



Appendix J, *GRIP Stage 5 — Signalling Detailed Design*

Network Rail specification

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1 Introduction

1.1 Background

The concept of Modular Signalling has been adopted and developed within Network Rail to introduce new products and changes in the implementation of signalling projects in order to bring about significant cost savings.

1.2 Purpose

This specification forms a part of the Modular Signalling Handbook. It sets out the requirements for signalling design that apply to Modular Signalling systems and the required deliverables.

Network Rail's process for signalling design, is set out in Company Standard NR/L2/SIG/11201, Signalling Design Production, supported by various associated standards which cover such topics as the competencies required by the staff involved in the work, the installation process and the testing and commissioning process.

For projects using the Modular Signalling system, this Handbook Appendix sets out an engineering design methodology with a level of production, verification, validation and assurance suitable for a safety critical signalling system but which achieves a cost saving compared with existing practices.

This is possible because the Modular Signalling system is designed for secondary routes with simple track layouts and operating patterns and a reduced operational functionality, compared with the full range which can be deployed on more intensively used routes.

Each scheme will be in many respects 'more of the same' leading to an opportunity to create a more economical design process based on the reuse of already produced and checked designs.

The simple nature of Modular Signalling schemes may also make it possible to use automated tools as part of the design process. Previous and current design tools have been of limited benefit, in part due to the complex nature of traditional resignalling schemes. It is anticipated that the simple nature of the routes selected for deployment of Modular Signalling will enable design tools to be used in a more effective way, avoiding the need for at least one stage of human effort. It is recognised, however, that the work needed to achieve a suitable assurance of the tools validity may be significant by comparison with possible savings precisely because the design task is relatively straightforward.

This document follows the headings of sections 5 to 20 of NR/L2/SIG/11201 and identifies where compliance with the current standard is required and where there is scope for alternative methods to be adopted.

The design process which a supplier of Modular Signalling will use for each application of the system should be documented and approved. Each application will then require preparation of only a simple design specification to manage production of the design deliverables.

1.3 Scope

The document covers the process for the preparation of the signal engineering design details for a Modular Signalling scheme, the bulk of which work which is carried out during GRIP Stage 5 and is carried out by the system supplier. It excludes scheme level design activities which are carried out in GRIP Stages 3 and 4. The outputs from the GRIP Stage 3 and 4 work are set out in the relevant Handbook Appendix and consist chiefly of the scheme plans and sighting forms.

The design process for the Civil, Telecommunications E&P, and Track disciplines is covered in Appendix N, Non Signalling Design.

1.4 Definitions

Common definitions are contained in the main section of the Modular Signalling Handbook.

2 Compliance (NR/L2/SIG/11201 Section 5)

2.1 Compliance with Standards

Clause 5 of NR/L2/SIG/11201 covers the requirement for the design process to be compliant with a range of standards. The design process and the content of the engineering details for a Modular Signalling scheme shall also comply with these standards unless an alternative approach is demonstrated by means of an approved derogation to provide an equivalent level of process and/or content quality. All design deliverables shall be accompanied by a Certificate of Conformity to confirm that they have been produced in compliance with the applicable standards and with the approved process. **[MSSC 6.1J]**

A number of derogations against this standard have been put in place by Network Rail to reflect the simple and repeated nature of Modular Signalling schemes. They are described in the relevant section of this document.

2.2 Changes to standards

The Railway Group and Network Rail standards applicable to Modular Signalling schemes are set out, along with supporting derogations, in Appendix F of the Handbook. These standards shall be applied until the end of Network Rail Control Period 5. No changes to these standards will be made unless required for system or personnel safety reasons or because of a demonstrable commercial benefit to both Network Rail and supplier and will only be made with the agreement of the Modular Signalling System Design Authority. **[MSSC 4.1J]**

3 Competence and responsibilities

In general, the requirements and guidance of clause 6 of NR/L2/SIG/11201 are applicable to Modular Signalling schemes

3.1 Competence of personnel

Network Rail standard NR/L2/SIG/10160 requires that all signalling design work is carried out by staff holding the appropriate IRSE licence for the task being undertaken.

The simple layouts and restricted functionality that characterise Modular Signalling may provide an opportunity for suppliers to use staff who do not have an IRSE licence for design tasks with a consequent cost saving. To achieve this, the supplier shall request a derogation against both NR/L2/SIG/11201 and NR/L2/SIG/10160, supported by details of the alternative methods by which appropriate competency is demonstrated and/or any templates and tools which form part of the design process. The request for derogation shall be supported by a safety argument to demonstrate that an equivalent level of design quality and assurance is achieved by this alternative methodology. To achieve approval for use by Network Rail the supplier shall demonstrate that the process is fully integrated within their company quality management system. **[MSSC 1.1J]**

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4 Signalling scheme conception

Client remit and scheme plan preparation are carried out in earlier GRIP stages and so are not relevant to this document.

Production of an Outline Project Specification (or Final Project Specification) is not required for a Modular Signalling scheme as the information it contains is recorded in either the general system technical documentation produced by the Supplier and by Network Rail, the Project Requirements Specification (PRS) or the Retained Equipment Interface Specification (both produced by Network Rail). A derogation formalising the non-provision of the OPS has been obtained.

The derogation is based on the following transfer of information from the OPS:

- *Section A – General:* The project scope and personnel involved are set out in the PRS and the GRIP Quality Plan.
- *Section B – Overall Design Concept:* The Modular Signalling Handbook, the PRS and the project programme address the section B headings.
- *Section C – New Systems/Equipment:* The Modular Signalling Handbook and the technical descriptions of approved Modular Signalling systems set out the details of the new equipment being provided. The supporting work by the other engineering disciplines is very standardised.
- *Section D – Existing Systems and Equipment:* The PRS and Retained Equipment Interface Specification cover the issues relating to the retention and alteration of existing equipment.
- *Section E – Implementation/Hazards:* The standardised equipment and application of a Modular Signalling system means that the approved Supplier's safety case, covering both equipment and process, address these issues for all applications.

4.1 Design Specification

The contents of the Design Specification as set out in NR/L2/SIG/11201 can be restricted to suit the simple, repeated nature of Modular Signalling schemes, giving a time and cost saving in the production of the document.

The content of the design specification is split between two key areas:

- the new work within the body of the resignalling area;
- the alterations at the fringes and to any retained equipment to accommodate these new works.

The content and format of the new works is described in the system description and design process documentation produced by the Supplier and is unchanged from one scheme to the next. The details of the alterations required at the fringes and to retained equipment are set out in the Retained Equipment Interface Specification produced and approved during GRIP Stage 4 and can be copied across and enhanced as necessary. The project specific information needed is generally