

# Hydraulically treated soils in residential construction

John Kennedy and Julie Bregulla





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**John Kennedy** is a consulting engineer specialising in pavement engineering and soil treatment.  
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In Appendix B, Tables B1–B3 contain public-sector information licensed under the Open Government Licence v2.0.

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# Contents

Glossary vi

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## **PART I: INTRODUCTION** **1**

1 Overview 2

2 Background 3

3 Purpose and objectives 4

---

## **PART II: PRINCIPLES OF SOIL TREATMENT** **5**

4 History 6

5 The basis of soil treatment 7

<b>5.1</b>	Introduction	7
<b>5.2</b>	Lime	7
<b>5.3</b>	Cement	8
<b>5.4</b>	Ground granulated blastfurnace slag (ggbfs)	8
<b>5.5</b>	Coal fly ash	9
<b>5.6</b>	CEM II, III, IV and V cements	9
<b>5.7</b>	Hydraulic road binders (HRB)	9
<b>5.8</b>	European Standards	10
<b>5.9</b>	Construction methods	10

---

6 Current guidance and specifications for soil treatment in highways 11

<b>6.1</b>	Introduction	11
<b>6.2</b>	Highways England requirements and guidance for treated capping layers	11
<b>6.3</b>	Highways England requirements and guidance for treated earthworks	12
<b>6.4</b>	Highways England requirements for treated sub-base	12
<b>6.5</b>	BS EN 14227-15:2015	12

---

7 Experience of hydraulically treated fill for housing 14

<b>7.1</b>	BRE good practice for untreated fill	14
<b>7.2</b>	Actual experience of the use of soil treatment in housing	14

<b>PART III: DESIGN</b>	<b>15</b>
<b>8 Overview</b>	<b>16</b>
<b>9 Soils and treating agents: suitability and compatibility</b>	<b>17</b>
<b>9.1</b> Introduction	17
<b>9.2</b> Sulfate/sulfide issues	17
<b>9.3</b> Shrinkage and swelling	19
<b>9.4</b> Constructibility	19
<b>9.5</b> Low-plasticity clays, silty soils, clayey/silty sandy soils, collapsible soils like loess and brick earth	20
<b>9.6</b> Organic/peaty soils	20
<b>10 Suggested design protocol for housing</b>	<b>21</b>
<b>10.1</b> Optimum compaction with minimal air voids	21
<b>10.2</b> Freedom from volume change	21
<b>11 Suggested laboratory design process for housing</b>	<b>23</b>
<b>11.1</b> Introduction	23
<b>11.2</b> Soils with $PI < 25$ , organic content $< 2\%$ , $TPS < 0.25\%$	23
<b>11.3</b> Soils with higher organic and TPS contents than allowed by Table 1	23
<b>11.4</b> Soils with $PI > 25$	24
<b>PART IV: REALISATION IN THE FIELD</b>	<b>25</b>
<b>12 Site investigation to establish soil characteristics and suitability</b>	<b>26</b>
<b>12.1</b> Introduction and desktop evaluation	26
<b>12.2</b> Site investigation, sampling and testing	26
<b>12.3</b> Material classification and consistency	26
<b>12.4</b> Testing for sulfates and sulfides	27
<b>12.5</b> Testing for organics	27
<b>13 Construction</b>	<b>28</b>
<b>13.1</b> Introduction	28
<b>13.2</b> Construction recommendations	28
<b>14 Laboratory mixture design</b>	<b>30</b>
<b>14.1</b> General	30
<b>14.2</b> A suggested laboratory procedure	30
<b>14.3</b> Soils with $0.25\% < TPS < 0.5\%$	31
<b>14.4</b> Soils with $PI > 25$	32

<b>15</b>	<b>Construction control</b>	<b>33</b>
15.1	Introduction	33
15.2	Testing for MCV, moisture content, organic matter, grading, plasticity, sulfates, pH of soil before treatment	33
15.3	Checks on stabiliser spread rates using collecting trays/sheets	33
15.4	Checks on homogeneity of treatment	33
15.5	Checks on pulverisation of mixture	34
15.6	Checks on MCV/moisture content	34
15.7	In situ density measurement	34
<b>16</b>	<b>Verification of treatment</b>	<b>35</b>
<b>17</b>	<b>Ancillaries</b>	<b>36</b>
17.1	Roads and drainage	36
17.2	Remedials	36
17.3	Sustainability	36
17.4	Environmental and health & safety considerations	36
<b>18</b>	<b>References and bibliography</b>	<b>37</b>
18.1	References	37
18.2	Bibliography	38
<b>PART V: APPENDICES</b>		<b>40</b>
Appendix A: Hydraulically treated soil projects where expansion occurred		41
Appendix B: Highways England protocol for soil treatment		43
Appendix C: Actual use of hydraulically treated soil under house foundations		46
Appendix D: Performance properties for hydraulically treated soils		48



# 1 Overview

This publication focuses on soil treatment for residential construction using lime, cement, ground granulated blastfurnace slag (ggbs) and coal fly ash. Whilst the application of soil treatment has been common for road and airport construction since the 1970s in the UK, its use in residential application has been more limited. This guidance draws on available knowledge and provides information on the technical issues to be reviewed when considering its use.

This report is subdivided into four parts, followed by appendices:

- Part I: Introduction
- Part II : Principles of soil treatment
- Part III: Design
- Part IV: Realisation in the field
- Part V: Appendices.

The guidance is intended to inform developers, engineers and other building professionals considering the use of soil treatment and wanting to learn more about the subject and its application. It also suggests a regime of validation and testing to support the review of suitability and appropriateness of the technique.

In this guidance, 'treatment' refers to the process of using lime, cement, ggbs and coal fly ash to render mainly wet natural or reworked natural soils suitable for use as engineered fill. The treatment, which uses the ability of the treating agents to alter favourably the properties of the soil, usually by removing free or excess water from the soil, is then competent to support foundations, ground floors, services and infrastructures without excessive deformation.

The processes reviewed in this report use the traditional technique of in situ soil treatment to produce successive horizontal layers of treated soil. There are also techniques that use deep column mixing or injection techniques applied vertically. These are not covered.

Horizontal-layer soil treatment using lime and/or cement has a long history in the road and pavement sectors. It is also used for:

- improvement of trafficking on construction sites
- construction of car and lorry park pavements
- foundations for industrial floor slabs (mainly large commercial)
- pavements for airport runways, taxiways and aprons
- reclamation and remediation of contaminated land.

As a result of this diversification in use, there is a substantial body of work and information on the subject, the vast majority of which is concerned with pavement works and remediation. There is little, if any, current authoritative guidance specifically for housing development in the UK. The guidance here draws together learning and experience to provide recommendations for consideration of the technique for residential construction. The reader should ensure to refer to the latest version of all standards referred to in this report.

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