Improving Upon Our Dig Laws

Evaluating an Anomalous Year, Incorporating Technology, and Applying Lessons from the Past Decade

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ALLIANCE FOR INNOVATION AND INFRASTRUCTURE



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The Alliance for Innovation and Infrastructure (Aii) is an independent, national research and educational organization that explores the intersection of economics, law, and public policy in the areas of climate, damage prevention, energy, infrastructure, innovation, technology, and transportation.

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Executive Summary

Each year, the Alliance for Innovation and Infrastructure (Aii) examines data on excavation damage incidents and recommendations from the Common Ground Alliance (CGA), the premier stakeholder organization focused on preventing damage to underground infrastructure. In continuation of this analysis, we discuss the latest Damage Information Reporting Tool (DIRT) Report and certain related topics.

Because of COVID-19, 2020 was anomalous for both excavation damages and data reporting and there are few insights to draw from the year. First, the lower number of damage incidents in 2020 is attributable, almost exclusively, to economic slowdowns and restrictions imposed by governments and private actors during the height of the COVID-19 pandemic, not an improvement in the underlying factors that lead to damages each year. Second, with the acknowledgement by the CGA president and CEO that "in the years to come, we expect the overall trend of rising damages will continue," much work by the damage prevention industry is still required.

Accordingly, we briefly look at the reported root causes of damage incidents and then turn our attention to several areas that are poised to address them. Of note has been CGA's launch of a working group called the *Next Practices Initiative*, tasked with assessing and recommending best practices, new programs, and technology that can drive down damages by tackling root cause problems.

We continue to see the need for innovative technology to be integrated into the damage prevention process. In line with CGA's 2021 Technology Report, which casts a vision for the ideal excavation project of 2030 using technology and fully implemented best practices, it is Aii's belief that the ideal dig can realistically arrive much sooner if stakeholders and public policy are in alignment. Our reasoning: for years, the solutions have been ready to deploy, but no significant implementation has occurred because of structural problems.

Finally, incorporating recommendations from the Pipeline and Hazardous Materials Safety Administration (PHMSA), a federal solution remains needed. With 50 state approaches and diverse stakeholder incentives, as well as a sluggish industry mentality to implement change, the federal government can offer the needed push to reform critical areas.

Introduction

Damage prevention is a fundamental policy concern for modern life. Every excavation has the potential to damage existing subsurface infrastructure, whether the excavation occurs during the construction of a new building, repairing or maintaining existing buildings or infrastructure, or simply digging a hole to plant a tree or install a backyard pool. Data on excavation incidents can help improve public policy responses and industry action to prevent future damage.

In September 2021, the Common Ground Alliance (CGA) released its annual Damage Information Reporting Tool (DIRT) Report, Volume 17.¹ Despite some deficiencies, the DIRT Report continues to be the only nationwide resource for comprehensive excavation damage data and trends, and it has long been instrumental to stakeholders and policymakers for examining root causes of excavation damage.

Against the backdrop of rising damage rates, inefficiencies, and stakeholder dissatisfaction, CGA has acknowledged real problems in the damage prevention ecosystem. In its previous 2019 DIRT Report, CGA laid out nine recommendations, noting that "systemic improvement" was needed.² We were disappointed that the follow-up to those recommendations in the latest DIRT Report for 2020 was primarily a reference to the establishment of new working groups.³ After noting the establishment of the five new groups, the report seems to indicate that the road to progress is through new best practices by explaining the process of establishing a best practice.

We note that this process includes the requirement of consensus from all 16 CGA stakeholder groups and that this process has been in place for a long time and not solved many root cause problems. In fact, as CGA admits, the top root causes accounting for most damage have persisted for years, despite robust best practices guides.⁴

The most recent DIRT Report covers calendar 2020 during the height of the COVID-19 pandemic. The year was highly irregular for all industries, with construction activity being similarly impacted. Pausing five consecutive years of an increasing excavation damage trend, 2020 saw an estimated 468,000 total damages, a 12 percent decline from 532,000 damage incidents in 2019. This decline was not attributable to reforms or systemic improvements, but to lower economic and construction activity in reaction to the COVID-19 pandemic. This dip is believed to be an aberration in the overall rising trend from the previous five years, with the upward trend projected to resume once economic activity picks up. CGA notes "in the years to come, we expect the overall trend of rising damages will continue."⁵

Since publication of the latest DIRT Report, in which CGA projected that the current system will lead to rising damages, a new \$1.2 trillion infrastructure package became federal law.⁶ With the known correlation between construction spending and excavation damage, this is guaranteed to bring about a massive increase in damage in the coming years if improvements are not made.

Separately, stakeholder outcry is growing. In November 2021, a group of "regular users and stakeholders in the 811 system" banded together to commission a study: "811 Emergency: \$61 Billion Lost in System to Protect Underground Utilities."⁷ By calling out waste and inefficiency to the tune of over \$60 billion, stakeholders are making clear that reforms are needed beyond best practices statements to prevent damage, reduce costs, and address stakeholder concerns.

Root Causes

The DIRT Report primarily focuses on estimating the number of damage incidents and identifying their root causes. Writing in the introductory letter to the latest DIRT Report, CGA noted, "year over year, hundreds of thousands of damages occur, and most of them can be attributed to the same handful of persistent root causes." Most critically, the same key root causes have endured year after year despite reform proposals.

Though few in number, the top five individual root causes account for almost 70 percent of all damage events with a known root cause every year. In 2020, these were:

No Notification made to One-Call center / 811
Excavator dug prior to verifying marks by test-hole (pothole)
Facility marked inaccurately due to abandoned facility
Facility not marked due to locator error
Excavator failed to maintain clearance after verifying marks

Recommendations from CGA as well as outside organizations like PHMSA, trade publications,⁸ insurance companies,⁹ state governments,¹⁰ and others have directly targeted these persistent root causes for years, but little apparent progress is indicated by the data. Seeing a lack of progress moving from recommendation to implementation of reforms, some affected stakeholder groups have even commissioned independent studies¹¹ or pressured state and local governments to force reforms into law.¹²

In our view, the high rates of damage cannot be allowed to persist – from an environmental standpoint, for public safety, or as an economic issue. The economy suffers over \$30 billion every year from damage incidents alone.^{13,14} Casualties continue to occur throughout the damage prevention ecosystem,¹⁵ and damage events can lead to hazardous liquid and gas leaks.

The launch of the new Next Practices Initiative is welcome for its intention to tackle big questions and elevate systemic issues. But while it is notable that CGA is talking about the problems, the elephant in the room remains unaddressed: how are changes going to be made where the entire body of recommendations and best practices have no requirement for implementation and at the end of the day remain just that, recommendations?

CGA Activity and Reports

The DIRT Report for 2019 made nine recommendations:

- 1) Address potholing and excavating in the tolerance zone.
- 2) Examine pressure on locators.
- 3) Emphasize the proper use of locate requests.
- 4) Develop strategies for addressing no-call damages.
- 5) Explore *all* opportunities for improvement to the damage prevention process both modifications to individual stakeholder performance, enhancements to the current system as well as potential structural changes and innovative solutions to address persistent challenges.
- 6) Increase the quantity and quality of DIRT submissions.
- 7) Use the new interactive Dashboard to explore damage data.
- 8) Read the Case Studies from North Carolina 811 and National Grid.
- 9) Adopt new technologies to help prevent damages.

The most recent DIRT Report for 2020 makes the following recommendations:

- 1) Capture more granular data on reasons for not notifying 811.
- 2) Explore common data collection, reporting processes and metrics for documenting and tracking late locates through the one call centers, as well as the establishment of a baseline ticket template to use for categorizing and measuring differences in state requirements that affect ticket volume.
- 3) Improve data quality and reporting by industry.
- 4) Use the Interactive Dashboard to explore damage data specific to your industry, state, and work performed.
- 5) Consider how damage prevention efforts address the leading individual root causes.
- 6) Address damages due to *Marks faded, lost, or not maintained* that occur early in a project.
- 7) Clarify and provide more specific guidance on the use of offset marks.

Perhaps it is not the place of the DIRT Report to report on reforms. The 2020 DIRT Report has moved on from last year recommendations and gives little indication of what, if any, progress has been made with respect to those recommendations other than to say they are being addressed through the establishment of five new working groups. While this is encouraging, it would be useful if, after making the recommendations, the report summarized exactly what progress has been made by those working groups. After stating five new working groups have been established the report goes on to say (almost as a warning to not expect timely progress) that for a new best practice to be adopted, the practice must (1) actually be in use somewhere and (2) achieve consensus from representatives of all 16 CGA stakeholder groups.

Although it doesn't say specifically, the insinuation is that the nine recommendations will be addressed through CGA best practices. Two issues present themselves, the first being that the 16 stakeholder groups have to agree on the best practice – a process that by its nature tends to make the best practices statements less than specific¹⁶ due to competing economic and liability

concerns among the stakeholder groups – and second, implementation of best practices is completely voluntary.

Rather than further discussing root causes as in our past papers, in this section of the paper we discuss two areas that continually plague the ecosystem: unclear site markings and weak communication or collaboration practices. These topics show up consistently across many of the various CGA reports and either directly or indirectly address the root cause issues leading to much of the excavation damage. Moreover, they present threshold issues that, if sufficiently reformed, can prevent potential damage later in the process.

Site Markings

According to CGA research, the top challenge for locators is a lack of clear white-line markings at the excavation site to unambiguously delineate where the digging will take place.¹⁷ While locators are provided ticket information describing the area of the proposed excavation, it can sometimes encompass a large area or lack specificity. This creates inefficiency in the locate process and stretches the resources of locators to timely complete locates.

The straightforward solution is to require all excavators to pre-mark (or white-line) the site with white flags, stakes, or paint, clearly indicating where they intend to break ground. Having this narrowed area can reduce unnecessary locating, allowing locators to work more efficiently while improving the accuracy and timeliness of the locate technician's markings.

For decades, onsite white-lining has been known by federal safety regulators and industry groups to improve damage prevention outcomes.^{18,19,20} The benefit of white-lining is obvious, but the practice is still not widely implemented because of resistance by excavators to the added costs to them of visiting the site in order to white line. Despite being a CGA best practice, the adoption of the practice is optional for stakeholders in most jurisdictions.²¹ This is one example of why addressing issues through drafting best practices is a challenge, with stakeholders confirming low implementation rates and expressing a desire to see systemic use by stating that "widespread adoption of existing CGA Best Practices could make an immediate impact."²²

Among locate technicians, lack of *mandatory* white-lining "is identified as the top barrier to accurate and on-time locates and the second-most effective measure for improving locate accuracy and timeliness, only behind update maps." Currently, only 23 states have some form of pre-marking or white-lining required of excavators in conjunction with notifying 811 of their intent to dig.

While no doubt requiring physical white-lining would contribute to lower damage incidents, this is an area that can be further leveraged through the adoption of existing technology. An extension of physical white-lining, using available technology, is virtual white-lining. While locators surveyed did not specify that white-lining be done electronically, and the CGA best practice statement merely mentions electronic white-lining (EWL) as an option, moving to a virtual process offers the most versatility, provides opportunity for improved data sharing, and addresses the excavators' cost issues by helping them avoid the site visit necessary for physical white-lining. In electronic white-lining, the excavator downloads an ariel image and "white-

lines" the specific area of excavation on the image. The digital image can then be shared with the locator and other parties. One-Call centers may offer additional mapping and imaging options to improve this practice going forward, and should explore expanding image capture options to include satellite, flyover, and drone imaging in the future.

Data on electronic white-lining demonstrates that it offers further benefits from traditional physical whitelining, proving to add value, reduce issues, and improve outcomes across at least eight metrics.²³ Another advantage of electronic white-lining is that it creates a record to assist in assessing future liability if a damage occurs. On-site white-lining, while helpful, is all but guaranteed to be destroyed in the excavation process. Finally, in some instances, on-site white-lining may not be feasible, while electronic white-lining makes the most practice sense, such as when excavating for disaster response, amid flood, fire, or storm damage, or for dredging or excavation within waterways.²⁴

To its credit, through its Technology Report and the Next Practices Initiative, CGA has elevated electronic white-lining and begun to promote this innovative evolution in pre-marking.^{25,26} In its latest Technology

CGA Recommendation No. 9 (2019 DIRT)

"Adopt new technologies to help prevent damages."

Report, CGA validates this being a threshold by laying out "What the future might look like: an idealized excavation project in the year 2030" in which the first step for every excavation is the use of electronic white-lining.²⁷

Additionally, in the inaugural Next Practices Initiative report, electronic white-lining is the number one recommendation for a "systemic improvement with greatest ROI for the industry."²⁸ In its follow-up report, CGA dedicated three and a half pages to EWL, detailing the impacts, barriers, incentives, and examples of EWL, along with survey responses.²⁹ Finally, the report also indicates that the Next Practices Initiative includes an Electronic White-Lining Working Group that will continue to compile and share resources, although it seems this group will mainly continue to aggregate case studies and not require members to implement EWL nor work with regulators or One-Call centers to advance implementation.

While it is encouraging to see CGA recognize the need for white-lining and the additional focus on electronic white-lining, their approach relies on voluntary adoption, which has not been demonstrated at scale in recent history or data. CGA seems to acknowledge the weakness of this approach by expressing the hope that, "Maybe states that require physical white markings will begin to adopt digital white-lining as an acceptable form of marking the area of proposed excavation."³⁰ This passive approach is very unlikely to lead to any change.³¹

Communication & Collaboration Practices

When an excavator calls 811 or requests a locate online through the One-Call center, they open a line of communication with an entire ecosystem. In addition to the excavators themselves, personnel including locators, One-Call centers, and the facility owners/operators are drawn into the communication loop. The current system has few or no enforceable mechanisms to close this communication loop and ensure all parties are fully informed about the presence or location of buried facilities at the excavation site – or in fact that the locate job was completed.

Excavators have expressed a need to "develop an integrated communications plan to reach all types of excavators."^{32,33} Locators surveyed believe the most effective solution after updated maps is "increased communication between excavator and locate technician."³⁴ They go on to say that "reimagining relationships between key stakeholders can dramatically move the industry forward." CGA even praises, when a process "allows communication between the excavator and facility owner/locator, and documents the request and response."³⁵

The closing of the communications loop is known as "positive response," and it entails the locator indicating that his work is complete, either to an excavator or One-Call center. The practice varies, with some states merely allowing spray paint on the ground itself to suffice as notice of completion of the locate, while others require a call or email to send along a response code. In general, while providing some communication, positive response falls far short of providing a complete record of what the locator did on the site or any problems that were encountered. Paint on the ground and response codes have been used for decades and are not sufficient for preventing the increasing damages we continue to see annually.

Electronic positive response is a significantly improved method of closing this communication loop. With this approach, excavators can access a digital portal hosted by the One-Call center that lists each implicated utility and provides a full record of whether locators were sent and whether they have completed the locate requests. Electronic positive response provides clarity to the excavator on the completeness of markings and offers a platform for even further communication enhancements.

Building on this electronic platform, the most robust communication tool is known as enhanced positive response (EPR). Improving the interaction between excavators and locators through advanced information sharing, damages are reduced and efficiency is gained. Through EPR, a record is generated and made available to all relevant stakeholders, greatly clarifying how many and which utilities are in the area, the completeness of the locator's work, and the presence and location of all underground facilities onsite. Far more than simply closing a communication loop, EPR allows the exchange of data between the excavator, the locator and the facility owner to provide critical detail about the facilities, including digital photographs, enhanced ticket information, virtual locator manifests, and facility maps.

The need for better communication among parties aligns with the top recommendation from PHMSA in its 2017 Report to Congress: "Development of collaboration/communication tools that foster better communication between the excavator and pipeline operator throughout the excavation process."³⁶ Specifically, that report identifies enhanced positive response (EPR) as

the favored tool to improve communication with a proven ability to reduce damage by up to 67 percent.³⁷

The data behind EPR led to its inclusion in the CGA Best Practice Guide since 2017, and it has been highlighted in every annual Technology Report that CGA has published. In its latest Technology Report, CGA identifies EPR as the second essential step in the "idealized excavation project," only after use of electronic white-lining. In fact, EPR is included in three of the seven steps throughout this 'project of the future,' further highlighting its versatility and importance.

Fewer than half of U.S. states currently have even a basic positive response that is required by law, and only 13 mention electronic forms or mandate their use.³⁸ Enhanced positive response, the most innovative and data-driven, is only found in a handful of states and is generally only used on a voluntary basis by certain stakeholders.³⁹

CGA Recommendation No. 5 (2019 DIRT)

"Explore *all* opportunities for improvement to the damage prevention process – both modifications to individual stakeholder performance, enhancements to the current system as well as potential structural changes and innovative solutions to address persistent challenges."

Additional Ecosystem Challenges

The implementation of the practice and technologies discussed above would have a significant impact on addressing many or the root causes of damage incidents. Beyond this, there are still a myriad of other actions that can and should be taken to reduce damage incidents. Many of these are already included in CGA's best practices, but because adoption is voluntary, a better way to achieve compliance is required. On the excavator front, emphasis is needed on existing best practices and general training for things like potholing, maintaining tolerance zones, white-lining, remaining within the located area, and digging within the ticket window. For locators, staffing, training, and other capacity factors must be addressed, preferably through greater flexibility within the system to schedule and prioritize tickets. One-Call centers can also help by managing ticket volumes based on project date and by offering improved virtual platforms for electronic white-lining and enhanced positive response. Finally, certification of stakeholders in the correct and applied use of best practices would likely offer a boost in implementing technologies and techniques systemwide.

Implementation Considerations

In conjunction with the admission that "widespread adoption of existing CGA Best Practices could make an immediate impact," CGA is pointing to the obvious fact that low implementation of its best practices and technologies is plaguing the industry – not that new technology or practices are needed. A new system does not need to be created, nor new technology developed. Stakeholders and governments simply must take action.⁴⁰

When considering how to achieve this implementation, CGA recognizes that "When there is an environment of weak damage prevention enforcement through regulatory intervention, contracts become an incredibly important mechanism for accountability to Best Practices." While not calling *for* regulation, the clear implication is that enforced regulation is the threshold and backstop to best practice use within damage prevention.

The admission that strong regulatory enforcement is a viable path to best practice use is in line with PHMSA, which recommends that certain best practices be mandated federally. Two key recommendations from PHMSA's seminal report include, "Consider the development of national standards for certain state One-Call requirements" and "Promote the continued identification and implementation of the Common Ground Alliance (CGA) and other damage prevention best practices." Together these provide a path forward.

Among excavators and locators there is also some desire to see certain best practices codified in law. CGA highlights a case study from Missouri⁴¹ where excavators successfully pressured lawmakers to implement reforms, and in its locator white paper, CGA emphasizes stakeholder desire for mandated reforms. Taking steps to implement best practice reforms through law as threshold practices can rely on known and proven technology and similar laws for notifying 811 or utilizing positive response.

Two key admissions by CGA speak volumes: first is that the solutions to implement many technological best practices already exist, and second that they are not being used systemically:

"Perhaps the single most important takeaway from CGA's 2021 Technology Report is the extent to which technological solutions for some of our most entrenched problems already exist, but equally ingrained barriers to implementing them remain roadblocks in our pathway to the next significant reduction in annual damages to underground facilities."⁴²

"In nearly every case, technological methods for closing these member-identified gaps exist, but liability concerns are roadblocks to the kind of data sharing that could make the damage prevention system more efficient."⁴³

Conclusion

The latest CGA DIRT Report indicates that despite calls in 2020 for "systemic improvements" and implementation of technology, there appears to be little to no ground gained in these areas year over year. In an industry where the entire ecosystem (utilities, locators, excavators, and One-Call centers) must participate and work together for any solution to work – and if just one party opts out, the fix crumbles – there is no clear path forward without some sort of action at a federal level, whether it be through legislation, grants, or other rulemaking. This is not only the recommendation of PHMSA, but it is stated or implied in several reports from CGA itself.

A federal approach need not be groundbreaking or burdensome – in fact CGA states that technological solutions exist to solve many the root cause problems. This is not a case where the technology needs to be created – it already exists in cell phones, tablet, and mapping software.

For example, industry groups, CGA, PHMSA, and other independent organizations have repeatedly highlighted Enhanced Positive Response (EPR) for its demonstrated ability to reduce damage by 67 percent by utilizing commonly owned and low-cost devices.⁴⁴ Electronic Whitelining – also highly praised and tied to an additional reduction in damage – can be done through existing One-Call websites and commercially available software packages. At a minimum, adoption of physical white-lining, requiring no technological implementation, would provide great benefit for damage reduction as has been done in 23 states.

While there are no silver bullets, and many structural issues remain within the industry, there are key threshold technologies ready to deploy and capable of bringing damage incidents down significantly. With virtually every report from CGA, numerous stakeholder groups, and public agencies all pointing to EPR and EWL, it is clear the next step is to implement them, not talk about them or wax on about root causes.

These are proven technologies that address many inherent issues and enhance communication to drive down damage, improve stakeholder collaboration, and eliminate costs from excavation damage and systemic inefficiencies and waste.

In our view, without action at the federal level requiring or strongly encouraging use of existing technology and enhanced communication practices, the damage prevention process will remain unchanged, lives will be lost, property damaged, and the economy will be impacted for years to come.



The Alliance for Innovation and Infrastructure (Aii) is an independent, national research and educational organization dedicated to identifying our nation's infrastructure needs, creating awareness of those needs, and finding solutions to critical public policy challenges.

Aii strives to promote proven, innovative technology and higher safety standards to achieve industry excellence nationwide. Our goal is to create higher standards by promoting innovative technologies and safer outcomes for national infrastructure projects.

The Alliance consists of two non-profit organizations: the Public Institute for Facility Safety, 501(c)(3) education and research organizations, and the National Infrastructure Safety Foundation, a 501(c)(4) social welfare organization. Two all-volunteer boards govern the Alliance. These boards also work in conjunction with the Alliance's own volunteer Advisory Council.

Citations and Notes

¹ CGA. (2021). *Damage Information Reporting Tool: 2020 Analysis & Recommendations*. Volume 17. https://commongroundalliance.com/Portals/0/2020%20DIRT%20Report 09.29.2021 Final4.pdf.

² CGA. (2020) Damage Information Reporting Tool: 2019 Analysis & Recommendations. Volume 16.

https://commongroundalliance.com/Portals/0/Library/2020/DIRT%20Reports/2019%20DIRT%20Report%20FINA L.pdf.

³ Supra note 1 at p. 35.

⁴ *Id.* at p. 3-4.

⁵ *Id.* at President's Letter.

⁶ Infrastructure Investment and Jobs Act, H.R.3684 (2021). https://www.congress.gov/bill/117th-congress/house-bill/3684/text.

⁷ Continuum Capital. 811 Emergency: \$61 Billion Lost in System to Protect Underground Utilities. Infrastructure Protection Coalition. https://www.ipcweb.org/.

⁸ Hayes, E. (2018). What If... ITC Solutions and Education. https://isemag.com/2018/03/what-if/.

⁹ CNA Risk Control. (2019). *Damage Prevention Guidelines: Excavation Procedures for Underground Facilities*. CNA Financial Corporation. https://www.mcaa.org/wp-content/uploads/2019/10/Damage-Prevention-

Guidelines.pdf.

¹⁰ Virginia State Corporation Commission. (2021) *Utility and Railroad Safety: Damage Prevention*. https://scc.virginia.gov/pages/Damage-Prevention.

¹¹ Supra note $\overline{7}$.

¹² See Missouri, discussed below.

¹³ *Supra* note 2 at p. 11.

¹⁴ This does not account for the additional cost of inefficiencies and waste reported to be an estimated \$61 billion annually.

¹⁵ In 2020, excavation damage to pipelines under PHMSA jurisdiction led to 18 fatalities or injuries. This does not account for lines outside of PHMSA jurisdiction, especially natural gas distribution lines, which can lead to explosions and other risks. Outside of pipelines, common injuries (slips, trips, and falls) as well as rare fatalities occur due to unnecessary site visits (for physical site markings and white-lining) and while using heavy machinery. Reliance on electronic and virtual processes can displace many of these needs, and improvements in the system can reduce excavation damage to facilities, which is a primary driver of injury and death to stakeholders and bystanders. ¹⁶ *Supra* note 2 at p. 25.

¹⁷ CGA. (2020). *Insights into Improving the Delivery of Accurate, On-Time Locates*. Common Ground Alliance. https://commongroundalliance.com/Portals/0/CGA%20Locator%20White%20Paper%20-%20FINAL%2010.21.20.pdf.

¹⁸ NTSB. (1997). *Protecting Public Safety through Excavation Damage Prevention. Safety Study*. National Transportation Safety Board.

https://webharvest.gov/peth04/20041107222641/http://www.ntsb.gov/publictn/1997/SS9701.pdf.

¹⁹ PHMSA. (2017). Report to Congress. *Improving Damage Prevention Technology*. Pipeline and Hazardous Materials Safety Administration. U.S. Department of Transportation. at p. 21.

https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/news/18351/report to congress on improving damage prevent ion technology aug 2017.pdf.

²⁰ CGA. (2021). *Best Practice: The Definitive Guide for Underground Safety & Damage Prevention*. Volume 18.0. Chapter 5.2 Electronic White Lining. Common Ground Alliance.

https://bestpractices.commongroundalliance.com/5-Excavation/502-White-Lining.

²¹ Id.

²² *Supra* note 16 at p. 7.

²³ Virginia Pilot Project; (2007). Incorporating GPS Technology to Enhance One-Call Damage Prevention. Phase I – Electronic White Lining Study. Project Report.

https://primis.phmsa.dot.gov/comm/publications/Virginia_Pilot_Project_Report_Phase_I.pdf.

²⁴ Of particular note is damage to pipelines from over-excavation of areas being cleared after fire or storm damage and issues involving dredging of waterways, where paint, stakes, or flags cannot be used, but virtual polygons can

greatly improve safety. Access to the site may also be limited, and remote electronic white-lining is more cost effective, logistically practical, and safer.

²⁵ CGA. (2021). Technology Report 2021. Technology Advancements & Gaps in Underground Safety. Volume 4. Common Ground Alliance. https://commongroundalliance.com/Portals/0/2021%20Technology%20Report.pdf.
²⁶ CGA, Next Practices Initiative. (2021). Report to the Industry. Common Ground Alliance.

https://commongroundalliance.com/Portals/0/NextPracticesReportToIndustry Final 03.01.2021.pdf.

²⁷ *Supra* note 24 at p. 2.

²⁸ Supra note 26 at p. 10.

²⁹ CGA, Next Practices Initiative. (2021). *Pathways to Improving U.S. Damage Prevention*. Status Update. Common Ground Alliance. https://commongroundalliance.com/Portals/0/Next%20practices%20Pathways%20Report%20 2021 FINAL4.pdf.

³⁰ *Supra* note 24 at p. 15.

 ³¹ From our study of state-level policy changes, across four-year periods, only minor change to damage prevention laws occurs. See *Aii Damage Prevention Report Card 2016* and *Aii Damage Prevention Report Card 2020*.
³² CGA. (2019). *Data-Informed Insights and Recommendations for More Effective Excavator Outreach*. Common Ground Alliance. https://commongroundalliance.com/Portals/0/Library/2020/White%20Papers/CGA%20White%20 Paper%202019%20-%20FINAL.pdf.

³³ Communications plans are needed for both awareness about calling and interacting within the system once the communication loop is open. In fact, some number of "no call" excavations are due to excavators who know about 811 and their legal requirement, but do not have time to wait for locates. Improved communications plans can reach uninformed excavators, share information with those who know the system, and improve efficiency and accuracy of the system for those considering not notifying of their intent to dig.

³⁴ *Supra* note 16 at p. 12.

³⁵ *Supra* note 27 at p. 19.

³⁶ Supra note 18 at p. 5.

³⁷ *Id.* at p. 22, 29.

³⁸ Aii. 2020 Damage Prevention Report Card. Alliance for Innovation and Infrastructure. https://www.aii.org/wp-content/uploads/2020/10/Aii-2020-Damage-Prevention-Report-Card.pdf.
³⁹ Id.

⁴⁰ To its potential credit, CGA announced this fall that it is exploring a partnership with the Gold Shovel Association to integrate certification programs into the stakeholder organization. While this could be a great step, and follows course with our recommendation from last year, many details remain unknown. This may be a way to incentivize and improve stakeholder adoption of best practices, although regulatory and contractual options remain most promising at this time.

⁴¹ *Supra* note 27 at p. 18-19.

⁴² Supra note 24 at President's Letter.

⁴³ *Id.* at p. 2.

⁴⁴ Supra note 18.



Recommended Citation for this report

B. Dierker. (December, 2021). *Improving Upon Our Dig Laws: Evaluating an Anomalous Year, Incorporating Technology, and Applying Lessons from the Past Decade*. Alliance for Innovation and Infrastructure.

About Aii

The Alliance for Innovation and Infrastructure (Aii) is an independent, national research and educational organization that explores the intersection of economics, law, and public policy in the areas of climate, damage prevention, energy, infrastructure, innovation, technology, and transportation.

The Alliance is a think tank consisting of two non-profits: the National Infrastructure Safety Foundation (NISF), a 501(c)(4) social welfare organization, and the Public Institute for Facility Safety (PIFS), a 501(c)(3) educational organization. Both non-profits are legally governed by volunteer boards of directors. These work in conjunction with the Alliance's own volunteer Advisory Council.

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