OVERVIEW: The State of Damage Prevention

Background: The Common Ground Alliance (CGA) is dedicated to preventing damage to underground utility infrastructure and protecting those who live and work near these important assets through the shared responsibility of our stakeholders. CGA is a member-driven association of nearly 4,000 damage prevention professionals committed to saving lives and preventing damage to North American underground infrastructure by promoting effective damage prevention practices of today and tomorrow. CGA is the preeminent source of damage prevention data and information to reduce damages to underground facilities in North America through shared responsibility among all stakeholders.

According to CGA's Damage Information Reporting Tool (DIRT) Report, the annual rate of damages to buried infrastructure in the U.S. has remained stagnant for most of the last decade and costs the U.S. a staggering $30 billion every year. Each of the hundreds of thousands of dig-ins to underground utilities that occur annually has the potential to cripple communities and businesses by cutting them off from critical services, causing injury or even loss of life.

Looking Ahead: The damage prevention industry is facing increasingly complex challenges, and we must encourage innovation and incentivize the development of damage prevention solutions for the future. To do this, CGA has elevated the work of its traditional programs (Best Practices, DIRT and 811 awareness and use) and launched three new efforts to expedite the industries' achievement of the next significant reduction in damages:

- **The Next Practices Initiative** – Launched in 2020, the Next Practices Initiative's goal is to encourage innovation and new practices to address the most critical challenges facing the damage prevention industry. The Next Practices Advisory Committee uses industry data, quantitative surveys, and stakeholder input to clearly identify and focus the industry on the advancement of the most effective solutions to address critical damage prevention challenges.
- **The Damage Prevention Institute (DPI)** – Launched in January 2023, the DPI mission builds on the industry-leading insights of CGA's Next Practices Initiative by utilizing a stakeholder-centered approach to develop performance metrics that reflect a commitment to Best Practices and dedication to improving the reliability of the U.S. damage prevention system for everyone involved.
- **The 50 in 5 Industry Challenge** – Announced in 2023, this effort challenges stakeholders to reduce damages to critical underground utilities by 50% in five years by bringing damage prevention advocates together around a targeted set of strategic, data-driven priorities. This call to action encourages the damage prevention industry to concentrate on three focus areas that prioritize critical issues identified by CGA's Next Practices

Initiative and the top damage root causes that contribute to more than 76% of damages to buried infrastructure (according to CGA's most recent DIRT Report):

- **Effective and Consistent Use of 811**
- **Key Excavator Practices (potholing, maintaining clearance, etc.)**
- **Accurate, Timely Utility Locating**

CGA recently introduced the CGA Index, a metric for evaluating year-over-year damage trends, to measure industry progress in reducing damage. The status of the CGA Index will be updated annually in conjunction with the release of the DIRT report**.**

CHALLENGE: The Mapping Gap

In 2023, failure to locate accurately and on time was the root cause attributed to 34% of damages to underground utilities. CGA's Locator White Paper and the work of the Next Practices Initiative reveal that improving the accuracy of facility maps and implementing electronic white-lining would help locators complete their work more quickly and accurately.

Records of underground utilities are often inaccurate or incomplete and are largely unavailable to damage prevention stakeholders like designers, locators, and excavators. Bringing damage prevention mapping technology and accessibility to damage prevention stakeholders has the potential to reduce damages and increase the efficiency of the safe excavation process.

Additionally, excavators continue to emphasize the importance of greater access to mapping records. The results of a 2024 national survey of excavators conducted by CGA revealed that 89% of professional excavators believe that having access to utility maps would reduce excavation damage.

OPPORTUNITY: Improved Facility Mapping Records

Although there is still a gap in mapping record accuracy and availability, many stakeholders are implementing programs and initiatives to improve mapping records. Featured in CGA's Leadership in Mapping video series, Jerry Schmitz, VP of Safety & Online Quality for Southwest Gas, describes his company's commitment to using maps as the foundation for its asset management and damage prevention efforts. Consumer's Energy has recently implemented a program to map its own natural gas distribution pipelines in addition to sewer facilities in close proximity to those assets.

In California, Senate Bill 865 (SB 865), introduced and passed in 2020, takes the improvement of mapping records further by requiring that new installations be mapped using GIS. The legislation aims to enhance safe excavation practices in the state by requiring all new subsurface

installations to be mapped using a GIS starting from January 1, 2023, except for specific oil and gas flowlines within oil fields.

Increased availability and accessibility of GPS-enabled locating devices is also providing the industry with greater opportunities to effectively map facilities. UtiliSource, a Missouri-based utility design, engineering and project management company, rolled out a program to record the location of all third-party locates throughout a fiber installation project. They will then be able to utilize this mapping record as they continue to do work in the same area improving future project efficiency.

Gopher State One Call's GPS-enabled locator program in Minnesota partners with locating technology providers to equip damage prevention stakeholders across the state with utility line locators integrated with RTK GNSS accuracy and GPS collection capabilities. This program has been particularly beneficial to small municipalities, for whom updating legacy paper maps can be prohibitively time-consuming and expensive.

OPPORTUNITY: Expanding Access to Utility Mapping Information

Important Concepts and Terminology

It is not necessary to consolidate utility mapping data in a single location to enable visualization of mapping data to support damage prevention processes.

The term "distributed GIS" refers to geographic information systems that do not have all of the system components in the same physical location. In the context of this document, "distributed GIS" refers specifically to the rendering (or display) of geospatial data for an end user *without that user having access to the underlying data*.

Current GIS technology allows geospatial data owners to publish their data through a "Web Mapping Service", or "WMS". Publishing a WMS is a means of displaying view-only map data over the internet. Publishing a WMS empowers a data owner to completely control their own data, including where the data is stored, how the data is rendered/displayed for end users, and who may view the data. A WMS can be configured to prohibit copying or downloading GIS data underlying an internet-based map.

Creating GIS Mashups

In a distributed GIS, the term "mashup" refers to a web-based mapping application that combines mapping content from disparate sources (such as web mapping services). Mashups separate the underlying geospatial data from the presentation of the data.

GIS mashups that incorporate mapping content from multiple utilities – who maintain full control over their own data – present many opportunities to support the damage prevention process. For example, an 811 center could create a mashup of member utility data. The 811 center could then provide a display of the mapping data for dig tickets. The display would be limited to the extent of the excavation area and would only be available for the life of the ticket. An example of a mashup created by an 811 center is presented in CGA's Next Practices Case Study - Minnesota Utilities Mapping Project. The case study clearly demonstrates the concepts described in this document. Additionally, Texas 811 has created a mashup to provide map renderings of select facility participants' abandoned lines. CGA is following several mapping pilot projects and industry efforts to document practical options, effective protocols, and successful practices.

Efforts such as these have the potential to increase locating efficiency, decrease over-notification practices utilized by both contractors and facility owner/operators, and help decrease overall 811 request volume so locators' workloads are more manageable. Additionally, increasing access to facility map information during the planning and design phase of large projects will improve overall project and process efficiency.

Documenting Industry Best Practices for Distributed GIS for Damage Prevention

Effectively using distributed GIS for damage prevention will require identifying Best Practices to address issues that arise with increased sharing of mapping records such as the following:

- Geospatial data accuracy
- Map feature attribute data
- Geospatial data projections and coordinate systems
- Adoption of protocols for publishing web mapping services to support damage prevention processes while also protecting data owners' information security

As the only trade association that brings together stakeholders from all facets of the damage prevention industry, CGA is uniquely situated to facilitate an industry-wide dialogue to identify and document Best Practices that are creating an environment in which distributed GIS can serve the damage prevention process. This includes consideration of the items outlined above, which would provide the guardrails needed to provide greater access to facility mapping information prior to and during excavation projects.

Taking Demonstration to Deployment

An effective option to provide greater access to facility map visualization for planned excavation would require selecting a finite area where map information would be provided to end users. Currently, the most widely adopted process for providing facility location information is when excavators make a locate request through the 811 process – this occurs over 41 million times per year. Through this process, 811 centers use facility owner/operator map information to identify utilities that may be affected during an excavation project. Those utilities are then notified to locate and mark their facilities during a specified period of time prior to the excavation project. This well-understood process can be applied more broadly to provide affected stakeholders with facility visualization prior to and during an excavation project. This would not replace locating and marking but would greatly enhance the entire 811 damage prevention process.

This document is not intended to outline all of the issues that must be addressed, but to serve as a starting point to establish a process that has the potential to significantly enhance the current 811 process and focus the industry on taking damage prevention to the next level in order to keep our communities safe and connected to the utilities we depend on every day.