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Foundation Framework

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Preface

The NAPUA Life Cycle Model Foundation Framework establishes the structural model for managing subsurface utility infrastructure risk within the ground disturbance project lifecycle. It defines the sequential lanes of risk management, clarifies lifecycle gaps, and establishes principles for identifying and classifying residual subsurface risk prior to ground disturbance.

This document forms the foundation upon which NAPUA Best Practices and companion Guidelines are developed.

The NAPUA Technical Advisory and Standards Committee (TASC)

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1. Purpose and Scope

Subsurface utility infrastructure risk is shaped long before ground disturbance occurs. Decisions made during planning, design, procurement, and notification determine the level of uncertainty that ultimately exists at the operational phase immediately preceding ground disturbance. This section establishes the purpose and defined scope of the NAPUA Life Cycle Model and clarifies the boundaries within which it applies.

1.1 Purpose

The NAPUA Life Cycle Model establishes a structured framework for managing subsurface utility infrastructure risk at the operational phase of a project, immediately prior to ground disturbance.

Across North America, most ground disturbance projects proceed without a formal Subsurface Utility Engineering (SUE) study. When design phase investigation is limited or absent, subsurface risk is not eliminated. It remains embedded in the project and progresses downstream to the point where buried utility infrastructure can be physically contacted.

This document defines how that residual risk should be identified, evaluated, documented, communicated, and appropriately assigned before ground disturbance begins. It formalizes the operational lane commonly referred to as private locating and establishes governance structure for a phase of work that has historically operated without unified standards.

The Life Cycle Model does not replace design phase SUE standards, nor does it replace regulatory public One Call and 811 locate systems. Instead, it integrates those functions into a coherent lifecycle framework and defines the responsibilities that arise when earlier investigative steps are incomplete, limited, or absent.

The purpose of this standard is to:

- Clarify the role of private locating within the broader project lifecycle
- Define structured lifecycle gap analysis prior to ground disturbance
- Establish principles for risk identification and classification
- Promote consistent documentation of limitations and residual uncertainty
- Support fair and transparent allocation of responsibility among stakeholders

1.2 Scope

This framework applies to ground disturbance activities on private property and other environments where subsurface utility infrastructure risk is not fully addressed through public locate systems or design phase Subsurface Utility Engineering programs.

It addresses the operational phase immediately preceding physical disturbance of soil, pavement, slab, or other surface conditions where public and privately-owned buried utility infrastructure may exist.

The NAPUA Life Cycle Model is intended to apply across projects of varying size and complexity, including:

- Small and mid sized projects where SUE is rarely commissioned
- Large scale projects where SUE may have been partially performed or limited in scope

- Projects where public locate systems address only publicly owned facilities up to a demarcation point
- Sites with incomplete records, undocumented private infrastructure, or legacy conditions

This framework does not:

- Supersede statutory One Call and 811 notification requirements
- Modify engineering standards governing design phase Subsurface Utility Engineering
- Replace contractual agreements between project stakeholders

Rather, it provides a structured model for identifying, evaluating, and communicating residual subsurface risk when projects advance to the point of ground disturbance without comprehensive upstream risk resolution.

The NAPUA Life Cycle Model recognizes that the operational phase represents the highest physical exposure point in the project lifecycle. Accordingly, it articulates expectations for due diligence, documentation, and communication consistent with that level of exposure.

2. The Lifecycle Gap

Subsurface utility infrastructure risk does not originate at the moment of ground disturbance. It originates when investigative decisions are made during planning and design.

When Subsurface Utility Engineering is commissioned and performed in accordance with recognized quality levels, uncertainty is reduced before construction commitments are made. When it is limited in scope or absent entirely, subsurface uncertainty remains embedded in the project.

That condition is referred to in this framework as a lifecycle gap.

A lifecycle gap arises when:

- Design phase investigation was not performed
- SUE was partially performed or limited in scope
- Available records were not obtained or reviewed
- Privately owned buried utility infrastructure was not considered
- Project procurement advanced without mitigating limitations encountered

When a lifecycle gap exists, risk does not disappear. It progresses downstream.

In many projects, that progression becomes visible in contractual language. Responsibility for unknown conditions is often transferred to contractors or ground disturbance professionals. Clauses addressing unforeseen conditions may exist, but operational schedules rarely pause to resolve structural uncertainty.

As a result, the operational phase frequently inherits limitations created upstream.

The consequence is predictable. Subsurface uncertainty reaches the point of physical exposure without having been structurally addressed during design.

The NAPUA Life Cycle Model recognizes that lifecycle gaps are common across projects of all sizes. The purpose of this framework is not to assign blame for those gaps. It is to ensure that when they exist, they are identified, documented, and managed before ground disturbance occurs.

3. Definitions

For the purposes of the NAPUA Life Cycle Model, the following terms apply.

Alternate Locate Provider / Dedicated Locator
A private locate contractor authorized by a public utility owner to perform public utility locates on its behalf for a specific project. The locate contractor is typically engaged and paid directly by the Ground Disturbance Professional rather than through the standard One Call or 811 notification process. Although privately contracted, the locate remains a public utility locate and applies only to publicly owned buried utility infrastructure. This delivery model is currently used in certain regions, including Alberta and Ontario, Canada.

Asset Owner
An individual, organization, or entity that owns, controls, or is legally responsible for privately owned buried utility infrastructure located on private property.

Buried Utility Infrastructure (also referred to as Utility Line, Plant, or Facility)
Pipes, conduits, cables, ducts, tanks, structures, and related components located below grade that are used for the transmission, distribution, storage, or conveyance of utility services, whether publicly owned or privately owned.

Demarcation Point
The physical or legal boundary at which responsibility for buried utility infrastructure transitions from a utility owner to a private property owner or other entity.

Ground Disturbance
The phase during which physical soil disturbance, drilling, trenching, or excavation activities are performed following completion of investigation and notification requirements.

Ground Disturbance Professional (GDP)
An individual or organization responsible for planning, authorizing, supervising, or performing ground disturbance activities where buried utility infrastructure may exist. This includes but no limited to contractors, drillers, excavators, construction managers, and others directing or executing physical disturbance of the ground.

Lifecycle Gap
A condition that arises when subsurface utility infrastructure risk has not been fully investigated or resolved during the design phase and therefore progresses into procurement and operational phases.

Limitation
A condition, constraint, or boundary that restricts the completeness, reliability, or certainty of subsurface utility infrastructure information or detection during any phase of investigation. Limitations may arise from incomplete records, access restrictions, environmental interference, undocumented facilities, design omissions, time constraints, or technological boundaries. Limitations create residual subsurface risk when they are not resolved prior to ground disturbance.

Public Locate System
A regulatory notification and response system designed to facilitate communication between ground disturbance professionals and utility owners regarding publicly owned buried utility infrastructure within a defined service territory.

Public Utility Locate
A locate performed on behalf of a regulated utility owner through a One Call or 811 system to identify publicly owned buried utility infrastructure up to the defined demarcation point.

Private Locate
An operational phase investigation conducted prior to ground disturbance to identify, evaluate, and document the presence, approximate location, and limitations associated with buried utility infrastructure, particularly on private property or beyond the limits of public locate systems.

Private Locator
A qualified individual or firm engaged to perform a private locate as defined above. A private locator performing lifecycle gap analysis operates independently of public locate notification centers unless specifically contracted for additional services.

Public Utility Owner (also referred to as a Utility; plural: Utilities)
A regulated or non-regulated utility company or public entity that owns, operates, or maintains publicly owned buried utility infrastructure within the public right of way or originating from it, within a defined service territory, regardless of its level of participation in a public locate notification system.

Residual Subsurface Risk
The remaining uncertainty regarding the presence, condition, location, configuration, or completeness of buried utility infrastructure information after available records, public locates, and investigative methods have been applied.

Risk Classification
A structured assessment of the level of confidence and uncertainty associated with a utility locate investigation, as further described in NAPUA Best Practices guidance.

Subsurface Utility Engineering (SUE)
A design phase engineering process that applies defined quality levels to identify, designate, and document subsurface utility infrastructure in order to reduce risk prior to construction.

4. The Three Sequential Lanes of Subsurface Risk Management

Subsurface utility infrastructure risk is managed through three distinct and sequential operational lanes within a ground disturbance project lifecycle.

These lanes are often discussed independently within the industry. However, they function most effectively when understood as coordinated components of a single lifecycle structure. Each lane has a defined role, authority boundary, and risk reduction function.

When these lanes are performed in sequence and within their intended scope, subsurface uncertainty is reduced before physical utility infrastructure exposure occurs.

When one lane is omitted, misunderstood, or expected to perform the function of another, residual subsurface risk progresses downstream and increases at the point of ground disturbance.

This section defines the three sequential lanes through which subsurface risk is managed and clarifies the function each lane performs within the lifecycle.

4.1 Overview

Subsurface utility infrastructure risk progresses through distinct phases within the project lifecycle. These phases are sequential, not parallel. Each phase performs a specific and non interchangeable function.

In practice, project participants often engage primarily with the lane most visible to their role, without full awareness of the sequential structure through which subsurface risk is managed. When this occurs, expectations become misaligned and risk reduction functions may be assumed to exist where they do not.

The NAPUA Life Cycle Model recognizes three primary lanes of subsurface risk management:

- Design Phase Investigation through Subsurface Utility Engineering
- Regulatory Notification and Public Utility Response
- Operational Phase Investigation through Private Locating

Each lane serves a different purpose and carries different levels of authority, documentation, and risk reduction capability.

When earlier lanes are incomplete, limited, or absent, residual risk advances downstream and must be addressed at the operational stage prior to ground disturbance.

4.2 Phase One: Design Phase Investigation

Subsurface Utility Engineering represents the earliest structured opportunity to investigate and reduce subsurface utility infrastructure risk. Through defined quality levels and engineered documentation, SUE enables design teams to:

- Identify known buried facilities
- Correlate records with field investigation
- Expose critical crossings where necessary
- Adjust design to mitigate conflict

When properly executed, SUE reduces downstream uncertainty and allows risk to be addressed before procurement and construction commitments are made.

When SUE is not performed, or is performed only partially, uncertainty remains embedded within the project and progresses into later phases.

4.3 Phase Two: Public Locate Systems

Public locate systems such as One Call and 811 operate through regulatory notification requirements. They facilitate communication between Ground Disturbance Professionals and Utility Owners regarding publicly owned buried utility infrastructure within a defined service territory.

Public locate systems:

- Confirm participation of member utility owners
- Notify utility members to provide field marking of public utility owned facilities
- Establish legal documentation of notification

Public locate systems are not design phase investigations. They do not verify private infrastructure beyond demarcation points, nor do they resolve undocumented facilities that fall outside participating utility ownership.

In some jurisdictions, public locate delivery may be performed through dedicated or alternate locator models, including programs such as the Dedicated Locator Model in Ontario or the Alternate Locate Provider model in Alberta. While the delivery structure may vary, these programs remain within the regulatory public locate framework and do not alter the functional role of this lifecycle phase.

As a result, while public locates are mandatory in most jurisdictions, they represent a notification and marking system rather than a comprehensive subsurface verification process.

4.4 Phase Three: Operational Phase Investigation through Private Locating

Private locating represents the final structured opportunity to assess subsurface utility infrastructure risk before ground disturbance occurs.

Private locators evaluate:

- The extent and limitations of prior investigation
- The completeness of available records
- The scope of public locate responses
- Site conditions affecting detection
- The presence of privately owned or undocumented facilities

Where lifecycle gaps exist, private locating functions as an operational phase gap analysis. It identifies residual uncertainty and assigns a structured risk classification prior to physical disturbance.

At this stage, the project has typically advanced to a point where schedule, contractual, and operational pressures are present. Accordingly, this phase represents the highest physical exposure point within the lifecycle.

When earlier investigative phases are incomplete, the operational phase must address that residual risk with disciplined documentation and communication.

4.5 Lifecycle Risk Progression

Subsurface utility infrastructure risk does not originate at the moment of excavation. It originates at the moment investigative decisions are made.

When upstream phases reduce uncertainty, operational risk is proportionally lower.

When upstream phases are limited or absent, risk progresses sequentially into the operational phase, where it must either be:

- Identified and classified
- Contractually transferred
- Operationally mitigated
- Or physically encountered

The purpose of the NAPUA Life Cycle Model is to prevent unmanaged risk from being discovered only at the moment of physical contact.

5. Operational Phase Risk Identification and Classification

For the purposes of the NAPUA Life Cycle Model, the operational phase refers to the stage of a project immediately preceding ground disturbance, when physical work is scheduled or imminent and subsurface utility infrastructure may be exposed.

By the time a project reaches the operational phase, subsurface utility infrastructure risk has already been shaped by prior decisions. When design phase investigation is limited or absent, and when public locate systems address only publicly owned facilities, limitations remain.

These limitations are the source of residual subsurface risk.

At this stage, the objective is not to eliminate uncertainty entirely. The objective is to identify, evaluate, document, and communicate the limitations that exist before physical exposure occurs.

This section establishes the structured methodology through which limitations are assessed and translated into risk classification.

5.1 Risk Identification at the Operational Phase

Operational phase investigation through private locating begins with structured identification of limitations. These may include:

- The extent and quality of any prior Subsurface Utility Engineering
- The completeness and reliability of available records
- The scope and limitations of public locate responses
- Demarcation points and ownership transitions
- Presence of privately owned buried utility infrastructure
- Site constraints affecting detection methods
- Access limitations
- Environmental conditions
- Locate signal interference conditions
- Historical site use and legacy conditions

Limitations do not imply negligence. They reflect the practical boundaries of available information and investigative scope.

5.2 Residual Subsurface Risk

Residual subsurface risk arises from identified limitations that cannot be resolved prior to ground disturbance.

The degree of risk is directly proportional to:

- Incomplete records
- Undocumented private infrastructure
- Conflicting historical information
- Detection limitations
- Physical obstructions
- Restricted access

- Time constraints imposed on investigation

Residual risk is not a failure of investigation. It is the measurable outcome of limitations that remain.

5.3 Structured Risk Classification

Where limitations are identified, operational phase investigation should assign a structured risk classification consistent with NAPUA Best Practices guidance.

Risk classification should be based on:

- Confidence in record correlation
- Field detection reliability
- Known data gaps
- Complexity of site conditions
- Degree of undocumented private infrastructure
- Scope limitations imposed by access or schedule

Risk classification supports:

- Selection of appropriate excavation methods
- Determination of verification requirements
- Allocation of responsibility between stakeholders
- Transparent communication prior to ground disturbance

Risk classification should be documented in writing and communicated to the Ground Disturbance Professional and Asset Owner before work proceeds.

5.4 Relationship to NAPUA Best Practices

Detailed risk level definitions, limitation documentation protocols, and structured classification criteria are further defined in the NAPUA Best Practices document.

The Life Cycle Model establishes the structural requirement for identifying limitations and classifying residual subsurface risk prior to ground disturbance. The Best Practices document provides the operational framework for implementing that requirement consistently across projects.

6. Private Locators as the Final Risk Control Checkpoint

When a lifecycle gap exists, the operational phase becomes the final structured opportunity to evaluate and manage residual subsurface utility infrastructure risk before ground disturbance occurs.

At this stage, ground disturbance is scheduled or imminent. The private locator is frequently engaged with the expectation that all buried utility infrastructure will be identified and that public locates will be verified. In practice, private locators are often asked to “find everything” and confirm that the work area is clear.

That expectation must be understood within the boundaries of limitation and due diligence.

Private locating at the operational phase is not a substitute for design phase Subsurface Utility Engineering. It is a structured coordination, verification, correlation, and limitation identification process performed immediately prior to physical exposure. Its purpose is to define the level of confidence that exists at the moment before disturbance begins.

If a SUE study exists for the project, the Private Locator can skip the first step in section 6.1 below and start immediately at the Field Investigation and Correlation stage of the locate.

6.1 Pre Mobilization Utility Coordination

Operational due diligence begins before field utility locate equipment is deployed.

Utility coordination is the structured process of assembling and reviewing all available information relating to buried utility infrastructure prior to mobilization. It establishes investigative context and reduces avoidable limitations.

Utility coordination should include, where available:

- Collection and review of utility records from Asset Owners and Utilities
- Identification of publicly owned versus privately owned buried utility infrastructure
- Review of past construction drawings, as builts, surveys, and engineering plans
- Identification of prior renovations, tenant modifications, or expansions
- Coordination of access to utility rooms, electrical closets, mechanical spaces, pump rooms, vaults, and service entrances
- Communication with personnel familiar with the property’s infrastructure history

When utility coordination is not performed in advance, the private locator must reconstruct that information in the field. This often requires inspecting buildings, mechanical rooms, service entrances, and other infrastructure points to determine what may exist below grade.

Information that could have been gathered in hours through records review may instead require days of field verification and troubleshooting. The investigation becomes more time intensive, and the likelihood of unidentified buried utility infrastructure increases.

Assumptions introduce risk. When records are not reviewed and infrastructure history is not understood, field investigation must compensate for those gaps. If that compensation does not occur, residual subsurface risk increases.

Operational phase investigation frequently requires structured record review, field verification, and correlation under compressed schedules. This is not a replacement for Subsurface Utility Engineering, but it often functions as a rapid lifecycle gap assessment because earlier investigation was not performed.

Locating equipment does not “find everything.” Effective investigation relies on active locating methods, proper signal application, correlation with records, and professional interpretation. Passive electromagnetic scans & inductive sweeps and ground penetrating radar scans do not constitute comprehensive investigation and increase the probability of missed infrastructure.

Utility coordination reduces limitations. It does not eliminate them.

6.2 Field Investigation and Correlation

Following coordination, operational phase investigation should include:

- Verification of public locate notifications and responses
- Confirmation of demarcation points and ownership transitions
- Investigation and inventory of all service types present on the site, including gas, water, power, communication, sewer, storm, irrigation, and other applicable utilities
- Identification of associated appurtenances, service entrances, meters, vaults, cleanouts, transformers, pedestals, and mechanical equipment connected to buried utility infrastructure
- Evaluation of how multiple buildings or structures are serviced and whether interconnecting buried utility infrastructure may exist
- Field detection using appropriate technologies suited to site conditions
- Correlation of records with field findings
- Identification of discrepancies between documentation and field conditions
- Interviews with knowledgeable site personnel

Field detection alone does not constitute due diligence. Instrumentation without context cannot compensate for missing records, inaccessible infrastructure, undocumented facilities, or incomplete understanding of site servicing.

Certain buried utility infrastructure may not be locatable using standard electromagnetic or ground penetrating radar methods due to material composition, grounding conditions, shielding, soil characteristics, or technological limitations. In such cases, investigative boundaries must be acknowledged and documented.

6.3 Identification and Documentation of Limitations

Limitations encountered during operational phase investigation are the primary source of residual subsurface risk.

Limitations may arise from:

- Incomplete or conflicting records
- Absence or partial scope of design (SUE) phase investigation

- Restricted physical access
- Environmental factors (weather etc.)
- Equipment signal interference
- Undocumented privately owned buried utility infrastructure
- Technological detection boundaries
- Time constraints imposed on investigation

Limitations must be clearly documented. They must not be implied or assumed to be understood.

Failure to disclose limitations creates a false perception of certainty and transfers unmanaged risk to the ground disturbance phase.

6.4 Translation of Limitations into Structured Risk Classification

Where limitations remain unresolved prior to ground disturbance, they must be translated into structured risk classification.

Risk classification communicates the level of confidence associated with the investigation and supports informed decision making regarding excavation methods, verification techniques, and responsibility allocation.

Risk classification does not eliminate uncertainty. It defines the exposure condition that exists at the time of ground disturbance.

The structured risk classification framework, including defined confidence levels and associated documentation protocols, is established in the NAPUA Best Practices document. The Life Cycle Model requires that unresolved limitations be formally classified. NAPUA Best Practices provides the operational methodology for performing that classification consistently.

6.5 Professional Scope Boundaries

Private locating is an operational risk mitigation function performed within defined scope boundaries. The primary responsibility of the private locator is to identify, evaluate, and document privately owned buried utility infrastructure and other facilities not addressed through public locate systems.

However, effective operational investigation requires awareness of all buried utility infrastructure within the work area, including publicly owned facilities. This obligation becomes more critical when a Subsurface Utility Engineering study has not been performed or when its scope was limited.

Understanding the location of publicly owned buried utility infrastructure serves several critical purposes:

- It establishes investigative context for the work area
- It reduces the likelihood of signal misinterpretation during electromagnetic locating of privately-owned utility lines
- It assists in ruling out interference or cross coupling from adjacent conductors
- It supports correlation between records and field conditions
- It reduces the probability of erroneous markings caused by unidentified parallel infrastructure

Where public locate markings are incomplete, absent, or inconsistent with field conditions, the private locator may perform verification level investigation to understand the presence of active conductors within the work area. This activity is investigative in nature and does not replace the regulatory responsibilities of utility owners under public locate systems.

Private locating does not provide warranty of completeness, nor does it replace design phase engineering investigation. It does not assume responsibility for publicly owned buried utility infrastructure beyond defined scope boundaries.

The private locator is responsible for performing disciplined coordination, investigation, limitation identification, and communication. The purpose of this role is to ensure that residual subsurface utility infrastructure risk is identified, documented, and understood before buried utility infrastructure may be physically contacted. At the operational phase, the industry routinely relies on private locators to provide this level of risk clarity.

Operational due diligence requires active inquiry. Private locators should at minimum request available utility records, seek access to knowledgeable site personnel, and obtain entry to buildings, mechanical rooms, service entrances, and related infrastructure necessary to understand how the property is serviced.

Utility coordination reduces limitations and therefore reduces residual subsurface risk. It does not eliminate risk. When investigative steps are not pursued, limitations increase. When limitations are not identified and documented, the operational phase may unknowingly absorb risk introduced earlier in the project lifecycle.

Due diligence at the operational phase does not correct upstream omissions. It identifies their consequences before ground disturbance occurs.

7. Operational Responsibility Principles

Subsurface utility infrastructure risk is shaped by decisions made at multiple stages of a project. The NAPUA Life Cycle Model does not regulate those stages. It clarifies the operational responsibilities that arise when a project advances to the point of ground disturbance.

7.1 Scope Boundaries

This Foundation Standard governs subsurface risk management at the operational phase immediately prior to ground disturbance.

It does not:

- Replace Subsurface Utility Engineering standards
- Replace statutory public locate or One Call systems
- Modify contractual agreements between stakeholders
- Create regulatory authority

It establishes expectations for identifying, documenting, and communicating residual subsurface utility infrastructure risk before physical exposure occurs.

7.2 Responsibility Clarity Across Lifecycle Phases

Each phase of the project lifecycle performs a distinct function:

- Design phase investigation reduces uncertainty before construction commitments are made
- Public locate systems fulfill regulatory notification and marking requirements for publicly owned buried utility infrastructure
- Private locating provided locates for privately-owned buried utility infrastructure and performs operational phase risk identification and limitation disclosure

When lifecycle gaps exist, responsibility for identifying residual subsurface risk shifts to the operational phase prior to ground disturbance.

Clarifying these boundaries reduces confusion, duplication of effort, and misaligned expectations.

7.3 Limitation Transparency

Limitations are inherent in subsurface investigation. They must be identified and disclosed.

Undocumented or undisclosed limitations create false confidence. False confidence increases exposure at the moment of ground disturbance.

Operational responsibility requires:

- Clear documentation of identified limitations
- Communication of residual uncertainty
- Translation of limitations into structured risk classification

Transparency supports informed decision making before physical disturbance begins.

7.4 No Implied Warranty of Completeness

Private locating is an operational risk mitigation function.

It does not guarantee completeness.
It does not eliminate uncertainty.
It does not substitute for design phase engineering investigation.

Its function is to define the exposure condition that exists at the time of ground disturbance and to communicate that condition clearly.

7.5 Risk Assignment Prior to Ground Disturbance

Before ground disturbance proceeds on private property, residual subsurface risk should be understood by relevant stakeholders.

This includes:

- Disclosure of limitations
- Assignment of structured risk classification
- Discussion of appropriate verification or mitigation measures with the Ground Disturbance Professional
- Clarification of responsibility for unresolved conditions

The purpose of the Life Cycle Model is to prevent unmanaged subsurface risk from being discovered only at the moment of physical contact.

8. Relationship to NAPUA Best Practices

The NAPUA Life Cycle Model Foundation Framework establishes the structural model for managing subsurface utility infrastructure risk across the ground disturbance project lifecycle.

It defines:

- The sequential phases through which subsurface risk progresses
- The concept of the lifecycle gap
- The requirement to identify and document limitations
- The obligation to translate unresolved limitations into structured risk classification prior to ground disturbance
- The operational responsibility principles applicable at the point of highest exposure

The NAPUA Best Practices document operationalizes this framework.

While the Life Cycle Model defines what must be structurally addressed before ground disturbance, the Best Practices provide detailed guidance on how to implement these requirements in practice.

The Best Practices document defines:

- Risk level descriptions and classification criteria
- Documentation protocols
- Limitation reporting standards
- Field investigation procedures
- Communication expectations
- Application examples and templates

The Best Practices are governed by this Foundation Framework.

Together, the Life Cycle Model and the NAPUA Best Practices form a coordinated structure for identifying, documenting, and communicating residual subsurface utility infrastructure risk on private property prior to ground disturbance.

9. Conclusion

Subsurface utility infrastructure risk progresses through identifiable phases within the ground disturbance project lifecycle. When design phase investigation is limited or absent, and when public locate systems address only a portion of buried utility infrastructure, residual uncertainty advances to the operational phase.

The operational phase represents the point of highest physical exposure. At this stage, limitations must be identified, documented, and translated into structured risk classification before ground disturbance occurs.

The NAPUA Life Cycle Model Foundation Framework establishes a structured approach for recognizing ground disturbance lifecycle gaps, clarifying operational responsibilities, and ensuring that residual subsurface utility infrastructure risk is understood prior to physical ground disturbance.

By defining limitations, assigning structured utility risk classification, and reinforcing transparent communication, this framework supports informed decision making at the moment when consequences are most significant.

It does not eliminate uncertainty. It defines it.

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