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**Soil quality — Sampling —**

Part 205:

**Guidance on the procedure for  
investigation of natural, near-natural  
and cultivated sites**

*Qualité du sol — Échantillonnage —*

*Partie 205: Recommandations relatives aux modes opératoires  
d'investigation des sites naturels, quasi naturels et cultivés*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 2, *Sampling*.

This first edition of ISO 18400-205, together with ISO 18400-104 and ISO 18400-202, cancels and replaces the first edition of ISO 10381-4:2003, which has been technically and structurally revised. The new ISO 18400 series is based on a modular structure and cannot be compared to ISO 10381-1 clause by clause.

A list of all parts in the ISO 18400 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document is one of a group of standards providing guidance on site investigation in general, and sampling in particular, for the principal purpose of determining soil quality. It is intended to be used in conjunction with the other parts of the ISO 18400 series. The role/position of the standards within the total investigation programme is shown in [Figure 1](#).

This document describes investigation and sampling procedures for determination of soil quality on natural, near natural and cultivated sites. Its structure is generally similar to that of ISO 18400-203 which provides guidance on the investigation of potentially contaminated sites. In accordance with ISO 18400-104, it recommends that investigations should be undertaken in three phases:

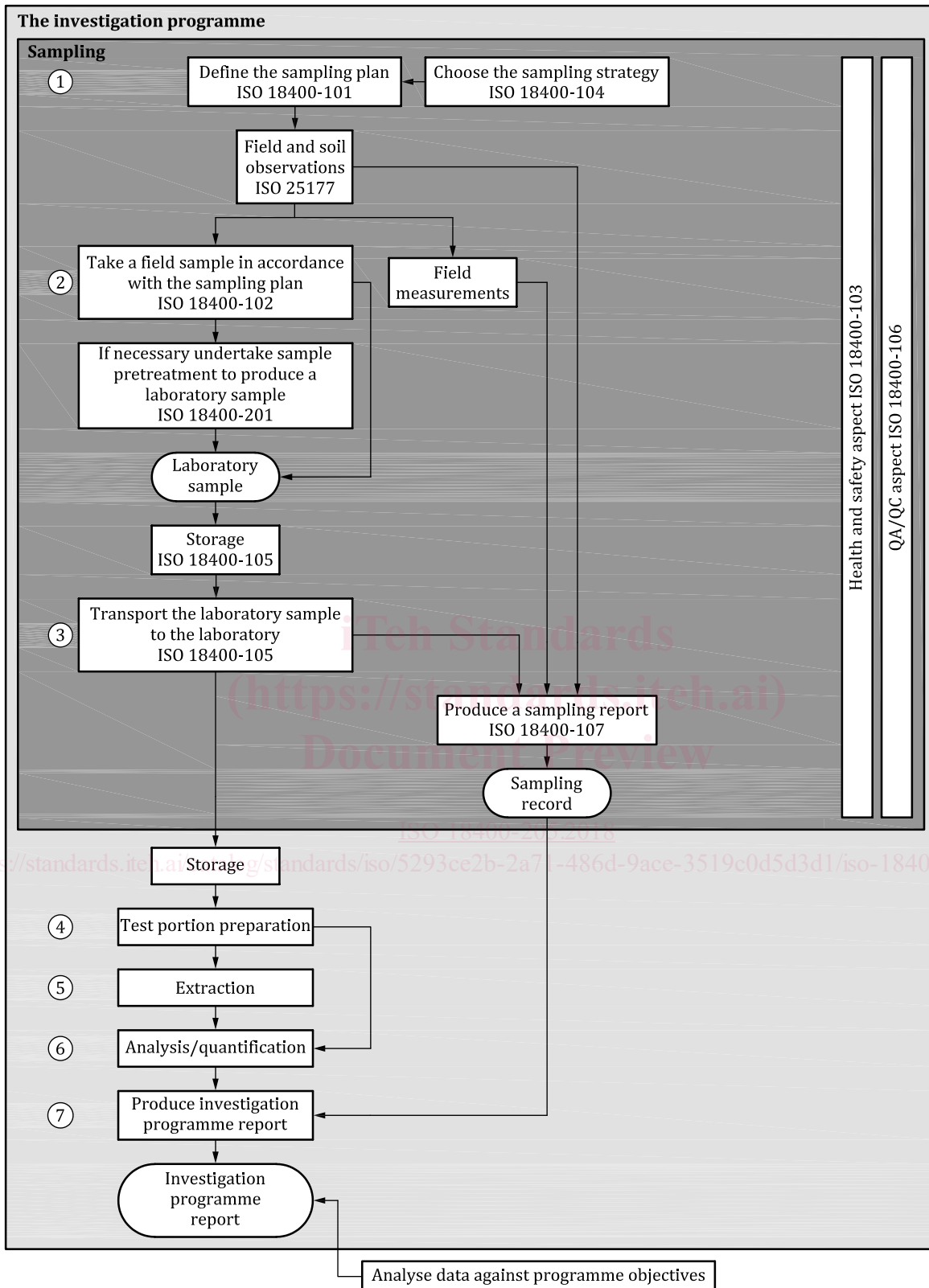
- preliminary investigation (desk study and site reconnaissance) in accordance with ISO 18400-202;
- exploratory investigation (this document);
- detailed site investigation (this document).

It is recognized that:

- the preliminary investigation needs to be no more detailed than required by the task in hand (objectives of the investigation), but some basic information is always required for reasons of legality, safety of those carrying out site work including site reconnaissance, and protection of the environment;
- the preliminary investigation might show that no intrusive investigation is required;
- an exploratory investigation might suffice in some cases with no requirement for a detailed investigation;
- an exploratory investigation is not always needed in advance of a detailed investigation;
- it might be desirable to carry out each phase of an investigation in stages;
- during any phase of an investigation it might become apparent that the site should be treated as a potentially contaminated site — decisions will then be required whether to proceed as planned, to delay the investigation, and/or carry out an investigation in accordance with ISO 18400-203.

The guidance also calls for the formulation of a conceptual site model as described in ISO 18400-202. This synthesis and interpretation of the available information needs to be no more detailed than required by the task in hand but helps in the design of intrusive phases of investigation. In practice, the investigator will always have a mental image of the site and formal development of the conceptual site model helps to reveal what could be serious flaws in this mental image.

NOTE [Clauses 4, 5](#) and [6](#) provide guidance applicable to sampling on the generality of natural, near-natural and cultivated sites. [Clause 7](#) provides additional guidance in relation to sampling for particular purposes (e.g. determination of mobile nitrogen) and soil types (e.g. peat soils).



NOTE 1 Numbers in circles define the key elements (1 to 7) of the investigation programme.

NOTE 2 Figure 1 displays a generic process which can be amended when necessary.

Figure 1 — Links between the essential elements of an investigation programme

# Soil quality — Sampling —

## Part 205:

# Guidance on the procedure for investigation of natural, near-natural and cultivated sites

## 1 Scope

This document provides guidance on the sampling of soils of

- natural and near-natural sites,
- natural arboreal areas including forests and woods,
- areas used for agriculture (arable and pasture sites),
- areas used for horticulture (including domestic gardens, allotments), and
- areas used for special crop-cultivation, orchards, vineyards, commercial plantations and forests, etc.

It is applicable to

- soil investigations and evaluations in the field, and
- collection of samples for chemical, geochemical, physical, and biological characterization of soil and soil materials in the laboratory.

This document sets out appropriate strategies for the design of sampling programmes, field procedures and subsequent treatment of samples for transport and storage prior to sample pretreatment (e.g. drying, milling). It is intended to be used in conjunction with the other parts of the ISO 18400 series. Attention is, in particular, drawn to the requirements concerning collection, handling and storage of soil for assessment of biological functions in ISO 18400-206.

NOTE 1 Groundwater and surface water can be adversely impacted by agricultural and related activities, such as nitrates and pesticides, and by translocation of soil particles. In turn, knowledge about water quality can provide information about possible sources of groundwater contamination or contaminating run-off. Investigation of groundwater and surface water quality is outside of the scope of this document; relevant guidance is given in the ISO 5667 series of standards. ISO 15175 provides guidance on the relationship between soil properties and groundwater quality.

NOTE 2 It could also be appropriate to investigate ambient air, vegetation, potable water supplies and a variety of other media depending on the findings of the preliminary investigation.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11074, *Soil quality — Vocabulary*

ISO 18400-103, *Soil quality — Sampling — Part 103: Safety*

ISO 18400-104:2018, *Soil quality — Sampling — Part 104: Strategies*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11074 and ISO 18400-104 apply.

NOTE When the definitions in these two documents differ, those in ISO 18400-104 take precedence.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 4 Objectives of sampling

The investigation, sampling and analytical strategies are determined mainly by

- the objective of the investigation, and
- current and previous soil/land use.

The objective of investigations can be various but might be:

- collection of information on general soil quality with regard to preservation and improvement of ecological soil functions;
- collection of information for evaluation of soil quality and nutrient supply or nutrient demand with regard to preservation and improvement of the productivity of soils;
- collection of information to manage and evaluate the effects of the addition of soil amendments materials such as sewage sludge;
- collection of information for soil mapping, classification and taxation;
- collection of information on the quality of forest and woodland (arboreal) soils in connection with study of damaged trees or other vegetation;
- collection of information for establishment and maintenance of soil monitoring areas;
- collection of information for replicate samples used for soil specimen banks or environmental specimen banks.

Further guidance about the setting of objectives for soil sampling is given in ISO 18400-104.

## 5 Principles, requirements and general considerations for soil sampling

### 5.1 General

This document should be used in conjunction with ISO 18400-104 which gives general guidance on the development of site investigation strategies and detailed guidance on sampling strategies.

This clause summarizes general principles, requirements and considerations for soil sampling which should be taken into account for natural, near-natural and cultivated sites.

The aspects in [5.3](#) to [5.16](#) should be considered when developing a sampling strategy and preparing the sampling plan in accordance with ISO 18400-101.

NOTE 1 [Clause 5](#) and [6](#) provide guidance applicable to sampling on the generality of natural, near-natural and cultivated sites. [Clause 7](#) provides additional guidance in relation to sampling for particular purposes (e.g. determination of mobile nitrogen) and soil types (e.g. peat soils).



NOTE 2 A supposed natural site or near-natural site (e.g. an agricultural site or a wooded site) could be a potentially contaminated site, not only because of activities carried out on the site, but because they were developed in the past on potentially contaminated land, for example an old refuse disposal site (landfill) or mining waste. This could have significance for agricultural performance of a site and the health and safety of the investigator; hence the need for a good site history to be developed as part of the preliminary investigation.

## 5.2 General strategy of site investigation

### 5.2.1 General

The principal site investigation phases are

- preliminary investigation (see [5.2.3](#)),
- exploratory investigation (see [5.2.5](#)), and
- detailed (main) site investigation (see [5.2.6](#)).

The relationship between these phases is illustrated in [Figure 2](#).

On completion of soil sampling activities during any phase or stage of investigation, a sampling report should be prepared in accordance with ISO 18400-107 (see [Clause 8](#)).

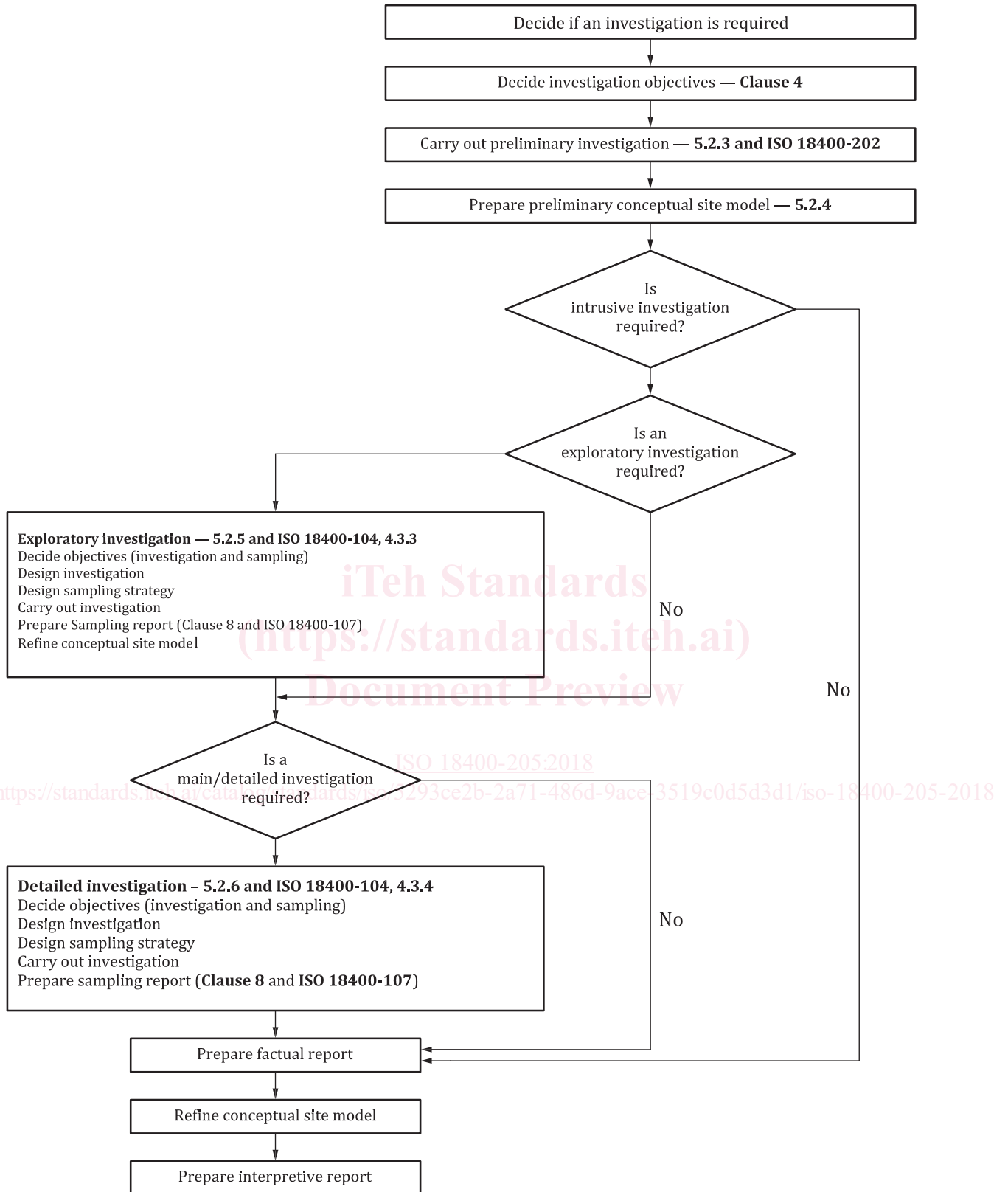
Following completion of the investigation, a report giving its results should be prepared.

The strategy for the investigation (whether preliminary, exploratory or detailed) will be determined by the objectives (see [Clause 4](#)).

Before embarking on any phase or stage of investigation, it is important to set data quality objectives in terms of the type, quantity and quality (e.g. analytical quality) of the data and other information that is to be collected. These data quality objectives will depend in part on the nature of the decisions to be made on the basis of the investigation, and the confidence required in those decisions.

When deciding on the strategy, consideration should be given to the applicability and use of on-site analysis and/or *in situ* measurement techniques (e.g. see ISO 12404 and ISO 13196).

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NOTE This is an example of a site investigation process for agricultural sites.

Figure 2 — Site investigation process