

This is a preview of "ISO 18400-203:2018". [Click here to purchase the full version from the ANSI store.](#)

First edition  
2018-10

---

---

# Soil quality — Sampling — Part 203: Investigation of potentially contaminated sites

*Qualité du sol — Échantillonnage —*

*Partie 203: Investigation des sites potentiellement contaminés*



Reference number  
ISO 18400-203:2018(E)

© ISO 2018

This is a preview of "ISO 18400-203:2018". [Click here to purchase the full version from the ANSI store.](#)



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

This is a preview of "ISO 18400-203:2018". Click here to purchase the full version from the ANSI store.

## Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Objectives</b> .....	<b>2</b>
4.1 General.....	2
4.2 Definitions of objectives.....	2
<b>5 General strategy of site investigation</b> .....	<b>3</b>
5.1 General.....	3
5.2 Scope of preliminary investigation.....	6
5.3 Scope of exploratory investigation.....	6
5.4 Scope of detailed site investigation.....	7
<b>6 Preliminary investigation</b> .....	<b>7</b>
6.1 General.....	7
6.2 Development of the conceptual site model.....	8
6.2.1 Overall conceptual site model.....	8
6.2.2 Formulation of contamination-related hypotheses.....	8
6.3 Reporting the preliminary investigation and the conceptual site model.....	8
<b>7 Design of intrusive investigations</b> .....	<b>8</b>
7.1 Overview.....	8
7.2 General aspects of field work.....	9
7.3 Overall design aspects.....	9
7.3.1 General.....	9
7.3.2 Design of site works.....	10
7.4 Sampling patterns and spacing for sampling soils.....	11
7.4.1 General.....	11
7.4.2 Judgemental sampling.....	12
7.4.3 Systematic sampling.....	12
7.4.4 Detection of hotspots.....	13
7.4.5 Depth of sampling and the strata to be sampled.....	13
7.4.6 Sample sizes.....	13
7.4.7 Sample types.....	13
7.4.8 Number of samples.....	13
7.5 Analytical and testing strategies.....	13
7.5.1 General.....	13
7.5.2 Analysis of soil samples.....	14
7.6 Quality assurance and quality control.....	15
<b>8 Exploratory investigation</b> .....	<b>15</b>
8.1 General.....	15
8.1.1 Basis of the exploratory investigation.....	15
8.1.2 Steps to be incorporated.....	15
8.1.3 Aspects to be considered when drawing up a strategy.....	15
8.2 Sampling strategy.....	16
8.2.1 General.....	16
8.2.2 Sampling locations.....	16
8.2.3 Depth of sampling.....	17
8.2.4 Selection of soil samples for analysis.....	17
8.2.5 Selecting parameters for testing and analysis.....	17
8.3 Evaluation of the exploratory investigation.....	18
8.3.1 Testing the hypotheses formulated during the preliminary investigation.....	18

This is a preview of "ISO 18400-203:2018". Click here to purchase the full version from the ANSI store.

8.3.2	Risk assessment.....	18
8.3.3	Considering hypotheses by zone.....	18
8.3.4	Obtaining information on soil quality.....	18
8.3.5	Checking if investigation strategy is adequate.....	19
8.3.6	Re-examining the hypotheses.....	19
8.3.7	Examples indicating if the hypothesis should be revised or rejected.....	19
8.3.8	Possible actions if a hypothesis is not valid.....	20
8.4	Reporting the exploratory investigation.....	20
8.5	Determination of the need for a detailed site investigation.....	21
<b>9</b>	<b>Detailed site investigation.....</b>	<b>21</b>
9.1	General.....	21
9.2	Objectives and scope.....	22
9.2.1	Objectives.....	22
9.2.2	Major aspects to be considered in setting the scope and determining the objectives.....	22
9.3	Investigation design.....	22
9.4	Sampling strategy.....	23
9.4.1	General.....	23
9.4.2	Sampling locations.....	23
9.4.3	Depth of sampling.....	23
9.4.4	Selecting parameters for testing and analysis.....	23
9.5	Evaluation of the detailed site investigation.....	24
9.6	Reporting.....	25
	<b>Annex A (informative) Contamination hypotheses.....</b>	<b>27</b>
	<b>Annex B (informative) Methods of non-intrusive investigation.....</b>	<b>30</b>
	<b>Bibliography.....</b>	<b>32</b>

This is a preview of "ISO 18400-203:2018". [Click here to purchase the full version from the ANSI store.](#)

## 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 18400-203, together with ISO 18400-104 and ISO 18400-202, cancels and replaces ISO 10381-5:2005, which has been technically and structurally revised.

The new ISO 18400 series is based on a modular structure and cannot be compared to ISO 10381-5 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).

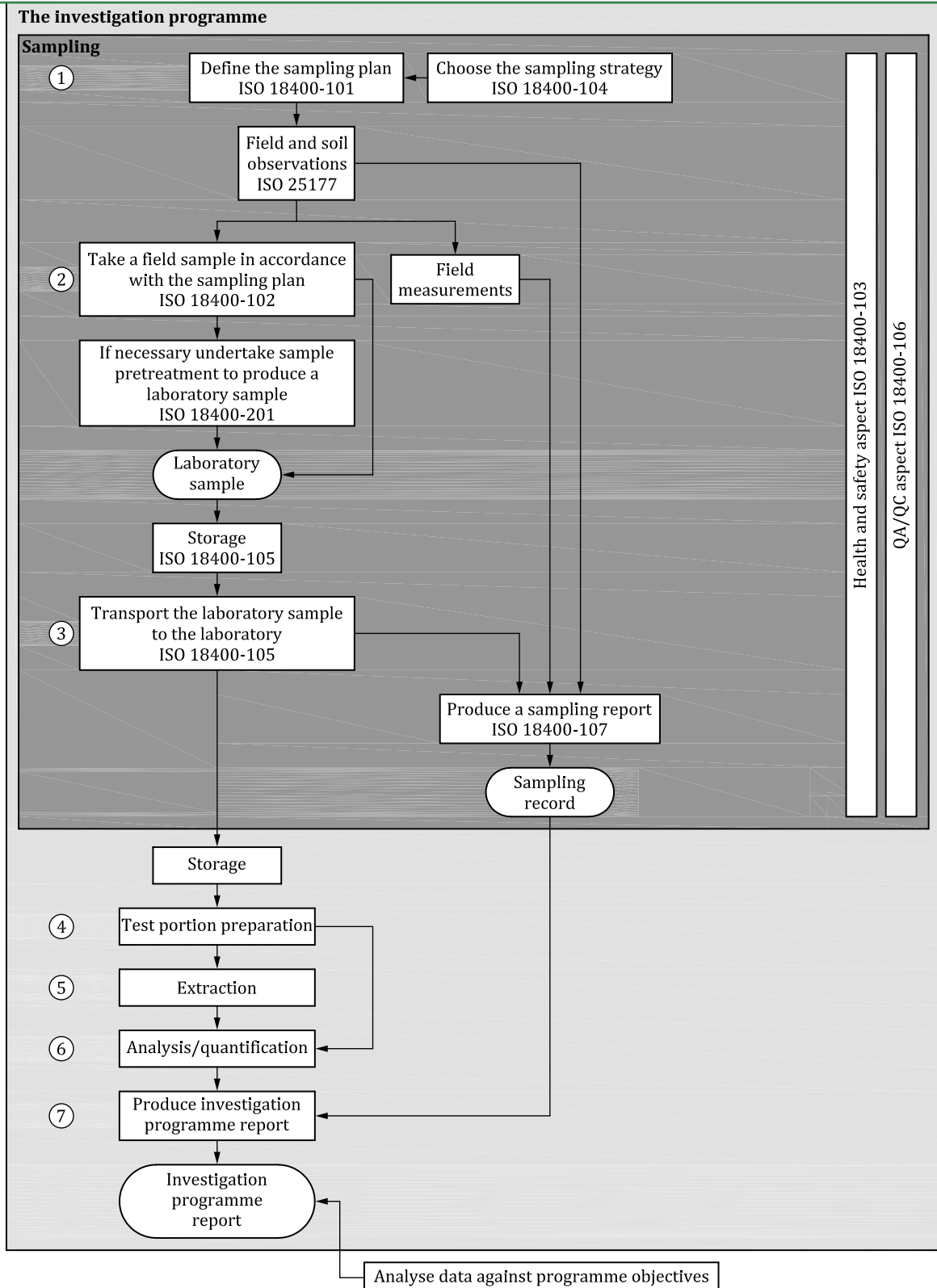
## Introduction

This document is one of a series of standards dealing with various aspects of site investigation and sampling. It is intended to be used in conjunction with the other parts of the ISO 18400 series. The role/position of the individual standards within the total investigation programme is shown in [Figure 1](#).

While serious cases of soil contamination mostly occur on urban and industrial sites, serious contamination of agricultural land can also occur (for example, due to pesticides usage, long-term irrigation and application of organic wastes). In addition, it is important to recognize that agricultural, near-natural and wooded sites, etc. are sometimes developed on deposited wastes or suffer severe aerial deposition when close to industrial sites. In such cases, a combination of the methodologies described in ISO 18400-205 and in this document would be appropriate.

An understanding of the surface water, groundwater and soil gas regimes is essential to the assessment of the potential risks to human health and safety and to other potential receptors including, for example, groundwater resources. However, the provision of detailed guidance on the investigation of groundwater, surface water and soil gas falls outside the scope of this document. For more information on groundwater and surface water sampling, see ISO 5667. Guidance on the sampling of soil gas is provided in ISO 18400-204.

This is a preview of "ISO 18400-203:2018". Click here to purchase the full version from the ANSI store.



NOTE 1 The numbers in circles in this figure define the key elements (1 to 7) of the investigation programme.

NOTE 2 This figure displays a generic process which can be amended when necessary.

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