

Roads Service Policy & Procedure Guide: RSPPG_E008

Title: MANAGING GEOTECHNICAL RISK

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Classification

Level 1 (Title / Key Words) : Geotechnical certification, site investigation, foundations, structure, embankment, technical approval, construction compliance certification DBFO, contractor design, developer
Level 2 : Engineering
(Directorate/Owner):
Level 3: (RSHQ or HoBU Managed Function): TEPU – Engineering Policy Branch
Level 4 : (Work Areas) Contracts, Design, Development Control, Forward Planning, Maintenance, Structures

Notes

Certification

This document complies with Roads Service Policy. For Implementation and Issue Dates, see above.

(Signed) RJM Cairns Director of Engineering

Certification Date: 07/09/09

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1 Introduction

1.1 Purpose

This Roads Service Policy & Procedure Guide (RSPPG):

- a) Is aimed at all Roads Service, consultants and DBFO Companies involved in the design, procurement or maintenance of works involving geotechnical activities. It is also applicable to Development Control staff involved as statutory consultees in the planning process.
- b) Is intended to provide guidance for the implementation of the procedures in HD 22/08 "Managing Geotechnical Risk". It is **not** a standalone document and shall be read in conjunction with HD 22/08.

1.2 Definitions

1.2.1 **General definitions**, refer to HD 22/08 Chapter 1.

1.2.2 **Additional definitions:**

1.2.2.1 **Geotechnical Activities:** For the purpose of this RSPPG geotechnical activities shall include, but are not limited to, the construction of embankments, reinforced/strengthened earthworks, cuttings, structural foundations, excavations and roads on poor/fill ground. Geotechnical activities shall also include earthworks processes involving ground stabilisation/improvement.

1.2.2.2 **Geotechnical Advisor (GA):** The person appointed by Roads Service to advise on geotechnical aspects of projects and review geotechnical design proposals.

1.2.2.3 **Geotechnical Risk Register:** The register, which usually includes a description of the risk, an assessment of its likelihood and consequence, response actions and owners.

1.2.2.4 **Initial Designers Geotechnical Advisor:** The DGA nominated by the Employer/Project Manager on Roads Service schemes involving contractor design (eg. Design & Build and DBFO). The Initial DGA is responsible for geotechnical aspects of the scheme up until award of Contract.

1.2.2.5 **Overseeing Organisation (OO):** To be taken to be Roads Service TAA, Transportation and Engineering Policy Unit.

1.2.2.6 **Proposer:** The person or body who notifies the project to the Overseeing Organisation, e.g. the Roads Service Client Division or Developer.

1.2.2.7 **TAA:** Roads Service Technical Approvals Authority.

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1.2.2.8 **TEPU:** Transportation and Engineering Policy Unit, Clarence Court, 10–18 Adelaide Street, Belfast, BT2 8GB.

1.3 **Background**

1.3.1 HD 22/08 “Managing Geotechnical Risk” was introduced into Volume 4 of the DMRB in August 2008 replacing HD 22/02. HD 22/02 has been withdrawn.

1.3.2 The purpose of HD 22/08 is to ensure that geotechnical risks are correctly identified and managed to protect the public and not cause the Department unnecessary expenditure. The procedures are straightforward, provide a consistent approach for geotechnical design and certification and act as a safeguard for the Department.

1.3.3 HD 22/02 introduced the concept of Geotechnical Categories based on the complexity and degree of geotechnical risk to the project. The current revision is intended to further simplify and improve the process and align reporting to reflect the requirements of BS EN 1997-1 and 2.

1.3.4 In addition this RSPPG provides Guidance on Roads Service procured contractor design projects; including Design & Build and DBFO projects. This guidance is in addition to that provided in HD 22/08.

1.4 **Costs and Benefits**

1.4.1 Costs and benefits are not relevant at this time as this RSPPG replaces the previous policy implemented by RSPPG_E008 Version 2.

2 Roads Service Policy & Procedure

2.1 Scope

2.1.1 The procedures are relevant to all Roads Service projects involving geotechnical activities as defined in HD 22/08 Chapter 1.

2.1.2 The procedures also apply to Developer led projects involving geotechnical activities which are to be adopted by Roads Service under the Private Streets Regulations or which affect a public road. This shall include new developments at the top of cuttings or the foot of embankments.

2.2 Geotechnical Certification Procedures

2.2.1 The procedures are defined in HD 22/08.

2.2.2 As soon as the project brief is confirmed the Proposer shall submit the initial geotechnical proposal through the Roads Service Division to TEPU. The initial geotechnical proposal shall identify the complexity of the proposal, the geotechnical activities that may be involved and may include a preliminary Geotechnical Risk Register, which identifies potential hazards. It should also identify the DGA, if appointed, and the Roads Service Divisional contact.

2.2.3 For projects which may affect any part of the road network being managed by the DBFO Cos the Proposer shall consult with the DBFO Co and shall notify Roads Service of the DBFO Cos requirements, if any. Written evidence of this consultation shall be provided to TEPU.

2.2.4 TEPU shall review the initial geotechnical proposal as part of the Key Stage 1 Initial Review, register the proposal and agree the Geotechnical Classification, refer to HD 22/08 Chapter 3. TEPU shall reply to the Proposer and the GA in writing.

2.2.5 The Proposer's Designer and/or DGA shall subsequently liaise directly with the GA and progress Geotechnical Certification through the relevant Key Stages in accordance with HD 22/08. All formal submissions issued by the DGA to the GA shall be copied to TEPU and the Division.

2.2.6 The Geotechnical Classification shall be reassessed at each Key Stage and the GA may amend the Geotechnical Category as more information becomes available. Similarly, projects submitted which clearly involve no geotechnical activities, shall be closed at the earliest opportunity and the project file annotated accordingly by the GA and TEPU.

2.2.7 A Geotechnical Certificate signed by the DGA shall accompany the main geotechnical submissions made by the Designer, including:

- The Statement of Intent.
- Preliminary Sources Study Report.
- Ground Investigation Report.
- Geotechnical Design Report and Geotechnical Feedback Report and any revisions thereof.

A template Geotechnical Certificate compliant with HD 22/08 is available on the Roads Service website: http://www.roadsni.gov.uk/geotechnical_certificate.

2.2.8 The Designer and/or DGA shall be responsible for the production of the Geotechnical Feedback Report. The format of as built records shall be agreed with the Division and/or DBFO Co.

2.2.9 Where Geotechnical Certification is being undertaken for highway structures covered by BD 2 the Designer/DGA shall provide a Highway Structure Summary Information Sheet. A template Highway Structure Summary Information Sheet is included in Appendix A of this RSPPG and also on the Roads Service website: http://www.roadsni.gov.uk/highway_structure_summary_information_sheet

2.3 **Geotechnical Category 1 Projects**

2.3.1 **Key Stage 1**

2.3.1.1 Proposals assigned a Geotechnical Classification of Geotechnical Category 1 shall follow the abridged procedures outlined in HD 22/08. The Statement of Intent shall be prepared by the Designer outlining the nature of the project, the geotechnical issues and identifying the risks, (refer to Appendix B in HD 22/08).

2.3.1.2 If it is clear that geotechnical activities are absent the project file shall be annotated to that effect and closed. No further action need be taken unless the project brief is amended.

2.3.2 **Key Stage 2 and 3**

2.3.2.1 Proceed with the desk study, the ground investigation, the Ground Investigation Report and the Geotechnical Design Report. Subject to the agreement of the GA these reports may be produced individually or as parts of one document. They will follow the headings used in the respective appendices, but entering "not relevant" or "not significant" against headings where appropriate and concentrating on those topics which relate to significant geotechnical issues on the particular scheme.

2.3.2.2 All reports shall be accompanied by a Geotechnical Certificate in accordance with HD 22/08. However, if acceptable to the GA, a single certificate may be used to certify a number of reports/documents.

2.3.3 Key Stage 4

2.3.3.1 Subject to the agreement of the GA the Geotechnical Feedback Report may be limited to reporting changes made from Geotechnical Design Report and any maintenance or monitoring requirements.

2.4 Construction Compliance Certification

2.4.1 Developer led projects involving geotechnical activities which are to be adopted by Roads Service shall require the Geotechnical Certificate accompanying the Geotechnical Feedback Report to incorporate the Construction Compliance Certification element.

2.4.2 Where this is required the Geotechnical Certificate which accompanies the Feedback Report shall be amended as shown in Appendix B of this RSPPG. A template certificate is also available on the Roads Service website: http://www.roadshl.gov.uk/geotechnical_construction_and_compliance

2.4.3 The DGA and Contractor shall sign this certificate before forwarding it to the GA. Once received by the GA it shall be forwarded to Roads Service Division for receipt and copied to TEPU for record purposes.

2.4.4 As built records shall be to the satisfaction of the Division and/or DBFO Co.

2.5 Roads Service Contractor Design Projects

2.5.1 The guidance in this section is intended to form the basis of procedures for Roads Service projects involving contractor design, including Design & Build and DBFO. Should an alternative approach to the implementation of HD 22/08 be proposed the Project Manager shall formally agree this with TEPU and the GA.

2.5.2 An Initial DGA, appointed by the Employer/Project Manager, shall follow the procedures outlined in HD 22/08 for Key Stage 1 and 2, including producing the Preliminary Sources Study Report, initial Ground Investigation Report and the necessary certificates. In producing this, the Initial DGA shall agree with the GA the extent of ground investigation, if any, necessary for the Ground Investigation Report.

2.5.3 The Preliminary Sources Study Report and initial Ground Investigation Report shall be provided to tenderers/bidders to allow the preparation of competitive tenders.

2.5.4 The Initial DGA shall consider if a review of tenderers/bidders proposals is required during the tender period. The Initial DGA shall be responsible for keeping the GA and TEPU apprised of any tender period review.

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2.5.5 If necessary, the Initial DGA shall be responsible and co-ordinate requests from tenderers/bidders (received during the tender period) for supplementary ground investigation, determine what, if any, will be undertaken and arrange for the information to be provided. The initial Ground Investigation Report/Certificate shall be updated accordingly and be submitted for review by the GA.

2.5.6 The Project Manager shall ensure that a window is built into the tendering process to facilitate 2.5.4 and 2.5.5.

2.5.7 On award of Contract, the successful Contractor shall be required to appoint a DGA who will be responsible for the Geotechnical Design Report and design certification; Geotechnical Certificate(s). Responsibility for any information used from the initial Ground Investigation Report shall be the Contractor's and the Contractor's Designer. The Project Manager shall confirm this contractual requirement to TEPU and the GA in advance of going to tender.

2.5.8 The Contractor's Designer and/or Contractor's DGA shall be responsible for the production of any supplementary ground investigation deemed necessary post award of Contract. The Contractor's DGA shall provide a revised Annex A to the Preliminary Sources Study Report followed by the updated Ground Investigation Report/Certificate. This shall be subject to the review of the GA.

2.5.9 The Contractor's Designer and/or Contractor's DGA shall be responsible for the production of the Geotechnical Feedback Report. The format of as built records shall be agreed with the Project Manager and if applicable the DBFO Co.

2.6 **Enquiries**

2.6.1 William Kerr
Transportation and Engineering Policy Unit
Clarence Court
10-18 Adelaide Street
Belfast
BT2 8GB

2.6.2 For non Roads Service projects it is requested that Divisions handle initial enquiries taking advice as necessary from TEPU-EPB.

3 Equality Impact Assessment (EQIA)

3.1 Equality Impact Assessment Section 75 of the Northern Ireland Act 1998

3.1.1 It is not necessary to complete an Equality Screening Analysis Form for this RSPPG as it is a revision of an internal procedure, refer to RSPPG_F001, clause 3.1.4.

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4 References

4.1 General References

1. HD 22/08 Managing Geotechnical Risk *DMRB Volume 4*.
2. BS EN 1997-1 and 2 Eurocode 7 Geotechnical Design, *BSi*.
3. Not used.

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Appendices

Appendix A Highway Structure Summary Information Sheet

Geotechnical Ref No.....

Revision

.....Division

Scheme:		CHAINAGE and OS Grid Reference:			Reference/ Comments
Structure Name:		TAA/AIP ref No:			
Structure Type:		DESIGN LIFE 120/other #			
SOILS/GEOLOGY		RELEVANT TRIAL HOLES			
Strata		Typical depths			
PREVIOUS GROUND HISTORY					
CONTAMINATED GROUND RISK ASSESSMENT REQUIRED					
GROUNDWATER					
EARTH PRESSURE VALUE k_0 , k_a , k_p , k_* #					
BEARING CAPACITY	Spread Footings				
Structure Element	Founding Stratum	Founding Level (m AOD)	Footing Size	Allowable Bearing Pressure (KN/m²)	
PILE DESIGN					
Structure Element	Founding Stratum	Toe Level (m AOD)	Pile dia (m)	Pile length (m)	Pile working Load (kN)
Pile type..... Criteria for selecting pile toe level..... Allowance for negative skin friction within design.....					

Highway Structure Summary Information Sheet (cont'd)

SETTLEMENT						Reference/ Comments
Structural Element	Founding Level (mAOD)	Immediate Settlement (mm)	Total Settlement (mm)	Time for 90%	Settlement Remaining at Completion	
Differential settlement to be allowed for between adjacent supportsmm						
Differential settlement allowed between structure and approach embankment.						
GROUND MOVEMENTS						
Associated Earthworks	Settlement due to Embankment Loading	Heave due to Cutting Extraction	Subsidence Due to Mineral Extraction	Flowing Water	Other	
Cause of Movement						
Maximum Movement (mm)						
Measures to Deal with Movement						
CHEMICAL ANALYSIS						
Type of test/sample						
Sulphate/Sulphide						
Chloride						
ph						
Redox						
Other						
Buried Concrete Classification.....Class.....(BRS Special Digest 1)						
Corrugated Steel Buried Structure ground/water classification						
OTHER DESIGN FEATURES						
NOTES						
Drawing attached, to include an elevation of the structure showing the foundation, ground conditions and location of exploratory holes.						

delete as appropriate

Appendix B Geotechnical Certificate – Construction Compliance Certification

Where Construction Compliance Certification is required, refer to 2.4, the Construction Compliance Geotechnical Certificate¹ accompanying the Feedback Report shall be amended as follows:

4. INCORPORATION OF GEOTECHNICAL DATA INTO CONSTRUCTION DETAILS

We certify that reasonable professional skill and care has been used in examining the construction of this scheme and that it has been constructed in accordance with the Design Data and Construction Drawings² as Certified by:

Certificate Sequence No

Signed:.....
Designer (Designers Geotechnical Advisor)

Signed:.....
Contractor (Agent or Contracts Director)

Name:.....
Date:.....
On behalf of
.....

Name:.....
Date:.....
On behalf of
.....

5. This Certificate is³:

- (a) received
- (b) received with comments as follows:
- (c) returned marked “comments” as follows:

Signed:.....
Overseeing Organisation Geotechnical Advisor
Name:.....
Date:.....

6. This Certificate is received by Roads Service:

Signed:.....
PPTO Division
Name:.....
Date:.....

Notes:

1. The template Geotechnical Certificate in HD 22/08 to be amended as indicated this Appendix.
2. Include all certified design data appropriate to the scheme.
3. Received = Submission accompanying certificate is accepted.
Received with comments = Submission accompanying certificate generally acceptable but require minor amendment which can be addressed in subsequent revisions.
Returned marked comment = Submission accompanying certificate unacceptable and should be revised and resubmitted.

Control Sheet - Roads Service Policy & Procedure Guide: E008

Title: MANAGING GEOTECHNICAL RISK

Document History

Version	Date	Author	Authorised by Document Control Panel Members Name : Signature
1	28/3/2000	J Irvine	R Wilson
2	24/3/2005	W Kerr	R Wilson
3	4/09/2009	W Kerr	R Wilson

Overall Reasons for this Version

Version	Reasons
1	First issue of RSPPG
2	Second issue of RSPPG. Revision of Standard – HD 22/02 (replaced HD 22/92)
3	Third issue of RSPPG. Revision of Standard – HD 22/08 (replaced HD 22/02)

Revision Details

Version	Amendments
2	Complete re-draft of RSPPG_E008 Version 1 to complement HD 22/02
3	Rationalization of RSPPG_E008 Version 2 to simply and improve the process and align reporting to reflect the requirements BS EN 1997-1 and 2.