com</a>	<b>Partial legislation:</b> National Energy Board governed pipelines are required to register with ClickBeforeYouDigMB			

## Regional Profiles Ontario

	2017	2018	2019	2020
<b>PROFILE</b>				
Population	14,193,384	14,411,424	14,566,547	14,733,506
Land area	908,699	908,699	908,699	908,699
Population density	15.6	15.9	16.0	16.2
Housing starts	79,123	78,742	68,985	81,305
Employment in construction	512,500	525,100	542,800	520,800
Construction GDP (\$ millions)	49,443	51,506	50,741	50,881
<b>SUMMARY</b>				
Locate requests	1,041,610	1,077,815	1,071,928	1,025,432
Notifications	7,498,270	6,698,205	6,227,227	5,746,332
Locate requests to notifications ratio	1:7.2	1:6.2	1:5.8	1:5.6
Damages	5,367	5,313	5,005	4,566
Damages per work day	21.1	21.2	19.9	18.1
Damage ratio per 1,000 notifications	0.7	0.87	0.80	0.79
Damage ratio per 1,000 locate requests	5.2	5.16	4.67	4.45
<b>DAMAGES BY TYPE OF WORK</b>				
Green (Landscaping)	799	831	750	906
Construction	799	1072	1,182	547
Water/Sewer	1,437	1,281	1,166	1,157
Road/Street	640	496	523	543
Utilities	992	950	815	621
Unknown/other	700	683	569	792
<b>DAMAGES BY FACILITY TYPE</b>				
Electric	343	341	270	222
Natural Gas	2,404	2,408	2,332	2,422
Liquid Pipeline	17	17	13	15
Telecommunications	2,549	2,484	2,343	1,884
Water/Sewer	52	62	42	8
Unknown/Other	2	1	5	15
<b>ROOT CAUSE</b>				
Excavation Issue	2,499	2,356	2,085	1,955
Notification Issue	1,318	1,321	1,381	1,314
Locating Issue	271	302	249	144
Miscellaneous Root Causes	1,279	1,334	1,290	1,153
<b>Damage Prevention/One-Call Legislation</b>				
OntarioCGA: <a href="http://orcga.com">orcga.com</a> One-Call: <a href="http://ontarioonecall.ca">ontarioonecall.ca</a>	<b>Partial legislation:</b> National Energy Board governed pipelines and all buried infrastructure within public rights of way are required to register with Ontario One-Call			

## Regional Profiles Quebec

	2017	2018	2019	2020
<b>PROFILE</b>				
Population	8,394,034	8,390,499	8,484,965	8,575,812
Land area	1,667,712	1,667,712	1,667,712	1,667,712
Population density	5.0	5.0	5.1	5.1
Housing starts	46,495	46,874	47,967	54,066
Employment in construction	245,800	249,600	264,600	257,200
Construction GDP (\$ millions)	23,048	23,884	24,602	23,913
<b>SUMMARY</b>				
Locate requests	259,670	274,938	288,149	293,462
Notifications	572,049	597,324	627,518	595,823
Locate requests to notifications ratio	1:2.2	1:2.2	1:2.2	1:2
Damages	1,302	1,235	1,102	911
Damages per work day	4.9	4.9	4	3.6
Damage ratio per 1,000 notifications	2.2	2.07	1.8	1.61
Damage ratio per 1,000 locate requests	4.74	4.49	3.82	3.27
<b>DAMAGES BY TYPE OF WORK</b>				
Green (Landscaping)	144	112	93	48
Construction	160	164	168	130
Water/Sewer	407	416	298	247
Road/Street	296	261	252	214
Utilities	73	84	94	79
Unknown/other	222	198	197	193
<b>DAMAGES BY FACILITY TYPE</b>				
Electric	99	127	120	41
Natural Gas	480	443	369	328
Liquid Pipeline	2	0	2	0
Telecommunications	614	570	540	506
Water/Sewer	0	1	0	0
Unknown/Other	107	94	71	36
<b>ROOT CAUSE</b>				
Excavation Issue	527	558	463	324
Notification Issue	339	231	205	243
Locating Issue	48	45	32	29
Miscellaneous Root Causes	388	401	402	315
<b>Damage Prevention/One-Call Legislation</b>				
QCGA et One-Call: <a href="http://info-ex.com">info-ex.com</a>	<b>Partial legislation:</b> Pipelines governed by the National Energy Board are required to register with Info-Excavation.			

## Regional Profiles

### Atlantic Region

	2017	2018	2019	2020
<b>PROFILE</b>				
Population	2,394,362	2,416,754	2,426,711	2,531,079
Land area	500,531	500,531	500,531	500,531
Population density	4.8	4.8	4.8	5.1
Housing starts	8,619	9,299	10,103	10,351
Employment in construction	82,400	82,300	84,700	78,600
Construction GDP (\$ millions)	8,299	7,500	7,652	6,979
<b>SUMMARY</b>				
Locate requests	35,451	44,481	52,361	55,837
Notifications	53,338	53,771	68,686	67,725
Locate requests to notifications ratio	1:1.5	1:1.2	1:1.3	1:1.2
Damages	17	54	60	15
Damages per work day	0.3	0.2	0.2	0.06
Damage ratio per 1,000 notifications	1.2	1.00	0.87	0.22
Damage ratio per 1,000 locate requests	0.48	1.21	1.15	0.27
<b>DAMAGES BY TYPE OF WORK</b>				
Green (Landscaping)	3	4	5	2
Construction	6	5	9	2
Water/Sewer	4	21	11	7
Road/Street	2	10	15	4
Utilities	0	4	6	0
Unknown/other	2	10	14	0
<b>DAMAGES BY FACILITY TYPE</b>				
Electric	0	0	0	0
Natural Gas	14	17	15	15
Liquid Pipeline	0	0	0	0
Telecommunications	52	29	45	0
Water/Sewer	0	0	0	0
Unknown/Other	0	0	0	0
<b>ROOT CAUSE</b>				
Excavation Issue	13	18	12	11
No notification made to the One-Call Centre	3	31	35	4
Locating Issue	0	1	4	0
Miscellaneous Root Causes	1	4	9	0
<b>Damage Prevention/One-Call Legislation</b>				
Atlantic Canada CGA: <a href="http://atlanticdigsafe.ca">atlanticdigsafe.ca</a> One-Call: <a href="http://info-ex.com">info-ex.com</a>	<b>Partial legislation:</b> Pipelines governed by the National Energy Board are required to register with Info-Excavation.			