



Toronto Pearson International Airport



**2024
Surface Penetration Guidelines**



Surface Penetration Guidelines

Current Edition: 2024

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This document supersedes: “Surface Penetration Guidelines v3.0” created Aug 2019, “Surface Penetration Guidelines v2.0” created May 2017 & “Core Drilling Guidelines at Toronto Pearson v1.1” created July 2013.

The GTAA reserves the right to amend the content of the “Surface Penetration Guidelines” on an as-required basis.

All correspondence concerning or requesting clarification of any information contained in this document can be directed to:

Construction Compliance & Permits Office
Greater Toronto Airports Authority
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Toronto AMF, Ontario, Canada L5P 1B2
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PDF copies of all the current FAP Process forms, checklists, guides, and the Airport Construction Code are available on-line using this link:

[Pearson Airport Construction Approvals | Pearson Airport \(torontopearson.com\)](https://www.torontopearson.com/airport-construction-approvals)



Version Control

Version	Effective Date	Changes	Prepared by	Reviewed by	Approved by
2024	November 2023	Issued "Surface Penetration Guidelines"	Sam Adile		Stuart Bricknell
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1. Guidelines Purpose & Application

The purpose of these Guidelines is to ensure that the structural integrity of GTAA buildings and facilities is being maintained and to assist contractors in their planning and execution of construction activities requiring the surface penetration of floor and/or wall surfaces with a focus on safe, responsible, and consistent procedures. Note that these Guidelines apply to any surface penetration, regardless of the penetration size or depth and subject to CCPO/GTAA Engineering discretion.

These guidelines shall be used to:

- ensure that project design & execution is inline with GTAA's requirements for maintaining building and facilities structural integrity and all applicable reviews & assessments are completed, documented and the required signoffs are obtained prior to any surface penetrations commencing,
- locate embedded reinforcement and services within or installed underneath the concrete slabs where surface penetrations are required,
- obtain GTAA Engineering review & signoff for proposed surface penetrations when applicable,
- safely execute surface penetrations involving concrete coring, drilling, chipping, cutting, etc. within any GTAA buildings and facilities on Airport Lands,
- ensure that accurate building records are maintained after the work is completed.

These guidelines are not intended to:

- replace any existing GTAA processes in place for construction. A valid Facilities Alteration Permit (FAP), Activity Notice and/or Terminal Work Permit (TWP) must be in place prior to any construction work at the Airport commences; or
- provide direction regarding fire-stopping requirements. All fire-stopping will be reviewed separately by GTAA's Independent Code Compliance Consultant (ICCC) as a part of the FAP process.

2. Roles and Responsibilities

- Project Owner (PO)** – is the company who initiated the work at Toronto Pearson being undertaken by a Contractor. The PO shall ensure that:
 - the Design Consultants and Contractor are made aware of these guidelines through the project specifications and the construction contracts to facilitate full compliance with these guidelines.
 - project designers review the project area and utilize the existing layout of services and surface penetrations to minimize the need for new surface penetrations. Where large numbers of new surface penetrations are required, a full structural analysis will be required to establish that the structural integrity of the base building components is being maintained.
 - all surface penetrations i.e., coring, drilling, chipping, cutting, etc., are carried out in compliance with the requirements of these guidelines and are subject to GTAA Engineering review and signoff. If the structural integrity of the base building structural components cannot be maintained, a redesign may be required as determined by GTAA Engineering.



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- b. Contractor** - is the company who with their submitted NOP to the MOL has taken responsibility for all aspects of construction activities for the specific project and to whom a FAP has been issued by Construction Compliance & Permits Office. The **Contractor** shall ensure that:
- all applicable employees, sub-contractors, etc., are made aware of all requirements of these guidelines to facilitate full compliance.
 - arrange with a reputable **scanning services sub-contractor** to scan and mark the locations on site of all proposed surface penetrations and surrounding obstructions for review & signoff by the **Structural Engineer (SE)** &/or the **Designated Structural Engineer (DSE)** as applicable.
 - arrange with the project or an independent **Structural Engineer (SE)** in good standing to review the proposed locations of the penetrations and based on the available base building structural data, scanning data, etc., help the contractor ensure that each surface penetration avoids any reinforcement or obstructions that are embedded/surface mounted. Further, the SE should assess and confirm in their signoff report that the integrity of the associated base building structural components is not affected by the location or number of surface penetrations within a specific area. When issues or concerns persist, the SE can refer to the **Designated Structural Engineer (DSE)** as listed in Appendix A or can refer the issue to CCPO/GTAA Engineering.
 - arrange with the **Independent Safety Compliance Consultant (ISCC)** based on their availability, to conduct an on-site safety review & provide their signoff prior to commencing any surface penetrations.
 - all surface penetrations i.e., coring, drilling, chipping, cutting, etc., are completed safely and in compliance with the contractor's reviewed **Project Specific Safety Plan** and these guidelines.
 - all applicable documentation including: the surface penetration location(s) record drawings, structural engineer's reports and all scans completed, etc., are submitted to the Construction Compliance & Permits Office (CCPO).
- c. Structural Engineer (SE)** - is part of the project consultant group or an independent consultant in good standing who has been retained by the Project Owner/Contractor to fulfill the requirements for the project design and/or construction overview as required by the Airport Construction Code (ACC). The SE must:
- review the proposed locations of the penetrations and based on the available base building structural data, scanning data, etc., to help the contractor locate each surface penetration to avoid slab reinforcement or obstructions that are embedded/surface mounted. Further, the SE should assess and confirm in their signoff report that the integrity of the associated base building structural components is not affected by the location or number of surface penetrations within a specific area. When issues or concerns persist, the SE can refer to the **Designated Structural Engineer (DSE)** as listed in Appendix A for assistance and must notify CCPO/GTAA Engineering.
 - based on the available documentation, site reviews and assessment, provide a sealed & signed report with any applicable comments for each penetration location.
- d. Designated Structural Engineers (DSE)** – includes consultants who have an in-depth understanding of the base building structural components of GTAA Facilities. The DSE will:
- provide assistance upon receiving a request from the SE or the **Contractor** to help with the SE's requirements noted above.



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- ensure that the structural integrity of the base building structural components is being maintained and if this is not possible, the coring should not proceed and CCPO should be notified.
- e. **Independent Safety Compliance Consultant (ISCC)** – GTAA’s consultant who is responsible for the review of all **Project Specific Safety Plans** submitted for FAP applications and for ensuring that all work on Airport Lands is completed safely. The ISCC will:
 - review the contractor’s **Project Specific Safety Plan**.
 - conduct a site safety review with the **Contractor** prior to any surface penetrations being commenced and if all appropriate safety measures are in place, sign the **Contractor’s ‘Surface Penetration Checklist & Signoff form’**.
- f. **GTAA Engineering** – responsible for ensuring that the structural integrity of all GTAA buildings & structures is maintained.
 - review applicable surface penetration structural review reports, scanning reports & documentation requiring GTAA Engineering’s signoff.
 - based on documentation submitted confirm that they are in agreement that the structural integrity of the base building is being maintained and provide their signoff for the surface penetrations to proceed.
- g. **Construction Compliance & Permits Office (CCPO)** – AHJ for monitoring all construction activities carried out on Airport property.
 - Receive copies of all structural review reports, scanning reports & as-builts documentation as applicable for any surface penetrations.
 - **Maintain the AHJ official project records of all documentation & correspondence for project consultants’ design & contractors’ execution activities.**

3. General Guidelines

The following general guidelines shall be followed when executing the process outlined below:

1. All surface penetrations in any concrete floor or wall structure shall be kept to a minimum and shall be planned in accordance with this document and other associated building-specific guidelines regarding coring, drilling, chipping, cutting, etc. **Where possible, installations shall use existing penetrations.** New surface penetration layouts shall be reviewed & signed off by the applicable parties noted above prior to any surface penetrations commencing.
2. Project designers shall review the project site area and utilize the existing layout of services (plumbing, electrical, communications, etc.) and establish their design to minimize the need for new surface penetrations. Where large numbers of new surface penetrations are required, a full structural analysis (seal & signed report) will be crucial to establish that the structural integrity of the base building components is being maintained which will be required for CCPO/GTAA Engineering signoff before any surface penetrations can commence.
3. The **Contractor** shall include in their **Project Specific Safety Plan (PSSP)** submitted to the Construction Compliance & Permits Office (CCPO) with the FAP application all control measures and work safe procedures for any surface penetrations including all necessary precautions to prevent and capture any water or debris that may fall through **any openings** during the surface penetration(s).
4. Prior to commencing any surface penetrations, the **Contractor** shall arrange an onsite review by the Independent Safety Compliance Consultant (ISCC) to review the control measures that have been put in place in compliance with the **Contractor’s PSSP** previously submitted to CCPO.
5. The GC shall submit all required terminal work permits and/or shut-down requests and must have received confirmation that the requests are approved prior to any work commencing.



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6. The Contractor shall erect barricades and bilingual warning signage identifying the hazards around all work areas, including the floor area below where the surface penetration is going through the entire slab depth to ensure that only those involved with the work have access.
7. Additionally, in any location where the public or Airport employees are present, the Contractor shall position an adequate number of spotters to direct persons away from the area during the surface penetration. Effective communication must be maintained between the spotter(s) and those executing the surface penetration(s) at all times.

4. Process

Locating Hidden Obstructions

1. The Contractor shall scan the floor slabs &/or walls at all proposed surface penetration locations for obstructions that are embedded/surface mounted. If any obstructions are found, then the proposed penetration must be relocated.
2. If scanning results for structural obstructions are inconclusive, the Designated Structural Engineer (refer to Appendix A) can be contacted to request assistance and CCPO must be notified.
3. Located obstructions must be clearly marked & maintained on the floor surface for reference & further review as may be required and until all the surface penetration activities are completed. Building gridline reference points must be used when referencing penetration locations on as-built documentation.

Structural Review & Signoff

4. Once the slab reinforcement & any obstructions have been located, the Contractor shall contact the Structural Engineer to conduct a site review & assessment of each proposed penetration location for their sign-off.
5. Upon completion of the site review, the Structural Engineer will issue a sealed & signed Structural Review Report to the Contractor as a record of the review. A copy of the report must be sent to CCPO/GTAA Engineering for review & sign-off prior to commencing any work.
6. If scanning results are inconclusive and/or the Structural Engineer cannot signoff on any of the locations, the Designated Structural Engineer (refer to Appendix A) may be requested for assistance and the CCPO/GTAA Engineering must be immediately notified.

Executing Approved Surface Penetrations

7. The Contractor shall arrange an onsite review with GTAA's Independent Safety Compliance Consultant (ISCC) upon receipt of the Structural Engineer's Review Report & sign-off to confirm that all safety control measures are in place in compliance with the Contractor's PSSP.
8. Once the site has been reviewed and the ISCC is satisfied with all the required control measures in place, they will then sign the 'Surface Penetrations Request Form'. The Contractor may only then proceed with the surface penetrations as planned.
9. Upon completion, the Contractor shall submit to the Construction Compliance & Permits Office, copies of the completed & signed 'Surface Penetrations Checklist & Signoff Form'; the Sealed & Signed Structural Review Reports; the Scanning Reports; & the As-builts Documentation of all penetration locations that indicate the size of each hole and their distance in relation to the building grid line reference points.



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Appendix A: Designated Structural Engineers (DSE) & ISCC Contact Information

Building	Company	Contact 1	Contact 2
Designated Structural Engineers (DSE)			
Terminal 1	Entuitive	Chongsong Yu, P.Eng. T: 416-309-0167 Chongsong.yu@entuitive.com	Wesley Peter, P.Eng. T: 416-477-7079 wesley.peter@entuitive.com
Terminal 3	Milman & Associates	Boris Millman, P.Eng. T: 905-760-1020 x 221 bmilman@ma-eng.ca	Jeff Mitchel, P.Eng. T: 905-760-1020 x 226 jmitchell@ma-eng.ca
Terminal 1 Parking Garage	EXP Services Inc.	Gordon Ho, P.Eng. T: 905-695-3217 x 3726 gordon.ho@exp.com	Weimin Liang, P. Eng. T: 905-695-3217 x 3734 weimin.liang@exp.com
Independent Safety Compliance Consultant (ISCC)			
All GTAA Facilities	TRH Group	Jack Papadopoulos M: 416-705-0234 E: Jack.Papadopoulos@gtaa.com	John Tomkow M: 416-705-0256 E: John.Tomkow@gtaa.com