

Transport Infrastructure Ireland

Ground Investigation Guidance

New Guidance Document for Project Managers



“Ground Investigations”

What comes to mind?

...boreholes, trials pits...

...landowners, traffic management...

...factual reports, interpretative reports...



“Ground Investigations”

What comes to mind?

...too late to influence design...

...programme delays...

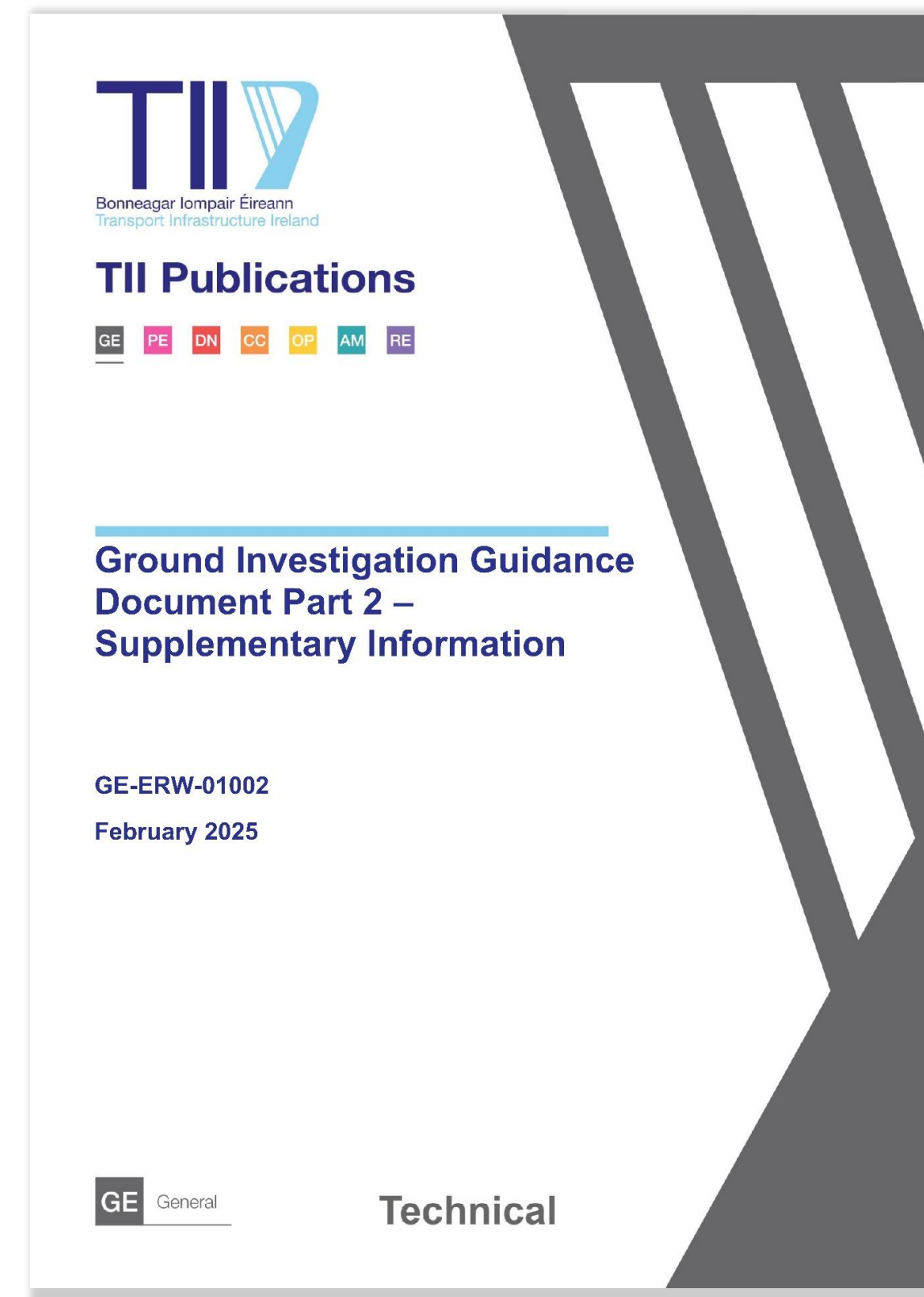
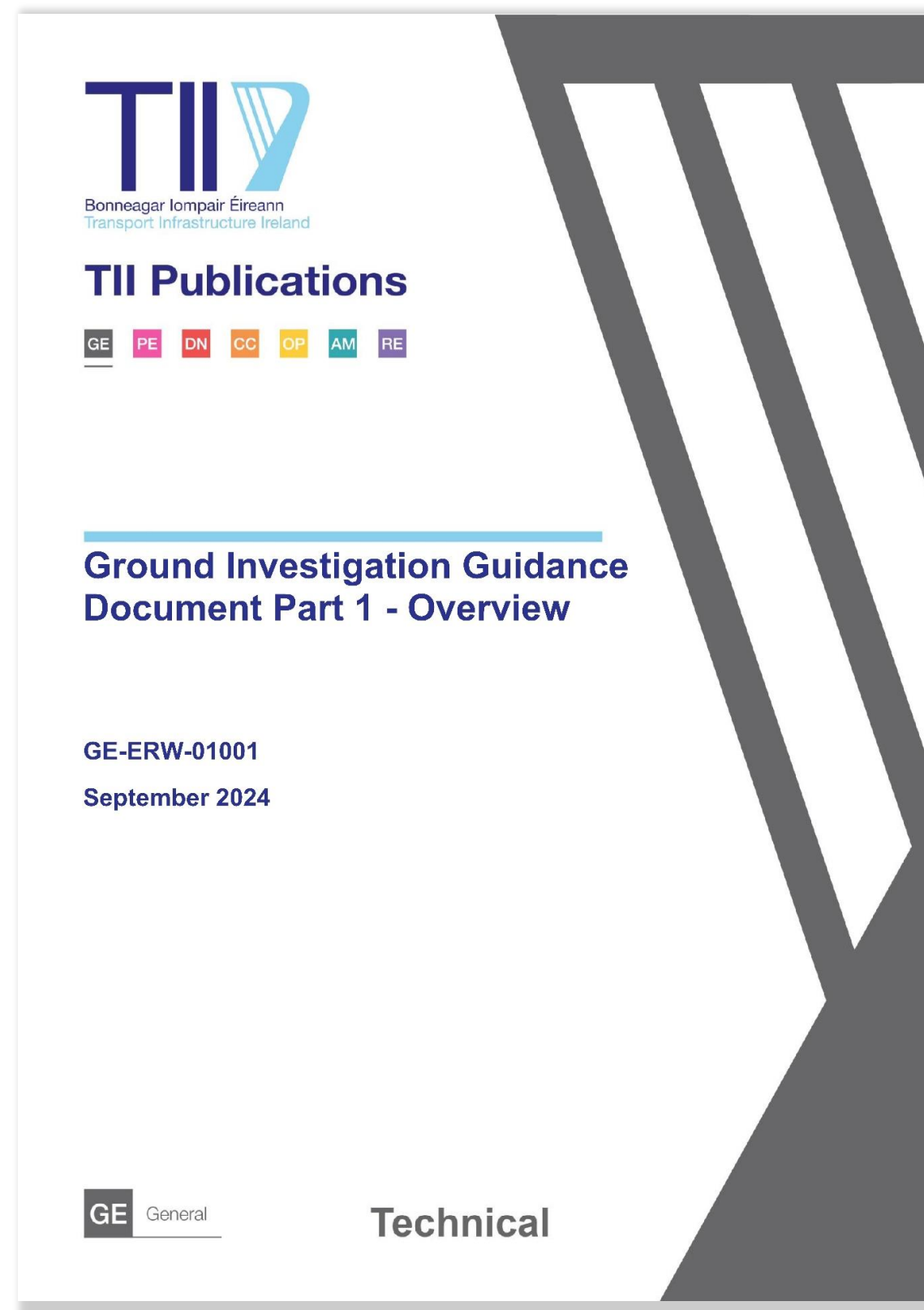
...data gaps and cost surprises...

...poor quality output...



Ground Investigation Guidance Document

GE-ERW-01001 and GE-ERW-01002



Reason for Guidance



Purpose of Ground Investigation



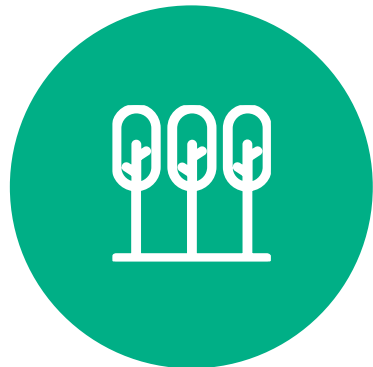
Ground Risk

Identify potential ground-related hazards and risks



Sustainability

Inform optimisation of material reuse, maximising material value, minimisation of waste, efficiencies in material haulage



Environment

Establish the baseline conditions to inform assessment of environmental effects resulting from development



Programme

Reduce risk of programme overruns due to unforeseen ground conditions and facilitate reliable project budgeting and programming at an early stage



Engineering Design

Determine ground-related parameters and characteristics to inform engineering design



Cost

Reduce the need for unsustainable or costly mitigation measures following identification of unforeseen ground conditions during construction

Challenges

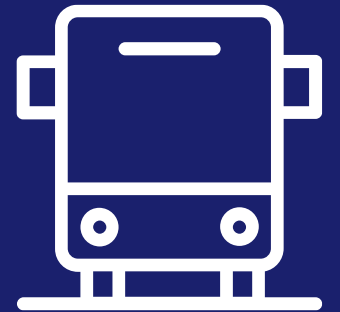
Common issues with ground investigation on historical projects:

- Too late for meaningful impact on key Project stages and deliverables
- Insufficient time in programme for execution of ground investigation
- Low or poor quality delivery

Standards exist on technical aspects for ground engineering specialists (e.g. IS EN 1997, BS5930) – however, currently no general guidance for Project Managers.



Content



Content

GE-ERW-01001 & 01002 Ground Investigation Guidance

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1. Introduction
2. Purpose of a Ground Investigation
3. Principles for Ground Investigations on National Road and Greenway Projects
4. Ground Investigation Methods and Techniques
5. Key Supporting Activities and Documentation
6. Programme
7. Quality

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Section 2 – Purpose of a Ground Investigation



Option Selection



Environmental Evaluation
& Appraisal



Engineering Design



Sustainability &
Circular Economy



Programme & Cost

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Section 3 – Principles for Ground Investigations on National Road and Greenway Projects

Extract from Table 3.1 of GE-ERW-01001 [Part 1]

	Project Phase	Ground Investigation Principles
Planning & Design
	Phase 2 Options Selection	Investigation of locations within the study area which interact with proposed options to identify and acquire data on ground risks which are differentiators for comparison of options. Investigation to also assist review of earthworks-related sustainability principles across options.
	Phase 3 Design and Environmental Evaluation	Investigation to inform design and environmental evaluation of preferred option and acquire sufficient data to minimise ground-related risk and reduce the risk of ground-related design changes, due to unforeseen ground conditions, following completion of the Statutory Processes. Investigation to also inform sustainable design, acquiring ground-related data which can facilitate optimisation of material reuse, maximisation of material value, minimisation of waste and efficient material haulage.

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Section 4 – Ground Investigation Methods & Techniques

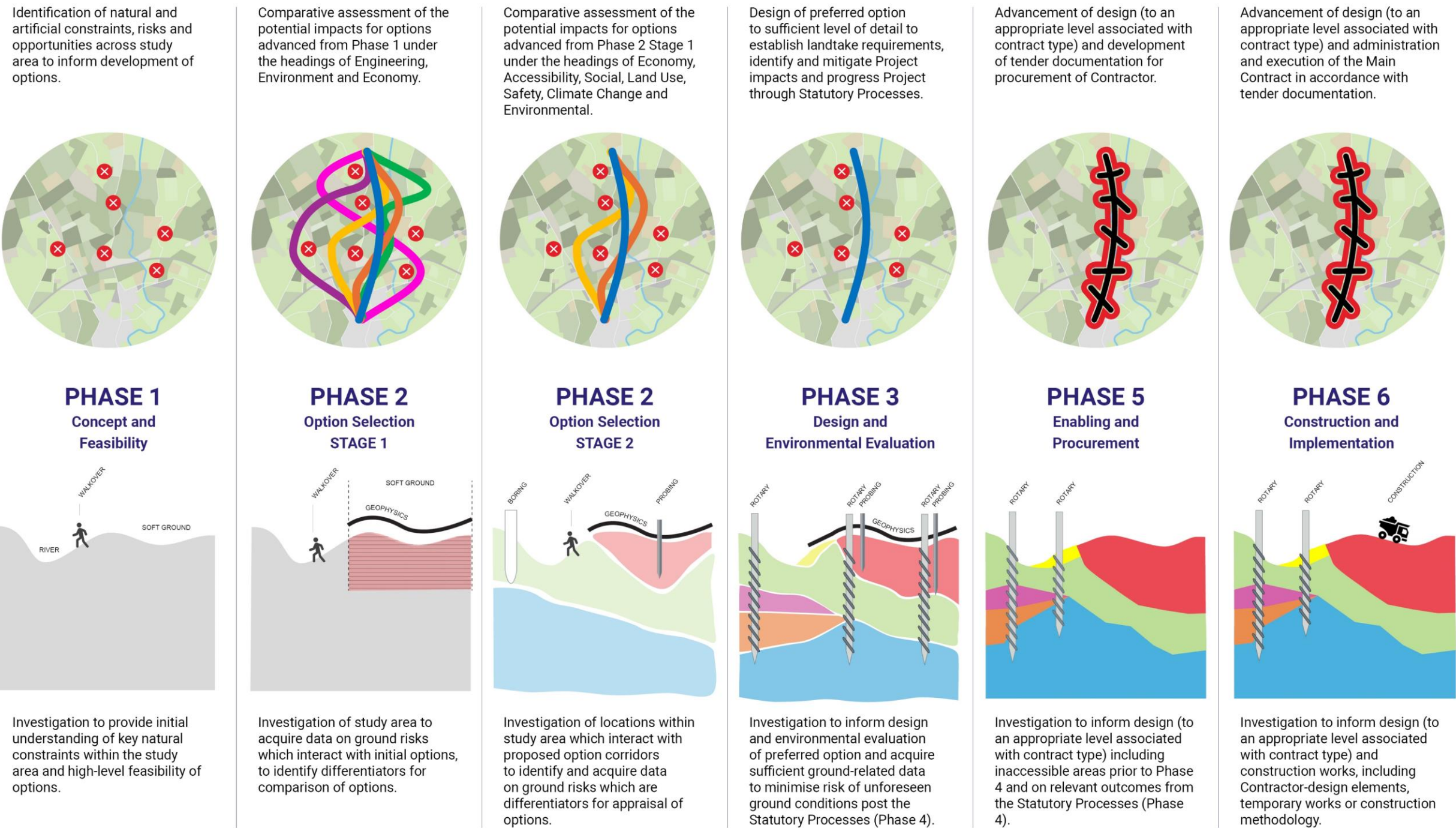


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Section 5 – Key Supporting Activities and Documentation

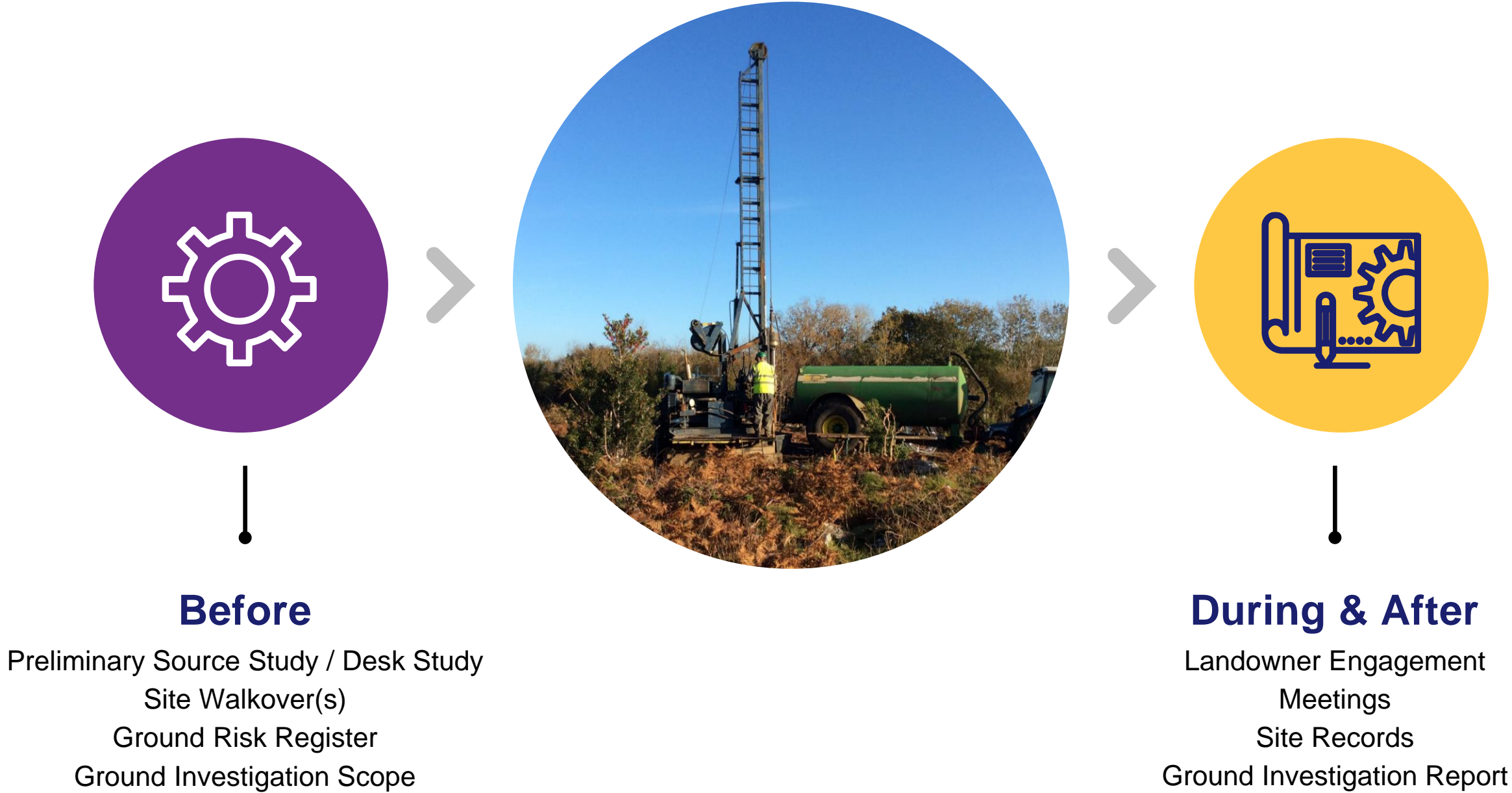


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Section 6 – Programme

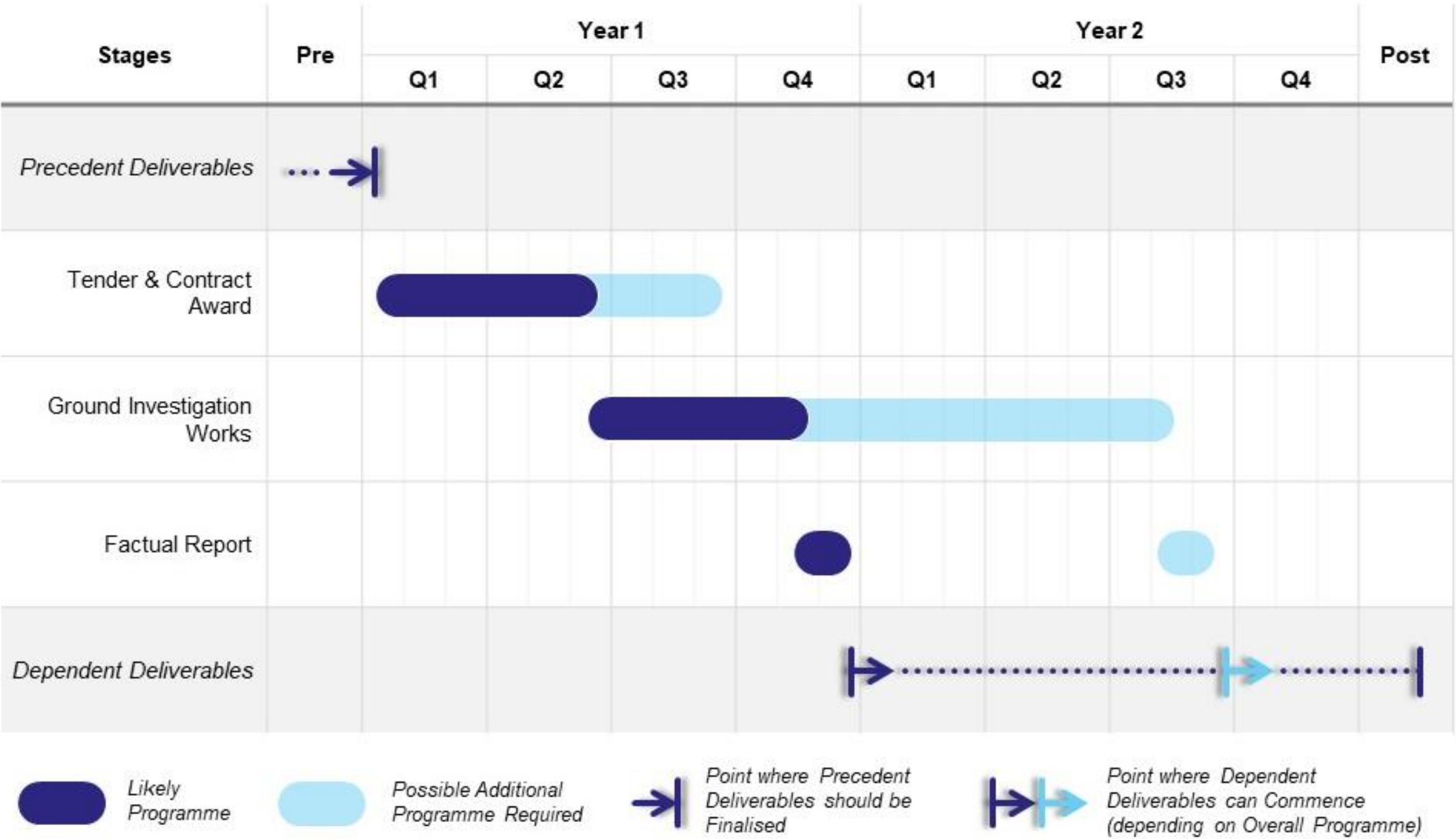


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Section 7 – Quality



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Format

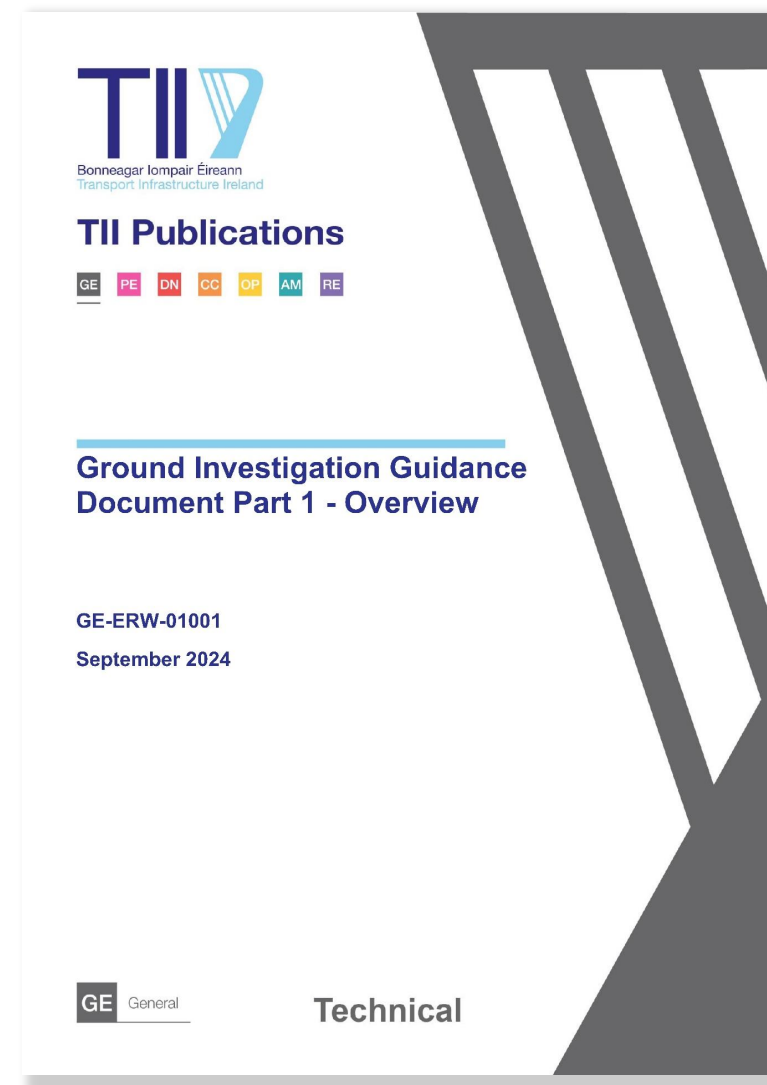


Format

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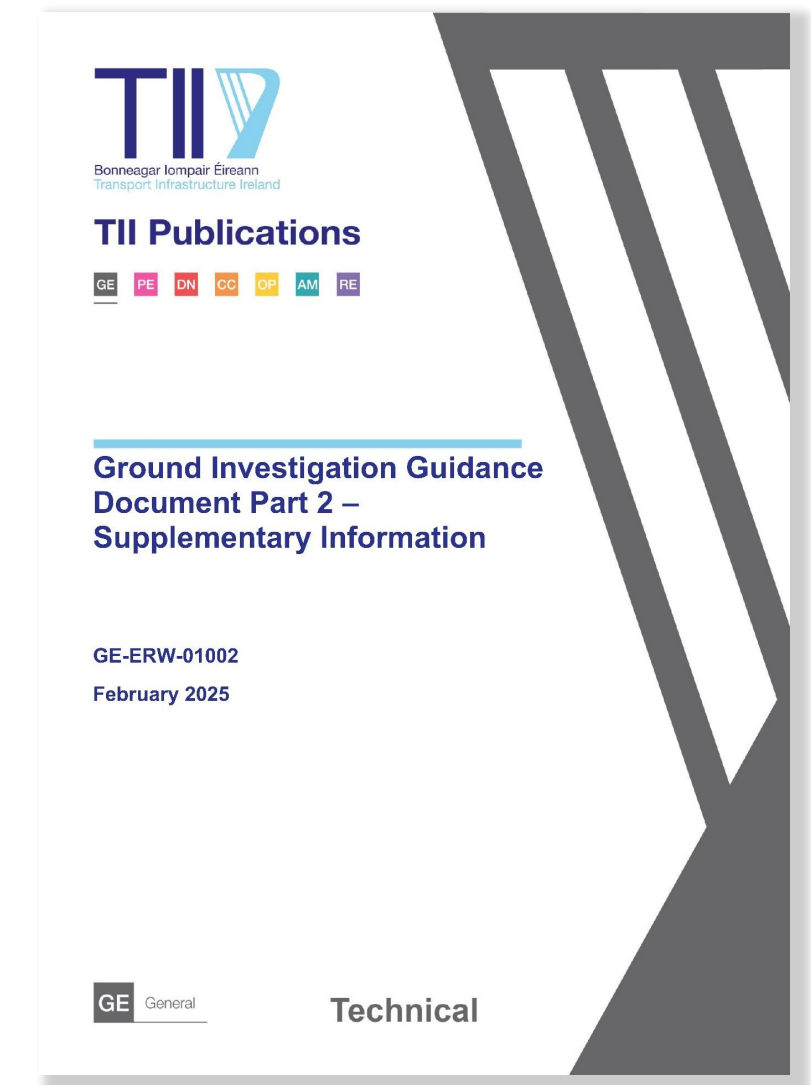
GE-ERW-01001 Part 1

- Condensed overview
- 18 pages
- 1-2 pages per topic
- 8 datasheets



GE-ERW-01002 Part 2

- Supplementary
- More detailed information on same topics
- 50 pages

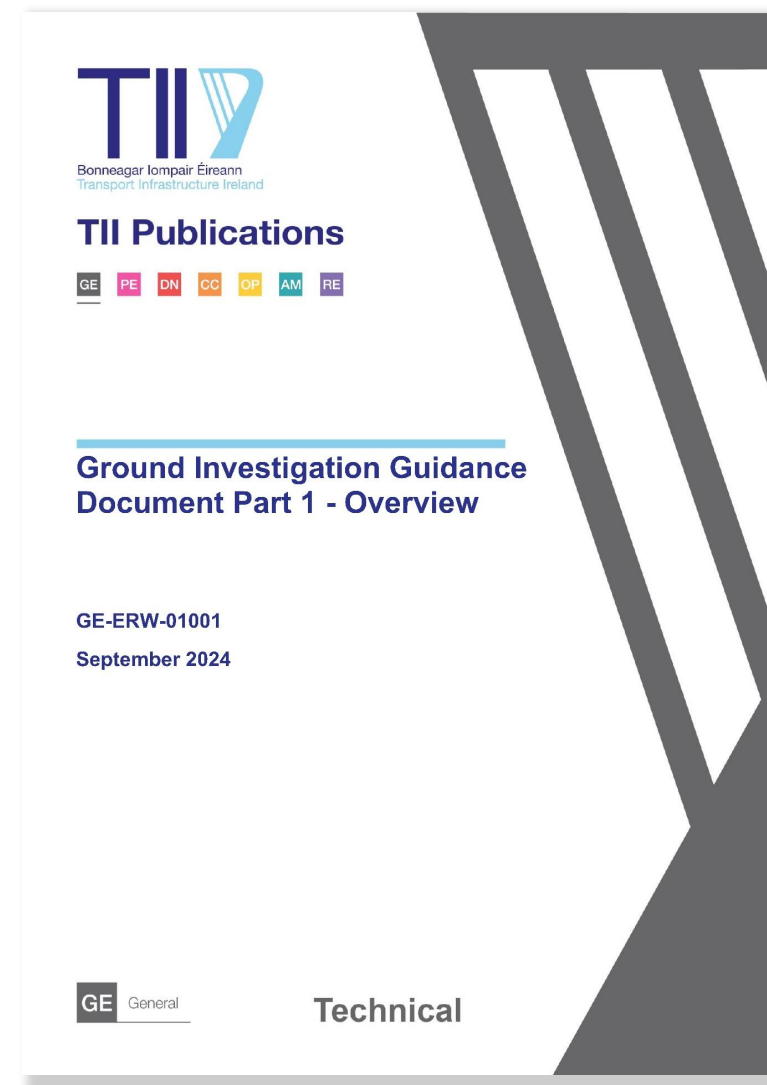


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Phase 2 Options Selection

Stage 2 – Project Appraisal Matrix

PLAN



- ⊗ CONSTRAINTS & GROUND RISKS
- MAGNIFIED PLAN OUTLINE

- VARIOUS OPTIONS

MAGNIFIED PLAN

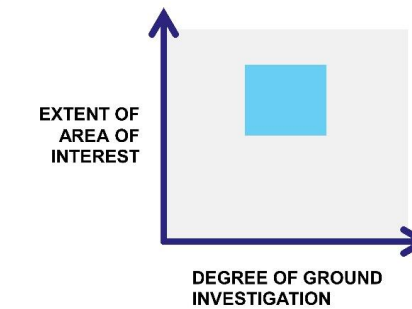


- APPROX. LOCATION OF GEOHAZARD (E.G. SOFT GROUND)

- VARIOUS OPTIONS

Context

Comparative appraisal of the potential impacts for options advanced from Stage 1, in the form of a Multi-Criteria Analysis (MCA) under the headings of Economy, Accessibility, Social, Land Use, Safety, Climate Change and Environmental.



Investigation Objective

Investigation of locations within the study area which interact with proposed option corridors to identify and acquire data on ground risks which are differentiators for appraisal of options.

Area Of Interest

Similar to Stage 1, but focusing on options advancing from Stage 1, the investigation should strategically target key ground-related differentiators across the option corridors to adequately inform the criteria under the Project Appraisal Matrix.

Degree Of Ground Investigation

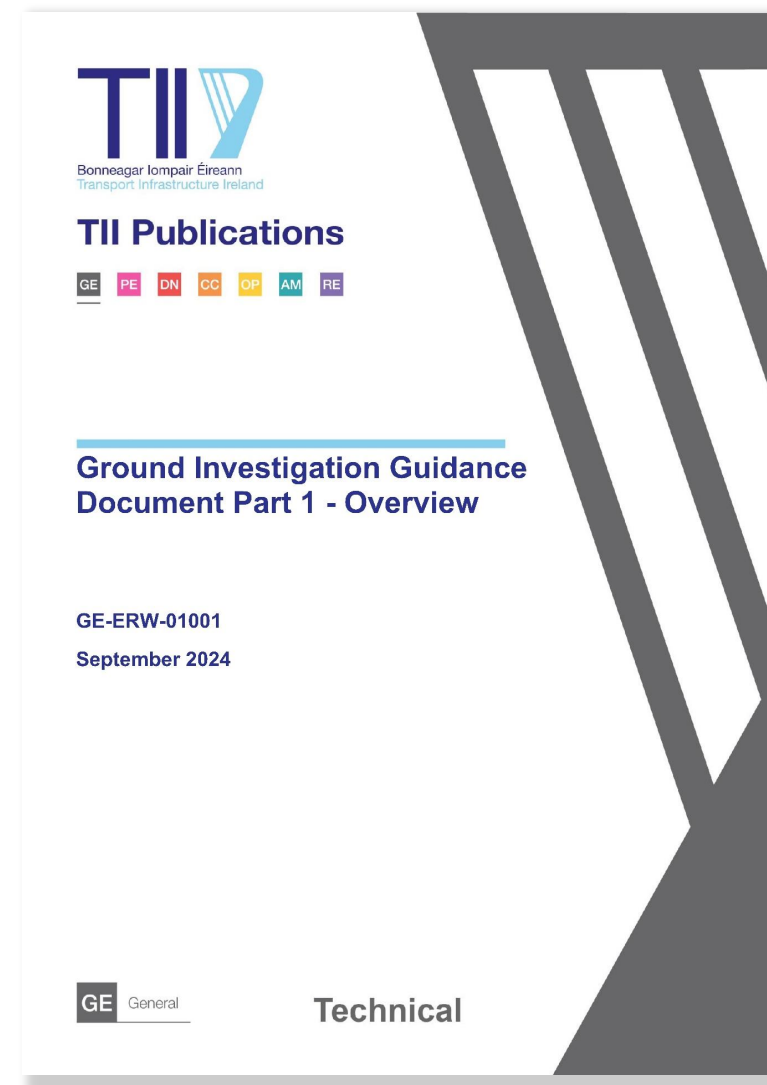
To adequately inform a comparative appraisal at Stage 2, it may often be necessary to undertake some ground investigation. For example, an adequate understanding of the ground model for each option is necessary to inform (non-exhaustive) material reusability, mass haul, structural foundations and ground improvement, which in turn will influence criteria including, but not limited to, environmental (waste, geological impacts) and economy (funding requirements). However, the degree of ground investigation will need to be balanced against the early stage of the project, public consultation and general access limitations to private land. Similar to Stage 1, ground investigation could include combining site walkovers, non-intrusive geophysical methods with some intrusive methods (for example probing, cable percussive boreholes).

Format

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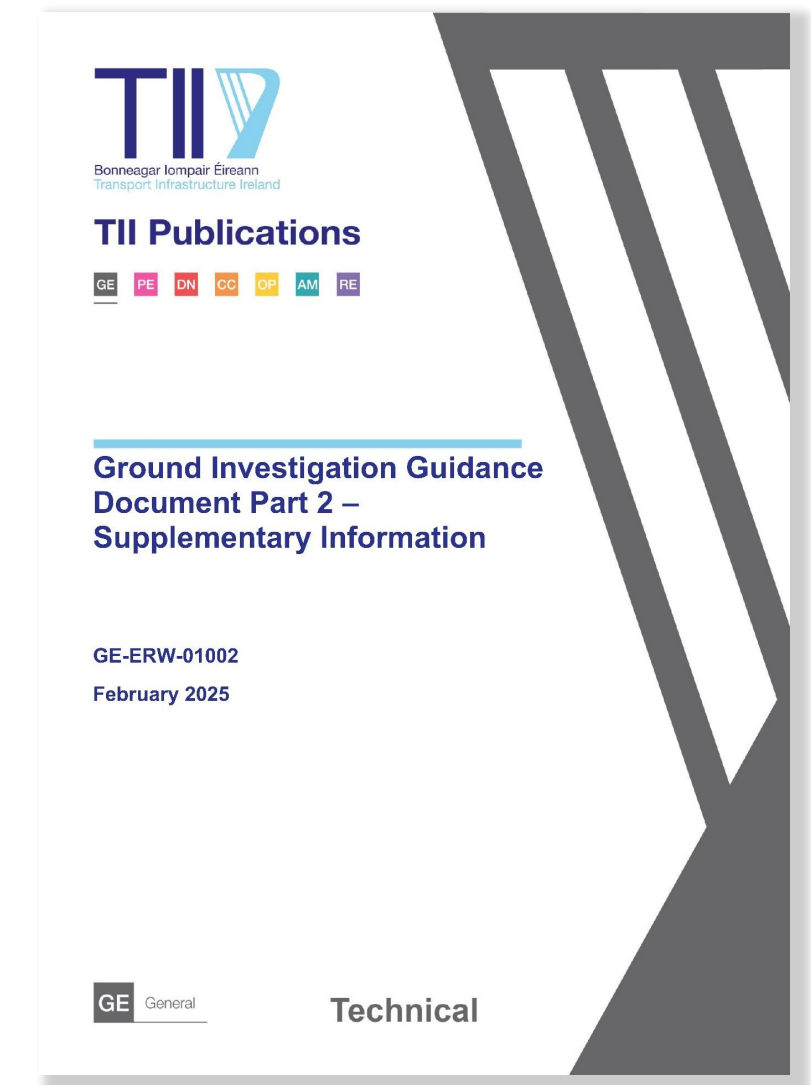
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Use & Application



Use & Application

GE-ERW-01001 & 01002 Ground Investigation Guidance

- Neither a Standard nor a mandatory Technical document
- No changes required to existing deliverables
- Alignment with existing suite of standards and technical documents
- Guidance can be applied on both current and future projects



Conclusion



Conclusion

Common issues and challenges with ground investigation:

- Too late for meaningful impact
- Insufficient time in programme
- Low or poor quality delivery

Aim of the guidance:

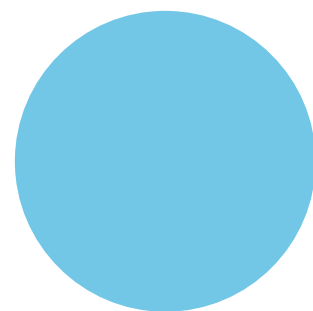
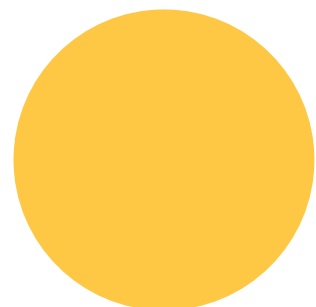
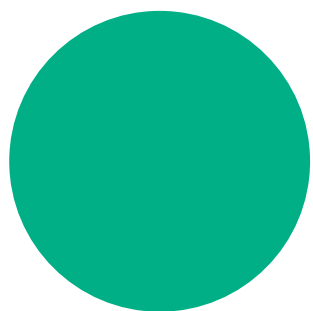
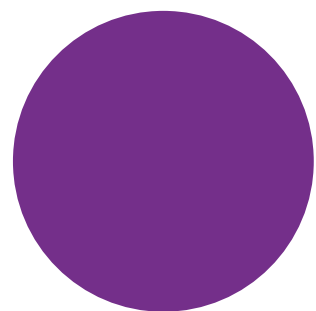
- Outline core principles across all Phases
- Practical reminders to help ensure investigations are timely
- Considerations to increase quality of output



Thank you

Questions?

Cathal Mac an tSearraigh | Senior Engineer
+353 (0)1 233 4205
Cathal.MacantSearraigh@arup.com



www.tii.ie



info@tii.ie



+353 (01) 646 3600



Bonneagar Iompair Éireann
Transport Infrastructure Ireland

