

Concrete Prepenetration GPR Survey JHA

Worked instructional example

Work and worksite

A trained concrete surveyor will acquire and interpret non-destructive radar data over a defined accessible ground-floor concrete area before a separately proposed penetration. The selected GSSI StructureScan Mini XT uses an accepted survey plan, fixed surface references and protected work positions. Findings and limitations pass to the responsible clearance reviewer; no hole is made. This fictional learning example describes planned controls and records no actual inspection or work authorization.

- The concrete area, proposed investigation extent and available structural/service information are identified. The survey planner defines coverage, depth interpretation, confirmation needs and reporting limits; a markout or a blank-looking image does not authorize drilling.
- The identified Mini XT is a supported legacy model. Manufacturer manual MN70-813 Rev K and the actual unit/software-compatible instructions govern setup and acquisition. Equipment suitability, data quality, surface access and current operating requirements are verified; no advertised depth guarantees detection.
- Drilling/dowel work 238110-06 and core/hammer drilling 238110-22 are partial connections: nonpenetrating evidence acquisition before intrusive work only. Drilling, structural design, service isolation, opening release, overhead scanning and ground-utility excavation are excluded.

Questions before work

- Which concrete area and proposed penetration question must the survey actually investigate?
- How will surface references, acquisition coverage and interpretation uncertainty remain traceable in the report?
- Who reconciles the scan with other evidence and authorizes any later intrusive investigation or penetration?

Task Hazard Control

1 Define the survey question and limits

Hazard: An undefined investigation can produce attractive images that do not address the proposed penetration or the relevant concealed hazard.

Control: Survey lead identifies the concrete face, requested work envelope and available design/service records. Agree the actual coverage and information needed with the responsible reviewer, including inaccessible areas and confirmation requirements. Separate investigation permission from penetration release. Hold uncertain site identity or an unworkable survey extent rather than accepting a smaller convenient patch as evidence for the whole proposed operation.

Verification: Lead records the area, purpose, requested coverage and unresolved information before scanning.

Reasoning: The evidence can support a decision only when its investigated extent is explicit.

2 Establish protected access and fixed references

Hazard: Watching a screen while crossing debris, an opening or other workers' equipment can cause a fall and shift the survey's physical reference.

Control: Crew separates the ground-floor survey area from intrusive work and conflicting movement. Check the full route, edges, services and working positions; use stable access without reaching across an exposure. Establish durable surface references and a clear orientation/file naming plan. Preserve access to those references and stop if other work or a moved template makes the location uncertain.

Verification: Surveyor checks footing, boundaries and the link between surface references and planned files.

Reasoning: Good positional evidence and safe movement both depend on a controlled, identifiable work area.

3 Verify the actual instrument and acquisition setup

Hazard: An unsuitable unit, wrong distance/depth configuration or impaired survey wheel can create misleading position or depth information.

Control: Surveyor confirms the identified Mini XT, compatible software/instructions, power and storage condition and required equipment checks. Establish the actual acquisition mode, units, depth basis and prescribed calibration through the accepted plan and manufacturer method. Resolve surface or material conditions that prevent reliable wheel contact or interpretation. Do not import another model's settings or treat a manufacturer's nominal range as proof of site performance.

Verification: Surveyor records equipment identity, required checks and the accepted acquisition configuration.

Reasoning: The configuration affects what the recorded data can reasonably represent.

Complete the work and hand over

4 Acquire traceable coverage through the planned method

Hazard: Incomplete direction coverage, lost wheel tracking or an interrupted line can conceal targets while giving the appearance of a completed survey.

Control: Collect the required lines or grid from the established references using the selected method, checking position, direction and recording status as work proceeds. Keep attention on footing as well as the display. Record interruptions and recollect compromised coverage under the plan; stop for uncertain tracking or changed surface conditions. Preserve the raw files rather than relying solely on a screenshot or automatic target overlay.

Verification: Surveyor verifies actual line/grid completion and identifies every unscanned or recollected area.

Reasoning: Traceable coverage makes gaps visible instead of hiding them behind a finished image.

5 Interpret findings and expose uncertainty

Hazard: An inferred metal identity, assumed target size or incorrectly scaled depth can cause a later crew to strike a service or structural component.

Control: Assigned trained interpreter reviews the actual data with its configuration and available records. Apply the accepted depth-assessment method and report indications, uncertainty and coverage limits. GPR signals alone do not distinguish every metal target; displayed shapes do not establish object size. Refer unresolved or congested areas for responsible confirmation rather than labeling them clear or choosing an arbitrary safe offset.

Verification: Interpreter records supported findings, interpretation basis and unresolved areas for the reviewer.

Reasoning: An honest limit is useful evidence; an unsupported clearance claim transfers the concealed hazard.

6 Preserve the record and hand over investigation status

Hazard: Faded marks, mismatched filenames or a receiving crew assuming permission to drill can break the connection between the survey and the real structure.

Control: Save the required raw data, references, report and photographs through the accepted record process. Label surface indications and investigation limits clearly without representing them as a drilling permit. Brief the receiving reviewer on unresolved areas and required corroboration. Restore safe access and maintain the intrusive-work hold until actual structural/service decisions are obtained; any later disturbance of references requires reassessment.

Verification: Receiving reviewer confirms report identity, limitations and the separate penetration-release requirement.

Reasoning: The survey ends with accountable evidence, while permission to disturb the concrete remains a separate decision.

Pause and reassess

- The requested area, fixed surface references, instrument suitability or actual acquisition method cannot be established.
- Coverage, wheel tracking, depth basis or signal interpretation becomes uncertain or differs from the accepted plan.
- A markout or automatic display is being treated as complete service identification or permission to penetrate.

Improve the controls

Needs improvement: The screen shows no target here, so drill on this mark.

More useful: Report investigated coverage and uncertainty, then obtain the separate structural and service-clearance decision using all required evidence.

Needs improvement: A screenshot is enough to show we scanned the area.

More useful: Preserve raw files, surface references, configuration and actual coverage gaps so the reviewer can trace the investigation.

Decisions that change the analysis

Does an automatic green drill-hole display establish a safe penetration?

No. The manufacturer's analysis aids interpretation and does not replace a trained review. This survey produces evidence within its actual detection and coverage limits. Keep intrusive work held until the responsible parties reconcile structural and service information and resolve the specific proposed hole; any confirmation drilling requires its own clearance and task plan.

What must the surveyor record for actual use?

Record area and purpose, equipment/software identity, method, setup and required checks, surface references, actual lines/grids and raw filenames. Document the depth basis, indications, uncertain or inaccessible areas, interpreter and report handover. Identify the later clearance authority without inventing its approval, target identities or a finding that every concealed object has been located.

Training needs

- Actual Mini XT and software instruction on acquisition, survey-wheel position, recording, depth interpretation and the selected method's limitations.
- Instruction on protected scanning routes, uncertainty reporting, preservation of surface/file references and the separate structural and service-clearance process.

Confirm applicable qualifications and actual training evidence for the people assigned. Related toolbox talks support discussion; they do not establish competence.

References and adaptation

GSSI StructureScan Mini XT manual MN70-813 Rev K: acquisition and interpretation limits

<https://www.geophysical.com/wp-content/uploads/2020/09/MN70813K-StructureScan-MiniXT-User-Manual.pdf>

GSSI support: retained Mini XT manual and software resources

<https://www.geophysical.com/support>

GSSI Mini XT product and legacy-support information

<https://www.geophysical.com/products/structurescan-mini-xt>

References reviewed October 13, 2026. Use actual equipment and product instructions, project design and site requirements. This original draft supplies no fabricated inspection, signature or approval.