



DIRT

Damage Information Reporting Tool

2022 ANALYSIS AND RECOMMENDATIONS

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Dear Damage Prevention Stakeholders,

As we publish the 2022 DIRT Report and **Interactive Dashboard**, the damage prevention industry is at a pivotal moment, with an opportunity to take our mission of protecting critical buried infrastructure to the next level. The data this year highlights concerning trends, while also providing a roadmap to guide our efforts toward achieving the **Common Ground Alliance's 50-in-5 industry challenge**.

If we are to meet the goal of reducing damages by 50% over the next five years, unprecedented collaboration across this industry is required, with each stakeholder group taking ownership and committing to necessary improvements.

Participation in the Damage Prevention Institute's metrics-focused accreditation and peer review processes is the first and best step that all facility owner-operators, excavators and locators can take toward shared accountability and our ambitious damage reduction goal. For the first time in 2022, excavators, road builders and engineers were the top DIRT reporting source, reflecting our increased engagement with these stakeholder groups.

This year's insights underscore consistent priority action areas that will significantly reduce damages. For facility owners, GIS-based mapping of assets and communication are urgently needed to improve locating timelines and accuracy. Construction, maintenance, installation and locating contracts must incentivize adherence to Best Practices and drive damage reductions. Excavators must double down on safe work practices and proper use of 811. Expanded enforcement and education programs are essential to motivate compliance. And improved damage reporting and analysis across the industry is required to strengthen our understanding of challenges and measure progress toward 50-in-5.

Damages were cut in half in the decade following the designation of 811 as the national before-you-dig number, but then started rising again and at best have leveled off in recent years.

Our ability to advance as an industry depends on our willingness to adapt legacy processes to the demands of modern-day damage prevention. The opportunity exists to create meaningful change, but only if we meet this moment with the necessary urgency.

The amount of utility installation and improvement set to occur across the U.S. over the next several years will result in an enormous increase in excavation activity. Your commitment to forward-thinking practices, engagement across committees and programs, participation in the Damage Prevention Institute, and investments in innovative technologies and processes are essential. We need each stakeholder's commitment to reducing their damages by 50% over the next five years to achieve our goal.



Visionary organizations have made promising progress, such as in **Chicago** where coordination and mapping efforts have helped reduce damages by 50% over a five-year period. Initiatives like this demonstrate what is possible through collaboration and commitment to continuous improvement.

Pilot projects like the **Minnesota Utilities Mapping Project** highlight how innovation can address critical challenges. Strategies for allowing more flexibility in the 811 process have been successfully implemented in states like Maryland, Missouri and Virginia. By learning from these successes and scaling effective solutions, we can collectively achieve our ambitious goals.

Please join me in thanking CGA's Data Reporting & Evaluation Committee for their work in creating a streamlined 2022 DIRT Report, which remains the only comprehensive accounting and analysis of damages to buried infrastructure in the U.S. and Canada.

The conclusion we must draw from this and **past DIRT Reports** is clear:

Now is the time for the damage prevention industry to take decisive, bold action by embracing innovation, capitalizing on technological advancements and working together to reimagine a damage prevention process that works for all stakeholders.

Be safe,

Sarah K. Magruder Lyle

President & CEO
Common Ground Alliance

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Executive Summary

2022 Data: Consistent Challenges, Increased Reporting from Excavators

- For the first time, excavation/construction was the top reporting source.
- Telecommunications and natural gas remain the most damaged facilities.
- Telecommunications work contributed to the most damages, followed by water/sewer work.
- Electronic tickets made up 73% of notices to 811 centers across the U.S. and Canada.
- A significant increase in the diversity and number of submitting stakeholders, as well as the quality of damage and near-miss data, would improve the value of DIRT insights.

Three-Year Damage Trends: Troubling Increases Across Key Analyses

- A regression analysis of consistent 2020-2022 datasets shows damages are at best flat, but more likely increasing when accounting for economic factors.
- Predictive metrics such as damages per unit of construction spending and per one thousand 811 transmissions increased 12.35% and 9.34%, respectively, between 2021 and 2022.
- Reversing these trajectories is imperative to reach the 50-in-5 industry challenge.



Root Causes: Top Six Damage Drivers Cause Majority of All Damages

- The top six root causes driving nearly 76% of all damages have been consistent year-over-year, which is an opportunity to focus our efforts and make measurable progress.
- Failure to notify continues to be the most persistent singular root cause year-over-year, with 77% of no-call damages attributed to professional excavators in 2022. Landscaping/fencing, water/sewer and construction are the top types of work performed when professionals cause no-notification damages.
- Damages attributed to failure to pothole/maintain clearance most frequently involve utility work. This means that facility owner/operators have a tremendous opportunity to address this issue via the processes and procedures around these excavations.
- Top root causes associated with locator error likely mask deeper issues like inaccurate maps, faulty tracer wire or abandoned facilities. Again, utility work dominates damages that occur due to locator error, giving facility owner/operators the opportunity to reduce associated incidents.

50-IN-5

PATHWAY TO 50-IN-5 Read about how 811 Chicago reduced damages by 50% in 5 years on page 23.

Late Locates: A Current and Emerging Crisis

- An analysis of data from seven states revealed that as often as 56% of the time, an excavator cannot legally begin work on their planned start date.
- Telecom and water/sewer operators are the largest contributors to instances in which excavators cannot legally begin work.
- With an influx of additional excavation forthcoming because of state and federal infrastructure spending, it is imperative that we address the timeliness and accuracy of locating.

The Future of Damage Prevention: Monthly Reporting and Damage Indices

- Monthly reporting and near-miss data submitted by Damage Prevention Institute (DPI) participants through DIRT will provide unprecedented insights, enable timely analysis and create shared accountability across stakeholder groups.
- To augment future DIRT Reports and damage prevention efforts, CGA is sourcing additional data, models and experts to create a U.S. damage prevention index that more accurately gauges the rate of damages over time.

Data-Driven Recommendations to Guide the Damage Prevention Industry

Meeting the challenge of reducing the top damage root causes will require forward-thinking practices and true industry transformation. CGA recommends the following actions to achieve our aggressive 50-in-5 industry challenge.

Collaboration, Reporting and Analysis

- Commit to unprecedented coordination and flexibility within organizations and across stakeholder groups to generate new solutions to systemic issues.
- Participate in the Damage Prevention Institute's accreditation and peer review processes; submit data and metrics to DIRT monthly to enhance value of insights.
- Standardize data collection fields and processes across relevant stakeholder groups to enable greater portability of data for benchmarking.
- Incentivize comprehensive damage and near-miss reporting across organizational departments; integrate reporting into operating workflows.
- Socialize tools and guidance to identify root causes beyond catch-alls.
- Develop damage prevention index/indices to better measure fluctuations in the rate of damage to buried facilities over time and gauge 50-in-5 progress.



Targeting the No-Notification Root Cause

- Focus 811 outreach to excavators on behavior change – particularly consistent and effective use of 811 – and tailor messages to professional vs. private property excavators, focusing on the types of contractors and digging activities driving the majority of no-notification damages.
- Restore confidence in the 811 system: Consider out-of-the-box ideas for meeting locating demand while reducing unnecessary locate requests; invest in locating process efficiencies and technologies.

Targeting Excavation Root Causes

- Prioritize tolerance zone safety on the jobsite (pothole, maintain marks, use observers to help maintain clearance (see **Best Practices 5-17 through 5-20**)), in trainings, via technology investments (e.g., vacuum excavators) and through contract structures.
- Facility owner/operators are the project owners for much of the work performed when failure to pothole/maintain clearance damages occur; they must address contract requirements and adequate compensation for potholing.
- Provide excavators with access to additional information such as map visualizations of the jobsite through processes like Enhanced Positive Response (see **Best Practice 3-31**).

Targeting Locator Error Root Causes

- Prioritize sufficient resources to meet marking timelines, and consider innovative technologies and/or processes for leveling locating demand (see **Best Practice 4-17**).
- Immediately begin enhancing facility maps to GIS-grade to enable accurate locating, and update maps with facility location information captured in the field.
- Address contract structures between facility owner/operators and third-party locators to increase efficiencies in the process, enabling them to meet locating demand and reduce damages.
- Provide timely, accurate positive responses to the 811 center.
- Encourage effective use of the 811 system to reduce overall locator workloads, including through (electronic) white-lining, inputting the correct size/scope of tickets and ticket renewal practices.

Effective Enforcement of All Aspects of the Damage Prevention Process

- Examine enforcement of all primary participants in the process to ensure penalties are effective and incentivize those involved to change their behavior. It is important to hold the asset owner, excavator and locator appropriately responsible in the adjudication process.



Introduction

To encourage the damage prevention industry to take advantage of this critical moment in damage prevention, CGA's 2022 DIRT Report takes a streamlined, forward-looking approach aimed at providing stakeholders with actionable data and recommendations. As in past years, the **2022 Interactive Dashboard** and Report are based on voluntarily and confidentially submitted data from facility operators, contractors, 811 centers, and state and federal agencies. Readers are encouraged to explore newly published 2022 data as well as annual data back to 2020 on the **Interactive Dashboard**.

While much of what DIRT reveals has been consistent over recent years, this 2022 Report is focused on strategic views of damage data that can illuminate pathways to our goal of reducing damages by 50% over the next five years. For **glossary terms**, an **appendix** describing regression and trend analysis models, and other **supplemental information** about CGA's Damage Information Reporting Tool (DIRT) program and 2022 data, visit dirt.commongroundalliance.com.

With the stakes higher than ever in damage prevention, our 2022 Report offers clarity and direction to drive progress.

Spotlight on 2022 Data

Our analysis of 2022 data includes damage reports entered into DIRT as well as 811 center information and statistics collected through CGA's One Call Systems International (OCSI) committee. For detailed 2022 damage data, including complete breakdowns of facility affected, work performed, equipment type, event source and more, visit the **Interactive Dashboard**.

Additional Resources

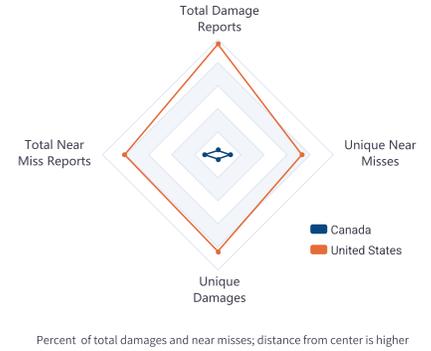
- **Past DIRT Reports**
- **How We Handle Multiple Reports of the Same Event**
- **Near-Miss Analysis**
- **Technology Reports**
- **Next Practices Reports**
- **CGA White Papers**

2022 Data Highlights:

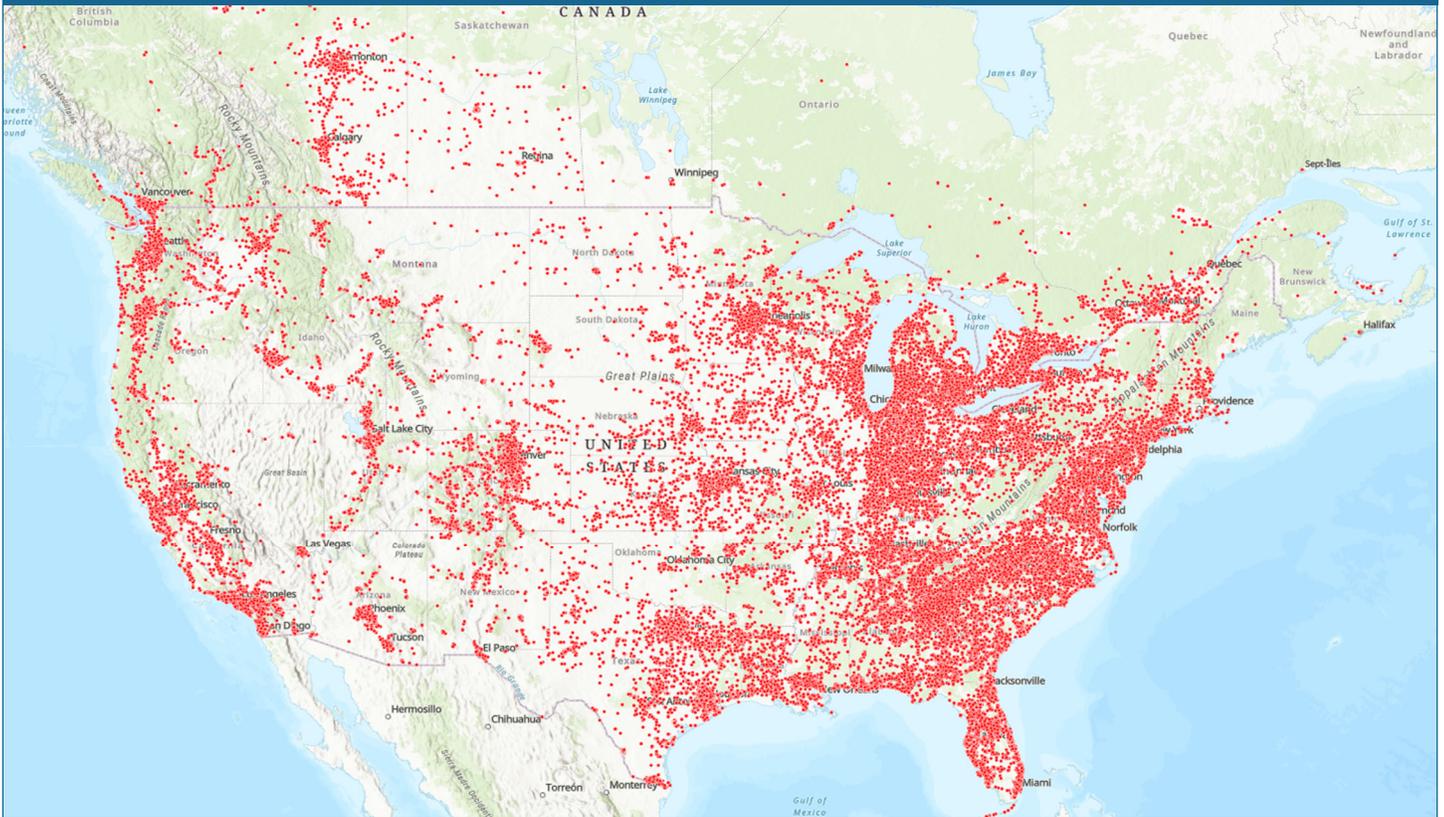
- There were 213,792 unique reported damages for 2022. Unless otherwise noted, these unique reported events are the basis for the full 2022 dataset.
- Excavation/construction stakeholders were the leading source of damage reports for the first time.
- Telecommunications and natural gas were the facilities most frequently damaged in 2022.
- Telecommunications work led to the most damages. Water, natural gas, sewer and electric work followed.
- Contractors were involved in more than half of damages while completing telecommunications and natural gas work.
- Electronic tickets made up 73% of notices to 811 centers.

Total and Unique Damages and Near Misses in Canada and the United States

COUNTRIES	TOTAL DAMAGE REPORTS	UNIQUE DAMAGES	TOTAL NEAR MISS REPORTS	UNIQUE NEAR MISSES
 Canada	10,422	9,783	281	261
 United States	233,810	204,504	1,973	1,782
Total	244,232	213,792	2,254	2,043



Map of Unique Reported DIRT Damages in 2022



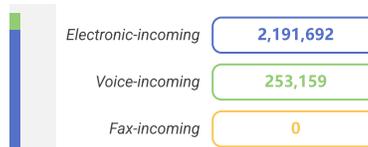
Incoming Locate Requests / Outgoing Transmissions



Total Incoming **42,716,394**
 Total Transmissions **274,244,329**
 Transmissions/Incoming **6.42**



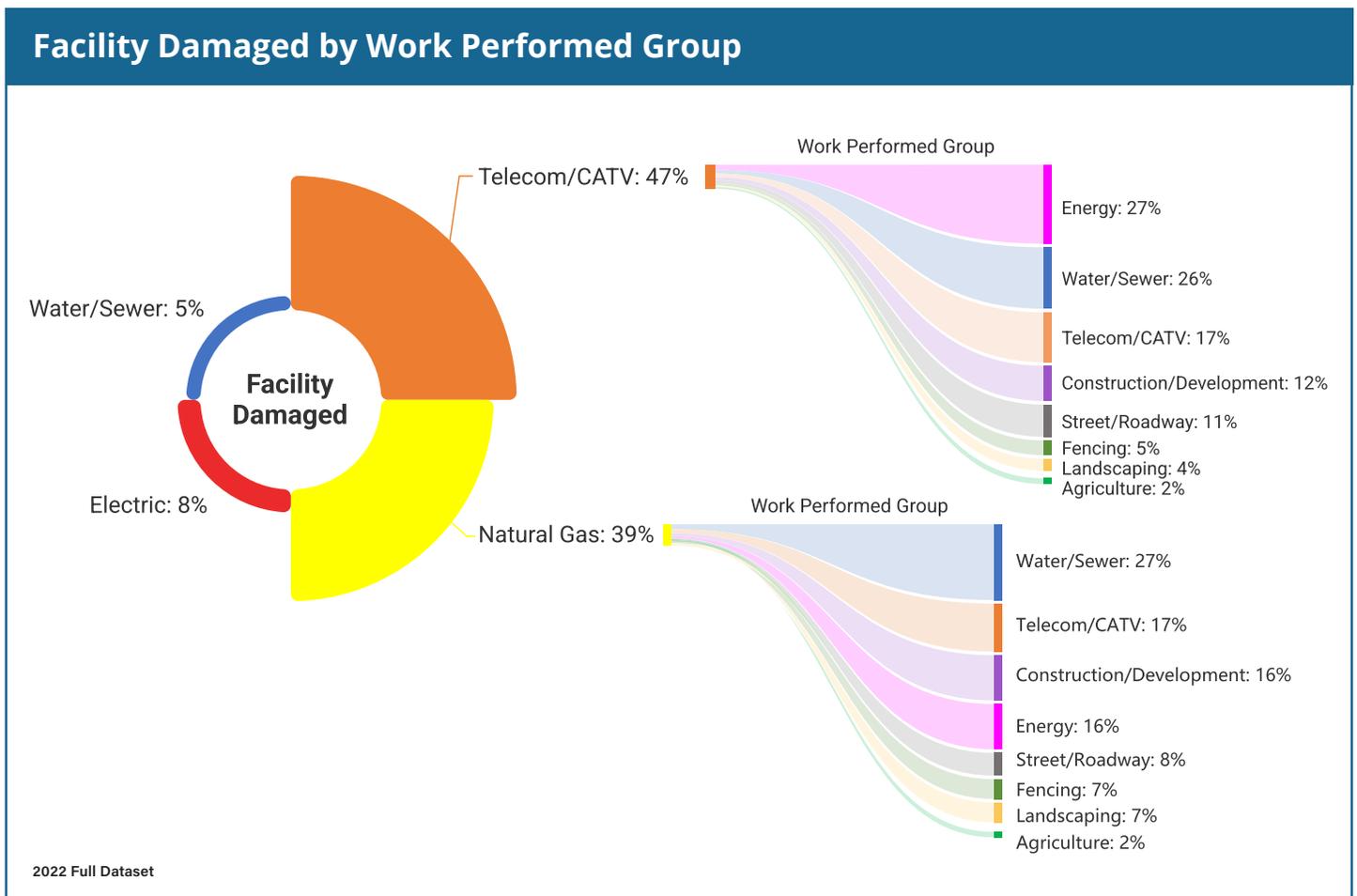
Total Incoming **2,444,851**
 Total Transmissions **10,193,154**
 Transmissions/Incoming **4.17**



Throughout this Report, we have consolidated the myriad of options for “work performed” within DIRT into groups for broader analysis. The chart below details those groupings.

Work Performed Group	Work Performed Types
Agriculture	Agriculture, Irrigation
Construction/Development	Construction, Demolition, Drainage, Driveway, Engineering, Grading, Railroad, Site Development, Waterway
Energy	Electric, Liquid Pipeline, Natural Gas, Steam
Fencing/Landscaping	Fencing, Landscaping
Street/Roadway	Curb/Sidewalk, Milling, Pole, Public Transit Authority, Roadwork, Storm Drainage, Streetlight, Traffic Sign, Traffic Signal
Telecom/CATV	Telecommunications, Cable TV
Water/Sewer	Water, Sewer

The graph below examines **2022 damages** through the macro lens of facility damaged, then drills down into the work performed when telecom/cable TV and natural gas utilities are damaged.



Top Event Report Sources

Excavator, Road Builder and Engineer | 64,089

Natural Gas | 62,234

Telecom/Cable TV | 50,688

Locator | 19,083

Electric | 6,303

2022 Full Dataset

Three-Year Trending: Statistical Analysis Confirms Upward Damage Trajectory

Looking at trends in damage and 811 center data can provide additional context beyond focusing on submissions for any individual year. CGA engaged a statistical consultant to analyze DIRT data from 2020-2022 and assess damage count trends.

Damage Trend Analysis Highlights:

- Damages per million dollars of construction spending and damages per one thousand 811 center transmissions increased 12.35% and 9.34% respectively from 2021 to 2022.
- Statistical regression analysis, controlling for other influencing factors like economic activity and population density, confirms an upward damage trend over the three-year period (2020-2022).
- Increased construction spending consistently correlates with more damages. If significant changes are not made to U.S. damage prevention, infrastructure funding will further strain the system, resulting in more damages in the coming years.

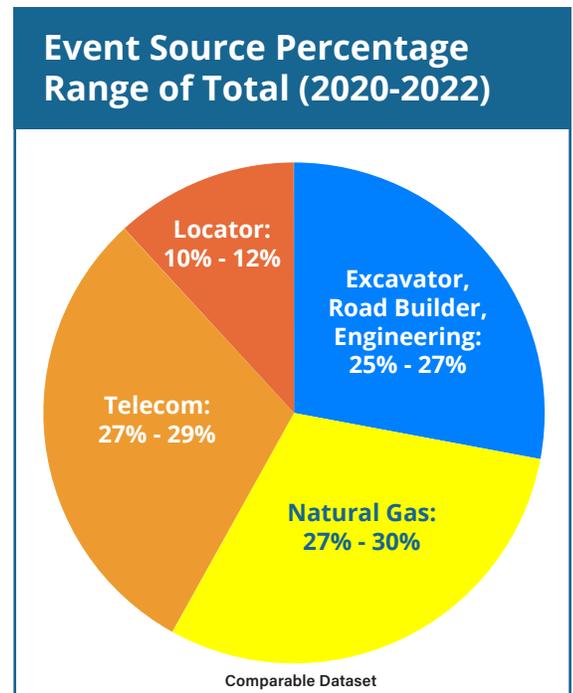
Methodology: Comparable Dataset

The trend analysis uses a **comparable three-year dataset** (2020-2022) of consistent DIRT contributors that includes a representative sample and typical distribution of reporting stakeholders in a given year (facility owners/operators, 811 centers, locators, excavators, public





works and private water, and regulatory agencies). This approach provides a focused view of damage trends. The **comparable dataset** is also used to examine damage root causes in the next section of this Report.



Damage Trends and Construction Spending

In addition to analysis of the three-year comparable damage dataset, CGA's statistical consultant incorporated 811 center data and construction spending into the analysis to evaluate how damage counts have changed in recent years.

As noted in the **2021 DIRT Report**, CGA makes every effort to normalize variables that can complicate interpreting damage trends over time. For example, disproportionate inflation rates between sectors require closely examining construction spending. As in 2020 and 2021, construction spending figures were adjusted to the latest year's (i.e., 2022 in this case) consistent dollars using a construction-specific price index to account for inflationary pressures.

With the Infrastructure Investment and Jobs Act unleashing over half a trillion dollars in new infrastructure investment, the time is now to double down on damage prevention efforts.

Trends in Damages and Key Metrics, Based on Total U.S. Damages

	2020	2021	2022
U.S. Damages (unique events from consistent reporting entities)	146,038	153,886	163,726
Total Transmissions (millions)	273.9	282	274.2
Value of Construction Spending (millions of 2022 USD)	\$1,852,381	\$1,911,498	\$1,798,926
Damages per Construction Spending	0.079	0.081	0.091
Change in Damages per Construction Spending	Baseline	+2.53%	+12.35%
Damages per 1000 Transmissions	0.533	0.546	0.597
Change in Damages per 1000 811 Center Transmissions	Baseline	+2.44%	+9.34%

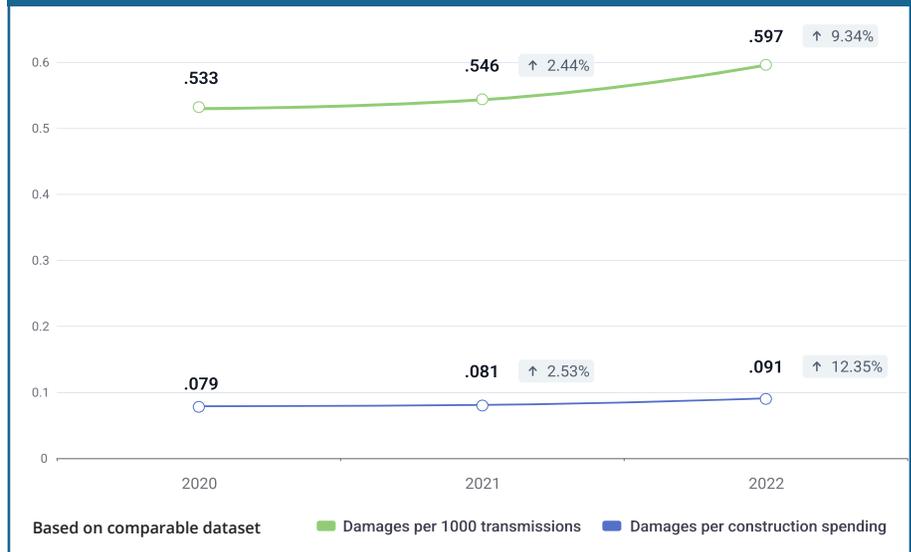
*Ratios are estimated based on unique damages from consistently reporting entities over the three-year period of 2020 to 2022 and therefore are not directly comparable to previously estimated ratios.

811 Center Ticket Type 2020 Compared to 2021

Incoming Voice	↓ 7.7%
Incoming Fax	↓ 16.9%
Incoming Electronic	↑ 5.6%
Total Incoming	↑ 1.7%
Total Transmissions	↓ 2.7%

More precise locate requests by excavators and improved polygon registration by facility operators point to progress in 811 efficiency, leading to transmissions declining even as incoming tickets increase.

Damages Per 811 Transmissions and Construction Spending



Regression Analysis

The damages per construction spending and per transmission metrics normalize the number of damages accounting for factors most directly linked to levels of excavation activity. However, there are other less direct factors that can also influence the number of damages, such as weather, population and the density of infrastructure in an area. To fully understand the damage trends, CGA's statistical consultant performed regression analysis on **three years of comparable data** at the state and national level, incorporating such additional variables.

This more advanced analysis controls for other potential influences on the damage rate. **(Visit Appendix for regression methodology.)**

National-level regression used building permits to indicate construction activity. State-level regression explored spatial variation and revealed influential predictors:

- Real GDP as an indicator of economic activity
- Housing starts indicating construction volume
- Population density capturing infrastructure density

The regression analysis tested whether damage trend results were statistically different over time. The analysis took into consideration the factors outlined above and suggests that the increase in damages per spending and transmission is partially explained by other variables. However, evidence shows 2022 damages were higher than 2021, pointing to a continued rise in damages.

THE PATH TO 50-IN-5

Damage prevention progress requires reversing an established upward trend. Visit this Report's **Recommendations** and commit to bold action today.

Damage Root Causes Remain Consistent

DIRT collects specific root cause data across 25 (known) categories, plus an “unknown/other” option. CGA’s Data Committee also consolidates related causes into higher-level groups, providing an overview of what went wrong. The multi-level structure, from specific to grouped causes, enables nuanced root cause analysis while also highlighting macro trends. Filtering out “unknown/other” focuses insights on identifiable failure points within the damage prevention system. In this section of the Report, we present 2022 data as well as data from the three-year **comparable dataset**. **[Click here to view definitions of damage root causes.](#)**

Root Cause Analysis Highlights:

- In 2022, the top six root causes make up nearly 76% of damages, with each major root cause group represented. The top six root causes also ranked highest in 2021, indicating a consistent set of prevalent issues.
- Tailoring initiatives to address these vital few root causes can drive progress – but some of the top causes are broad “catch-alls” likely masking deeper issues.
- Identifying and addressing deeper-level root causes, beyond documentation for claims and/or enforcement purposes, will play a critical role in addressing the most significant challenges in damage prevention.

2022 Individual Damage Root Causes

As has been noted in past DIRT Reports, the top six root causes have been consistent year-over-year and also represent the vast majority of all damages, making these key targets for reductions. These consistent top individual root causes will be discussed in more depth in the next section of the Report.

ROOT CAUSE	Reports	2022 % of Total
 No notification made to 811 Center	35,860	24.81%
 Facility not marked due to locator error	21,951	15.19%
 Excavator failed to maintain clearance after verifying marks	19,448	13.46%
 Marked inaccurately due to locator error	12,048	8.34%
 Improper excavation practice not listed elsewhere	11,835	8.19%
 Excavator dug prior to verifying marks by potholing	7,965	5.51%
 Excavator failed to shore excavation/support facilities	5,092	3.52%
 Facility not marked due to no response from operator/contract locator	4,438	3.07%
 Facility not marked due to incorrect facility record/map	3,558	2.46%
 Marks faded, lost or not maintained	3,096	2.14%
 Excavator dug prior to valid start date/time	2,914	2.02%
 Excavator dug after valid ticket expired	2,827	1.96%
 Site marked but incomplete at damage location	2,695	1.86%
 Facility not marked due to unlocatable facility	2,199	1.52%
 Excavator dug outside area described on ticket	2,069	1.43%
 Facility marked inaccurately due to incorrect facility record/map	1,736	1.20%
 Facility marked inaccurately due to abandoned facility	1,157	0.80%
 Excavator provided incorrect notification information	897	0.62%
 Previous damage	556	0.38%
 Facility not marked due to abandoned facility	477	0.33%
 Deteriorated facility	461	0.32%
 Facility marked inaccurately due to tracer wire issue	452	0.31%
 Facility not marked due to tracer wire issue	450	0.31%
 811 Center error	201	0.14%
 Improper backfilling	148	0.10%
Total	144,531	100.00%

 Excavation Practices
  Invalid Use of Request by Excavator
  Locating Practices
  Miscellaneous
  No Locate Request

Minor Fluctuations in Root Cause Groups Reflect Increase in Excavator Submissions

The slight changes in root cause groups over time can be explained by expanded excavator reporting. Locating practices root causes edge up while the no locate request root cause declines in the three-year **comparable dataset**. This trend strengthens when examining the **full 2022 dataset**, which includes newer excavator reporters not yet meeting the three-year threshold of the **comparable dataset**.

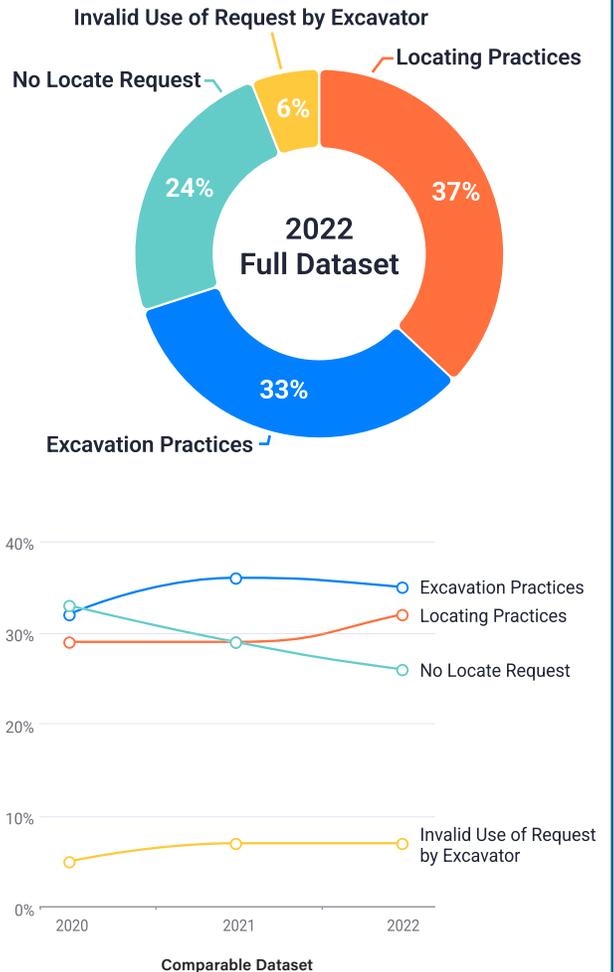
With excavators identifying locating issues in most of their reports, their inclusion pulls locating practices higher compared to the consistent reporting set. This may not mean there has been an increase in locating issues, but rather more balanced stakeholder data. Still, it underscores collective responsibility across the process.

The Liability Trap: Catch-All Root Causes

In order to start driving down damages, where should we look? First, we should understand that some of the top individual root causes are essentially catch-alls for their respective root cause groups.

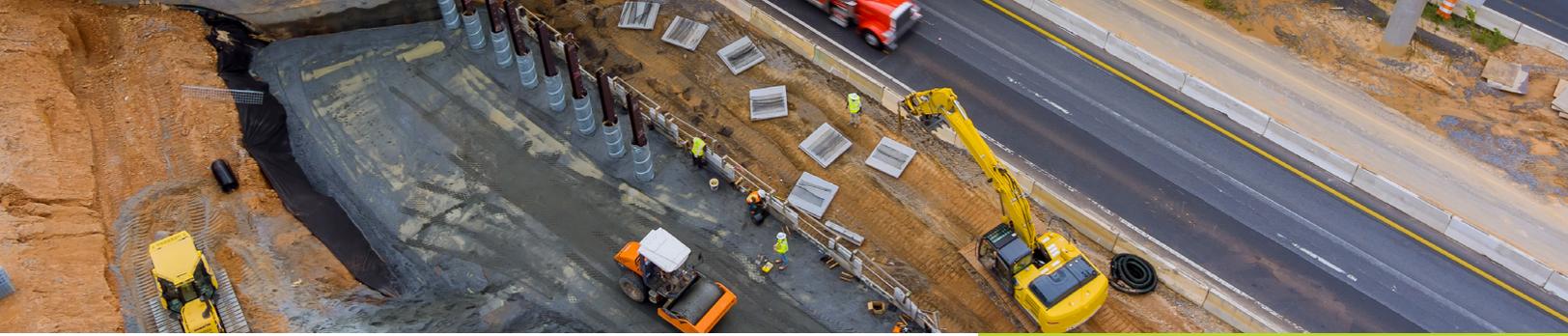
Many facility operators and contract locators base their DIRT root cause selections on information they collect to support repair claims (determining who is billed for repair costs). Regulatory agencies use code enforcement data (determining who is penalized for a rule violation). These catch-all buckets may adequately serve those purposes. However, they often mask more complex root causes that must be addressed in order to reduce damages. The following sections discuss how this phenomenon can play out within the major root cause groups.

Damages by Root Cause Group



THE PATH TO 50-IN-5 Moving Beyond Catch-All Root Causes

Review internal data and identify opportunities to pinpoint deeper root causes versus defaults.



No Locate Request

“No locate request” stands as its own group, consistently the top root cause and responsible for 25% of 2022 damages. Without contacting 811, the damage prevention process fails from the start. No-notification damages can mask other underlying issues:

- Expired or invalid tickets may be checked only superficially before assigning no notification. Issues like work area deviations or mismarks may go unaddressed.
- When marks are inaccurate, lack of a valid ticket might support repair bills and penalties, but the mismark is the true root cause of the damage.
- If excavators fail to pothole/maintain clearance while also not having a valid ticket (e.g., expired or “piggy-backing”), the damage may be recorded as no notification rather than an excavation practice.

Because professional excavators dig so much more frequently than occupant/farmers, they also cause the vast majority of dig-ins due to failure to notify 811. **CGA research** shows professional excavator 811 awareness is high, suggesting that outreach and education efforts should shift to consistent and effective use of 811 — and addressing why excavators are making the decision not to contact 811 prior to digging.

No notification damages concentrate in private property work like landscaping and fencing, indicating that these professionals are likely distinct from heavy construction and utility contractors, and could benefit from targeted 811 awareness and outreach.

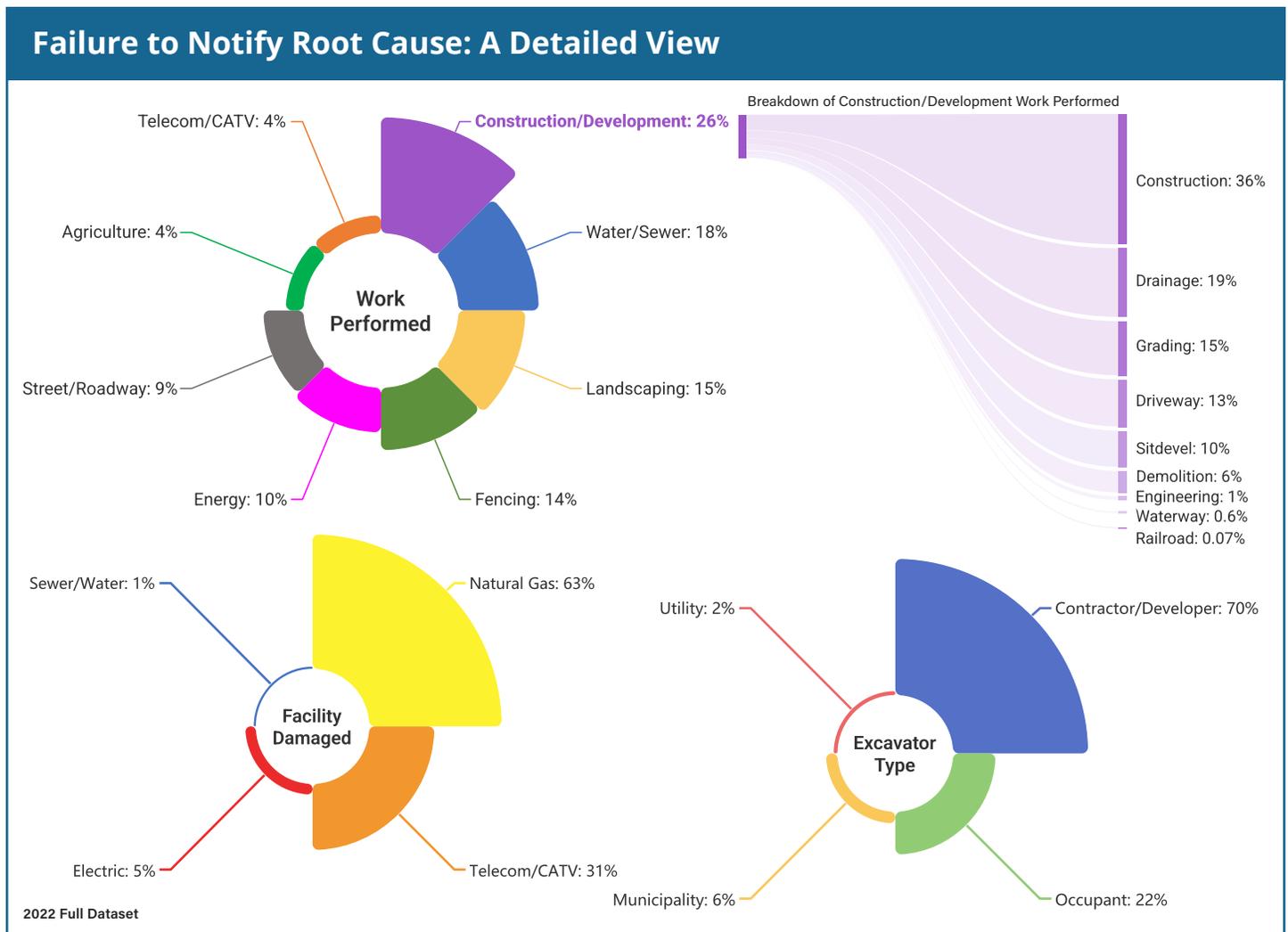
The persistence of no-notification damages despite high 811 awareness also indicates that excavators lack confidence in the system, which may require enforcement or other financial or legal consequences and shoring up 811 system reliability to reverse.

Resources like CGA's “Tips for Effective Use of 811” video highlight the excavator's role in an efficient process when utilizing 811.

LEGISLATIVE OUTLOOK

CGA is monitoring the impact of California and Virginia's new legislation strengthening enforcement of no-notification damages.

The following graphs examine no-notification damages using the **2022 full dataset** and highlight opportunities for targeted outreach.

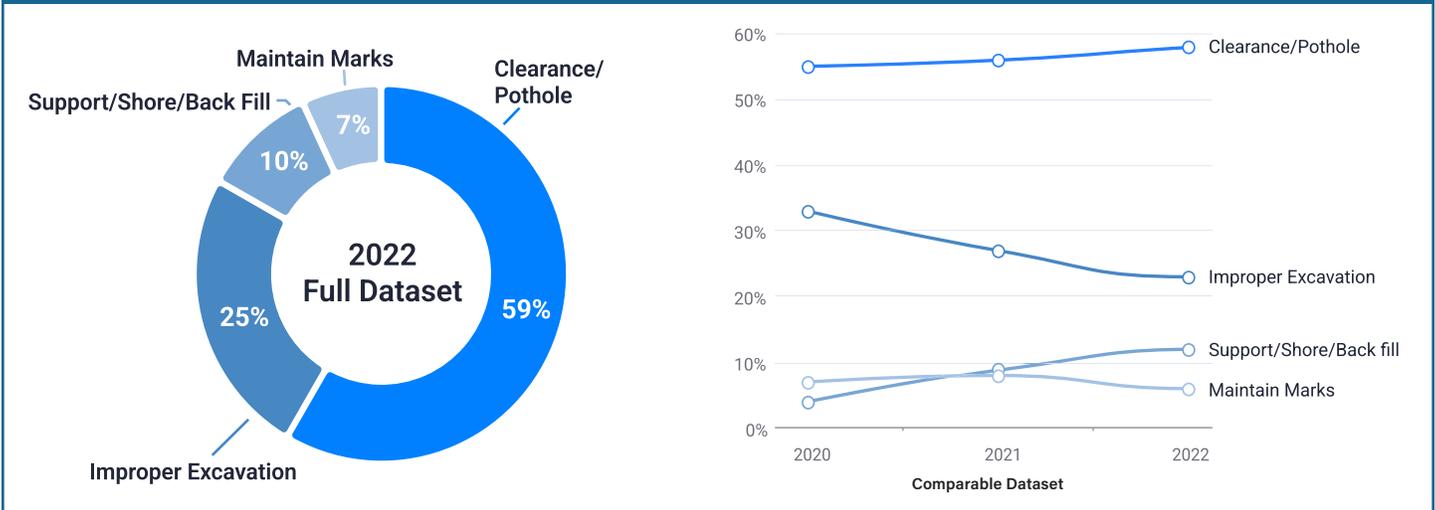


Excavation Practices

The excavation practices root cause group made up 33% of damages with a known root cause in the **2022 full dataset**. The majority (59%) of damages in this group point specifically to failure to maintain clearance and/or failure to pothole. These individual root causes are combined in our analysis because they are closely related, often selected interchangeably in damage investigations and involve safe excavation within the tolerance zone. The leading types of work when failure to maintain clearance or failure to pothole are the root cause are: telecommunication, water, sewer, natural gas and electric.

In the **top six individual root causes table**, failure to maintain clearance and failure to pothole were numbers three and six respectively. Improper excavation (practice not listed elsewhere) was number five, and one of the “catch-alls” referred to earlier. As seen in the graph on the following page, improper excavation typically makes up a quarter to a third of this root cause

Excavating Practices Root Causes

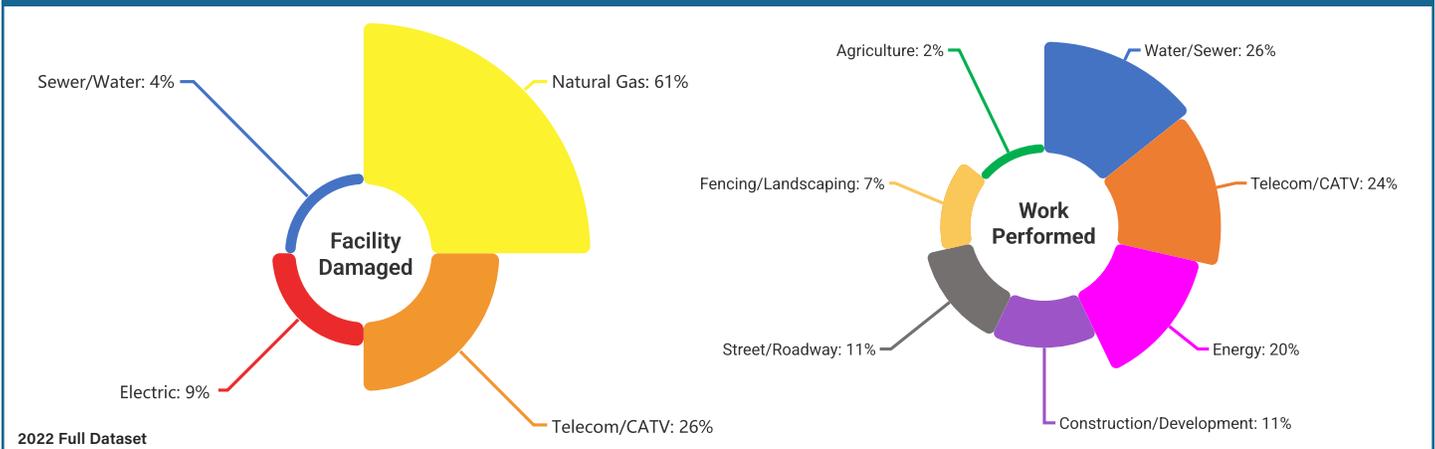


group (**comparable dataset, 2020-2022**). It likely includes some events that in reality are failure to pothole or maintain clearance, but the root cause investigation did not delve deep enough to reveal it. Excavator failed to protect/shore/support facilities is also fairly high on the **individual root cause list** at number seven, and likely makes up a portion of improper excavation.

CGA’s Excavator White Paper, published in 2019, took a closer look at awareness and execution of safe digging practices within the excavator community. The paper noted that “excavators have limited knowledge about regulations beyond the need to notify before beginning work,” with the survey “showing that concepts such as potholing, needing to maintain marks or request re-marks, and other critical but lesser-emphasized excavation Best Practices do not have the same level of awareness and compliance as making the notification.”

The following graphs specifically examine damages with failure to pothole and maintain clearance root causes using the **2022 full dataset**. It is concerning that high-consequence facilities like natural gas are frequently affected by these persistent damage drivers. On the

Failure to Pothole/Maintain Clearance Root Causes: A Detailed View



other hand, facility owner/operators have significant leverage given that utility and energy work were performed during 70% of failure to pothole/maintain clearance damages in 2022.

Increased emphasis on safe digging practices specifically within the tolerance zone would have an impact on excavator errors in the field. However, awareness and education are only two contributing factors. Other steps that would contribute to more widespread use of potholing include:

- Project owners (including facility owner/operators) requiring and adequately compensating for potholing.
- Applying emerging mapping/GIS technologies in project design and subsurface utility engineering (SUE). **CGA's 2022 Technology Report** included case studies highlighting opportunities for improved mapping and use of design/SUE. Improved mapping can streamline potholing and reduce associated expenses by avoiding wasteful or unsuccessful potholes (not finding the utility searched for).

Locating Practices

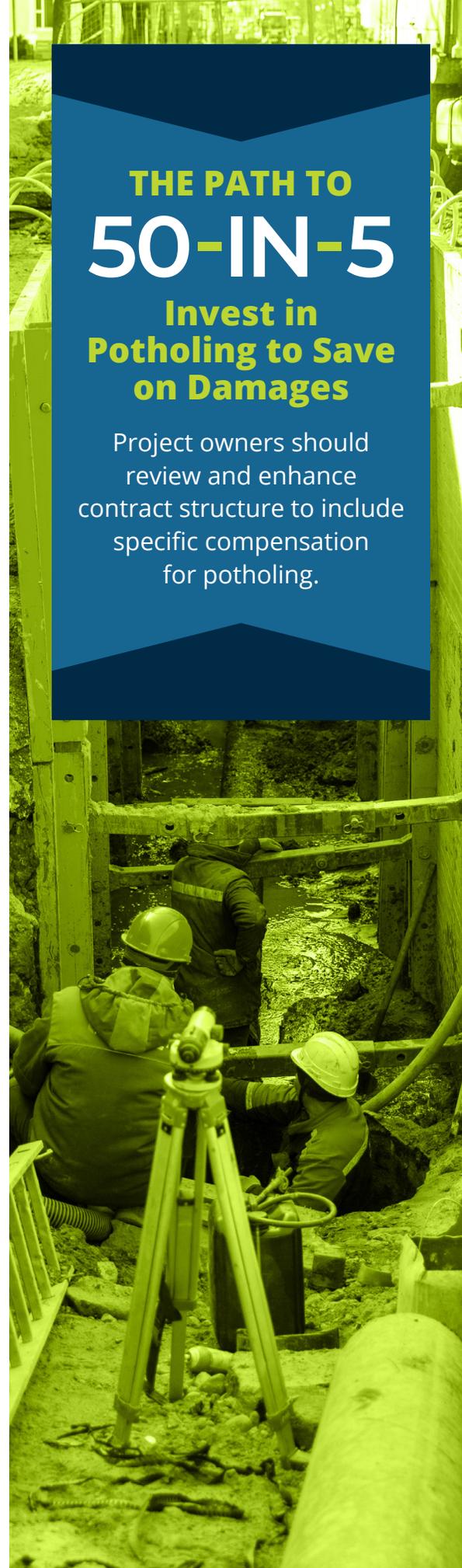
About two-thirds of damages attributed to locating practices specify locator error as the primary root cause. Indeed, they are numbers two and four on the **top six list**. Additional follow-up has shown locator error is often selected when a more specific root cause is not collected.

For example, an excavator may only know that marks are inaccurate. A locator or facility operator may be better able to determine if it was a mapping, tracer wire or abandoned facility issue by reviewing maps or records the excavator does not have access to, and/or by reconstructing the markout process used for the original marks.

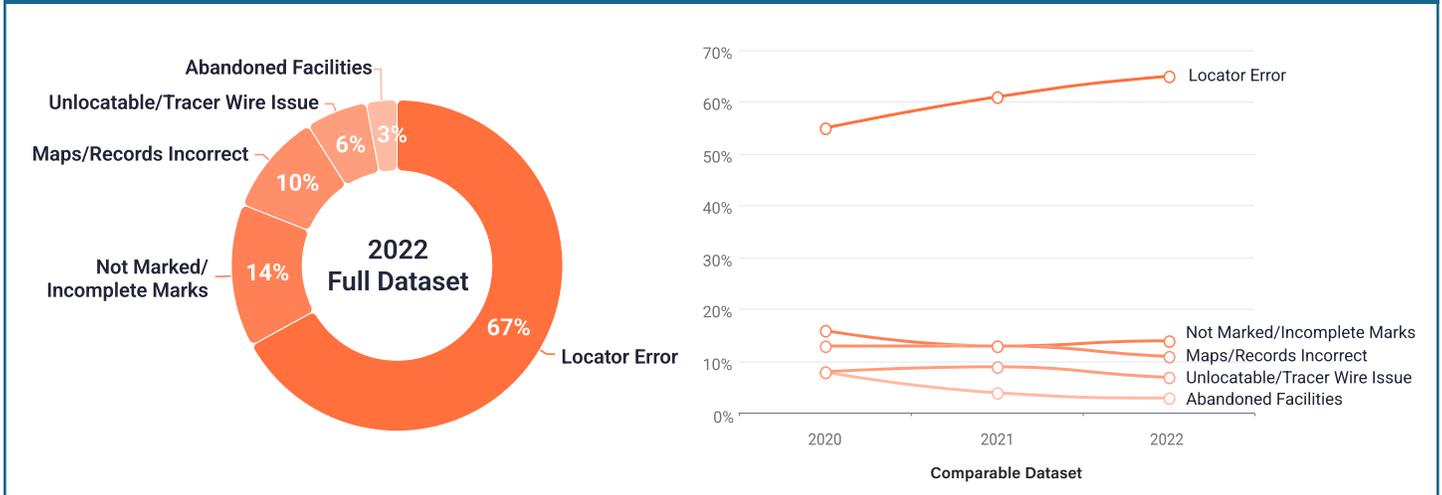
These issues can lead to an inaccurate locate even if the locator followed all proper procedures. Locator error is another example of a “catch-all” representing a broader spectrum of general locating issues.

THE PATH TO 50-IN-5 Invest in Potholing to Save on Damages

Project owners should review and enhance contract structure to include specific compensation for potholing.



Locating Practices Root Causes



The graph above shows incorrect maps/records at 10% in the **full 2022 dataset**; however, there are likely many other mapping related damages masked by locator error. Mapping issues could also be an underlying factor for some damages in the not marked/incomplete category. CGA **Next Practices reports**, the **Locator White Paper** and **Natural Gas White Paper** all identify up-to-date mapping as an effective method to improve locating.

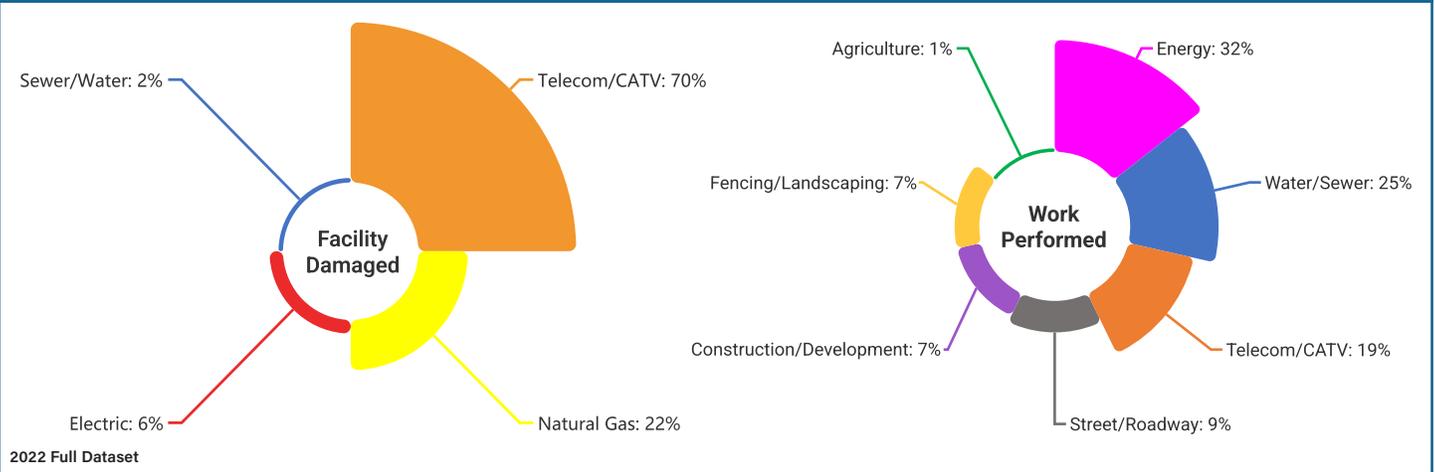
CGA's **2022 Technology Report** featured several case studies highlighting new technologies that capture information in the field and enable the production and sharing of updated, accurate maps. The report also discussed some of the barriers to creating and sharing GIS facility maps. This is an area where technology is rapidly advancing and has the potential to reduce incidents and make the entire damage prevention system more efficient. There are several stakeholder groups, and steps in the damage prevention process, where improved mapping could have an impact, including:

- Excavation project owners/designers: Project design and Subsurface Utility Engineering (SUE)
- Facility owners and contract locators: Locating and marking
- 811 centers: Identifying work areas for electronic tickets and electronic white-lining, establishing polygons and buffer zones around member facilities

The following graphs specifically examine two of the consistent year-over-year top damage root causes – not marked/marked inaccurately due to locator error – using the **2022 full dataset**. As we saw with failure to pothole/maintain clearance root causes, the vast majority of work performed for locator error-related damages was utility work. That facility owner/operators are likely the project owners for most of this work, combined with their mandate to locate their assets accurately and on time, gives that stakeholder group significant opportunities to influence damages related to locating practices.



Not Marked/Marked Inaccurately Due to Locator Error Root Causes: A Detailed Focus

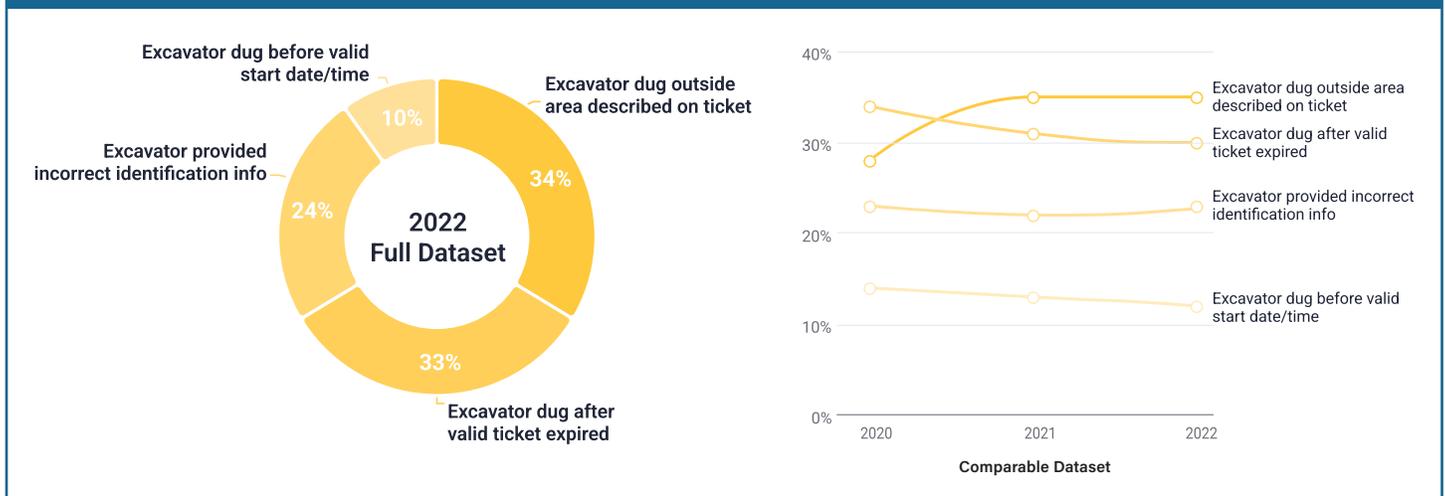


Invalid Use of Request

Invalid use of 811 requests accounted for 6% of damages with a known root cause in the **full 2022 data set**. About two-thirds resulted from digging on expired tickets or outside stated work areas. As with the other root cause groups, the **comparable dataset** largely shows consistency in invalid use of request damages from 2020-2022. These incidents stem not from a lack of 811 awareness, but from excavators' mistaken or incomplete understanding of regulations governing the process.

CGA's new video series, "**Tips for Effective Use of 811**," educates excavators on the proper use of the system. Clear communication and understanding of process requirements are critical for excavators to avoid misusing 811.

Invalid Use of Request Root Causes



Late Locates: A Current and Emerging Crisis

Late Locate Analysis Highlights:

- Data from seven states shows that as many as 56% of tickets receive late or no positive response, meaning work cannot legally start.
- Telecommunications and water/sewer operators have higher late response rates.
- Telecommunications work is most impacted by late responses.
- Some operators/locators mark sites on time but delay updating positive response systems.
- Excavators report inaccurate status codes, including those indicating sites are marked when they are not.

Late, absent and incorrect utility locates are a well-established challenge in the damage prevention industry, and one that must be addressed to meet our 50-in-5 industry challenge. To augment findings from CGA's **Locator White Paper** and DIRT data, we sourced additional information to get a clearer picture of the state of locating across the U.S.

CGA analyzed data from seven states with mandatory positive response to determine the percentages of "on time" locates, i.e., by the stated work start date and time, the excavator has received notices from all operators on a locate ticket that the marks are completed, or that they are clear. The states represented a diverse array of total transmissions, geography and response requirements. This sample group made up approximately 17% of incoming notices and 14% of outgoing transmissions in the U.S.

Our analysis of state-level positive response data showed that **as often as 56% of the time, excavators could not legally begin work on their planned start date.** Telecommunications and water/sewer operators had the highest late response rates, and telecom projects saw the most impact because of late or missing locates. Examining the structure of enforcement and locate contracts could help drive better compliance. Interestingly, although locators mark sites on time in some instances, delays in updating positive response systems can still leave excavators uncertain if their work can proceed. Better field technologies could enable quicker status updates.

THE PATH TO 50-IN-5 Timely and Accurate Positive Response

Late and inaccurate positive responses undermine the damage prevention process.

A closer look at locate data from one excavator indicated that about 30% of tickets received response codes from all operators on time with no problems, and also noted telecom as the most frequent late responders. This data also indicated that some positive response codes were dubious, such as unsuccessful attempts to contact the excavator, agreed-upon due date extensions and completed markings when none were present.

More consistent data collection across states and 811 centers would enable better analysis of this issue. Further research on late locates is needed to fully understand their impact – but current evidence shows timely, truthful facility locating is fundamental to preventing underground utility hits and restoring confidence in the entire system. Clear communication, accountability via enforcement and contracts with third-party locators, and technologies promoting real-time status updates are key to solving chronic lateness issues.

The Path to 50-in-5: 811 Chicago Reduced Damages by 50% Over Five Years

Chicago's Huge Damage Reduction: Leveraging Collaboration and Mapping

Chicago has cut underground utility damages in half since 2017 through its robust prevention program run by 811 Chicago. This service of the Chicago Department of Transportation (and located within the Division of Infrastructure Management) achieves damage reduction through:

- Project design reviews ensuring new utilities avoid existing infrastructure. Facility maps aid planning.
- Permitting requiring approved designs. Permit documents provide excavators with utility details.
- Enforcement of damage prevention laws via investigations and sanctions.
- Mapping tools like dotMaps showing project and ticket data. This enables coordination.

A key factor is that the Office of Underground Coordination (OUC, within the Division of Infrastructure Management) reviews all new utility project designs. OUC members, comprised of utility owners, must approve plans to mitigate conflicts. Facility map visualization access supports effective reviews. **Facility owners share maps because it ultimately protects their assets.**

Post-review, approved designs go to the permitting and 811 ticketing stages. Only licensed contractors can get permits/tickets, which include design documentation. Consistent enforcement of the city and state's damage prevention laws further promotes compliance.



Chicago's success highlights several adoptable practices:

- Sharing facility maps for planning purposes provides the data necessary to prevent damages without revealing sensitive details.
- Open communication on designs gives owners a voice and excavators foresight on potential conflicts.
- Collaboration from the start fosters stakeholder relationships and buy-in.
- Empowered excavators have the resources they need to identify buried infrastructure.

Chicago demonstrates that the damage prevention process works best when all parties commit to transparent planning, cooperation and accountability from project outset through excavation.

The Future of Damage Prevention: Welcome to the Damage Prevention Institute

The Damage Prevention Institute has accredited more than 1,000 organizations as of summer 2023.

CGA's **Damage Prevention Institute (DPI)** represents an essential evolution in damage reporting for the path to 50-in-5.

DPI's requirement for monthly reporting to DIRT and the influx of excavator data will provide unprecedented insights to shape the future of damage prevention and drive progress toward the 50-in-5 industry challenge.

- With monthly DIRT and metrics reporting requirements and additional near miss reports, DPI will complement CGA's annual DIRT report with more real-time insights to keep momentum toward 50-in-5.
- Performance metrics provide transparent accountability and an opportunity to identify what affects performance and how we can support strong performance among all stakeholders.
- Near-miss reporting is an opportunity for additional clarity, capturing invaluable lessons before damages occur to proactively prevent incidents.
- Excavators are critical players in collecting damage data – their direct participation and data is essential to understand challenges and devise solutions. DPI makes it easier than ever for excavators – and all stakeholders – to contribute data regularly.

Participation in DPI is open to all CGA members at no additional cost, and puts your organization at the forefront of damage prevention.

In addition to future DIRT Reports benefiting from damage and near-miss data entered by DPI-accredited organizations, CGA's Data Committee is sourcing additional experts, data sets and models to create a damage prevention index (or indices) that will provide a more complete picture of the rate of damages to buried utilities.



There's more to uncover.

DIRT



Visit the **DIRT Interactive Dashboard** to explore 2020-2022 damage data in-depth. Use the DIRT Explorer to filter data by geography, stakeholder group, facility damaged, equipment type and more. State- and province- level data is available as well.